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Portrait by Harris & Evans

William G. McAdoo

Secretary of the Treasury and Now Also Director General of Railroads

Nation's Railroads Now Under Government Control

W. G. McAdoo Taken Charge as Director General of Railroads



Transferring control of the railroads to the government. (Copyright by The Sun Photo.)

WASHINGTON, D. C., January 1, 1918.—The railroads of the United States passed from the control of their individual managements and into the possession and control of the government for the period of the war, at noon on Friday, December 28, under the direction of W. G. McAdoo, who now combines the office of Secretary of the Treasury in President Wilson's cabinet with that of Director General of Railroads. Although for accounting purposes the new plan of government control did not become effective until midnight, December 31, by that time the director general had issued several general orders to emphasize the fact that the railroads are to be operated as a co-ordinated system, had accepted the resignation of the Railroads' War Board (the Executive Committee of the Special Committee on National Defense of the American Railway Association), and had created an entirely new organization for centralizing the direction of railroad operations. He had also put in motion all the available machinery of organization for the purpose of relieving congestion and expediting the movement of freight.

The New Organization

The new organization consists of a temporary advisory committee or cabinet of assistants to the director general as follows:

John Skelton Williams, secretary of the carriage and formerly president of the Southern Air Line, as advisor on financial matters.

Hale Holden, president of the Chicago, Burlington & Quincy and a member of the former Railroads' War Board, to supervise the organization built up by the War Board,

including the Commission on Car Service from the various sub-committees.

Henry Walters, chairman of the Atlantic Coast Line, as operating advisor.

Edward Chambers, vice-president of Chicago & North Western, and chief of the bureau of transportation of the United States Food Administration, as advisor on traffic matters.

Walker D. Hays, chairman of the Executive Committee of the Atlantic Coast Line, as advisor on legal matters.

In addition, A. H. Sells, president of the New York Central, was appointed temporary chairman of the director general and assigned to the charge of operating in Official Classification territory. He succeeds George Clark of the organization of the General Operating Commission of All-Postal Railroads, which was dissolved.

Part-time operations will be given by the director general to his assistants with the national officers. An executive advisory committee of the Director General, comprising the members of the Executive Committee, Commissioners and others, to be appointed by and to the director general, will handle all other operating plans, including and especially New England. It has also authority regarding the relations with owners of the Road and Post Administration, the Shipping Board and the Army and the Navy. It is the primary of providing the fuel, maintenance and operating expenses for the various lines owned or controlled by the government. It has jurisdiction over the fuel, maintenance and operating expenses of the various lines owned or controlled by the government. It has jurisdiction over the fuel, maintenance and operating expenses of the various lines owned or controlled by the government.

A national advisory committee of New York Central, Chicago & North Western, Pennsylvania, and Erie will be appointed by the director general to advise on the operation of the various lines owned or controlled by the government. It has jurisdiction over the fuel, maintenance and operating expenses of the various lines owned or controlled by the government.

Mr. McAdoo, President Wilson and Director General McAdoo are expected to have some further consultation in the course of the transmission which the President will

*The photograph at the top of this page shows Director General of Railroads William G. McAdoo, Secretary of the Treasury, and members of the Railroads' War Board, and Mr. McAdoo's cabinet of assistants, standing behind a table in the War Board's office. From left to right the men are: Mr. John Skelton Williams, secretary of the carriage and formerly president of the Southern Air Line, as advisor on financial matters; Mr. Hale Holden, president of the Chicago, Burlington & Quincy; Mr. Edward Chambers, vice-president of Chicago & North Western, and chief of the bureau of transportation of the United States Food Administration, as advisor on traffic matters; Mr. Henry Walters, chairman of the Atlantic Coast Line, as operating advisor; Mr. Walker D. Hays, chairman of the Executive Committee of the Atlantic Coast Line, as advisor on legal matters; Mr. A. H. Sells, president of the New York Central, as temporary chairman of the director general and assigned to the charge of operating in Official Classification territory; and Mr. George Clark, former chairman of the General Operating Commission of All-Postal Railroads, which was dissolved.

make to Congress in a message soon after Congress reconvenes regarding the compensation to be paid the railroads in the form of a guarantee based on the average net operating income for the three years ending June 30, 1917, and President Wilson conferred on the subject on December 31 with Chairman Sims of the House Committee on Interstate and Foreign Commerce and Senator Pomerene of the Senate Committee on Interstate Commerce, as these committees will have charge of the proposed legislation.

Mr. McAdoo's Preliminary Statement

On the day following his appointment Mr. McAdoo issued the following preliminary statement.

"This new task is of great magnitude and difficulty. It cannot be done in a moment, and it cannot be done at all unless the people of the United States as well as the officers and employees of the railroads give to the railroad director their intelligent and patriotic support. I earnestly seek the co-operation and assistance of every good citizen in this great work.

"The operation of the railroads as a thoroughly unified system is of fundamental importance to the success of the war. Without it we cannot get the effective use of our resources. The supreme test in this war will probably come in the year 1918. Victory will depend upon our speed and efficiency. We can get neither speed nor efficiency unless the railroads are equal to the demands of the situation.

"I can only say at the moment that the problem will be taken hold of vigorously and that plans and policies will be announced from time to time as rapidly as it is possible to mature them. Meanwhile the business will be conducted through existing railroad organizations, with all the support and power of the government asserted in behalf of more efficient and satisfactory operation.

"The Director General of Railroads, upon invitation of the Interstate Commerce Commission, has accepted office in the Interstate Commerce building. The commission has also placed at the disposal of the director the entire work and facilities of the commission."

"The hour of the transition to government control found the members of the Railroads' War Board, Judge R. S. Lovett, director of priority, and John Barton Payne, counsel for the Shipping Board, who had been assisting Mr. McAdoo in a legal way, in conference with the new director general. The railroad executives offered their hearty co-operation and that of their organization in any way desired, and were told that Mr. McAdoo desired the committee to continue to function at least until some better organization could be devised if it were considered desirable to do so. He asked to be more fully informed as to the organization which the railroads had voluntarily developed and which had been directing the operations of the railroads of the country for eight months. There was a general discussion of possible ways for improving the railroad situation by the exercise of the new power delegated to Mr. McAdoo, and he asked the railroad executives to submit to him any suggestions they had to offer. He particularly desired an early report on the possibility of larger and more efficient use of terminals by joint operation. The railroad men also urged consideration of their recommendation of a list of non-essential commodities.

Later in the day, as his first official act, Mr. McAdoo sent the following telegram to the presidents and directors of all railroads coming within the terms of the President's proclamation of December 26:

"Having assumed the duties imposed upon me by, and in pursuance of, the proclamation of the President dated December 26, 1917, you will, until otherwise ordered, continue the operation of your road in conformity with said proclamation. You are requested to make every possible effort to increase efficiency and to move traffic by the most convenient

and expeditious routes. I confidently count on your hearty co-operation. It is only through united effort, unselfish service and effective work that this war can be won and America's future be secured."

This request was expressed in general terms to be amplified and made more specific later on and was evidently intended as preliminary announcement of policy more than anything else. However, by this simple request for the use of the most convenient and expeditious routes, it was explained afterward, the laws against pooling, giving the shipper the right to dictate the routing of his freight and prohibiting railroads from making agreements which in ordinary times would be considered "in restraint of trade" but which are now considered necessary to make trade possible, were thrown into the junk-pile. While the laws are still on the books, to be restored to force when the war is over unless Congress by that time sees fit to change or repeal them, they no longer apply to action taken under the authority of the director general.

On December 27 Mr. McAdoo issued a more specific order as follows:

Mr. McAdoo's First Order

"All officers, agents and employees of transportation systems may continue in the performance of their present regular duties, reporting to the same officers as heretofore and on the same terms of employment.

"Any officer, agent or employee desiring to retire from his employment shall give the usual and reasonable notice to the proper officer, to the end that there may be no interruption or impairment of the transportation service required for the successful conduct of the war and the needs of general commerce.

"All transportation systems covered by proclamation and order shall be operated as a national system of transportation, the common and national needs being in all instances held paramount to any actual or supposed corporate advantage. All terminals, ports, locomotives, rolling stock and other transportation facilities are to be fully utilized to carry out this purpose without regard to ownership.

"The designation of routes by shippers is to be disregarded when speed and efficiency of transportation service may thus be promoted.

"Traffic agreements between carriers must not be permitted to interfere with expeditious movements.

"Through routes which have not heretofore been established because of short hauling or other causes, are to be established and used whenever expedition and efficiency of traffic will thereby be promoted; and if difficulty is experienced in such through routing, notice thereof by carriers or shippers or both be given at once to the director by wire.

"Existing schedules or rates and outstanding orders of the Interstate Commerce Commission are to be observed, but any such schedules or rates or orders as may hereafter be found to conflict with the purposes of said proclamation or with this order shall be brought immediately by wire to the attention of the director."

Following the issuing of this order, a supplemental statement was issued as follows:

"Director General of Railroads McAdoo announced today that, pending the organization of a permanent staff, he had requested Walker D. Hines, of New York, to act as assistant pro tempore to the director general of railroads. Mr. Hines has accepted the appointment.

"In like manner the director general has appointed Alfred H. Smith, of New York, as assistant pro tempore to the director general of railroads, in charge of transportation in the trunk line territory east of Chicago and north of the Ohio and the Potomac rivers.

"The director general has called upon all presidents of railroads to take up vigorously and at once with all rail-

roads in their respective territories the closing of terminal use of terminals and parallel lines, wiping out all competitive prohibitions, if any survive, and waiving all competitive control or solicitation of traffic.

"The director general has specifically requested that 30 terminal facilities in the Chicago district be treated as far as capacity and efficiency will be promoted as a unit, and that all railroads having terminals in New York take up promptly the question of pooling docks, car floats, lighters and other facilities for distributing traffic in New York Harbor including marketing facilities now controlled by individual railroads.

"The director general also requested the Interstate Commerce Commission to have its railroad inspectors make an immediate investigation of conditions existing on all the trunk line railroads in eastern territory, and to submit a report at the earliest possible moment.

"The director general instructed the presidents of the Pennsylvania, Erie, Baltimore & Ohio, Lackawanna, New Jersey Central, and Lehigh Valley railroads to make an immediate study of the terminal facilities on the New Jersey waterfront at Port of New York and to report as quickly

as possible what rearrangements of passenger and freight train operations could be made that would increase the efficiency of these terminals."

Mr. McAdoo had spent Saturday in conference with members of the Interstate Commerce Commission and others for the purpose of obtaining exact information as to the situation and the field agents of the commission were ordered to investigate and report immediately on the state of transportation in various parts of the country. Commissioner McChord has been placed in charge of this investigation. Two inspectors were assigned to the freight yards in the vicinity of Washington, where there has recently been a considerable congestion, due largely to delays by consignees in removing their freight.

views you express. In accordance with your request, I express my assent to any desirable being the organized work of your committee for a year.

"I propose to designate one of your members as a pro tempore of my Advisory Committee, and to add the one so designated to take over such further order the various sub-committees of the American Railway Association's Special Committee on National Defense and the consolidated information and procedure your committee study of the problem of coordinating the railroads of the United States."

"I wish to express my appreciation of the interest and attentiveness of your members and especially appreciation as to the great public service. Cordially yours."

The members of the board who therefore remain in their own ranks are: Luther H. Rogers, president of the Southern Railway; James C. McLaughlin, secretary of the Northern Pacific; James Kaprielian, secretary of the Southern Railway; and Samuel R. Brown, president of the Pennsylvania.

Mr. Smith's cabinet was outlined as follows:

"My assistant pro tempore, A. H. Small, will remain at New York City, to handle charges of all matters relating to the operation of marine railways, and to what is commonly known as Official Classification Territory, and also of the Chesapeake & Ohio Railway, the Norfolk & Western Railway, and the Virginia Railway, and to order all such matters will be issued by my secretary. It is hereby ordered that the distribution of cars in freight service will continue to be pending here and subject to my direction."



John Skelton Williams
Comptroller of the Currency



Hale Holden, President
Chicago, Burlington & Quincy



Walker D. Hines, Chairman
Atchafalpa, Topeka & Santa Fe



A. H. Small
President, New York Central

as possible what rearrangements of passenger and freight train operations could be made that would increase the efficiency of these terminals."

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War Board Resigns

On Monday, December 31, the Railroads' War Board tendered their resignations to the director general in the following letter:

"When you assumed control of the railroads under the President's proclamation of December 26, our function, being one of private initiative, came to an end.

"At our conference with you on Friday morning, last we offered you the full measure of our co-operation, collectively and individually, in any capacity. You requested us, until further notice, to continue this organization in existence, to hold together our sub-committees and, meanwhile, to advise you on certain specific questions which you put to us. We

orders under the direction of the Committee on Car Service of the American Railway Association."

Instructions to Eastern Lines

In pursuance of the order Mr. Smith issued instructions to all eastern lines as follows:

"By order of the Director General of Railroads, Judge Lovett concurring as to priority modifications, please direct every attention to clearing your line of any congestion that exists, wiring me of any condition which is beyond individual control, with suggestions as to most available method of relief.

"You are authorized to disregard priority orders to the extent necessary to clear up a serious congestion, keeping in mind vital necessity for moving food and fuel.

"Wire me particularly where coal is congested without prospect of immediate movement, so that matter of diversion to open lines, or markets, can be arranged with the Fuel Administrator.

"Embargo any consignee who does not release freight promptly on arrival.

"So far as practicable, annual passenger trains which interfere with giving necessary freight service.

"Keep in touch with your connections and afford help to each other in any way possible to further general movement, change routing, short haul freight, and make any mutual arrangements that will facilitate movement and delivery of traffic.

"Call on all employees to lend their efforts in this matter of service to the Government and the people.

"Endeavor to start trains promptly from terminals and lead to permit of prompt movement over divisions.

"Advise by wire daily to New York number of cars of freight you have to move above capacity, location of congestion in the order of extent, with prospects of gaining or losing on the situation in the following 24 hours.

"If you have capacity to handle more business on any part of your line, advise between what points and how much, and what you can best handle and dispose of.

"If you are holding freight for connections, give number of cars, loads, or empties, and divide loads into coal, food, Government freight, and other."

General Order No. 2

Mr. McAdoo also issued the following General Order No. 2, addressed to the chief executives of all railroads:

"Pursuant to the authority vested in me by the President of the United States in his proclamation of December 26, 1917, wherein it was stated that, for purposes of accounting, possession and control of the railroads shall date from 12 o'clock midnight on December 31, 1917, you are notified that, until otherwise directed, no changes in the present methods of accounting, as prescribed by the Interstate Commerce Commission, will be required. The accounts of your respective companies shall be closed as of December 31, 1917, and opened as of January 1, 1918, in the same manner as they have heretofore been handled at the close of one fiscal period and the beginning of another, and in the same manner that you should have handled your accounts had the Government not taken possession and control."

The final action of the Railroads' War Board before adjourning sine die was to send the following telegram to the Presidents of all the railroads that have supported the committee:

"The function of the Railroads' War Board under the resolution of April 11 last came to an end with private railroad management. At the request of the Director General of Railroads we have remained here to furnish him with certain information, but that duty being now complete, we have requested and received permission to terminate our activities and return to our individual responsibilities. Mr. Holden has been designated pro tempore a member of the

Director General's Advisory Committee to take over until further order the various sub-committees of the American Railway Association's Special Committee on National Defense. We thank you cordially for your support and assistance during the past eight months."

The Effect of the Announcement of the New Plan

The only outward and visible sign of this momentous event in railroad history on December 28 was a strong upward tendency in the market quotations of railroad securities, depressed by weeks of uncertainty as to the future and neglected for Liberty Bonds, but now encouraged by the prospect of a Government guaranty.

Among railroad officers the event produced varying reactions. There was gloom among those who felt that they had been told they had failed to make good, and a feeling of relief on the part of many who realized that a great burden of responsibility for railroad credit had been lifted from their shoulders and that they would be left free to operate the roads with the help of the Government instead of under its restrictions. Mr. McAdoo received hundreds of telegrams of congratulation from railroad executives, bankers and security holders expressing enthusiastic approval of the plan and promises of co-operation. There was also the usual anxious speculation as to how the new boss would act, but a general willingness to co-operate with him to the full.

The New Director-General

William Gibbs McAdoo, who now combines the office of Secretary of the Treasury with that of Director General of Railroads, thus becomes, if he was not before, the most powerful individual in the administration under President Wilson. As Secretary of the Treasury he was in charge of the important function of financing the war and he now is charged with the duty of co-ordinating with the government's financial requirements those of the railroads, which had been necessarily neglected while the government was monopolizing the investment market for its own purposes. This doubtless represents one of the important reasons for Mr. McAdoo's selection and while some surprise has been expressed that two such important offices should have been given to one man, Mr. McAdoo has indicated that he intends to leave the operation of the railways largely in the hands of railroad men.

While Mr. McAdoo has had little experience in steam railroad matters, he was at one time a railroad lawyer in Tennessee, and, without having had previous experience in large business affairs, he made a reputation for himself by his successful financing and execution of the project for building the Hudson river tunnels from New Jersey into New York City. As Secretary of the Treasury he has demonstrated marked executive ability in the handling of the Liberty Loan campaigns and has shown the faculty of enlisting the co-operation and of utilizing the advice of the most experienced leaders in the financial field. By many he is regarded as the ablest man in the Cabinet, and the importance of his office has been greatly increased by the responsibility imposed upon it by the necessity of raising huge loans for the prosecution of the war and for the assistance of our Allies.

Mr. McAdoo was born near Marietta, Ga., on October 31, 1863. He was educated at the University of Tennessee. In May, 1882, he was appointed deputy clerk of the United States Circuit Court for the southern division, eastern district of Tennessee. In 1885 he was admitted to the bar, and he practiced law at Chattanooga, Tenn., until 1892, when he removed to New York. For a number of years, until 1903, he was a partner with William McAdoo in the practice of law at New York. He then engaged, as president and director of the Hudson & Manhattan Railroad, in the work of financing and constructing the Hudson river tunnel system, which completed on March 8, 1904, the

first tunnel under the Hudson river. The first Hudson river tunnels between Hoboken, N. J. and South street and Nineteenth street, New York City, were opened for traffic on February 25, 1908, and the fourth tunnel under the river was completed on March 11, 1910. Louis M. McAdoo became prominently identified with the Democratic political campaign. He was a delegate to the Democratic National Convention at Baltimore in 1912, later vice chairman of the Democratic National Committee, and he was acting chairman for the greater part of the campaign which resulted in the election of President Wilson. On March 6, 1915, he became Secretary of the Treasury in President Wilson's Cabinet. Mr. McAdoo is also ex officio member of the Federal Reserve Board, chairman of the National Farm Loan Board, and chairman of the United States section of the International High Commission.

Probable Changes Under New Regime

While the important question of the compensation to be guaranteed for the protection of railway security holders remains to be settled by act of Congress, after President Wilson has made his promised recommendations to it in a message, certain important features of the plan under which the railroads are to be operated have been made clear in advance by the terms of the President's proclamation and ex-Director McAdoo in his order and in his talks to newspaper men. There are many important details, however, which have not yet been settled and will not be until Mr. McAdoo has had time to receive further information and advice and to give them careful consideration.

The railroads will continue to be operated directly by their own officers except and until the director general shall find occasion to order a change. They will be given "a square deal," he has promised, and every opportunity to make good, with such help as the government can give them and under the presumption that they will not be disturbed except for good cause. Of course the director general's power is paramount, but his authority is superimposed upon that of the existing organizations and not substituted for it. If a railroad president should die or resign, his successor would be elected by the directors in the usual way, subject, of course, to the approval of the director general. On the other hand, if a railroad officer proved recalcitrant he undoubtedly could be dismissed.

Mr. McAdoo intends to conduct his railroad work from his office in the Interstate Commerce building. He realizes that a colossal task has been placed upon him and he does not intend to proceed rashly or to try to revolutionize the railroads at a single stroke. His purpose is to secure the greatest possible efficiency from the use of the existing instrumentalities of the railroads, and he believes that with the individual interests of the railroad companies absolutely submerged by the government guarantee it will be possible to work out many plans for co-ordinating their facilities which have been impracticable for the railroads under the prohibition of the laws and under the pressure of their individual interests.

He has been giving considerable study to the possibilities of common use of tracks and facilities of all kinds and while he has not yet given careful consideration to the recommendation that necessitated freight to be carried from transportation he has the impression that the vital needs of the government for the prompt movement of material and supplies of all kinds must have room to carry out all other traffic and that if necessary the governmental plan may

Interstate Commerce Commission to Co-operate

Mr. McAdoo expects to call on the representatives of the Interstate Commerce Commission and to ask that it will not interfere with its course of promoting the national interest

throughout the country. It is expected that the government will act in a similar manner. There are no reasons why the government should not have the same right to use the railroads as the government has the right to use the roads. It is not likely that the government will have the right to use the railroads for its own purposes, but it is likely that the government will have the right to use the railroads for its own purposes. It is likely that the government will have the right to use the railroads for its own purposes. It is likely that the government will have the right to use the railroads for its own purposes.

Government Eye Not to Be Cast on Five

Under the operating plan of government the railway industry, they say, that will be subject to government control. On administration and a committee on one that should be organized practically as a government. The committee would be organized to study the industry, which is now government in name only. For this reason Mr. McAdoo has not been able to get that government body organized in a form that will be organized and put in place of government. It is not likely that the government will have the right to use the railroads for its own purposes. It is likely that the government will have the right to use the railroads for its own purposes.

Just as R. S. Loring, director in private, will retain the present office, it is probable that a government director will be appointed for the purpose of coordinating the various government departments and securing the uniformity of action of professional bodies. The Commission on Car Service before the taking up of the work that is called its Billings, N. Y. which is now in the use of preference, will be the government body, and the order of preference will be given to the order of preference as prescribed in Justice Loring's Private Order No. 1.

One of Mr. McAdoo's aims is to get a graduated of wireless train service for railroads in the amount of one cent in the rate of freight rate to be charged for any except the most direct routes available. He believes that there is still some amount of fluctuation of payment facilities and he thinks it likely that if any possible action is found to be necessary in this respect, it will be necessary to meet and with the government with government for business purposes.

The railroads have already received government service to \$8,000,000,000, with the cost and the distribution of that money has not amounted to the last five days. The Railroads' War Board is to be formed on December 17 and further consideration of the government of government purposes. It is not likely that the government will have the right to use the railroads for its own purposes. It is likely that the government will have the right to use the railroads for its own purposes.

President Wilson's government that he would be expected to continue in the system and operating under the government. It is not likely that the government will have the right to use the railroads for its own purposes. It is likely that the government will have the right to use the railroads for its own purposes.

pressed their hearty approval of the plan. There has been some expression of opinion that the guarantee proposed by the President is too liberal and there may be a prolonged contest over the question, but the general feeling in Washington is that Congress will adopt the President's recommendations.

A few, particularly among the Republicans, have already expressed doubts as to the wisdom or the necessity of taking over the railroads, but the President's action has placed that subject in the category of academic questions. It is likely, however, that the Republicans will make an issue of an idea of extending the plan to government ownership.

The average net operating income for three years will undoubtedly work out more favorably for some companies than for others, particularly for such roads as have had only one good year out of the three instead of two out of the three, which has been the general experience. The proclamation provides, however, that nothing shall be done under it to impair the rights of stockholders and other interests in the properties to receive "just and adequate compensation" and it has been suggested that this is intended to provide for unusual cases.

The Wage Question

One of the important problems soon to be faced by the railroad director is that of the wages of employees. The executive officers and legislative agents of the four brotherhoods of train service employees held a conference with the President at the White House on December 27 and afterward expressed to the newspapers their hearty approval of the plan of government control. It was given out that they had asked for the appointment with the President and it was generally supposed that they had promised their support and also laid further foundations for the consideration of their demand for higher wages. The Railroads' War Board some time ago had placed the interests of the railroads in the matter unreservedly in the hands of the President. On December 29 it formally declined the demands and thereby placed the responsibility for dealing with the wage question in the hands of the government, but it is understood that the brotherhoods will not press their de-

mands for the present until some of the fundamental features of the new arrangement have been settled.

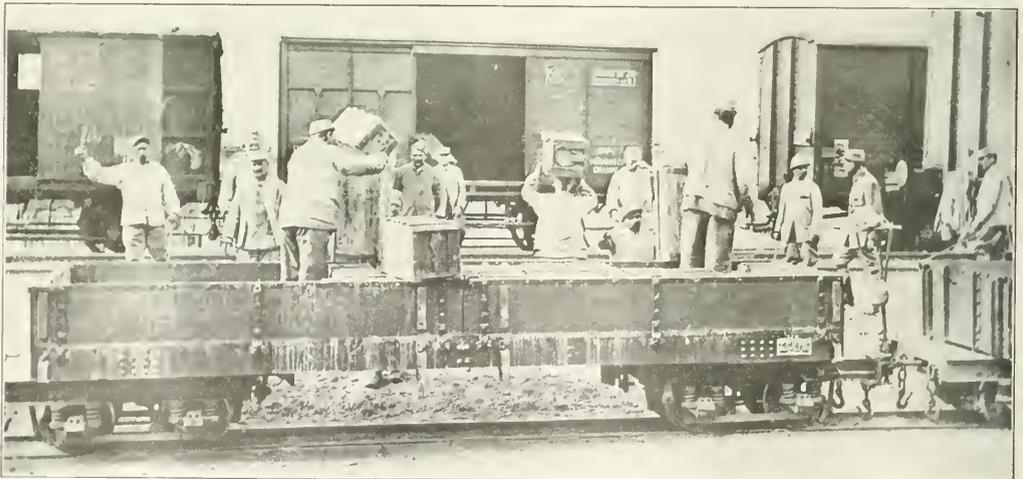
It was announced that Mr. McAdoo would meet the representatives of the brotherhoods to discuss the situation on Thursday.

For the purpose of improving the New England coal situation Mr. McAdoo has taken up with the Shipping Board the plan of putting some additional boats into service to replace those that were taken away earlier in the year, thereby increasing the burden of the railroads.

Before its dissolution the Railroads' War Board had addressed a telegram to its group chairmen suggesting that immediate study be given to the construction of convenient interchange tracks to link together heretofore competing terminals in all important cities; also to the rerouting of traffic which had formerly been competitive to accomplish the most expeditious switching deliveries.

Director McAdoo and his staff were busy all day Tuesday, New Year's day, in efforts to clear up the congestion of freight, especially in the eastern states. Mr. McAdoo recommended, and Judge Lovett took the necessary action, to have all existing priority orders suspended. Particular attention was paid to the desperate situation of New York City in the scarcity of coal for dwellings and offices, as well as for factories, and Mr. McAdoo ordered that coal, and also other freight, be sent through the Pennsylvania tunnels to the fullest extent practicable. These tunnels, hitherto used only for passenger traffic, afford a direct rail route from New Jersey terminals to the borough of Queens, and the movement of coal by this route is expected, under the present difficulties incident to extreme cold water and ice in the river and bay, to save several days' time in the movement of coal to Queens and Brooklyn; and also to parts of Manhattan. The Sunnyside yard, at the eastern end of the Pennsylvania tunnels, is adjacent to the Sixtieth street bridge leading to Manhattan.

It is expected that President Wilson will go before Congress today (Friday) with his recommendations for such legislation as may be necessary to carry out the purposes stated in his proclamation taking possession of the railroads of the country.



From Official Photograph, International Film Service

Bringing Up Cases of Shells on a Light Railway Behind the French Lines

Editorials—Annual Statistical Number

The New Government Control of Railroad Management

THE RAILWAYS of the United States enter the year 1918 under conditions wholly different from those under which they entered any earlier year. They are handling the heaviest traffic ever known. They are serving the government as an instrumentality in carrying on the greatest war ever waged, and they are being operated under direct government control. At noon on December 28 William Gull, McAdoo, Secretary of the Treasury, in accordance with a proclamation issued by President Wilson two days before, assumed the authority and entered upon the duties of Director General of Railroads.

Our Civil War was one of the most terrible conflicts in history. When it occurred this country had 36,000 miles of railway. In the four years it was in progress the government took control of only 2,100 miles, or less than 5 per cent of the total mileage. Our country has been engaged in the present war only nine months. Except for the material assistance given to its allies and the supplies of food and munitions, the effects of its participation thus far have been almost negligible; yet already it has taken control of the operation of 100 per cent of the railways.

This action by the government raises three important questions: First, what is its immediate significance? Second, what will be its financial effects? Third, what will be its effects on the efficiency of operation of the railways during the war?

1. The Significance of the Step Taken.

The step taken by President Wilson is strictly and solely a war measure. It has been interpreted by advocates of government ownership as a long move in the direction of the adoption of that policy. The President does not regard or intend it as such. He is understood on principle to be opposed to government ownership. Furthermore, as we pointed out in an editorial last week, the step is not due to any avoidable shortcomings of the managements of the railroads. President Wilson made this as clear as possible in the statement which he issued in announcing his plan.

"The committee of railway executives who have been operating with the government in this all important matter," he said, "have done the utmost that it was possible for them to do, have done it with patriotic zeal and with great ability; but there were difficulties that they could neither escape nor neutralize." He added, "Complete unity of administration in the present circumstances involves upon occasion and at many points a serious dislocation of earnings and the committee was, of course, without power or authority to increase charges or effect proper compensations and adjustments of earnings. Several roads which were willing and with admirable public spirit accepting the orders of the committee have already suffered from these circumstances and should not be required to suffer further. In more fortunate sections the full authority of the government must be asserted, tuted."

Immediately on the entrance of the United States into the war the railways voluntarily operated themselves to serve the government and the public particularly efficiently and regardless of their individual interests. No more generous statement that they did what they could make could be made than is contained in the statement just quoted from President Wilson. And yet the President decided that in the present

of the present military situation the government must take control.

What did he do to do it? He always indicated his intention to take over operations of the rails from the Railroad War Board, which means change and uncertainty. He proposed the most favorable conditions of transition, and proposed to coordinate with it a change which transferred operations but caused great delay, owing to the delay caused by the granting of the former government securities and old contracts. Government securities having not a goodly lot, the public investment would not have the President would have had that of about 100,000,000 in the form of a 400,000,000 of Railroad's debt, a governmental, state, municipal, and general bonds, that additions would be government securities, deposits.

We do not regret the passing of the responsibility on President Wilson, and we do not regret the government operation, the freight and passenger. What we do regret is that it was wrong in the government's conduct by the way for Congress to fail at its last session to remove what is now existing, owing to the restrictions on the railway which the Sherman law and the anti-trust law imposed, that it has been wrong for the Interstate Commerce Commission and the state commissions persistently to refuse over a long period of years to let the railways state through some adequate to change their facilities—that it has been wrong for the government departments to make a frequent issue of freight performance orders, and that those on the things which have permitted government control of the railways. It those who have regulated the railways and lost the confidence had courage to do their plain duty the Railroad War Board and the management of the individual railways would have been able to deal with entire success with the conditions created by the war. If Congress or its present session could have acted on the recommendations made by the Interstate Commerce Commission in its special report of December 1, and suspended the Sherman anti-trust law and the anti-trust law, and given the support of the investment of the bonds of the railways which would have been made, no occasion for the appointment of a Director-General of Railroads. The Railroad War Board could have assumed the operation of the railways, more obviously that it is likely to be directed under the Sherman law has been adopted.

2. The Financial Part of the Plan.

While, however, we realize the necessity of the present which has been taken by the government, we agree in the private opinion of most of us that the idea of government ownership. President Wilson has indicated to us good reasons why he would not be satisfied. The circumstances of the financial part of the plan is that it contemplated maintenance of each railway and operating losses equal to the interest which is paid on the three years ending in June 30, 1917. It is surprising to find that some people seem to give on the ground that it would give the railway 100 miles. The reason is that that would be the same thing as the interest on the three years ending in June 30, 1917, have provided for maintenance. On the contrary, the bond rate would be 1400 30 200, and the bond rate would be 100,000,000 had since 1890, and it was 100 in 1917, there were more miles of railway in the world, it would be more than sufficient. The following table gives the government in mind and treatment, the interest on the bonds, and the amount of operating losses, in cases

ment in road and equipment, in the three years ended June 30, 1917:

	Investment in road and equipment		Operating income (net)		Per cent operating income on investment in road and equipment
	Total	Per mile	Total	Per mile	
1915.....	\$17,247,018.81	\$7,268.9	\$7,821,079	\$2,972	4.09
1916.....	7,535,576.998	73,309	1,043,839.822	4,247	5.80
1917.....	74,000	74,000	1,050,000.000	4,257	5.72
Average per year....	73,909	73,909	940,683.967	3,819	5.20

The figures in this table for the years 1915 and 1916 are from the annual report of the Interstate Commerce Commission for 1917. The figures for the year ended June 30, 1917, are estimates made by the Bureau of Railway Economics. The Interstate Commerce Commission in its annual report estimates the percentage of return earned in the year ended June 30, 1917, at 6½ per cent. This is clearly too high. The Interstate Commerce Commission originally estimated the returns for the fiscal year 1916 at 6.35, while the Bureau of Railway Economics estimated it at 5.9, and the final figure of the Commission itself is only 5.8 per cent. The Commission's estimate for 1917 is too high for the same reason that its original estimate for 1916 was, namely, that it does not make allowance for certain factors which will finally have to be included.

Our estimate of the average return on investment in road and equipment earned by the railways in the three years ended June 30, 1917, is 5.2 per cent. This is almost exactly the same as the average earned in the ten years 1901-1910, which was 5.19 per cent. It is true that it is more than was earned in the five years ending with 1915, which was 4.54 per cent; but this was the worst five years the railways have had since the depression following the panic of 1893, and it can hardly be regarded as affording a fair basis of compensation.

Speaking in actual figures instead of in percentages, the basis suggested would give the railways as a whole an operating income of about \$941,000,000 a year. This would be \$102,000,000 less than their operating income in 1916 and \$109,000,000 less than their operating income in 1917. It is no evidence of fairness for anybody to contend that a basis which would give the railways over \$100,000,000 a year less than their average operating income of the last two years, and would yield them less than 5¼ per cent on the investment in their road and equipment, is unduly favorable to the railways. The opposite contention could be made with much more force.

It is true the prices of railway securities advanced when the President's plan was announced, but this was because investors in railway securities knew that the return earned by the railways was declining; because they were in great uncertainty as to how far this decline would go; and because they felt that the President's recommendation tended to remove this uncertainty. The owners of railway securities would, of course, rather have the return earned in 1916 or 1917 than the one the President proposes to guarantee, but they recently have been filled with dread lest their return would soon be back where it was in 1914 and 1915.

While, as applied to the railways as a whole, the financial plan of the President is as favorable to the railways as could reasonably be expected, it would do great injustice to some individual companies. There are, for example, several roads which became bankrupt in 1915, and which had only partially recovered in 1916, but which have got on fairly solid ground in 1917. Such cases, which are exceptional, will require special consideration and treatment, and the plan of the President is broad enough to permit this. The adoption of the President's plan probably would stabilize railway securities during the war and make it practicable for most large railways, with the lacking of the government, to raise the capital required to enlarge their facilities. Unfortunately the recommendations of the President do not solve the finan-

cial problem. They must, before a solution is reached, be acted on by Congress. There seems no good reason, however, for doubting that after some discussion the President's plan as a whole will be adopted. The objection that it would give the railways too much is based on a misunderstanding which discussion will soon remove.

3. Effects of the Plan on Railroad Efficiency.

In assuming control of the operation of the railways Mr. McAdoo will have some disadvantages which the Railroads' War Board has not had, but he will also have some great advantages it has not had.

As to his selection for director-general, it may be said without hesitation that once the President had decided to choose a man from his own official family he made the best choice available. With one possible exception, Mr. McAdoo is the ablest man in the Cabinet. He first demonstrated his ability by financing and constructing the Hudson and Manhattan tunnel when to most men who were considered competent judges the undertaking, especially by one almost unknown in the fields of finance and railroad construction, seemed like the "baseless fabric of a vision." When he was appointed Secretary of the Treasury he had had little experience with such affairs as it is concerned with, and there was no reason to assume he would have any weightier problems to solve than have been solved by his various predecessors since the Civil War. As things have turned out, he has had the hardest work to do and the most prodigious problems to solve that have ever been presented to any incumbent of his office, and no higher tribute to him could be paid than to say—and it can be said truly—that he has at all times proved equal to the situation. He has put the Federal Reserve System on a sound basis, and he has raised all the huge sums required for making large loans to our allies and for financing the requirements of our government in the war. Either his achievement in putting the Federal Reserve System on a successful working basis, or his achievement in raising funds for the war, would be enough to stamp him as an administrator of a high order. The railways and the nation may well congratulate themselves that when President Wilson decided to take over the railways, he appointed as director-general one of the very few first-class men in his administration.

One of Mr. McAdoo's disadvantages as director-general will be that he will have many other duties to perform. He retains the secretaryship of the treasury and three or four other important government offices. What effect his retention of these other offices will have on his direction of the railways will depend greatly on how he goes about the latter task. Few minds seem to be able to grasp the colossal magnitude of the railroad system of the United States and the consequent colossal magnitude of the work of operating it as a single system. The railways of the United States have a mileage of 260,000 miles, or about 40,000 miles more than all the railways of Europe. They have an army of one and three-quarter millions of employees. They cover an area almost equal to that of Europe. They handle more freight traffic than all the railways of Europe. No man who ever lived or who ever will live could direct the operation of this railway system in the same sense that the President of a railway system of 5,000 or 10,000 miles directs its operation. Indeed, very few men can be said ever to have measured up fully to the task of managing 10,000 miles of railroad, and those who have done so have always owed it to the fact that they have shown extraordinary capacity, first, for choosing able lieutenants, and, second, for giving their lieutenants a free hand in working out their problems. Even then the number of great problems which has come up to even the ablest presidents of large systems have been so numerous that in most cases they have been able to stand the strain only a few years.

with the situation that it is giving to Mr. McAdoo the War Board could have and would have increased even more than it has the efficiency with which the railways are operated. The one thing most essential to Mr. McAdoo's success is to enlist and keep something the Railroads' War Board has had, and that is the loyal support of the railway officers of the country. In view of the wisdom, the ability, the energy and the courage which he has shown in other fields, we believe Mr. McAdoo will succeed in doing this, first, because we believe railway officers are a unit in really wanting to support him, and, second, because we believe he will demonstrate that he deserves their support.

The experiment in railroad control which the government is making would be a gigantic and a most important one at any time. It is vitally important at present. The welfare of the nation imperatively demands that it shall succeed; it must be made to succeed; and it is the duty of every man in any way concerned with it to devote his utmost ability and energy to the task of making it succeed.

Effects of Unwise Regulation Illustrated by 1917 Statistics

JUST ABOUT TEN YEARS AGO the national and state governments began effectively to apply a system of railroad regulation which prevailed until noon on Friday, December 28. On this date the order as to both railroad regulation and railroad management which had lasted ten years passed away. A Director General of Railroads took charge, under whose yoke have been compelled to pass not only the railway managers, but also all the national and state regulating bodies.

Comparisons of the conditions which existed at the beginning and at the end of this ten years of regulation are not only interesting but very significant.

In the year 1907 there were built in the United States 5,212 miles of railroad; in the year 1917, as statistics published elsewhere in this issue, show there were built only 979 miles. While there were actually torn up 451 miles, operation was abandoned on 491 miles more, and the owners of 396 miles more asked permission from state authorities to abandon it.

In 1907 the railways ordered 151,711 freight cars. In 1917 they ordered only 79,367.

In 1907 they ordered 3,482 locomotives; in 1917 only 2,704.

It may be said that the condition of arrested development exhibited by the railways in 1917, as shown by the statistics gathered by the *Railway Age* and given elsewhere in this issue, was due to the war. Let us then compare the last three years of the period ending with 1907 with the last three of the period ending with 1917.

In the ten years from 1897 to 1907 the freight handled by the railways increased 150 per cent; and at the end of that period the development of their facilities was proceeding rapidly. Then began the period of regulation. In October, 1907, came the "rich man's panic"—so-called, perhaps, because the course of events during several months previous had thrown rich men into a panic.

The period of active railroad development only briefly overlapped the period of railroad regulation. The increase in traffic, as we have seen, was relatively greater in the ten years from 1897 to 1907 than in the ten years from 1907 to 1917. There were congestions and delays to traffic in the years at the end of the former period, but they were relatively no more serious than those which have occurred recently, and until toward the end of 1907 the railway companies were engaged in providing the remedy for these conditions in the form of increased facilities.

During the last three years, on the other hand, the railway companies have not been providing the remedy for similar conditions. The number of miles of line built and of locomotives and freight cars ordered in the two three-year periods 1905-7 and 1915-17 are given in the accompanying table. The number of miles of new line built in the three years ending with 1917 was 80.2 per cent less than in the three years ending with 1907. The number of freight cars ordered was 55.8 per cent less. The number of locomotives ordered was 53.1 per cent less.

Is it any wonder in view of such facts that recently the facilities have proved unequal to the demands upon them?

The latter half of 1915 and the years 1916 and 1917, like the years 1905, 1906 and 1907, were periods of large gross and net earnings as compared with previous years. Why, then, were there not large increases in railway facilities in the three years ending with 1917, as there were in the three years ending with 1907? Chiefly because railway regulation had destroyed the confidence of investors in the railroad business. After the United States entered the war in April, 1917, of course, the amount of equipment which the railroads could buy was limited by government priority orders; but the time during which this country has been at war covers only nine out of the thirty-six months which ended on December 31.

The final effect of the kind of regulation to which the railways have been subjected for over ten years has been to cause President Wilson to decide that in order to enable them to be operated with maximum efficiency during the war the government must take direct control of their management.

This being the record of the railroad regulation which prevailed from 1906 to 1917, no effort should be spared to make sure that we shall never return to it, with all its stupidities, its vexations and its disastrous effects. Perhaps we can never return to the management of railways by individual companies, such as formerly prevailed, without also returning to the kind of regulation we have had. If so, then let us frankly recognize the fact and act accordingly. If to get a better system of government regulation or control it is necessary to change our system of railroad ownership and management, let us proceed with the changes in ownership and management necessary to secure needed changes in regulation.

"The old order changeth, yielding place to new,

And God fulfills himself in many ways."

It is easy to hope and to expect that this new experiment of government control which we are beginning will have better results than those of the ten years' experiment of government regulation. The Director General of Railroads is free from all those trammels which government has imposed upon the managers of the railways. He can route traffic any way he pleases. He does not have to take orders from state legislatures as to how many men he shall employ in a train crew. He can reduce service as much as he thinks desirable. He can reduce as much as he likes the time given shippers to unload their freight and he can raise freight and passenger rates as high as he pleases. He can control the use of freight preference orders by government representatives. If, unlike most of the regulating authorities, he acts wisely and fairly he can get the loyal support of railway officers. With the country at war and a government officer in charge, the public will demand less of the roads and be more patient with their shortcomings.

We are obviously in a period of transition. Perhaps the new system of war control will be the means by which the ground will be cleared of a vast accumulation of rubbish so that a new constructive railroad policy can be built upon it. One thing, however, we must never forget or let the public forget, and that is that unwise and inefficient railroad regulation and not unwise and inefficient railroad management produced existing conditions. In view of these conditions

anybody who can find in them an opportunity for governmental ownership after the war is added-pated in real.

NEW Mallet Boilers and Equipment Ordered and Delivered				
1917 (1918 Deliveries)				
New orders and deliveries				
		1917	1918	Percentage increase
1905	4,388	1,171	1,171	0
1906	5,623	1,171	1,171	0
1907	5,211	1,171	1,171	0
Total three years	15,222	3,513	3,513	23.1 per cent
Pacific type Boilers				
		1917	1918	Percentage increase
1905	41,311	1,171	1,171	0
1906	310,315	1,171	1,171	0
1907	151,711	1,171	1,171	0
Total three years	503,341	3,513	3,513	23.1 per cent
Locomotives ordered				
		1917	1918	Percentage increase
1905	6,265	1,171	1,171	0
1906	5,642	1,171	1,171	0
1907	3,482	1,171	1,171	0
Total three years	15,389	3,513	3,513	23.1 per cent

The Locomotive Situation

WHEN THE EXTRAORDINARY CONDITIONS of the locomotive market, both as to prices and deliveries, existing during the greater part of this year are considered there is nothing unexpected in a falling off in the number of orders placed for locomotives for domestic use during 1917 as compared with 1916. The significance of this reduction so far as it applies to the railroads, however, is more apparent than real. The reduction has taken place largely in the number of locomotives ordered for industrial use and the lighter types for railroad service. There is an actual increase in the number of locomotives of several of the heavier types for which orders have been placed. The falling off of available tractive effort is, therefore, much less real than the figures for the total number of locomotives ordered would indicate.

During 1916 orders were placed for 761 locomotives of the 2-8-2 type. During the past year about 850 of these engines were ordered. There is also a slight increase in the number of 2-10-2 type and Pacific type ordered, while orders for Mallet type locomotives decreased from 220 last year to considerably less than 200 during 1917. It is evident, both from the number and the distribution of the orders for the Mikado type, that this is the leading type for road freight service while the 2-10-2 type is the most general choice where more hauling capacity is desired than can be obtained with the Mikado type.

A comparison of the number of Mallet locomotives being ordered today with the number which were placed in service six or seven years ago, might lead to the inference that the Mallet locomotive is discredited as a road unit, and that its usefulness is confined to certain special operating conditions only. But the facts hardly justify such an inference. There are a number of railroads on which the requirements for heavy freight service are consistently being met by the use of Mallet locomotives, in some cases to the exclusion of the consideration of the 2-10-2 type.

Much of the early experience with Mallet locomotives was unfortunate. This type, when introduced into America was a decided innovation under our conditions of maintenance and operation. It is not at all surprising, therefore, that its use was not always highly successful at the outset. One of the greatest difficulties, and probably the one which it most frequently eliminates it from consideration, was the high cost of maintenance. The more recent types of these locomotives are operating in road service and offering no difficulty in maintenance, and it is doubtful whether the prejudice generally entertained against the type, based on experience with the earlier designs, is justified under present conditions.

Two noteworthy developments in the locomotive field must

be kept in mind. One is the increasing use of the feedwater heater, which, in many cases, is now being installed on all 2-10-2 type locomotives. The second is the increasing use of the Pacific type locomotive, which, in many cases, is now being installed on all 2-10-2 type locomotives.

The use of a feedwater heater is, in many cases, a decided disadvantage. The cost of installing the heater and the extra weight which it adds to the locomotive is considerable. The rate of fuel consumption is increased, and the efficiency of the engine is reduced. The working conditions are made more difficult, and the maintenance of the engine is increased. The use of a Pacific type locomotive is, in many cases, a decided advantage. The Pacific type locomotive is more powerful than the 2-10-2 type, and it is more economical in its use of fuel. The Pacific type locomotive is also more reliable than the 2-10-2 type, and it is more economical in its use of fuel. The Pacific type locomotive is also more reliable than the 2-10-2 type, and it is more economical in its use of fuel.

The feedwater heater, however, is the locomotive engineering class of economy and capacity, increasing the application to the locomotive. Its development has been a slow one when unprecedented conditions have distressed the industry of the nation as a whole to the point where the locomotive has never before in the history of the industry. It has been shown that the feedwater heater, conservatively, may be expected to effect a fuel saving of about 10 per cent. Under present conditions, both the severe shortage of fuel and the high cost and shortage of fuel have naturally increased the economic importance of any device or development capable of effecting a reduction in fuel consumption of any magnitude.

Practically all of the second locomotive engineering developments effect the increase in capacity by an increase in cylinder conditions have been such in the past, however, that the greatest stress has been laid upon their ability to increase capacity. Conservation of existing locomotives has largely been made on that basis. The fact remains, however, that rapidly becoming such that improvement of existing locomotives which might not be justified from the standpoint of increased capacity, may be fully justified from the standpoint of increased fuel economy.

Since the United States entered the world war the condition of the railroads has been such as to prevent the possibility of making an unprecedented increase in traffic, with existing equipment. Little hope has been held out to better the condition of the railroads, and the situation with a supply of new equipment. Conditions now existing indicate that the needs of the railroads for the next year will receive more than satisfaction during the coming months than they have received during the past year. The need for the additional power is urgent, especially in certain congested districts. By doing the greatest possible in increasing the number of locomotives in service, the building of standard locomotives of 2-10-2 type for delivery to the railroads by the railroads, and the use of these, at the same time, are essential to the meeting of the new, and the old, requirements. Undoubtedly, many difficulties, such as, increased maintenance, and the high cost of fuel, will be encountered in the different parts, and will have to be met by the railroads, and by the public. With respect to the locomotive, however, it offers a means of greatly increasing the current and future locomotive power of the railroads. It is one of the most important developments of the industry.

The effect of such a plan upon deliveries is amply demonstrated by the results obtained by the United States government in securing locomotives for use in France. Its disadvantages, from the standpoint of the interests of the individual railroads, would be no greater than those now being suffered through the transfer of existing locomotives from one railroad to another on which traffic is more congested. Whether or not such a plan proves to be wholly feasible, it can be adopted to the extent of holding in abeyance all plans for the building of locomotives of new designs, none of which have ever previously been built. Let the builders work to existing designs and deliveries will be expedited.

Construction Activities in 1917

A RECORD of three consecutive years in which railway extensions averaged only 1,000 miles of new line per year, or less by nearly 40 per cent than in any other three consecutive years since the Civil War, would indicate a condition of distress under any circumstances, but occurring during a period of most remarkable industrial and commercial expansion it is irrefragable evidence of the sore straits in which the railroads find themselves. To contradict the suggestion that the network of railroads has become so comprehensive over the country as to make further extensions unnecessary, attention is called to the fact that a single railway, the Santa Fe, has undertaken 300 miles of extensions in a single year, some of which was started after our entrance into the war to meet the demands for transportation facilities from communities now without them.

Granting that intensive development is more necessary at the present time than expansive growth, attention need only be called to the contrast between additions to second track during the past three years as compared to the preceding three to show that the same restrictive condition prevails. During 1915, 1916 and 1917 only 1,282 miles of second track was added, as compared with 2,901 miles added during 1912, 1913 and 1914.

In the case of terminals we find that work on very few classification yards of first magnitude or extensive belt line projects has been undertaken in the past three years. Activities in terminal work have been directed largely to numerous small improvements made in efforts to relieve conditions of congestion in the shortest possible time and with relatively minor expenditures. It must be said in justice that this policy on the part of the railroads is not entirely a result of limited funds. The labor shortage extending over the past two years and the enormous increase in the costs of both material and labor with a consequent enormous increase in the obligations incurred in any improvements at this time are partly responsible. The change in policy introduced by our own entrance into the War with the enforced need of curtailing the use of men and materials has had an even more marked effect.

In pursuance of this policy municipal and state authorities have generally taken a broad stand in regard to grade separation, passenger station and other projects having no direct bearing on the expeditious movement of traffic, recognizing that the times demand the postponement of work unnecessary to the prosecution of the War. A striking exception to this rule is the demand of the United States War Department for the raising of river bridges at Pittsburgh, in connection with which the Pennsylvania Lines are making an expenditure of nearly \$1,000,000.

The public has taken a less favorable attitude in regard to a number of railway improvements sorely needed to relieve congestion, and has in several instances evinced an almost childish obstinacy in blocking the projects. Among these may be cited the New York Central's proposal to spend \$100,000,000 for improvements on Manhattan Island and the plan for a new bridge across the Hudson below Albany

to be used in connection with a belt line to reduce congestion through that city. In Chicago, the Atchison, Topeka & Santa Fe and the Illinois Central have been unable to proceed with important improvements because of what appears to be a definite policy of insisting on wholesale electrification in all cases where the railways are compelled to negotiate with the city.

While it has been necessary to display careful judgment in improvement budgets during the years past it will be necessary to exercise even greater discrimination in deciding upon the construction work to be done during the coming year. Unquestionably the government administration of the railroads will exercise some bearing on this matter but a more marked influence will be felt through the designation of priority on the necessary materials. The shortage of labor will also act as even more of a deterrent than in the past and unquestionably constitutes the most formidable obstacle confronting the railways at the present time in the completion of the additions and betterments to their properties so necessary to the expeditious handling of the war traffic.

A Review of Maintenance Conditions

THE YEAR WHICH HAS JUST CLOSED has been without precedent in the maintenance of way department as in other branches of railway service and in industrial activities in general. Not the least unusual has been the fact that the roads were unable to spend all of the money available for the upkeep of their properties, or which should have been expended. As a result a large amount of deferred maintenance has accumulated and the net earnings of the roads have been swelled by these unexpended portions of maintenance, appropriations the equivalent of which will have to be returned to the physical properties with liberal interest at no late date if their efficiency is not to be impaired.

The past year has been one of unprecedented traffic, the gross earnings being estimated to be over \$450,000,000 greater than in the preceding year. For the first time in history the gross earnings of the railways of the United States passed the \$4,000,000,000 mark. This heavy traffic has exacted its toll from the track and structures through the added wear and tear which must be made good if the property is not to be allowed to deteriorate. The statistics of the Bureau of Railway Economics for the first ten months of 1917 show an increase in total operating revenues of 11.8 per cent per mile of line as compared with the same months of 1916. For the same period expenditures for maintenance of way and structures showed an increase of 6.1 per cent. On its face this comparison is not unsatisfactory, for an increase in the amount of business handled should not lead to a corresponding rise in the cost of maintaining the property since a considerable part of the charges are independent of the traffic and others are only partially affected by it.

The difficulty arises from the changing conditions which have affected the factors involved in these comparisons during the past year. The rates received for transportation have been practically stationary during the two periods compared; therefore, a comparison of the operating revenues is a fair measure of the amounts of work done and of the wear and tear on the property. In studying the expenditures to overcome this deterioration, however, conditions are different, for a dollar of expenditure did not produce the same relative improvement in 1917 as in 1916. The effect of the rising prices of materials had begun to make itself felt in 1916 and in some instances great advances had already occurred. However, this tendency toward increased costs continued steadily throughout the first nine months of 1917 so that a dollar bought less material in that period than in 1916. The same is true of labor. Wage rates have risen steadily and they were accompanied by decreased efficiency on the part of the men so that the labor returned per dollar of expenditure fell

sharply. As a result the increase in expenditures on maintenance and the expenditures of 6.1 per cent increased to 14.1 per cent, and finally an actual decrease of no more than 10 per cent in terms of productive work of the property. This occurred at a time when the facilities were being taxed to their utmost to handle the traffic and when the wear had had its full and was correspondingly great. This condition has necessarily led to an accumulation of deferred maintenance which will be necessary to take up in the near future if the industry is to continue to perform the efficient service which the country is now demanding of them.

To the men in the maintenance of way department the outstanding feature of the past year's work has been the constantly increasing scarcity of labor. The constant influx of open immigration, the shutting up of the Mexican supply through the enactment of the alien laws, the transfer of over 1,000,000 men from industry to military service, and the widespread activity in agricultural work have all served to increase the shortage of men throughout the country.

One development of the past year in this respect has been a marked improvement in the living conditions provided for transient laborers by the railroads. In an effort to hold as many men in their employ as possible many of the roads have given more attention to the provision of better housing and feeding facilities and have provided more sanitary conditions in their camps. While many men undoubtedly have benefited these measures for a number of years, the general acute shortage of labor has forced the managements to adopt these as means of self-protection.

The competition for men between the railways and other industries and also between individual roads has led to considerably higher wages, the rates paid for track laborers on some roads now being twice those of two or three years ago. This competition for men and the bidding of one road against another has served further to demoralize the labor market and, as is inevitably the case, has resulted in a serious decrease in efficiency. Not only is there an absolute shortage of men, but the character of the men employed in railway service is probably lower than ever before and the return in productive work per dollar of expenditure has probably been lower than in any previous season.

Conditions in the material market have been also equally chaotic. Prices of materials have been climbing higher at an alarming rate, while even more serious is the fact that it has been almost impossible to secure many materials except with long delays. This has made it practically impossible to proceed with extensive programs of work with any certainty that they would be completed at definite dates. The formation of the Priorities committee late in the year is already assisting the roads as the committee is in general giving preference to materials for which the road can show an immediate need, thereby giving them at only a minor cost other work less necessary for the public welfare at the present time. The fixing of prices has also resulted in numerous reductions in some instances and equally important has tended to stabilize the market and put a stop to the speculative trading which has been going on for some months.

Because of the rapidly changing conditions and because it is difficult to predict what the next year will bring, little hope can be held out for an improvement of the labor situation. The industries of the country will undoubtedly be forced to operate at high speed for the remainder of the war and as long as these conditions exist the industry will continue to suffer from a scarcity of labor and the inefficiency of that which they can secure. The principal relief will be the substitution of mechanical equipment for men wherever this can be done and the country will only undoubtedly see a remarkable development of labor-saving equipment in the maintenance of way field. With resources so restricted the Priorities committee will undoubtedly be of great assistance

in the future in securing better conditions than exist in the industry and in the maintenance of way field. The maintenance of way department has been particularly benefited by the fact mentioned by the committee in a report that about one-third of the budget of the industry is now allocated to the maintenance of way field and that if proper appropriations of funds were made for other industries, other industries would enjoy a similar share of resources in the maintenance of way field. The committee would like to see the maintenance of way field receive at least 25 per cent of the total industry budget.

Car Development in 1917

Development in the car field during the current season of war has been particularly noticeable in the maintenance of way field. The maintenance of way department has been particularly benefited by the fact mentioned by the committee in a report that about one-third of the budget of the industry is now allocated to the maintenance of way field and that if proper appropriations of funds were made for other industries, other industries would enjoy a similar share of resources in the maintenance of way field. The committee would like to see the maintenance of way field receive at least 25 per cent of the total industry budget.

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The progress of oil tank cars and other kinds of equipment in the road industry is also reported particularly in the article in the present issue. They are a development in the maintenance of way and supply and are of great importance to the government in the maintenance of way field.

There were 1,000,000 goods cars in the United States in 1917. The production of goods cars in the United States in 1917 was 1,000,000. The production of goods cars in the United States in 1917 was 1,000,000. The production of goods cars in the United States in 1917 was 1,000,000.

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usually a shell within a shell, the inner lining being self-sustaining and separated from the outside lining by four continuous layers of insulation extending from side sill to side sill over the top of the inner steel wall in one continuous piece. The cars are provided with basket bunkers, an insulated solid bulkhead and the space between the bulkheads is divided into three compartments. The Baltimore & Ohio and the Michigan Central have built refrigerator cars which are particularly well insulated, the insulation being applied solid instead of with the usual intervening air spaces. These cars have the basket ice bunker with the solid bulkhead.

The Virginian 120-ton capacity coal car marks a most important step in the construction of this type of equipment. It is provided with the Lewis articulated six-wheel truck having a wheel base of 9 ft. The car weighs 73,900 lb. and has a ratio of revenue load to total load, with 10 per cent overload of 76.4 per cent. It represents a design which has been given the most careful study, and contains many interesting features. The Pennsylvania 85-ton capacity hopper car with five hoppers, has a light weight of 60,000 lb. and a gross cubical capacity of 3,228 cu. ft. as against 4,422 cu. ft., the maximum cubical capacity of the Virginian car is also noteworthy.

Among the passenger cars those built for the Delaware & Hudson and for the Erie represent real progress in the design of all-steel passenger equipment. The Delaware & Hudson cars are 72 ft. 8 $\frac{3}{4}$ in. long over body end sills, they weigh 138,700 lb. and have a seating capacity for 90 passengers. The Erie cars are interesting on account of the ingenious construction of the superstructure. The distribution of metal is such that a stiff construction has been obtained with a saving in weight. These cars are 70 ft. long over the body end sills; they weigh 110,900 lb. and have a seating capacity for 76 people, including 12 seats in a smoking compartment.

The prospects for improvements in design during the coming year are promising, particularly in freight cars. With the heavy demand for freight equipment new cars will be built and every means will be taken to get them promptly. With private and corporate interests being held subordinate to the nation's needs, the "standard car" will receive more serious consideration. A committee of the American Railway Association has been working on this problem for some time. Sample cars have been built and much study has been given the question. The committee has been unable as yet to come to an agreement. It is extremely desirable that the matter be settled as promptly as possible so that the designs can be used for the large amount of new equipment which must be constructed in record time during the current year.

Optimism in the Supply Field

OPTIMISM is the word that most aptly characterizes the feelings of railway supply men as to the outlook for the car and locomotive markets in the coming months. The car and locomotive builders and the specialty manufacturers have not by any means had a bad year in 1917—but they have, nevertheless, had to do considerable worrying. The combination of circumstances during the past fortnight, however, has put an entirely new and brighter aspect on the situation. The President's taking over the railways has been received with favor in the supply field. For one thing, it is confidently expected that the guaranty of the average earnings for 1915, 1916 and 1917 will now permit the railways to get back once more into the market for new equipment and that in the very near future. For another thing the fact that the President has appointed one of the biggest men in his Cabinet to be Director-General of Railways is understood to indicate that the administration realizes more

fully than ever the importance of railway transportation in winning the war. In other words, supply men confidently expect that railway equipment requirements will receive much prompter attention than they have been receiving for the last six months. And, as if good always had to come in bunches, it also happens that the material situation has eased considerably recently both as to prices and deliveries.

The labor situation still looks bad, but the railway supply people are no worse off than any other of the country's industries. The Russian situation, bad as it is in the broader aspects, even lends some small grounds for optimism. The collapse of Russia has been a very serious event for America, but there is a silver lining to every cloud. In the case of Russia's plight, the silver lining seems to relate to the American locomotive situation. Russia has placed orders on our books this year for something like 700 locomotives. It was about to close for 1,500 more, and shop arrangements had even been made for them to the detriment of deliveries on orders for our own roads at home. The orders for the 1,500 Russian locomotives will now undoubtedly be sidetracked and work will be begun immediately, in fact, has already begun, on American orders which have been held up for months, and the American railroads need the locomotives badly.

Receiverships and Reorganizations

THE REORGANIZATIONS of railroad properties effected in 1917 are important. The receiverships that took place are quite unimportant. Three large railroad systems were reorganized during the calendar year, two—the Missouri Pacific and the Pere Marquette—by means of foreclosure sales, and one—the Chicago, Rock Island & Pacific—by means of a voluntary exchange of debentures for preferred stock and a subscription on the part of a syndicate of bankers to approximately \$30,000,000 preferred stock, and on the part of former directors, to \$5,000,000 preferred stock.

If the Chicago, Rock Island & Pacific reorganization had been an immediate and unquestioned success it would have proved a striking example of the exception to the general inability of railroads to do any financing in recent years through the issue of stock. As a matter of fact, however, the reorganization has not as yet by any means demonstrated itself a success, and the purchasers of the new preferred stock are faced with the possibility of a heavy loss. When the road went into the hands of receivers there were various individuals and financial institutions with conflicting interests in it. There were the Reid-Moore people, including D. G. Reid and Judge W. H. Moore, who were in control prior to the receivership. There were also various Chicago capitalists and estates representing conservative, legitimate investment interests, and, of course, in addition, a great number of individual bondholders, including large financial institutions in the East. Superimposed on this, or rather inserted in this complication, were the followers of N. L. Amster, a Boston banker, who himself had comparatively a small investment interest in the property.

Most of the eastern capitalists and financial institutions, with the exception of the followers of Mr. Amster, favored a foreclosure sale and thorough reorganization. Amster's followers held out for a reorganization without foreclosure, and they were rather surprisingly aided by the unprecedented prosperity which the Rock Island enjoyed in 1916. Whereas in the previous three years total net income had averaged less than \$15,500,000, the total net income in 1916 was \$23,429,000. It was this fact, probably, which had a good deal to do with persuading the conservative Chicago investment interests to side with the Amster faction. The fact that there was \$23,429,000 available for interest in 1916, and that interest charges without foreclosure sale and scaling down of outstanding securities was only \$15,350,000, was an argu-

Comment on Government Control of Railways

Newspaper Cartoonists and Editorial Writers Discuss Various Phases of the New Situation

[Philadelphia Public Ledger]

SURELY, WITH THE ADVANTAGES of unification which governmental control now opens up, American skill and managing ability can speed freight shipments to double or treble the record made under the wastes of division and private competition. Mr. McAdoo retains his secretaryship of the treasury. Thereby, the President says, Mr. McAdoo's double authority will enable him to co-ordinate systematically the financial interests of the railroads. The advantages of system, unity and co-ordination which the mere fact of direction under the commander-in-chief of the army and navy permits will have an instant effect in heightening the productive capacity and value of the great carriers. Their combined strength and the strength of their staffs will be added to Mr. McAdoo. He will be responsible. But every facility is offered him for grasping his responsibility splendidly. It is his portion to help win the war with the most powerful of all instruments for waging war, namely, the best-built system of transportation in the world.

[Wall Street Journal]

No better solution of the railroad problem could have been chosen than that which has been adopted by the President. It takes from the railroad managers the problem of finance, leaving them to the expert business of operating their roads. It transfers to the shoulders of the United States Treasury the financial burdens which have harassed railroad management. It gives to the holders of securities a guarantee which amply justifies the striking recovery in Thursday's prices.

Among the members of Mr. Wilson's Cabinet, not one has matured and broadened more notably than Mr. McAdoo. It may be said that the Secretaryship of the Treasury alone is a man's size job, and that the control of 250,000 miles of railroad calls for all the time and ability of a first-class man. But Mr. McAdoo will have the best assistance, and it may be taken that his Government and Treasury experience will be directed to general policy and financing, while the railroad operating officers will work out the technical problem of the movement of freight and passengers.

[New York Sun]

Ten men's brain power, ten men's nerve energy and physical endurance, would not be more than adequate to the load that rests upon the Secretary of the Treasury in this time of war in his own official sphere. How manfully Mr. McAdoo is carrying the burden everybody knows. At what physical cost and personal risk nobody but himself can know. Perhaps he himself doesn't know.

If that makes a ten man-power job, surely a twenty or a fifty-man-power job is that which the Dictator of Transportation is now bravely undertaking at the President's instance; an untried experiment; an unmeasured work of organization, of co-ordination, of application of special knowledge to countless problems of policy and detail involved in the unification, operation and financing of two hundred and fifty thousand miles of railroad for the period of the war.

[Cleveland Plain Dealer]

The railroads have failed signally to meet the requirements of war. It may be profitless now to discuss the reasons; the fact stands confessed. Palliative methods have proved insufficient. At a time when the conditions of national life put unprecedented demands upon our trans-

portation systems, these systems have shown weaknesses unsuspected. They have failed to meet the test.

It is vital to the national safety that the railroads shall render the highest service they are capable of. It is in part a matter of management, or co-operation, and in part of finance.

The various systems must be operated as a single, efficient unit. There is no excuse for play of selfish interests; there can be no question of advantage between one line and another. From now on each road is to contribute its individual share toward the efficiency of the whole.

[Florida Times Union]

It may be that this step will help solve the transportation problem. The roads will continue to be operated by their regular force though under a head appointed by the government. They will be able to act as one while without such action as the government has taken or the repeal of laws forbidding pooling they would have been compelled to continue a competition that whether healthful or not in normal times would have been a hindrance under present circumstances. The result ought to bring improvement from the reasons stated without considering any other reasons.

But when we consider the labor problem we see where a decided improvement may be made. The railroads will be as much a part of the government as the armies will be. Interference with the operation of the railroads will be as truly an act of mutiny as interference with the operations of the army would be. A strike that would impair the efficiency of the transportation system would naturally stand on the level with a refusal to fight on the part of a combination of soldiers.

All this would be logical but we shall have to wait to see whether the government will act on it. It may be that the government, in acknowledged control of the railroads, will make concessions to every demand of labor as it forced concessions when in virtual control; or it may prove true that it will expect as much patriotism and require as great a display of patriotism from high priced men safe from danger as from the thirty dollars a month soldiers at the front who are in range of German cannon. If the government pursues a policy of giving labor unions everything they demand and charging it up to the people, the railroads will find later greater difficulties than they ever experienced at holding up to a level their business cannot pay when it is back in their hands and they are not permitted to charge up any deficit to the people.

[Indianapolis News]

Though new legislation will be necessary, and will doubtless be forthcoming, the director-general, even under present conditions, will have vast powers. Also he faces a heavy responsibility. He announces that he will utilize the services of the Railroads' War Board, and rely for advice on the experts of the Interstate Commerce Commission. Of course, he will work through the staffs that are now operating the roads. Questions of finance and reconstruction will be dealt with later. In regard to them the co-operation of congress will be necessary.

It is a great experiment that the country is now trying. If the result is to make the nation more efficient in the war, even those who doubt the wisdom of the policy, and fear its extension, will rejoice. All know that the railroad situation was very bad. It is hoped and believed that there will be a speedy bettering of conditions.



Cartoon in the New York Times

McAdoo Smoothing Out Transportation Wrinkles



Cartoon in the New York Times

Our New Train Crew



Cartoon in the New York Times

The Rookie



Cartoon in the New York Times

The New Type Dispatcher of the U.S. & V.

American Railway Efficiency During the War

Review of Accomplishments and Increased Service in Nine Months Since United States Entered Conflict

THE RECENT DISCUSSION of proposals for new ways of dealing with the transportation system of the country and President Wilson's action in taking control of railway operations during the war has obscured to some extent the remarkable record of accomplishment the railways have already achieved under their own direction and with little assistance from the government.

It is now practically nine months since the United States became an active participant in the great world war, and only a few days less since the organization was formed under which the railroads of the country have been working to perform their important share in the great enterprise. In view of the change in the policy under which their service is to be rendered, therefore, this is an opportune time to review the results of their operations during that period, although their activities have been rather fully described currently in the *Railway Age Gazette* during the past year.

The change in the railway policy of the country is sometimes referred to as an attempt to repair a "breakdown" of the transportation system. Far from having "broken down," however, the railways of the United States during the past nine months and even for a considerable period before that time have made a record for efficiency which in comparison with many other industries and all previous records of their own, is nothing short of remarkable, especially under the conditions with which they have been confronted.

The co-operation of the railways with the government and the efficient service they have been rendering have been frequently recognized and commented upon by prominent officers in the government in various public statements.

Railway Co-operation Appreciated by Government

President Wilson in his statement announcing the taking over of the railroads said:

"The committee of railway executives who have been co-operating with the government in this all-important matter have done the utmost that it was possible for them to do; have done it with patriotic zeal and with great ability; * * * and if zeal and ability and patriotic motive could have accomplished the necessary unification of administration it would certainly have been accomplished."

Secretary of War Baker, in his annual report for 1917, said regarding the way in which the railroads have co-operated with the War Department:

"In this general connection it seems appropriate to refer to the effective co-operation between the department and the transportation agencies of the country. For a number of years the Quartermaster General's Department has main-

tained close relations with the executives of the great railway systems of the country. In February, 1917, a special committee of the American Railway Association was appointed to deal with questions of national defense, and the co-operation between this committee and the department has been most cordial and effective, and but for some such arrangement the great transportation problem would have been insoluble. I am happy, therefore, to join the Quartermaster General in pointing out the extraordinary service rendered by the transportation agencies of the country, and

I concur also in his statement that 'of those who are now serving the Nation at this time of stress, there are none who are doing so more wholeheartedly and efficiently than the railroad officials who are engaged in this patriotic work.'"

The Quartermaster General of the Army in his annual report said:

"The Special Committee on National Defense is a voluntary organization of the railways, serving purely through a spirit of patriotism. Its activities have been extended far beyond what was originally contemplated, even for the military service. The railroads of the country are operated practically as one continental system with the result that the congestion, which would have been intolerable without such an organization, has been in every case ameliorated and in many cases completely removed. The Railroad War Board has been in practically continuous session at Washington since April 23. No more patriotic or self-sacrificing body of men is at this time serving the government.

"It has extended to the distribution of power between the railroads, the adjustment of passenger train service in accordance with national requirements, has furnished personnel and material for rehabilitation of the railways in France, has aided in every way possible the great national endeavor which has become the duty of every citizen of the country."

A special committee of the National Association of Railway Commissioners, in its report to the recent convention of the association, said:

"The fine sense of duty on the part of the leaders of the country's transportation systems that prompted this resolution deserves our respect and praise. We believe, moreover, that this resolution must also be considered as a most important document in American railroad history. The pledge of these men that they will operate their properties as a 'continental railway system,' that they are merging during the war 'all their merely individual and competitive activities in the effort to produce a maximum of national transportation efficiency,' opens a wide outlook. It must be remembered that it is the executive heads of the railroads who

Railway War Service

Railroads have furnished more service than ever before in their history.

Military traffic handled without abatement of commercial traffic.

Fourteen per cent more freight carried than in 1916, including 18 per cent more coal.

Passenger service breaks all records.

Over 2,000,000 soldiers and their equipment transported safely and without delay.

Over 134,000 carloads of freight moved to cantonments and training camps which still require 2,500 carloads of supplies daily.

Nine regiments of railroad men in service in France.

Box and coal cars pooled and competition ignored in routing of troops and military supplies. Facilities of eastern railroads pooled under direction of Operating Committee.

diers safely and without delay, the freight service performed is the most important index of their usefulness to the nation. Freight operating statistics since the end of September are not yet available, but the freight earnings as reported by the Interstate Commerce Commission for the 10 months including October show nearly as much business handled in 10 months of this year as in the whole of 1916, while the freight business in October was greater than for any previous month in railroad history. As there was a slight falling off in traffic in September, but a very large increase in October, it is probable that later figures will show an even greater increase in traffic than is shown in the six months' report. The railroads have succeeded in securing much more service from every track, every car and every locomotive than ever before in their history. In fact, practically the only material they have had to deal with whose efficiency has not been increased has been the almighty dollar. Even during the month of November they succeeded in reducing the number of unfilled requisitions for freight cars from 140,000 on November 1 to 117,000 on December 1. This represents an increase of only 10,000 in the shortage, as compared with December 1, 1916, when the United States was still at peace.

Increasing Efficiency

Probably the most important single step toward increasing the efficiency of the available facilities has been the campaign for heavier loading of freight cars, in which the hearty co-operation of shippers, the Interstate Commerce Commission, and many of the state commissions was obtained. The result so far as the figures are available is seen in the report showing that for the first six months after war was declared an average of 2.2 tons has been added to the average carload, which has been increased from 24.8 to 27 tons, or 8.9 per cent. As the freight car miles amounted to over 8,250,000,000, the addition of over 2 tons to each carload meant that 18,150,000,000 ton miles more freight was carried with the same number of cars.

In addition to the heavy carloading, stricter supervision on the part of railroad officers also enabled them to increase the average number of tons per train from 626 in 1916 to 675 in 1917, while the average mileage per car per day was increased from 27.3 to 27.9 and the mileage per locomotive per day was increased from 65.8 to 68.7. In the six months alone the railroads handled over 25 billion ton miles of revenue freight more than in the corresponding period of 1916. Also the percentage of freight locomotives in shop or awaiting shop was reduced by 9.1 per cent and the percentage of freight cars in shop or awaiting shop was reduced by 7.8 per cent.

The first plan announced by the Railroads' War Board after its organization, in the direction of increasing the efficiency of the railway plant by greater co-ordination of the available facilities was the pooling of box cars, by suspending the car service rules and placing their distribution under the direction of the Commission on Car Service. This commission has since ordered the movement of box cars without regard to individual ownership but in accordance with the requirements of the traffic. Under its direction 222,000 cars have been ordered moved empty since May 1, often in trainload lots, from roads on which the prevailing direction of traffic had caused them to become accumulated to roads which needed them for loading. At first coal and refrigerator cars and other special equipment were not pooled, but were left subject to the rule that they should be returned, when made empty, to the owning road. Recently, however, a pool of open-top cars has been established under the direction of the General Operating Committee of the Eastern Roads and an effort is being made to include in it not only railroad-owned cars but the cars owned by coal companies.

Another measure adopted at the suggestion of the War Board, which undoubtedly would have laid the roads open

to a charge of conspiracy in other times, was a general movement toward curtailment of unnecessary passenger service in order to release cars, engines, men, fuel and track room for the more necessary freight service. Since May 1 the railroads have been able to reduce their passenger service by approximately 28,656,983 train miles, thereby facilitating the movement of military traffic and coal, food products and supplies needed by the government, by saving 1,800,000 tons of coal per year and releasing 570 locomotives and 2,800 trainmen for freight service. For a time most of these reductions were on branch lines of little traffic and resulted in handling on one or two well filled trains the same number of passengers formerly served by two or three half filled trains. Of late, however, it has been necessary to take more drastic steps, such as the discontinuance of the Broadway Limited and other through trains and several roads have used newspaper advertising to urge people to refrain from unnecessary travel at Christmas time.

Troop Movement

One of the first of the military tasks with which the railroads were confronted was the transportation of the enormous tonnage of freight needed for the hurried construction of the army cantonments and training camps. Here competition was in most cases ignored and supplies were routed over the lines that were in a position to give the best service. Agents of the War Board organization were stationed at all camps and concentration points and at military headquarters to co-operate with the war department officials in every way possible. A total of 134,000 carloads of freight have had to be hauled to the National Army and National Guard camps and approximately 2,500 carloads of food and other necessities are being delivered daily.

Soldiers have been moving in large numbers, both to the seaboard for embarkation and to the various training camps, since about August 1 and the total movement up to date has amounted to over 2,000,000 men. This figure, of course, includes the duplications involved in handling the same men more than once, as to the training camps and later from the camps to concentration points or seaports. Of the total approximately 687,000 men were included in the mobilization of the national army, who were without equipment, but the other soldiers have usually been accompanied by their impedimenta, which has required the use of many express, baggage and freight cars. Of course, all of this traffic has complicated matters and increased the difficulty of moving the freight traffic. While the addition of an equal number of ordinary passengers to the railroad traffic would have been handled without difficulty, the troop movement has required special schedules and 3,600 special trains. Here again the old methods of competition were discarded and the traffic was virtually pooled according to routings worked out by committees of passenger and operating officials in such a way that the most direct routes were used and no line was allowed to become congested.

The Railroads' War Board has also performed important services in co-operation with the representatives of the Allies in co-ordinating the movement of export food, munitions and other supplies and the various railroads individually have taken an active part in the campaign for food conservation and for the sale of Liberty bonds.

18 Per Cent Increase in Coal Traffic

While the fact that the shortage of coal may be attributed in part to scarcity of railroad equipment has probably been the cause of more complaint against the railroads than anything else it is still true that probably the best example of their increased service is afforded by their record in moving coal. During the eight months, April to November, there were moved by rail 1,101,677 more carloads of anthracite and bituminous coal than in the same months of 1916, an

Over Seventy Thousand Railway Men Join Colors



Railway Regiments Were First United States Troops Ever Reviewed by the King of England. Photo Copyright by Underwood & Underwood.

RECENT REPORTS from American railroads indicate that approximately 70,000 men have left railway service to join the colors. Inquiries addressed to all lines, 100 miles in length or over, brought replies from 122 railroads with a combined operated mileage of 202,634, or almost 78 per cent of the mileage of the country. These roads reported that about 54,000 officers and employees had joined the armed forces of the United States since the declaration of war, of whom 1,408 received commissions. It is reasonable to assume that the remaining railroads of the country have supplied the army and navy with a proportionate number of men. At the rate at which employees of the 122 lines volunteered or were drafted, the number for the remaining carriers should approximate 16,250, making the total number of railway men in army or navy service nearly 71,000, or over four per cent of all the railroad employees in the United States.

Some individual roads were exceptionally heavy contributors to the nation's military and naval forces. The Pennsylvania system alone has 9,019 in the army and navy, or about one man to every mile of line operated. The New York Central system has the next best record with 7,143 men under arms. Other roads which gave large numbers of employees to the colors are the Santa Fe lines, approximately 3,000 men; the Southern Pacific system, 2,185 men; the Union Pacific system, 2,008; the Illinois Central system, 1,916; the Baltimore & Ohio, 1,760; the Chicago, Milwaukee & St. Paul, 1,645; the Northern Pacific, 1,638, and the Chicago & North Western, 1,573. The patriotic sacrifices of American lines compare favorably with those of neighboring roads in Canada which have been sending large numbers of men to the trenches ever since 1914. The Canadian Pacific alone has supplied about 13,000 men to the Canadian overseas forces.

The highest commission held by any railroad man is that of W. W. Atterbury, vice-president of the Pennsylvania Railroad, now director-general of American-operated railways in France, with the title of brigadier-general. A large number of railroad officers have been commissioned colonels and majors. The Pennsylvania system has five colonels, one lieutenant-colonel and seven majors in army service. The Southern Pacific lines have one colonel and four majors in the army; the Baltimore & Ohio, five majors; the Chicago, Mil-

waukee & St. Paul, three majors; the Chicago, Burlington & Quincy, a lieutenant-colonel and a major; the Northern Pacific, a lieutenant-colonel and two majors; the Louisville & Nashville and the North Western, one colonel each; the Erie, the Chicago, Rock Island & Pacific, the Chicago, St. Paul, Minneapolis & Omaha, the Delaware & Hudson, and the Southern, two majors each.

Owing to the fact that the carriers are burdened with an unusually heavy traffic and are short of men, some roads were able to supply partial information only, concerning their contributions in men to the army and navy. The New York Central, which undoubtedly furnished the nation's armed forces with a large number of officers, did not find it possible to compile a list of employees who have received commissions. The Great Northern, on the other hand, was unable to furnish data showing the total number of employees who volunteered or were drafted. On the whole, the information received from the various railroads is complete and accurate.

The inquiries sent out by the *Railway Age* asked, first, for a list of the railroad officers of ranks equal to or above trainmaster, division engineer, master mechanic or general agent who had entered military or naval service, with the military rank, department and assignment of each. The returns for 122 lines showed that 160 railroad officers of this class had gone to the colors. The names of all other employees who had received commissions in the army or navy were also requested. The data at hand shows that 1,248 employees of this class are now army or navy officers. Inasmuch as roads with 202,634 miles of line supplied a total of 1,408 officers for our armed forces, it is probable that statistics from all American roads would show that 1,800, or more, railroad men now hold commissions.

Railway men are serving their country in practically every department of the army and in various capacities in the navy. In addition, they are doing special service of great importance to the success of our armies in the nine railway regiments, organized last spring, which have taken over the operation of railroads serving the battle front in France. Two additional regiments of this kind, a car construction regiment and a light railways regiment, recently completed their organization at Camp Grant, Rockford, Ill. Late this fall, 200 railway officers from roads in the Northwest left

for Russia where, it political conditions permit, they will rehabilitate the Trans-Siberian railway. The organization known as the Russian Railway Service Corps consists of 1000 of commissioned officers, ranging from colonel down to second lieutenant. Colonel George H. Timmerman, formerly general manager of the Great Northern will take charge of the operation of the Trans-Siberian. He has under him two general superintendents with the title of lieutenant-colonel and 12 division superintendents with the title of captain and their staffs. The organization of the Russian Railway Service Corps and the railroad regiments for service in France has been carried out under the direction of S. M. Felton, president of the Chicago Great Western and director general of railroads with headquarters at Washington, D. C.

Although the transportation system of the country is placed next to the army and navy in its importance in the prosecution of the war, the railroads have not asked blanket concessions for their employees. In spite of a very heavy traffic and the importance of the expeditious movement of government supplies, the carriers asked no favors. A consideration of the number of special railway units organized, in addition to the loss of men who volunteered in other branches of service or were drafted, leads one to the conclusion that the railroads have not only contributed their share of men to the armed forces of the land, but more than their share.

The following statistics from 119 railroads show the num-

Officers Who Received Commissions

Name	Position	Military Rank	Branch of Service
R. J. Lockwood	Vice-Pres. & Gen. Mgr.	Major	Signal Corps

Arizona & New Mexico

Name	Position	Military Rank	Branch of Service
R. J. Lockwood	Vice-Pres. & Gen. Mgr.	Major	Signal Corps

The Atchafalaya, Topeka & Santa Fe Ry

Name	Position	Military Rank	Branch of Service
R. J. Lockwood	Vice-Pres. & Gen. Mgr.	Major	Signal Corps



Officers of the 21st Engineers (Light Railways) Until Recently Stationed at Camp Grant, Ill.

ber of men in army or navy service, and the names of officers and employees who have received commissions, their military rank and the branches of service to which they have been assigned:

Apalachicola Northern

Officers Who Received Commissions

Name	Railroad Position	Military Rank	Branch of Service
R. J. Lockwood	Vice-Pres. & Gen. Mgr.	Major	Signal Corps

Officers who received commissions: Total number of commissions: _____

Arizona & New Mexico

Total number of commissions: _____

Arizona Eastern

Officers Who Received Commissions

Name	Railroad Position	Military Rank	Branch of Service
F. H. Hule	Chief Engineer	Major	Signal Corps

Name	Position	Military Rank	Branch of Service
R. J. Lockwood	Vice-Pres. & Gen. Mgr.	Major	Signal Corps
F. H. Hule	Chief Engineer	Major	Signal Corps

Name	Railroad Position	Military Rank	Branch of Service
Edw. W. Finney	Asst. R. of W. Agt.	1st Lieut.	7th Engrs.
Enoch M. Brown	Wire Chief	1st Lieut.	National Guard
James Vawter	Asst. Eng.	1st Lieut.	Sig. Dept. Tel. Bat.
E. E. Bell	Clerk	1st Lieut.	315th Engrs.
H. E. McCullough	Transitman	1st Lieut.	315th Engrs.
J. C. DeBrimmond	Operator	1st Lieut.	E. O. R. C.
C. T. Dull	Asst. Atty.	1st Lieut.	Infantry O. R. C.
E. Schiew		1st Lieut.	Infantry O. R. C.
H. W. Whittier	Transitman	1st Lieut.	Engr. Corps
Gordon H. Lennard		1st Lieut.	314th Engrs
John J. Moore	Draftsman	1st Lieut.	Engr. Corps
H. R. Miller	Mach. Helper	1st Lieut.	National Guard
W. H. Bownell	Clerk	2nd Lieut.	315th Engrs.
A. Noble		1st Lieut.	315th Engrs.
Walter Bohnstengel	Asst. Eng.	1st Lieut.	Ord. Dept. O. R. C.
A. M. Watkins	Rodman	2nd Lieut.	Infantry O. R. C.
S. S. McConnell	Clerk	2nd Lieut.	13th Engrs.
Francis A. Nolan	Clerk	2nd Lieut.	
James Joyce	Clerk	2nd Lieut.	
Paul Nowers	Clerk	2nd Lieut.	
E. D. Boskin		2nd Lieut.	Infantry
H. J. Morgan	Draftsman	2nd Lieut.	315th Engrs.
L. E. Watson	Draftsman	2nd Lieut.	Field Artillery
D. G. Hume		2nd Lieut.	U. S. Army
P. H. Davis	Contr. P. Agt.	2nd Lieut.	Infantry
W. W. Haggard	Asst. Eng.	2nd Lieut.	E. O. R. C.
E. G. Edwards		2nd Lieut.	
T. J. Connell		2nd Lieut.	
J. A. Hasty	Attorney	2nd Lieut.	
R. A. Van Ness	Draftsman	2nd Lieut.	E. O. R. C.
H. S. Mahood	Draftsman	2nd Lieut.	E. O. R. C.
Walter I. Fotts	Brakeman	2nd Lieut.	314th Engrs.
H. W. Laird	Asst. R. of W. Agt.	2nd Lieut.	Infantry
M. D. Gaither	Transitman	2nd Lieut.	National Guard
J. B. Hughes	Rodman	2nd Lieut.	Field Artillery
L. Tucker	Computer	2nd Lieut.	314th Engrs.
E. A. Fletcher	Asst. R. of W. Agt.	2nd Lieut.	Infantry
W. S. Emley	Asst. Eng.	2nd Lieut.	315th Engrs.
Charles Schlom	Clerk	2nd Lieut.	E. O. R. C.
T. H. Stanley	Clerk	2nd Lieut.	National Army
E. Rust	Clerk	2nd Lieut.	National Army
L. F. Taylor	Clerk	2nd Lieut.	Cavalry O. R. C.
Ernest D. Clabaugh		2nd Lieut.	E. O. R. C.
H. E. Holt		2nd Lieut.	E. O. R. C.
R. A. Williamson		2nd Lieut.	O. M. Corps
G. B. Blanchard		2nd Lieut.	Infantry
N. W. Bolling		2nd Lieut.	O. M. Corps
E. B. Phillips		2nd Lieut.	E. O. R. C.
F. L. LaRue		2nd Lieut.	315th Engrs.
E. H. Shaugnessy		2nd Lieut.	Infantry
G. C. Benedict		2nd Lieut.	O. R. C.
William Oliver		2nd Lieut.	Field Artillery
R. E. Butcher	Asst. Eng.	2nd Lieut.	U. S. Navy
F. Carter		Ensign	U. S. Navy
D. S. Hamm		Ensign	U. S. Navy
H. S. Teague		Ensign	U. S. Navy
W. E. Henderson		Ensign	U. S. Navy

Officers who received commissions..... 3
 Employees who received commissions..... 94
 Number of employees volunteering or drafted..... 2,903
 Total number of employees in government service..... 3,000

Atlantic Coast Line

Name	Railroad Position	Military Rank	Branch of Service
V. R. King	Supt.	Major	Ord. Dept.

EMPLOYEES WHO RECEIVED COMMISSIONS

L. B. Ingram	Clerk	Captain	Infantry
Chas. D. O'Neal	Asst. C. C.	1st Lieut.	Infantry
Branz Mayer	Tel. Maintainer	1st Lieut.	Am. Eng. Forces
Alvin C. McCall	Surgeon	1st Lieut.	M. O. R. C.
Roland S. Clinton	Surgeon	1st Lieut.	M. O. R. C.
Wm. L. Aley	Civil Engr.	1st Lieut.	U. S. Reserves
Paul L. Cantwell	Clerk	1st Lieut.	Engrs.
Wm. A. Peschaut	Draftsman	1st Lieut.	Engrs.
M. B. Cavenaugh	Clerk	1st Lieut.	
L. L. Galloway	Clerk	1st Lieut.	Infantry
McC. B. Wilson	Clerk	1st Lieut.	Engrs.
Geo. E. Knox	Asst. Eng.	1st Lieut.	Engrs.
Robt. M. Marye	Res. Engr.	1st Lieut.	Artillery
T. L. Harris	Clerk	1st Lieut.	O. R. C.
B. Coleman	Clerk	1st Lieut.	Field Artillery
M. M. Green	Gen. Yd. Master	1st Lieut.	Engrs.
E. H. Whitaker	Clerk	2nd Lieut.	O. M. Dept.
Wm. R. Chisholm	Clerk	2nd Lieut.	Artillery
T. Robinson	Tel. Maintainer	2nd Lieut.	Infantry
S. J. Ives	Clerk	2nd Lieut.	Artillery
C. B. Moore	Levelman	2nd Lieut.	Engrs.
Wm. A. Marshall	Clerk	2nd Lieut.	O. R. C.
B. H. Taylor	Stenographer	2nd Lieut.	O. R. C.
P. J. Paschon	Clerk	2nd Lieut.	O. R. C.
C. F. Andrews	Clerk	2nd Lieut.	
J. F. Clowe	Clerk	2nd Lieut.	Infantry
Walter C. Sanders	Draftsman	2nd Lieut.	O. R. C.
H. H. Mansfield	Inspector	2nd Lieut.	305th Engrs.
Las. E. Jeffords	Asst. Engr.	2nd Lieut.	Engrs.
W. C. Barrow	Ch. Clerk	2nd Lieut.	Infantry
H. B. Barrow	Clerk	2nd Lieut.	Infantry
S. W. Graham	Chief Act.	2nd Lieut.	Artillery
A. B. Ester	Dispatcher	2nd Lieut.	Russ. Ry. Corps
C. G. Grigg	Dispatcher	2nd Lieut.	Russ. Ry. Corps
A. C. Hick	Operator	2nd Lieut.	21st Engrs.
Rev. Oates Hill	Sec. to Gen. Supt.	Ensign	U. S. Navy

Officers who received commissions..... 1
 Employees who received commissions..... 36
 Number of employees volunteering or drafted..... 723
 Total number of employees in government service..... 760

The Baltimore and Ohio

OFFICERS WHO RECEIVED COMMISSIONS

Name	Railroad Position	Military Rank	Branch of Service
R. A. Grammes	Asst. Supt.	Major	Ord. Dept.
J. B. Jenkins	Val. Eng.	Major	Engr. Corps
H. H. Doyd, Jr.	Gen. Atty.	Captain	Artillery
Richard Brooke	Div. Engr.	Captain	Engr. Corps
W. E. Campbell	Supt. Pass. Serv.	1st Lieut.	Signal Corps
C. R. Elkins	Spec. Rep. of G.M.	1st Lieut.	Naval R. C.
J. J. McGuire	M. M.	1st Lieut.	Engr. Corps
A. S. Bowie	Asst. Gen. Atty.	2nd Lieut.	Artillery

EMPLOYEES WHO RECEIVED COMMISSIONS

C. Edgar	Transitman	Major	Artillery
R. E. Lamphers	Asst. Eng.	Captain	W. M. O. R. C.
W. V. Sinpley	Pass. Agt.	Major	O. M. Corps
Herbert Corkran	Clerk	Captain	O. M. Corps
J. S. Walton	Transitman	Captain	Engr. O. R. C.
W. W. Gruber	Ch. of Party	Captain	308th Engrs.
H. Craig	Roadman	Captain	Inf. T. C.
A. M. Davison	Asst. Eng. MotW.	Captain	Inf. T. C.
G. F. Farlow	Asst. Eng. MotW.	Captain	Off. T. C.
T. S. Pattison	Asst. Div. Eng.	Captain	Engr. Corps
J. J. McDonough	Ch. Supt. Shops	Captain	E. O. R. C.
Thos. Morrow	Clerk	Captain	Artillery
C. S. Roberts	Clerk	1st Lieut.	Aviation
W. C. Robinson	Clerk	1st Lieut.	Infantry
W. W. Gwaltney	Field Eng.	1st Lieut.	308th Engrs.
E. J. Burke	Field Eng.	1st Lieut.	308th Engrs.
F. G. Ash	Stenographer	1st Lieut.	Infantry
J. C. Brady	Draftsman	1st Lieut.	30th Engrs.
Thos. Hampton	Transitman	1st Lieut.	23rd Engrs.
W. K. Heblen	Ch. of Party	1st Lieut.	308th Engrs.
W. H. Briscoe	Transitman	1st Lieut.	21st Engrs.
R. E. Kennedy	Pilot Eng.	1st Lieut.	Machine Gun Bat.
Dr. Ino. F. Byrne	Asst. Med. Exam. 1st Lieut.	1st Lieut.	Med. Off. R. C.
Dr. A. E. Callahan	Asst. Med. Exam. 1st Lieut.	1st Lieut.	Med. Off. R. C.
C. S. Woolford	Asst. Trf. Agt.	1st Lieut.	Signal Corps
A. C. Spurr	Ch. Facilities Bu.	1st Lieut.	21st Ry. Engrs.
McDevitt, Jr.	Sec. to Ind. Agt.	1st Lieut.	Aviation
E. B. Ritchie	Sec. Pass. Dept.	1st Lieut.	Ord. Dept.
A. C. Canzani	Roadman	1st Lieut.	Ord. Dept.
H. B. Gaither	Pc. Wk. Insp.	1st Lieut.	Engr. R. C.
W. W. Baldwin	Roadman	1st Lieut.	Infantry
W. S. Hoover	Supt. Police	1st Lieut.	Infantry
H. D. Stem	Asst. Fng. MotW.	1st Lieut.	Inf. T. C.
D. C. Elphinstone	Asst. Yd. Mast.	1st Lieut.	Signal Corps
Wm. C. Robinson	Clerk	1st Lieut.	Infantry
L. R. Chambers	Clerk	1st Lieut.	Cavalry
E. M. Boyd	T's man, MotW.	1st Lieut.	Infantry
F. C. Mellon	Inspector	Lieut.	Infantry
Jesse Gover	Field Eng.	Lieut.	E. O. R. C.
E. B. Erickson	Draftsman	Ensign	U. S. Navy
T. D. Sullivan	Supt. Police	Ensign	U. S. Navy
R. M. VanSant	Editor, Emply's Mag.	2nd Lieut.	Infantry
L. A. Smith	Levelman	2nd Lieut.	Reg. Army
P. A. Helmbold	Draftsman	2nd Lieut.	Reg. Army
F. M. Crist	Transitman	2nd Lieut.	Reg. Army
A. F. Rutter	Field Eng.	2nd Lieut.	Infantry
E. M. Hinchman	Typographer	2nd Lieut.	Nat'l Army
Geo. N. Holman	Accountant	2nd Lieut.	Infantry
Donald Wilson	Ch. of Party	2nd Lieut.	Infantry
H. H. Pfaff	Field Eng.	2nd Lieut.	306th Engrs.
S. T. W. Green	Draftsman	2nd Lieut.	Engr. Corps
Asa Needham	Abstractor	2nd Lieut.	24th Engrs.
H. F. Bucher	Draftsman	2nd Lieut.	2nd Engrs.
T. C. Gerber	Typographer	2nd Lieut.	Infantry
A. J. Janushek	Pilot Engr.	2nd Lieut.	Engr. Corps
W. E. Robinson	Draftsman	2nd Lieut.	Infantry
W. C. Linthicum	Clerk	2nd Lieut.	O. M. Corps
C. I. Edwards	Ch. Per. Op. Bu.	2nd Lieut.	Artillery
R. I. Offutt	Asst. Div. Engr.	2nd Lieut.	Inf. T. C.
R. I. Offutt	Machinist	2nd Lieut.	Engr. Corps
F. R. Cross	Asst. Atty.	2nd Lieut.	Artillery

Officers who received commissions..... 8
 Employees who received commissions..... 61
 Number of employees volunteering or drafted..... 1,691
 Total number of employees in government service..... 1,760

Bangor & Aroostook

Total number of employees in government service..... 75

Bessemer & Lake Erie

EMPLOYEES WHO RECEIVED COMMISSIONS

Name	Railroad Position	Military Rank	Branch of Service
O. M. Thompson	Clerk	Captain	U. S. Army
F. L. Ruffing	Cashier	1st Lieut.	U. S. Army

Employees who received commissions..... 2
 Number of employees volunteering or drafted..... 2
 Total number of employees in government service..... 222

Boston & Albany

OFFICERS WHO RECEIVED COMMISSIONS

Name	Railroad Position	Military Rank	Branch of Service
Dwight S. Brigham	Trainmaster	Major	Ry. Engrs.

EMPLOYEES WHO RECEIVED COMMISSIONS

E. P. Morrison	Sec. to Gen. Supt.	Capt. & Adj.	Ry. Engrs.
Robert G. Henderson	Clerk	Captain	Ry. Engrs.
E. H. Smith		1st Lieut.	Ry. Engrs.
E. D. Collamer		1st Lieut.	Ry. Engrs.
George M. Trumbull		2nd Lieut.	Ry. Engrs.

Officers who received...
Final year's who received...
Number of employees...
Total number of employees...

Boston and Maine

EMPLOYEES WHO RECEIVED COMMERCIAL

Table with 3 columns: Name, Position, Salary. Includes B. W. Coffey.

EMPLOYEES WHO RECEIVED COMMERCIAL

Table with 3 columns: Name, Position, Salary. Includes F. T. Shelton, R. A. H. ...

Employees who received...
Number of employees...
Total number of employees...

Buffalo & Susquehanna

Total number of employees in possession...

Buffalo, Rochester & Pittsburgh

EMPLOYEES WHO RECEIVED COMMERCIAL

Table with 3 columns: Name, Position, Salary. Includes F. J. Barker, J. J. Aves...

Employees who received...
Number of employees...
Total number of employees...

Cape Girardeau Northern

EMPLOYEES WHO RECEIVED COMMERCIAL

Table with 3 columns: Name, Position, Salary. Includes Herbert F. Wickham.

Employees who received...
Number of employees...
Total number of employees...

Carolina, Clinchfield & Ohio

EMPLOYEES WHO RECEIVED COMMERCIAL

Table with 3 columns: Name, Position, Salary. Includes Frank P. M. Fwen, R. J. M. B. ...

Employees who received...
Number of employees...
Total number of employees...

Central of Georgia

Total number of employees in possession...

Central of New Jersey

EMPLOYEES WHO RECEIVED COMMERCIAL

Table with 3 columns: Name, Position, Salary. Includes J. L. Jones, T. V. H. ...

Employees who received...
Number of employees...
Total number of employees...

Central Vermont

EMPLOYEES WHO RECEIVED COMMERCIAL

Table with 3 columns: Name, Position, Salary. Includes J. T. ...

Employees who received...
Number of employees...
Total number of employees...

Charlotte and Western Carolina

Table with 3 columns: Name, Position, Salary. Includes Charlotte Harner...

Charlotte Harbor & Northern

Table with 3 columns: Name, Position, Salary. Includes Charlotte Harbor...

Chesapeake & Ohio

Table with 3 columns: Name, Position, Salary. Includes Chesapeake...

Table with 3 columns: Name, Position, Salary. Includes Chesapeake...

Table with 3 columns: Name, Position, Salary. Includes Chesapeake...

Table with 3 columns: Name, Position, Salary. Includes Chesapeake...

Table with 3 columns: Name, Position, Salary. Includes Chesapeake...

The Chesapeake & Atlantic

Table with 3 columns: Name, Position, Salary. Includes Chesapeake...

Table with 3 columns: Name, Position, Salary. Includes Chesapeake...

Table with 3 columns: Name, Position, Salary. Includes Chesapeake...

Table with 3 columns: Name, Position, Salary. Includes Chesapeake...

Table with 3 columns: Name, Position, Salary. Includes Chesapeake...

Chicago & Eastern Illinois

Table with 3 columns: Name, Position, Salary. Includes Chicago...

Table with 3 columns: Name, Position, Salary. Includes Chicago...

Table with 3 columns: Name, Position, Salary. Includes Chicago...

Table with 3 columns: Name, Position, Salary. Includes Chicago...

Table with 3 columns: Name, Position, Salary. Includes Chicago...

Table with 3 columns: Name, Position, Salary. Includes Chicago...

Chicago & North Western

Table with 3 columns: Name, Position, Salary. Includes Chicago...

Table with 3 columns: Name, Position, Salary. Includes Chicago...

Table with 3 columns: Name, Position, Salary. Includes Chicago...

Table with 3 columns: Name, Position, Salary. Includes Chicago...

Table with 3 columns: Name, Position, Salary. Includes Chicago...

Table with 3 columns: Name, Position, Salary. Includes Chicago...

Chicago, Milwaukee & St. Paul

(Incomplete)

OFFICERS WHO RECEIVED COMMISSIONS

Table listing officers who received commissions for Chicago, Milwaukee & St. Paul, including names, positions, ranks, and branches of service.

Table listing officers who received commissions for Chicago, Milwaukee & St. Paul, including names, positions, ranks, and branches of service.

EMPLOYEES WHO RECEIVED COMMISSIONS

Table listing employees who received commissions for Chicago, Milwaukee & St. Paul, including names, positions, ranks, and branches of service.

Chicago, Burlington & Quincy

OFFICERS WHO RECEIVED COMMISSIONS

Table listing officers who received commissions for Chicago, Burlington & Quincy, including names, positions, ranks, and branches of service.

EMPLOYEES WHO RECEIVED COMMISSIONS

Table listing employees who received commissions for Chicago, Burlington & Quincy, including names, positions, ranks, and branches of service.

Chicago, Peoria & St. Louis

OFFICERS WHO RECEIVED COMMISSIONS

Table listing officers who received commissions for Chicago, Peoria & St. Louis, including names, positions, ranks, and branches of service.

Chicago, Rock Island & Pacific

OFFICERS WHO RECEIVED COMMISSIONS

Table listing officers who received commissions for Chicago, Rock Island & Pacific, including names, positions, ranks, and branches of service.

EMPLOYEES WHO RECEIVED COMMISSIONS

Table listing employees who received commissions for Chicago, Rock Island & Pacific, including names, positions, ranks, and branches of service.

Chicago Great Western

OFFICERS WHO RECEIVED COMMISSIONS

Table listing officers who received commissions for Chicago Great Western, including names, positions, ranks, and branches of service.

EMPLOYEES WHO RECEIVED COMMISSIONS

Table listing employees who received commissions for Chicago Great Western, including names, positions, ranks, and branches of service.

Chicago, St. Paul, Minneapolis & Omaha

OFFICERS WHO RECEIVED COMMISSIONS

Table listing officers who received commissions for Chicago, St. Paul, Minneapolis & Omaha, including names, positions, ranks, and branches of service.

EMPLOYEES WHO RECEIVED COMMISSIONS

Table listing employees who received commissions for Chicago, St. Paul, Minneapolis & Omaha, including names, positions, ranks, and branches of service.

Chicago, Indianapolis & Louisville

EMPLOYEES WHO RECEIVED COMMISSIONS

Table listing employees who received commissions for Chicago, Indianapolis & Louisville, including names, positions, ranks, and branches of service.

Name	Railroad Position	Military Rank	Regiment	Service
Wm. G. Kuhfeld	S. H. I.			
C. H. Sorenson	Assistant			
J. V. Matthews	Asst. B. M.			
Everet S. Peters	Asst. B. M.			
M. S. Vandresnar	Inspector			
Peter Copeland	Inspector			
Fred A. Dietz	Inspector	1st Lieut.		
H. S. Bronson	Inspector	1st Lieut.		
L. C. Fitzgerald	Inspector	1st Lieut.		
A. E. Lamb	Inspector	1st Lieut.		
F. B. Byers	Inspector	1st Lieut.		
J. W. Ryan	Inspector	1st Lieut.		
R. T. Rodgers	Inspector	1st Lieut.		
C. M. Dugan	Inspector	1st Lieut.		
W. W. Grease	Inspector	1st Lieut.		

Officers who received commissions
 Number of employees who received commissions
 Total number of employees who received commissions

Chicago, Terre Haute & Southeastern

Name	Railroad Position	Military Rank	Regiment	Service
A. Link	Inspector			
A. Leub	Inspector			

Cincinnati, Indianapolis & Western

Name	Railroad Position	Military Rank	Regiment	Service
Chas. G. Moore	Inspector	1st Lieut.		

Officers who received commissions
 Number of employees who received commissions
 Total number of employees who received commissions

Cincinnati Northern

Name	Railroad Position	Military Rank	Regiment	Service
Arthur Berthold	Inspector	1st Lieut.		

Officers who received commissions
 Number of employees who received commissions
 Total number of employees who received commissions

The Cleveland, Cincinnati, Chicago & St. Louis

Name	Railroad Position	Military Rank	Regiment	Service
N. R. Markle	Inspector			
C. F. Hinchman	Inspector			
J. T. Kingsley	Inspector			
O. C. Wyman	Inspector			
J. V. Fitzgerald	Inspector			
C. E. Trotter	Inspector			
Marley Maguire	Inspector			
Ray C. Norton	Inspector			
C. J. Derrick	Inspector			

Officers who received commissions
 Number of employees who received commissions
 Total number of employees who received commissions

Colorado & Southern

Name	Railroad Position	Military Rank	Regiment	Service
C. R. Rau	Inspector			
S. F. Willis	Inspector			

Officers who received commissions
 Number of employees who received commissions
 Total number of employees who received commissions

Colorado, Wyoming & Eastern

Colorado Midland

Name	Railroad Position	Military Rank	Regiment	Service
N. B. Wood	Inspector			

Officers who received commissions
 Number of employees who received commissions
 Total number of employees who received commissions

Copper River & Northwestern

Cripple Creek & Colorado Springs

Consolidated & Pennsylvania

Conemaugh Valley

Delaware & Hudson

Delaware, Lackawanna & Western

Denver & Rio Grande

Detroit & Mackinac

El Paso & Southwestern

Erie

Name	Railroad Position	Military Rank	Branch of Service
Thomas J. Jackson		1st Lieut.	165th U. S.
C. H. K. Riley		2nd Lieut.	
Walter W. Linzel		2nd Lieut.	Q. M. Corps
W. A. Frazer		2nd Lieut.	
Chas. M. Colver		2nd Lieut.	
Vincent B. Moore		2nd Lieut.	

Officers who received commissions..... 4
 Employees who received commissions..... 22
 Number of employees volunteering or drafted..... 1,349
 Total number of employees in government service..... 1,375

Escanaba & Lake Superior

Total number of employees in government service..... 4

Evansville & Indianapolis

Total number of employees in government service..... 15

Ft. Dodge, Des Moines & Southern

OFFICERS WHO RECEIVED COMMISSIONS

Name	Railroad Position	Military Rank	Branch of Service
C. E. Carson	Supt.	Captain Adj.	Engr. Corps

Officers who received commissions..... 1
 Number of employees volunteering or drafted..... 17
 Total number of employees in government service..... 18

Georgia Railroad

EMPLOYEES WHO RECEIVED COMMISSIONS

Name	Railroad Position	Military Rank	Branch of Service
A. D. Nicholson	Trav. Tariff Insp.	Captain	U. S. Reserves
G. C. McKinley	Clerk	Lieutenant	U. S. Reserves
F. S. Kagle	Agent	Lieutenant	U. S. Reserves
A. I. Bindewald	Secy. to G. F. A.	Lieutenant	U. S. Reserves
R. K. Teter	Clerk	Lieutenant	
W. M. Robinson, Jr.	Asst. Val. Engr.	Lieutenant	U. S. Reserves

Employees who received commissions..... 6

Georgia & Florida

Total number of employees in government service..... 4

Georgia, Florida & Alabama

OFFICERS WHO RECEIVED COMMISSIONS

Name	Railroad Position	Military Rank	Branch of Service
W. W. Wright	Asst. Div. Com.	1st Lieut.	Infantry

Officers who received commissions..... 1
 Number of employees volunteering or drafted..... 6
 Total number of employees in government service..... 7

Georgia Southern & Florida

EMPLOYEES WHO RECEIVED COMMISSIONS

Name	Railroad Position	Military Rank	Branch of Service
J. W. White	Com. Agt.	Captain	
C. R. Dickinson	Sol. Frt. Agt.	1st Lieut.	
J. M. Cutler, Jr.	City Ticket Agt.	2nd Lieut.	

Employees who received commissions..... 3
 Number of employees volunteering or drafted..... 60
 Total number of employees in government service..... 63

Great Northern

OFFICERS WHO RECEIVED COMMISSIONS

Name	Railroad Position	Military Rank	Branch of Service
G. H. Emerson	Gen. Mgr.	Colonel	Rus. Ry. Corps
G. S. Stewart	Gen. Supt.	Lieut. Colonel	Rus. Ry. Corps
R. D. Hawkins	Supt. of M. P.	Lieut. Colonel	Rus. Ry. Corps
E. B. Morden	Supt. of Constr.	Major	O. M. O. R. C.
J. H. Carroll, Jr.	Gen. Agt.	2nd Lieut.	Ry. Engrs.
J. C. Benson	Mast. Mech.	Captain	Rus. Ry. Corps

EMPLOYEES WHO RECEIVED COMMISSIONS

Millard A. Butler	Civil Engr.	Major	O. M. Corps
I. A. McGlogan	Asst. Supt. Tel.	Major	Russian Ry. Corp.
Walter J. Bennett	Asst. Engr.	Captain	U. S. Engrs.
F. A. Dupuis	Clerk	1st Lieut.	Infantry
M. V. Fortier	Tariff Insp.	1st Lieut.	Infantry
Lawrence Solon	Triff Insp.	1st Lieut.	Infantry
Walter L. Lewis	Dr. U. S. Man.	1st Lieut.	Field Artillery
Franklin O. Rose	Rodman	1st Lieut.	U. S. R. Engrs.
W. C. Sadler	Inst. Mail	1st Lieut.	18th Ry. Engrs.
Walter K. Tanner	Asst. Engr.	1st Lieut.	U. S. R. Engrs.
Vincent Sylhaasen	Rodman	1st Lieut.	U. S. R. Engrs.
Wm. B. Upton	Inspector	2nd Lieut.	U. S. R. Engrs.
Roy. C. Kellerman	Dr. U. S. Man.	2nd Lieut.	O. M. Corps
Bernard P. Hoey	Clerk	2nd Lieut.	Infantry
Robert Boynton	Draftsman	2nd Lieut.	Infantry
W. T. Middlebrook	Trav. Frt. Agt.	2nd Lieut.	O. M. Corps
Lyle D. Tucker	Clerk	2nd Lieut.	Q. M. Corps

Officers who received commissions..... 6
 Employees who received commissions..... 17

Great Bay & Western

Total number of employees in government service..... 22

Gulf, Florida & Alabama

Total number of employees in government service..... 40

Elgin, Joliet & Eastern

EMPLOYEES WHO RECEIVED COMMISSIONS

Name	Railroad Position	Military Rank	Branch of Service
Chas. R. Woods	Land Appraiser	2nd Lieut.	E. O. R. C.
Otto E. Lindgren	Clerk	Adj. Lieut.	National Guard

Employees who received commissions..... 2
 Number of employees volunteering or drafted..... 317
 Total number of employees in government service..... 319

Gulf, Mobile & Northern

Total number of employees in government service..... 67

Gulf, Texas & Western

Total number of employees in government service..... 5

Illinois Central System

OFFICERS WHO RECEIVED COMMISSIONS

Name	Railroad Position	Military Rank	Branch of Service
C. L. Bent	Insp. Service	Major	
W. G. Van Winkle	Asst. Eng. MotW	Captain	
R. L. Walshe	Term. Supt.	Captain	
W. M. Vanderluis	Sig. Engr.	Captain	

EMPLOYEES WHO RECEIVED COMMISSIONS

Dr. Battle Malone	Div. Surgeon	Major	
Dr. J. J. Robert	Dist. Surgeon	Major	
G. Wildes	Agent	Captain	
W. H. Wilson	Gen. Y. Master	Captain	
R. L. Montgomery	Agent	Captain	
F. P. Varnado	Brakeman	Captain	
S. C. Jump	Asst. Engr.	Captain	
J. M. Farrin	Asst. Engr.	Captain	
C. G. Bryan	Asst. Engr.	Captain	
C. P. Fantz	Asst. Engr.	Captain	
J. W. Moore	Asst. Engr.	Captain	
A. W. Whaler	Asst. Engr.	Captain	
S. M. Sherman	Chief Draftsman	Captain	
Dr. H. Laten	Dist. Surgeon	Captain	
Dr. L. W. Barksdale	Dist. Surgeon	Captain	
Dr. L. L. Parsons	Dist. Surgeon	Captain	
Dr. F. T. Fort	Dist. Surgeon	Captain	
Dr. L. A. Essminger	Dist. Surgeon	Captain	
Dr. J. P. Lord	Dist. Surgeon	Captain	
Geo. T. Sheehan	Yd. Master	1st Lieut.	
O. B. Quinn	Timekeeper	1st Lieut.	
E. W. Romberger	Timekeeper	1st Lieut.	
R. W. Sanders	Gen. Foreman	1st Lieut.	
F. P. Nash	Gen. Foreman	1st Lieut.	
R. F. Dusenberry	Brakeman	1st Lieut.	
G. M. Anderton	Asst. Engr.	1st Lieut.	
A. King	Asst. Engr.	1st Lieut.	
F. I. Stephenson	Draftsman	1st Lieut.	
A. C. Cox	Draftsman	1st Lieut.	
F. A. Stone	Draftsman	1st Lieut.	
J. R. Roll	Draftsman	1st Lieut.	
T. Clabby	Draftsman	1st Lieut.	
E. W. Bullard	Bldg. Insp.	1st Lieut.	
W. E. Meisenhelder	Computer	1st Lieut.	
O. H. Waincott	Clerk	1st Lieut.	
John S. McVee	Dist. Surgeon	1st Lieut.	
Dr. E. G. Thompson	Dist. Surgeon	Lieut.	
Dr. M. Etherton	Dist. Surgeon	Lieut.	
J. A. Hutton	Engine For.	2nd Lieut.	
C. F. Kratz	Timekeeper	2nd Lieut.	
H. S. Goldman	Draftsman	2nd Lieut.	
F. L. Phipps	Draftsman	2nd Lieut.	
E. M. Bandli	Draftsman	2nd Lieut.	
C. Van Gundy	Draftsman	2nd Lieut.	
I. W. Kern, Jr.	Gen. Foreman	2nd Lieut.	
S. B. Christopher	Resident Engr.	2nd Lieut.	
T. S. Dillon	Masonry Insp.	2nd Lieut.	
W. B. Apperson	Masonry Insp.	2nd Lieut.	
E. B. Styles	Masonry Insp.	2nd Lieut.	
L. W. Warfel	Computer	2nd Lieut.	
J. E. Donker	Car Repairer	2nd Lieut.	
J. R. Blachflower	Travel. Aud.	2nd Lieut.	
A. D. McGee	Claim Agent	2nd Lieut.	
W. B. Livingston	Claim Agent	2nd Lieut.	
Geo. S. Michnard	Clerk	2nd Lieut.	

Officers who received commissions..... 2
 Employees who received commissions..... 55
 Number of employees volunteering or drafted..... 1,837
 Total number of employees in government service..... 1,916

International & Great Northern

OFFICERS WHO RECEIVED COMMISSIONS

Name	Railroad Position	Military Rank	Branch of Service
H. C. Dinwiddie	Gen. Act.	Captain	O. M. Corps
A. D. Pinkerton	Com. Agt.	2nd Lieut.	G. M. Dept.

EMPLOYEES WHO RECEIVED COMMISSIONS

J. W. King	Div. Frt. Act.	Captain	O. M. Corps
Geo. B. Heller	Ch. Tr. Aud.	Captain	O. M. Corps
Chas. R. Stewart	Brakeman	Captain	Infantry
Harry V. Fletcher	Draftsman	1st Lieut.	
Edw. R. Daltrey	Ch. Frt. Act.	1st Lieut.	Infantry
B. B. Brown	Secy. to G. M.	2nd Lieut.	O. M. Corps
H. P. Hoffmaster	Tr. Clerk	2nd Lieut.	O. M. Corps

New York, New Haven & Hartford

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists personnel including A. G. Greuciseth, G. J. Hinton, F. S. Patton, etc.

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists officers who received commissions including P. J. Kearney.

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists employees who received commissions including R. M. Lawton, F. E. Hanson, etc.

Missouri, Kansas & Texas

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists personnel including E. V. McGinnis, R. C. Meeks, etc.

Mobile & Ohio

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists personnel including H. Anstall.

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists officers who received commissions including W. W. Meyer, etc.

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists employees who received commissions including Woolsey Fennell, etc.

New York, Ontario & Western

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists personnel including Harry C. Carpenter, B. E. Brown, etc.

Monongahela

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists personnel including H. M. Crawford, E. L. Clemmer, etc.

Norfolk & Western

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists personnel including W. D. Cardwell.

New Orleans Great Northern

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists personnel including Jas. W. Vaughn, Herbert H. Lester, etc.

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists employees who received commissions including C. Masse, A. J. Carter, etc.

New York Central Railroad

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists personnel including D. W. Smith, R. H. Erwin, etc.

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists employees who received commissions including Jos. E. Moore, A. H. Tabor, etc.

New York, Chicago & St. Louis

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists personnel including H. N. Williams, C. E. Denney, etc.

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Lists officers who received commissions including R. D. Burdick, R. W. Parkhurst, etc.

Name	Position	Military Rank	Branch of Service	Name	Railroad Position	Military Rank	Branch of Service
Robt. H. Reynolds	Power Plant Eng.	Captain	116th U. S. Inf.	E. A. Morris	Clerk	2nd Lieut.	111th U. S. Inf.
F. S. Robins	Asst. Mast. Mech.	Captain	19th Ry. Engrs.	John W. Murray	Chief Clerk	2nd Lieut.	Off. Res. Corps
Clarence Roberts	Asst. R. F. of E.	Captain	21st Ry. Engrs.	Herman S. Noll	Brakeman	2nd Lieut.	U. S. Field Art.
David M. Salter	Shop Foreman	Captain	110th M. G. Bat.	Chas. D. Nordhump	Fireman	2nd Lieut.	114th U. S. Inf.
John Schulze	Clerk	Captain	U. S. Trans. Ser.	R. H. Nottingham	Clerk	2nd Lieut.	114th U. S. Inf.
R. M. Smith	Asst. R. F. of E.	Captain	35th Ry. Engrs.	W. Lincoln Paul	Stenographer	2nd Lieut.	Off. Res. Corps
G. S. Stewart	Stenographer	Captain	10th U. S. F. A.	A. W. Penrose	Clerk	2nd Lieut.	314th U. S. Inf.
Arcie M. Stinson	Main Foreman	Captain	112th U. S. Inf.	I. E. Potter	Asst. Med. Exam.	2nd Lieut.	U. S. Navy
J. W. Thompson	Clerk	Captain	D't Br., 28th Div.	S. S. Richards	Apprentice	2nd Lieut.	314th U. S. Inf.
Chas. A. Walter	Chief Clerk	Captain	Engrs. O. R. C.	Blight R. Robinson	Sig. Apprentice	2nd Lieut.	Off. Res. Corps
E. B. Whitman	Asst. R. F. of E.	Captain	Ord. Dpt., U.S.A.	J. L. Ross	Clerk	2nd Lieut.	110th U. S. Inf.
E. W. Barr	Shop Inspector	1st Lieut.	Med. C., U.S.A.	G. H. Schlottler	Rodman	2nd Lieut.	104th U. S. Engrs.
Rudolph Bloom	Asst. Med. Exam.	1st Lieut.	Med. C., U.S.A.	F. S. Schmitt	S. H.	2nd Lieut.	1st U. S. Inf.
C. G. Boffenmyer	Inspector	1st Lieut.	19th Ry. Engrs.	R. D. Schweitzer	Car Repairman	2nd Lieut.	314th U. S. Inf.
Basil S. Bowles	Clerk	1st Lieut.	113th U. S. Inf.	E. S. Shaw	Clerk	2nd Lieut.	Off. Res. Corps
F. E. DeCard	Asst. Foreman	1st Lieut.	Med. O. R. C.	I. G. Sheaffer	Spec. Apprentice	2nd Lieut.	19th Ry. Engrs.
J. G. Dennis	Train Despatcher	1st Lieut.	413th Teleg. Bat.	H. W. Shoemaker	Clerk	2nd Lieut.	Off. Res. Corps
F. S. Dickson, Jr.	Safety Inspector	1st Lieut.	35th Ry. Engrs.	Herman Sloan	Clerk	2nd Lieut.	109th U. S. Inf.
John C. Diehl	Chief Draughtsman	1st Lieut.	Engrs. O. R. C.	F. G. Smith	Clerk	2nd Lieut.	Off. Res. Corps
F. H. Dryden	Asst. Div. Eng.	1st Lieut.	U. S. Engrs.	I. G. Somerville	Rodman	2nd Lieut.	U. S. Mar. Corps
H. H. Dravo	Foreman	1st Lieut.	21st Ry. Engrs.	Geo. O. Tighman	Draughtsman	2nd Lieut.	Off. Res. Corps
G. E. Fetterman	Asst. Ind. Act.	1st Lieut.	313th U. S. Inf.	H. E. Walberg	Clerk	2nd Lieut.	U. S. Avia. Corps
William P. Gleason	Draughtsman	1st Lieut.	O. M. Corps	C. Charles Weiss	Rodman	2nd Lieut.	304th U. S. Engrs.
W. A. Heywood, Jr.	Clerk	1st Lieut.	Engrs. O. P. C.	K. S. Whittemore	Tracer	2nd Lieut.	Off. Res. Corps
E. W. Horton	Clerk	1st Lieut.	113th U. S. Inf.	Chas. S. Wilson	Conductor	2nd Lieut.	Off. Res. Corps
A. S. Howard	Clerk	1st Lieut.	114th U. S. Inf.	Marshall S. Wilson	Conductor	2nd Lieut.	O. M. Corps
R. Hunter	Lineman	1st Lieut.	114th U. S. Inf.	Geo. L. Winslow	Rodman	2nd Lieut.	303rd U. S. Engrs.
H. Kiesel	Shop Inspector	1st Lieut.	21st Ry. Engrs.	P. J. Sweeney	Special Agent	2nd Lieut.	110th U. S. Inf.
Chas. A. Kline	Pass. Conductor	1st Lieut.	101st U. S. Cav.	Louis L. Derismond	J. C. Conductor	2nd Lieut.	11th Supt. Div.
E. S. McCormick	Train Despatcher	1st Lieut.	413th Teleg. Bat.	R. D. Benson, Jr.	Stenographer	Ensign	U. S. Navy
Chas. E. McCullough	Dist. Pass. Solic.	1st Lieut.	103rd Avia. Corps	Wilbur H. Conover	Tug Captain	Ensign	Pay Corps, U.S.N.
F. Mackey	Asst. Foreman	1st Lieut.	19th Ry. Engrs.	H. L. Donatelli	Exp. Agent	Ensign	Pay Corps, U.S.N.
T. L. Mailand	Foreman	1st Lieut.	21st Ry. Engrs.	M. P. Grady	Gen. Foreman	Ensign	U. S. Navy
James M. Morris	Asst. Mast. Mech.	1st Lieut.	21st Ry. Engrs.	F. E. Selman	M. P. Inspector	Ensign	U. S. Navy
Stephen H. Noves	Clerk	1st Lieut.	18th U. S. Aero Sq.	Benj. M. Snyder	Rodman	Ensign	U. S. Navy
W. C. Penney	Chief Clerk	1st Lieut.	19th U. S. Inf.	W. Spenser, Jr.	Inspector	Ensign	U. S. Navy
H. H. Pinter	Train Despatcher	1st Lieut.	413th Teleg. Bat.	Leon C. Stroth	Clerk	Ensign	U. S. Navy
W. M. Pomeroy	Frt. Solicitor	1st Lieut.	Ord. Dpt., U.S.A.				
J. V. Reaph	Clerk	1st Lieut.	% Dir. G. Rys. Fr.				
G. T. Richers	Asst. Mast. Mech.	1st Lieut.	10th U. S. Inf.				
C. C. Rill	Trainmaster	1st Lieut.	21st Ry. Engrs.				
Wm. R. Rothe	Asst. Med. Exam.	1st Lieut.	U. S. Med. R. C.				
Chas. R. Rowan	Inspector	1st Lieut.	110th U. S. Inf.				
B. Rudd	Asst. R. F. of E.	1st Lieut.	19th Ry. Engrs.				
I. B. Shiner	Chief Clerk	1st Lieut.	U. S. Sig. Corps				
Herman Sloan	Clerk	1st Lieut.	109th U. S. Inf.				
C. K. Steins	Spec. App.	1st Lieut.	19th Ry. Engrs.				
Paul Tanner	Foreign Frt. Sol.	1st Lieut.	Ord. Dpt., U.S.A.				
H. M. Taylor	Clerk	1st Lieut.	U. S. Inf.				
G. L. Tilbrook	Rodman	1st Lieut.	10th U. S. A'ro Sq.				
A. C. Tollinger	Asst. Sta. Master	1st Lieut.	Nav. Ct. De. Res.				
W. R. Wadsworth, Jr.	Clerk	1st Lieut.	112th U. S. Inf.				
William Welch	Chief Clerk	1st Lieut.	114th U. S. Inf.				
E. A. Wightman	Motive Pow. Insp.	1st Lieut.	19th Ry. Engrs.				
Robert Woodcock	Asst. Supervisor	1st Lieut.	111th U. S. Inf.				
H. C. Wright	Account Clerk	1st Lieut.	115th U. S. Inf.				
Edgar Anderson	Clerk	2nd Lieut.	14th U. S. Inf.				
L. A. Appleton	Yard Clerk	2nd Lieut.	21st Ry. Engrs.				
E. S. Barrett	Collector	2nd Lieut.	U. S. Army				
M. W. Bartlett	Usher	2nd Lieut.	Off. Res. Corps				
M. R. Bingham	Clerk	2nd Lieut.	315th U. S. Inf.				
Donald S. Bixler	Asst. Inspector	2nd Lieut.	413th Teleg. Bat.				
R. A. Bixler	Clerk	2nd Lieut.	Off. Res. Corps				
F. C. Bowersox	Clerk	2nd Lieut.	115th U. S. Inf.				
C. B. Brewer	Asst. Supervisor	2nd Lieut.	Engrs. O. R. C.				
C. G. Brown	Spec. Apprentice	2nd Lieut.	9th Ry. Engrs.				
Edward H. Brown	Clerk	2nd Lieut.	7th U. S. Inf.				
F. R. Burgard	Pass. Brakeman	2nd Lieut.	28th Div. M. Pol.				
Robert T. Byron	Foreman	2nd Lieut.	35th Ry. Engrs.				
C. B. Svanberg	Clerk	2nd Lieut.	O. M. Corps				
F. T. Clayton	Stenographer	2nd Lieut.	O. M. Corps				
H. R. Condon	Asst. Forester	2nd Lieut.	10th U. S. Engrs. (Frsty.)				
W. M. Corbin	Car Repairman	2nd Lieut.	112th U. S. Inf.				
Wm. R. Cummins	Flagman	2nd Lieut.	111th U. S. Inf.				
K. N. Davis	M. P. Inspector	2nd Lieut.	Off. Res. Corps				
Warner Doran	Clerk	2nd Lieut.	Off. Res. Corps				
D. I. Douchette	Chairman	2nd Lieut.	316th U. S. Inf.				
I. E. Eckstein	Transitman	2nd Lieut.	301st U.S. Engrs.				
S. E. Fmmons	Chairman	2nd Lieut.	15th Ry. Engrs.				
Edward W. Ernie	Examiner	2nd Lieut.	O. M. Corps				
McClure Fahnestock	Inspector	2nd Lieut.	Off. Res. Corps				
Evs. Feasters	Dr. Draughtsman	2nd Lieut.	Off. Res. Corps				
H. B. Frazier	Clerk	2nd Lieut.	O. M. Corps				
R. A. Freas	Clerk	2nd Lieut.	101st U. S. Cav.				
B. Gallagher	Stenographer	2nd Lieut.	Engrs. O. R. C.				
John B. Goehne	Clerk	2nd Lieut.	104th U. S. Cav.				
Chas. M. Greeley	Special App.	2nd Lieut.	21st Ry. Engrs.				
R. C. Greenland	Chairman	2nd Lieut.	304th U.S. Engrs.				
Jas. A. Groff	Transitman	2nd Lieut.	111th U. S. Inf.				
Geo. F. Gunning	Clerk	2nd Lieut.	304th Div. Train				
E. D. Hagerty	Storekeeper	2nd Lieut.	19th Ry. Engrs.				
Frank I. Hamilton	Rodman	2nd Lieut.	311th U. S. F. A.				
A. C. Hawkins	Apprentice	2nd Lieut.	U. S. Coast Art.				
Thos. P. Haworth	Draughtsman	2nd Lieut.	104th U. S. Cav.				
William S. Hayward	Stenographer	2nd Lieut.	Off. Res. Corps				
William G. Horney	Clerk	2nd Lieut.	304th Div. Train				
S. R. Hursh	Rodman	2nd Lieut.	14th Ry. Engrs.				
R. J. Hutchins	Clerk	2nd Lieut.	Engrs. O. R. C.				
Dean C. Jenkins	Rodman	2nd Lieut.	Engrs. O. R. C.				
Perry A. Jones	Usher	2nd Lieut.	107th U. S. F. A.				
F. R. Lehman	Clerk	2nd Lieut.	Off. Res. Corps				
W. T. Kerwin	Clerk	2nd Lieut.	317th U. S. Inf.				
H. E. Leonard	Usher	2nd Lieut.	111th U. S. Inf.				
T. H. L. Lewis	Rodman	2nd Lieut.	Off. Res. Corps				
A. M. Lichtfoot	Clerk	2nd Lieut.	304th Div. Trg. Cn.				
F. K. McClintock	Inspector	2nd Lieut.	413th Teleg. Bat.				
C. B. McCollough	Draughtsman	2nd Lieut.	304th U. S. Cav.				
H. B. McCormick	Clerk	2nd Lieut.	301st Travers R. Co.				
Earl W. McKee	Draughtsman	2nd Lieut.	Engrs. O. R. C.				
Jas. S. McKee	Clerk	2nd Lieut.	315th U. S. Inf.				
John A. McManus	Clerk	2nd Lieut.	304th Div. Train				
Jas. S. Mathers	Computer	2nd Lieut.	304th Div. Tr. St.				
E. A. Morris	Clerk	2nd Lieut.	111th U. S. Inf.				
John W. Murray	Chief Clerk	2nd Lieut.	Off. Res. Corps				
Herman S. Noll	Brakeman	2nd Lieut.	U. S. Field Art.				
Chas. D. Nordhump	Fireman	2nd Lieut.	114th U. S. Inf.				
R. H. Nottingham	Clerk	2nd Lieut.	114th U. S. Inf.				
W. Lincoln Paul	Stenographer	2nd Lieut.	Off. Res. Corps				
A. W. Penrose	Clerk	2nd Lieut.	314th U. S. Inf.				
I. E. Potter	Asst. Med. Exam.	2nd Lieut.	U. S. Navy				
S. S. Richards	Apprentice	2nd Lieut.	314th U. S. Inf.				
Blight R. Robinson	Sig. Apprentice	2nd Lieut.	Off. Res. Corps				
J. L. Ross	Clerk	2nd Lieut.	110th U. S. Inf.				
G. H. Schlottler	Rodman	2nd Lieut.	104th U. S. Engrs.				
F. S. Schmitt	S. H.	2nd Lieut.	1st U. S. Inf.				
R. D. Schweitzer	Car Repairman	2nd Lieut.	314th U. S. Inf.				
E. S. Shaw	Clerk	2nd Lieut.	Off. Res. Corps				
I. G. Sheaffer	Spec. Apprentice	2nd Lieut.	19th Ry. Engrs.				
H. W. Shoemaker	Clerk	2nd Lieut.	Off. Res. Corps				
Herman Sloan	Clerk	2nd Lieut.	109th U. S. Inf.				
F. G. Smith	Clerk	2nd Lieut.	Off. Res. Corps				
I. G. Somerville	Rodman	2nd Lieut.	U. S. Mar. Corps				
Geo. O. Tighman	Draughtsman	2nd Lieut.	Off. Res. Corps				
H. E. Walberg	Clerk	2nd Lieut.	U. S. Avia. Corps				
C. Charles Weiss	Rodman	2nd Lieut.	304th U. S. Engrs.				
K. S. Whittemore	Tracer	2nd Lieut.	Off. Res. Corps				
Chas. S. Wilson	Conductor	2nd Lieut.	Off. Res. Corps				
Marshall S. Wilson	Conductor	2nd Lieut.	O. M. Corps				
Geo. L. Winslow	Rodman	2nd Lieut.	303rd U. S. Engrs.				
P. J. Sweeney	Special Agent	2nd Lieut.	110th U. S. Inf.				
Louis L. Derismond	J. C. Conductor	2nd Lieut.	11th Supt. Div.				
R. D. Benson, Jr.	Stenographer	Ensign	U. S. Navy				
Wilbur H. Conover	Tug Captain	Ensign	Pay Corps, U.S.N.				
H. L. Donatelli	Exp. Agent	Ensign	Pay Corps, U.S.N.				
M. P. Grady	Gen. Foreman	Ensign	U. S. Navy				
F. E. Selman	M. P. Inspector	Ensign	U. S. Navy				
Benj. M. Snyder	Rodman	Ensign	U. S. Navy				
W. Spenser, Jr.	Inspector	Ensign	U. S. Navy				
Leon C. Stroth	Clerk	Ensign	U. S. Navy				

The Pennsylvania Railroad Company Lines West of Pittsburgh

OFFICERS WHO RECEIVED COMMISSIONS

Name	Railroad Position	Military Rank	Branch of Service
Harry C. Oliver	Spec. Agt.	Captain	Infantry
Nettelton Neff	Supt.	Captain	16th Engrs. Res.

EMPLOYEES WHO RECEIVED COMMISSIONS

E. C. Charnock	Gen. Bookkeeper	Captain	Infantry
T. L. Taylor, Jr.	Asst. Div. Engr.	Captain	Engrs. O. R. C.
R. Haulbick	Asst. Mach.	Captain	Infantry
Chas. C. Caldwell	Janitor	Captain	9th Battalion
N. A. Powell	Asst. Engr. Corps	Captain	Infantry
Cyrus G. Young	Clerk	Captain	Field Artillery
John J. Cost	Frt. Solicitor	1st Lieut.	Cavalry
H. A. Hobson	Pilot Engr.	1st Lieut.	Engrs. T. C.
R. C. Robert Lloyd	Asst. Engr. Corps	1st Lieut.	U. S. Reserves
F. C. McFarland	Draughtsman	1st Lieut.	Officers' Reserve

Officers who receive commissions
 Employees who receive commissions
 Number of employees
 Total number of employees in government service
 Total number of employees in government service

Pere Marquette

Name	Position	Military Rank	Branch of Service
B. Johns	Gen. Freight Agent		
M. R. ...	Chief		
M. R. ...	Chief		
A. O. K...	Chief		
F. J. W. ...	Chief		
F. A. Weldon	Chief		

Philadelphia & Reading

Name	Railroad Position	Military Rank	Branch of Service
W. G. Casper	Eng. Dept. & Con. List. C.		Rail. B. Corps

Pittsburgh & Lake Erie

Name	Railroad Position	Military Rank	Branch of Service
G. J. Waddinger	Chief Clerk		
J. R. Watson	Inspection Engr. (st. Insp.)		D. M. O. R. C.
F. C. Gamsu	Draughtsman		D. M. O. R. C.

Pittsburgh & Shawmut

Name	Railroad Position	Military Rank	Branch of Service
Dwight C. Morgan	Mech. Engr.		S. O. R.
F. A. Schwidtz	Secretary		S. O. R.
O. D. Lucore	Shift Tel. & Sigs.		S. O. R.

Quincy, Omaha & Kansas City

St. Louis & Hannibal

St. Louis-San Francisco

Name	Railroad Position	Military Rank	Branch of Service
S. H.		
F. G.		
H. E.		
J. T.		
Fred		
Perry		
A. M.		
J. H.		
C. C.		
L. L.		
H. F.		
F. D.		
R. A.		
J. S.		
Sam. B.		
M. F.		
Emery		
J. D.		
L. E.		
F. J.		
R. W.		
Jas. C.		
W. F.		
W. R.		

St. Louis-Southwestern

San Antonio & Alamo River

Savannah & Atlanta

Southern Railway System

(Faded and mostly illegible text in the right half of the page, likely containing names and positions for the St. Louis-Southwestern, San Antonio & Alamo River, Savannah & Atlanta, and Southern Railway System.)

Southern Pacific Lines (Texas and Louisiana)

Spokane, Portland & Seattle

OFFICERS WHO RECEIVED COMMISSIONS

OFFICERS WHO RECEIVED COMMISSIONS

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Includes names like F. B. Irvine, E. B. Cushing, W. F. Hutson.

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Includes names like Chester K. Smith, F. A. Jeter, F. S. Barlow.

EMPLOYEES WHO RECEIVED COMMISSIONS

EMPLOYEES WHO RECEIVED COMMISSIONS

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Includes names like A. A. Riley, J. J. Cammack, M. C. Cooper.

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Includes names like H. A. Barnick, J. West, E. P. Fischer.

Officers who received commissions... 3
Employees who received commissions... 5
Number of employees volunteering or drafted... 93
Total number of employees in government service... 101

Tionesta Valley

Total number of employees in government service... 5

Toledo, Peoria & Western

OFFICERS WHO RECEIVED COMMISSIONS

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Includes M. S. Stevens.

Southern Pacific (Pacific System)

OFFICERS WHO RECEIVED COMMISSIONS

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Includes J. L. May, A. H. Babcock, J. A. Given.

Toledo, St. Louis & Western

OFFICERS WHO RECEIVED COMMISSIONS

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Includes F. M. Miller.

EMPLOYEES WHO RECEIVED COMMISSIONS

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Includes Leroy Coons.

EMPLOYEES WHO RECEIVED COMMISSIONS

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Includes R. G. Sullivan, W. O. Williams, J. K. James.

Tonopah & Goldfield

Total number of employees in government service... 1

Tonopah & Tidewater

Total number of employees in government service... 6

Union Pacific

EMPLOYEES WHO RECEIVED COMMISSIONS

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Includes C. O. Diffenderfer, H. E. McClintock, J. E. Long.

Employees who received commissions... 22
Number of employees volunteering or drafted... 1,218
Total number of employees in government service... 1,240

Vicksburg, Shreveport & Pacific

Total number of employees in government service... 21

Virginian

Total number of employees in government service... 25

Wabash

OFFICERS WHO RECEIVED COMMISSIONS

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Includes I. R. Hindley, R. A. Brown.

EMPLOYEES WHO RECEIVED COMMISSIONS

Table with 4 columns: Name, Railroad Position, Military Rank, Branch of Service. Includes H. M. Bennett, E. A. Dixon.

Officers who received commissions... 7
Employees who received commissions... 59
Number of employees volunteering or drafted... 1,808
Total number of employees in government service... 1,874

Name	Railroad Position	Military Rank	Number of Comm. (O. R. I.)
S. M. Smith	Draughtsman	1st Lieut	1
D. G. Phillips	Asst. Claim Act.	1st Lieut	1
F. H. Baird	Timekeeper	2nd Lieut	1
Geo. Rogers	Off. Engr.	2nd Lieut	1
J. J. Sullivan	Machinist	2nd Lieut	1
V. A. McCarthy	Depot Pass. Act.	2nd Lieut	1
R. F. Rawland	Draughtsman	2nd Lieut	1
E. Gaebler	Draughtsman	2nd Lieut	1
Officers who received commissions			
Employees who received commissions			
Number of employees volunteering or of			
Total number of employees in government service			

Western Maryland

Total number of employees in government service 108

Western Pacific

Total number of employees in government service 14

Wheeling & Lake Erie

Total number of employees in government service 138



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 French Railroad Guns Lined Forwardable

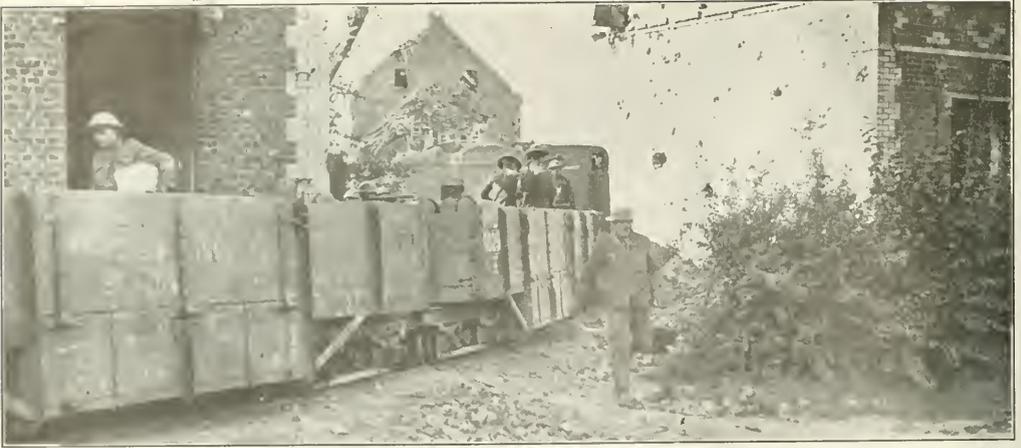
ITALIAN RAILWAY FARES INCREASED—Commencing with December 10, the Italian Government has decided to raise the price of railway fares 50 per cent. for first and second-class and 30 per cent for third-class tickets.



Copyright, Underwood & Underwood
 British Engineers Building a Railway Trestle Across the Swamps of Flanders



Photograph from Underwood & Underwood, N. Y.
 The Light Railway Is Being Laid in Every Whimsical



Ammunition Train Drawn by Canadian Armored Locomotive. (Photo from Canadian War Records Office.)

Railway Progress in Canada During the Year 1917

The Roads Have Worked Under Heavy Pressure With a Shortage of Labor; This Will Continue

By J. L. Payne,

Comptroller of Statistics, Department of Railways and Canals, Ottawa, Canada.

NOIWTHSTANDING ABNORMAL CONDITIONS, the railways of Canada did well in 1917. That is to say, they had larger gross earnings than ever before. For the statistical year 1916 they created a new record, with a total of \$263,527,157; but this year they will go considerably beyond that aggregate. The official figures, which will tell the full tale, are not yet available. The published weekly returns of the three largest lines, however—the Canadian Pacific, the Grand Trunk and the Canadian Northern—which in normal years represent nearly 80 per cent of the total for all roads, show something like \$230,000,000 for the year ended June 30 last. If the ratio of other years is maintained, it would mean that gross earnings for all lines in Canada for the year 1917 will exceed \$285,000,000. November was the best month which the Canadian Pacific has ever had, and it may be assumed with safety that all other roads have in some degree shared in the prevailing activity. Of course, there is another side to the whole matter.

Railway Mileage Has Grown Too Fast

The full significance of \$285,000,000, merely as a total of gross earnings, is not realized without a retrospective survey. Ten years ago the receipts were \$146,738,214, and a decade back of that they were but \$52,353,276. The comparison suggests remarkable progress, and, from the viewpoint of volume, that deduction is as sound as it is gratifying. But there is at least one vital qualification. The greater gain was made between 1907 and 1917; yet, when measured by the standard of mileage in operation, the betterment loses some of its seeming significance. Gross earnings per mile of line in 1897 amounted to \$3,163; in 1907 to \$6,536; and in 1917 to say \$7,300. In other words, the increase per mile for the former ten-year period was equal to 106.6 per cent, and for the latter decennial 11.7

per cent. The explanation of this striking difference between mere totals and percentages is found in the fact that in 1897 there were 16,550 miles of railway in operation in the Dominion; in 1907 there were 22,452; and in 1917 probably 38,800.

The really salient feature of Canadian railway history is the growth of mileage during the past twenty years. Extensions of old lines and the construction of new have out-run earnings per mile. This is due to the fact that optimism found expression in the rapid spreading of transportation facilities. Up to three years ago there was a universal conviction in the Dominion that the building of railways could not proceed fast enough. This was particularly true of the western provinces, into which settlers were flowing in a swelling tide. The war stopped that rush from Europe and the United States for free or cheap land, and it also brought a sharp halt to construction; but, apart from the overwhelming cataclysm which has fallen on the world, the year 1914 would have given definite warning that there had been undue haste. Railway earnings had begun to decline five months before Germany invaded Belgium. So that, if we have a railway problem in Canada today it will not be understood in its essence unless regard is had to these facts. To the main features of that problem reference will be made a little farther along.

A Busy Year For Canada

Of the character of the traffic which led to a gain of probably \$22,000,000 in earnings for the year 1917 nothing specific can be written. The facts will be disclosed in the official statistics of the Department of Railways and Canals. But, as railway executives well understand, traffic is created by commerce. One is the mere reflection of the other; and Canada has been very busy during the past year. It is no compensation in the final reckoning to know that while

for any further allusion to the matter. Government did not give effect to the majority recommendations, to the course of action proposed by Mr. Smith, nor to the voluntary advice tendered in a public way by Sir Thomas Tait and W. F. Tye. It did the one thing which was most urgent, and took over the entire Canadian Northern system, including express, telegraph, steamship, elevator and other subsidiary interests. This was done in August last so far as Parliamentary action is concerned. Without going into details which would take up considerable space, let it be said that Government has simply taken the place of Messrs. MacKenzie and Mann, the sole owners, assuming all liabilities and paying merely whatever value may be assigned to the common stock by Chief Justice Sir William Meredith and his associate arbitrators after full investigation. Actual possession will follow the arbitration proceedings.

Government already owns and operates the National Transcontinental, which was built as the Moncton-Winnipeg section of the Grand Trunk Pacific; so that Canada now takes a prominent place among nations in the matter of state ownership. The extent of that ownership may be gathered from the following summary of mileage:

Intercolonial	1,553
Prince Edward Island	275
National Transcontinental	2,002
Canadian Northern	9,600
Total	13,430

During the consideration of the Drayton-Acworth report there was considerable discussion throughout the country on the general question of nationalization. There were a few open advocates of a sweeping policy, a larger number who were in favor of taking over some, or all of the principal systems, and still many others who stood up for corporate control of all railways. The matter scarcely reached the position of a clear-cut issue. At this date of writing a general election is in progress throughout the Dominion and the entire railway question is subordinate to the war. Conscription and other vital matters growing out of Canada's participation in the great conflict command public interest to the exclusion of nearly all else.

The compensations which have come to a people agonized by losses on the battlefield are many and varied. We are learning the useful lesson, even in railway service, of what women can do when their brothers, husbands and sweethearts are called away to fight; but scarcely secondary is the discovery of the latent strength of the nation in monetary resources. There is today an outstanding liability of \$1,085,000,000 in railway bonds, and it is safe to say that 98 per cent of it is owned abroad. Whenever prior to 1914, it became necessary for any purpose whatever to borrow more than two or three million dollars Canadians appealed to London or New York—almost invariably the former. Nearly every dollar represented in the national debt came across the Atlantic. When Government found it imperative to finance part of Great Britain's war purchases in Canada it tried the seemingly hazardous experiment of borrowing at home. Up to date it has succeeded in raising nearly \$800,000,000 and has not struck bottom. The November Victory Loan was placed at \$150,000,000. The people subscribed nearly three times that sum. They are apparently good for the balance of a billion without serious inconvenience.

There has been little or no labor trouble during the year. Adjustments were made with certain classes of employees by several of the larger roads; but there was not at any time a serious menace to peaceful relations. The concessions were all on the side of higher operating cost however.

Railway Mail Pay

At this juncture the railways are appealing to the Board of Railway Commissioners for a larger allowance for the carriage of mails. They are resting their case very largely on the decision of the Interstate Commerce Commission last

year. In the United States the rates are based on 21 cents per car mile for full cars to roads which have not received state aid. In Canada the rate is 16 cents for full cars, 9 cents for half cars and 4 cents for the use of baggage cars. All roads are on the same footing. There is, however, a substantial difference in the service demanded across the boundary. In Canada the post office department supplies all the labor, both on and off the cars, except in the case of baggage cars; but, on the other hand, the railways do not receive any terminal allowances. The case is to be argued about the middle of December.

Despite the larger volume of freight traffic which the railways have been called upon to handle during the past two years immaterial additions have been made to equipment. The prudence of heavy purchase in 1912, which brought thousands of new cars into service in 1913, has been vindicated by events. The principal trouble during the past year in the car department, was in securing expeditious repairs. At times the situation in that regard was very trying.

Canadian Railway War Board

To meet extraordinary conditions growing out of the war, there was organized during the past year the Canadian Railway Association for National Defence, with headquarters in Montreal. The primary object of this organization, in which is represented the best railway judgment of all operating companies, is to develop the highest possible efficiency and co-ordination during the term of the war. Car shortage stood in the way of effective service, and the new Association at once addressed its activities toward securing a better interchange as between Canada and the United States. The balance at the outset was greatly adverse to Canada. That disability has in large measure been overcome. The next task was to increase the average carload, so as to make existing equipment give the highest possible service. Excellent results have been achieved. Collateral to carload was the important matter of reducing the time for loading and unloading, and here again co-operation has done wonders. In a word, the problem of moving traffic, in all its aspects, has received special and concentrated attention, and it can now be said that this voluntary co-operation of railways, without a penny of expense to the state, has yielded betterments which would have been beyond the power to accomplish of any extraneous body.

Looking Forward

The railways of Canada will enter upon the new year with all departments working at extreme tension. Earnings have been showing fair gains right up to the present moment, which is another way of saying that the rising freight movement persists. If these conditions are not modified ere long the car service officers will probably be compelled to call for more rolling stock. Taken altogether, the outlook is encouraging. The entrance of the United States into the war has created new business in Canada, and there are no grounds for suspecting a reduction in the volume of orders from Europe. The outflow of foodstuffs should increase. The shipment of munitions may even be raised to a larger scale. In spite of higher operating expenses the railways appear able to hold their own in the matter of net earnings. The scarcity of labor is troublesome, but is not so acute at this time as it was a year ago. Conscription, which went into effect in November, has not been hitting the railways with special severity, since they had practically let out every man who wanted to go overseas, and there is a disposition on the part of the military authorities to recognize the vital importance of preventing impairment of transportation service.

All said and done, however, there is nothing in either present conditions or prospects which suggests lighter burdens for those upon whose shoulders rests the grave responsibility of keeping the great railway machine up to the highest standards of efficiency at this period of infinite crisis.

New Railway Construction in Foreign Countries

Opportunities for Railway Supply Men Good in South America
Projects in Asia and Africa

By P. Harvey Middleton
Executive Assistant, Railway Business Association

BUILDING RAILWAYS IN STRANGE LANDS is a peculiarly American occupation. Since William Wheelwright built the first railway on the South American continent in 1851—a short line in Chile—our railway engineers have constructed lasting memorials to American genius in every corner of the globe. A legend made by Wheelwright to his native city is to this day used to send the ambitious youth of Newburyport to the Massachusetts Institute of Technology. Hailed as foolish dreamers by natives who thought their catarrhs and jungle swamps and mountains, offered insurmountable tasks to railroad construction, the American railroad builders calmly proceeded to convert their dreams into realities.

From Alaska to Zanzibar American built railroads are in operation. Meiggs and Thorndike American engineers constructed the famous Oroya Railroad in Peru, which reaches an elevation of 15,000 feet, and where the roadbed for miles was carried through galleries cut in the face of the solid rock by workmen suspended in cages from cliff-tops. Equally at home in the fever-haunted jungles of Brazil and the treeless plains of Argentina, in the interior of China or the Sahara desert, the American railway engineer has laid a firm foundation for the development of a world-wide trade in American railway supplies.

On August 30, 1916, the Bureau of Foreign and Domestic Commerce reported that our exports of railway appliances and equipment had more than doubled since 1914, the total value for the fiscal year being \$75,000,000. Canada and Cuba are the foremost markets for our freight cars, Cuba, Canada and Brazil the largest markets for locomotives; Canada, Australia, Japan, Brazil, Argentina and Cuba the leading markets for steel rails. Large consignments of freight cars and other supplies have gone to Russia, and important consignments have also been sent recently to France, Spain and to Central America. Frank Rhea, an expert from the Division of Valuation of the Interstate Commerce Commission, representing the Bureau of Foreign and Domestic Commerce, has just completed an investigation of the field for American railway supplies in the Far East, Australia and South Africa, his studies covering railway construction, equipment, traffic and probable extension or reconstruction of railways and street car lines. Mr. Rhea is on his way back to the United States, and his report will be available shortly.

The following statistics are taken from a report which has just been published, covering the 1000 months ending September, 1917:

FOREIGN TRADE IN RAILWAY SUPPLIES

	1917	1916
Railroad spikes	1,000,000	1,000,000
Steel rails	1,000,000	1,000,000
Switches, trices	1,000,000	1,000,000
Passenger coaches, street cars, etc.	1,000,000	1,000,000
Freight cars	1,000,000	1,000,000
Car wheels and axles	1,000,000	1,000,000
Engines and parts	1,000,000	1,000,000
Locomotives, street cars, etc.	1,000,000	1,000,000
Railroad ties	1,000,000	1,000,000
EXPORTS WITH FREIGHT IN TONS	1,000,000	1,000,000
Electrical machinery	1,000,000	1,000,000
Metal working machinery	1,000,000	1,000,000
Tools	1,000,000	1,000,000
Metals and metal products	1,000,000	1,000,000
Abrasives	1,000,000	1,000,000
Paints, oil, etc.	1,000,000	1,000,000

Argentina

Half a century ago railroads were almost unknown in Argentina and today they represent a considerable railway network in all directions from Buenos Aires, a metropolitan of 1,000,000. The Argentine Great Southern Railway, which is the finest of these lines, runs from the Pacific coast to the Atlantic coast, a distance of 1000 miles, and is the longest of its kind in the world. At the present moment Argentina is engaged in building the longest of its kind in the world, the Buenos Aires and Rosario Railway, which is 1000 miles long. This railway will be the longest of its kind in the world, and will be the longest of its kind in the world. The Argentine government is now engaged in building a railway from Buenos Aires to Rosario, a distance of 1000 miles. This railway will be the longest of its kind in the world, and will be the longest of its kind in the world. The Argentine government is now engaged in building a railway from Buenos Aires to Rosario, a distance of 1000 miles. This railway will be the longest of its kind in the world, and will be the longest of its kind in the world.

In April 1917, the Argentine government announced plans to undertake the construction of the Patagonian Railroad from San Antonio to Lake Nahuel Huapi, in the territory of the Rio Negro. The government also has in view the construction of additional railroads in Patagonia, in order to connect up the three provinces of Rio Negro, Santa Cruz, and Santa Cruz, all of which are exceedingly rich in natural resources, and which are well situated. The government is now engaged in building a railway from Buenos Aires to Rosario, a distance of 1000 miles. This railway will be the longest of its kind in the world, and will be the longest of its kind in the world.

The output of the Argentine railroads are in Chile, Peru, Brazil, Argentina, and Cuba. The Argentine government is now engaged in building a railway from Buenos Aires to Rosario, a distance of 1000 miles. This railway will be the longest of its kind in the world, and will be the longest of its kind in the world. The Argentine government is now engaged in building a railway from Buenos Aires to Rosario, a distance of 1000 miles. This railway will be the longest of its kind in the world, and will be the longest of its kind in the world. The Argentine government is now engaged in building a railway from Buenos Aires to Rosario, a distance of 1000 miles. This railway will be the longest of its kind in the world, and will be the longest of its kind in the world.

Some idea of the scope of American business in Argentina may be gathered from the fact that in 1916 the value of Argentine exports which were imported from America, as compared with the quantity imported from Argentina, was \$100,000,000. This quantity included 100,000 tons of machinery and tools, 100,000 tons of electrical machinery, 100,000 tons of metal working machinery, 100,000 tons of tools, 100,000 tons of metals and metal products, 100,000 tons of abrasives, 100,000 tons of paints, oil, etc.

stock at any time after one year. This stock in the past has been quoted as high as 120.

Bolivia

Bolivia with its 708,195 square miles could include within its limits the combined areas of California, Nevada, Utah, Idaho, Arizona, Oregon and Washington. With vast tablelands pushed up into the heart of the continent to a height of more than 14,000 feet, hemmed in by huge mountains, it is the highest inhabited country on the face of the earth. A country presenting obvious difficulties in railway construction, and one which has therefore attracted the American capitalist and railway engineer. American capital to the extent of \$17,000,000 has been invested in Bolivian railways, chiefly through the banking house of Speyer, the National City Bank, and W. R. Grace & Co. Negotiations have been entered into at various times to extend further the Potosi-Sucre Railway to Puerto Suarez, on the Paraguay river. The concession at last attempts was controlled by an Italian syndicate, the Fomento de Oriente Boliviano. The length of line, which has been partially surveyed, will be between 425 and 450 miles, and its cost will probably exceed \$10,000,000. The Bolivian government has agreed to guarantee a certain percentage on a portion of the construction cost.

Another Bolivian project is for the construction of a line from Yacumba on the Argentine frontier—between which point and the town of Embarcacion the Argentine government is constructing a railway—northward to Santa Cruz, tapping the oil country as well as other important although little developed sections of the country. This line would approximate 250 miles in length and would encounter some difficult grades. Concessions have been granted by the government for the line's construction, and much of the route has been surveyed. A line has also been surveyed from La Quiaca on the Argentine frontier (terminal of its government line) to Tarija, Bolivia, which is a town of some importance and the center of an agricultural area of great fertility. The length of this line would probably not exceed 125 miles.

The most important railways under construction are the extension of the Yungas Railway from La Paz to Coripata, and from that point on to Rurrenabaque on the Beni river. Then there is the route from Cochabamba to Santa Cruz, from Santa Cruz to Trinidad and from Potosi to Sucri, this last rapidly nearing completion. When the short distance from Tupiza to La Quiaca—now under construction—has been completed it will connect the Pacific on the West with the Atlantic at Buenos Aires, Argentina, on the East. This is a part of the proposed Pan-American Railway route.

The La Quiaca-Tupiza and La Paz-Yungas lines are being constructed with funds obtained in France and the United States, and the Potosi-Sucre Line with money appropriated by the Bolivian government. There is also to be constructed a line from Tupiza to Atocha, the Bolivian government having been authorized by the national Congress to enter into a financial transaction for \$5,000,000 guaranteed by the shares which the government owns in the National Bank. The total cost of the railroads constructed by the Bolivian government amounts to \$30,316,965. The materials for the Yungas Railway and for the Potosi-Sucre Railway have all been ordered in the United States.

The activity of the Bolivian government in recent years in the construction of railways, the establishment of automobile routes, and the building of new trails into the vast agricultural regions of Eastern Bolivia, has been favorably commented on throughout South America. There are at present in operation in Bolivia about 840 miles of railroad, besides some 1,100 miles in course of construction, and about 3,000 miles more or less definitely projected.

The Antofagasta and Bolivia Railway has taken over

under lease the Bolivia Railway, which was incorporated in the United States in 1907, and holds a perpetual concession from the Republic of Bolivia for the construction of lines in the republic. Practically all the equipment of the Bolivia Railway is of American manufacture. The Arica-La Paz Railway, which traverses a mountainous region and operates 28 miles of rack rail, recently purchased a rack locomotive in the United States.

Brazil

In Brazil, that greatest of all South American countries, with its 3,300,000 square miles of territory, 4,000 miles of coast, and vast tracts of totally unexplored land, an American has made the greatest success in the railroad field. Percival Farquhar of New York, president of the Brazil Railway Company (a \$250,000,000 corporation), has responded with such energy to the call of the Brazilians for help in the development of their country that a movement was actually launched recently by certain members of the Brazilian Congress against what they called "the Farquharizing of Brazil." Mr. Farquhar's company not only owns and operates thousands of miles of railways in Brazil, but also owns hundreds of thousands of head of cattle, millions of acres of grazing and timberlands, and has numerous other colossal enterprises. Another New Yorker, F. S. Pearson, is the president of A. Luz, the great syndicate which owns and controls the light, power, street railway and telephone systems of Rio de Janeiro.

The *Diario Oficial* of Rio de Janeiro published a decree in February, 1917, approving the revision of contracts entered into between the Brazilian Government and the Brazil Northern Railway Company relative to the construction of the Tocantins Railway. The company undertook to complete and open to traffic the second section of the line (from Alcobaca to a point 65 miles therefrom) by December 31, 1917. The construction of the first and third sections (from Cameta to Alcobaca, and from the termination of the second section to Chambioaz) were to be commenced simultaneously within a period of six months from a date to be named by the government. The switch section of the line, from Chambioaz to Santa Maria, and the Tocantins branch line, were to be commenced within six months after the completion of the third section. Compared with the difficulties encountered in the construction of that great achievement of tropical engineering, the Madeira and Mamore Railway, the Tocantins line is a much simpler proposition, as it is nearer the coast and the country is more healthy.

The certainty of continuance of railroad activity in Brazil opens up a field for railway equipment of all kinds. On government owned roads the government calls for bids on equipment purchases, but only accepts bids from those licensed to do business in Brazil. The license fees are not heavy. As there are no local factories manufacturing railway equipment, the foreigner has almost an open field. Calls for tenders are usually published in the *Diario Oficial*, but this method is not strictly adhered to, and many cars have been purchased recently by the Central de Brazil by private contract without competition.

Another method employed is to call for bids in the *Diario Oficial*, specifying the types and quality of equipment made by one or more manufacturers, in which case local agents endeavor to have their type of equipment or rolling stock specified. Sales cannot be effected by correspondence from the United States without an agent in Brazil, as there is rarely time for specifications to reach the United States and return in the allotted period. All negotiations for purchases take place in Rio de Janeiro. Compliance with the law is neither expensive nor exacting, and one American firm has recently established its own branch office in Rio to bid direct on the large government contracts and thus save commissions. Probably the best method, however, under normal

conditions is to have a local construction force in both Rio de Janeiro and Sao Paulo, the two railway centers, set as agent, supported by a technical representative of the American manufacturer, who can travel extensively and seize opportunities as they arise.

The President of Brazil by decree of August 30, 1910, granted a concession to Alberto Alvim de Azevedo, Comte de Rio de Janeiro for the construction and operation of a railway from Cuyaba, the capital of the State of Mato Grosso, through the town of Sant' Anna, on the Paranaíba River, to communicate with the Araguaia Railway at Itagarda, or at San Jose do Rio Preto. This total extension will be about 620 miles in length and will furnish direct rail communication between the city of Cuyaba and the ports of Rio and Santos. During the period of the concession (60 years) the government will not authorize the construction of any other railway within a zone of 12 miles on each side of the center of the roadbed, but will permit the laying of branch lines for private use. Plans for the first section 6 miles, must be submitted to the government before June 30, 1919, and construction work must be begun within one year from the date of approval of these plans by the government. Construction must be carried on at the rate of 31 miles a year. The concession calls for a single line of meter (5' 8 1/2") gage.

Chile

Since Wheelwright of Newburyport, Mass., built his first line in 1851 from Caldera to Copiapo, Americans have had a very definite interest in the railways of Chile. Wheelwright also constructed a line that was to connect Valparaiso with Santiago, but through lack of funds he was only able to complete it as far as La Laja, but another American, Henry Meiggs, of Catskill, N. Y., came along a few years later and finished it. In Chile the railways are largely operated by the government, which owns 1,979 miles. Passenger coaches are of the American pattern, and many of them are built in the United States.

Practically all the rolling stock for the government lines is purchased by the Ministro de Industria y Obras Publicas, Santiago, Chile, after asking for bids through the Diario Oficial. Not more than 60 days are given by these notices and then the rolling stock must be built according to plans and specifications on file in the government offices at Santiago, so it is necessary to have an agent or representative there. On October 17, 1917, the American ambassador at Santiago called that tenders had been requested by the Chilean government for 15 locomotive boilers. With their bids American manufacturers were required to present the requisite export licenses.

At the present time Justiniano Sotomayor vice general manager and vice minister of public works of Chile is at the McAlpin Hotel, New York, having been sent to this country by his government to try to obtain a certain number of locomotives and cars. The length of the Chilean State Railways is 3,570 miles, or 75 per cent of the total. The present administration of these government lines has sent a number of Chilean engineers to this country to learn American railroading. A few of them have been admitted to the motive power and maintenance of way departments of the Pennsylvania Railroad in Allentown, Pa., and Princeton, N. J. Jorge Beaumont, master mechanic of the Concepcion shops is now in the United States, inspecting machinery to be used in an up-to-date motive power shop which is being erected in San Bernardo, near Santiago. He was obtained from engineering concerns in America and Europe and the contract was awarded to the Nitro Ferns, Portland, Oregon.

Costa Rica

Philip W. Chamberlain, of San Jose, Costa Rica, a member of the American Society of Civil Engineers, has a proposal for the construction of a railway from Alajuela to Grecia, a

distance of about 18 miles. The proposed line requires extensive work and will require an investment of about \$1,000,000. The proposed line is to be built by the Costa Rican Government and the American manufacturer, who can travel extensively and seize opportunities as they arise. The President of Costa Rica, by decree of August 30, 1910, granted a concession to Alberto Alvim de Azevedo, Comte de Rio de Janeiro for the construction and operation of a railway from Cuyaba, the capital of the State of Mato Grosso, through the town of Sant' Anna, on the Paranaíba River, to communicate with the Araguaia Railway at Itagarda, or at San Jose do Rio Preto. This total extension will be about 620 miles in length and will furnish direct rail communication between the city of Cuyaba and the ports of Rio and Santos. During the period of the concession (60 years) the government will not authorize the construction of any other railway within a zone of 12 miles on each side of the center of the roadbed, but will permit the laying of branch lines for private use. Plans for the first section 6 miles, must be submitted to the government before June 30, 1919, and construction work must be begun within one year from the date of approval of these plans by the government. Construction must be carried on at the rate of 31 miles a year. The concession calls for a single line of meter (5' 8 1/2") gage.

Colombia

The government of Colombia is planning to construct a railway from Bogota to Medellin. The proposed line requires extensive work and will require an investment of about \$1,000,000. The proposed line is to be built by the Colombian Government and the American manufacturer, who can travel extensively and seize opportunities as they arise. The President of Colombia, by decree of August 30, 1910, granted a concession to Alberto Alvim de Azevedo, Comte de Rio de Janeiro for the construction and operation of a railway from Cuyaba, the capital of the State of Mato Grosso, through the town of Sant' Anna, on the Paranaíba River, to communicate with the Araguaia Railway at Itagarda, or at San Jose do Rio Preto. This total extension will be about 620 miles in length and will furnish direct rail communication between the city of Cuyaba and the ports of Rio and Santos. During the period of the concession (60 years) the government will not authorize the construction of any other railway within a zone of 12 miles on each side of the center of the roadbed, but will permit the laying of branch lines for private use. Plans for the first section 6 miles, must be submitted to the government before June 30, 1919, and construction work must be begun within one year from the date of approval of these plans by the government. Construction must be carried on at the rate of 31 miles a year. The concession calls for a single line of meter (5' 8 1/2") gage.

Guatemala

A railway from Guatemala to Mexico is being planned by the Government of Guatemala. The proposed line requires extensive work and will require an investment of about \$1,000,000. The proposed line is to be built by the Guatemalan Government and the American manufacturer, who can travel extensively and seize opportunities as they arise. The President of Guatemala, by decree of August 30, 1910, granted a concession to Alberto Alvim de Azevedo, Comte de Rio de Janeiro for the construction and operation of a railway from Cuyaba, the capital of the State of Mato Grosso, through the town of Sant' Anna, on the Paranaíba River, to communicate with the Araguaia Railway at Itagarda, or at San Jose do Rio Preto. This total extension will be about 620 miles in length and will furnish direct rail communication between the city of Cuyaba and the ports of Rio and Santos. During the period of the concession (60 years) the government will not authorize the construction of any other railway within a zone of 12 miles on each side of the center of the roadbed, but will permit the laying of branch lines for private use. Plans for the first section 6 miles, must be submitted to the government before June 30, 1919, and construction work must be begun within one year from the date of approval of these plans by the government. Construction must be carried on at the rate of 31 miles a year. The concession calls for a single line of meter (5' 8 1/2") gage.

Peru

A study of the railway and transport of Peru is being planned by the Government of Peru. The proposed line requires extensive work and will require an investment of about \$1,000,000. The proposed line is to be built by the Peruvian Government and the American manufacturer, who can travel extensively and seize opportunities as they arise. The President of Peru, by decree of August 30, 1910, granted a concession to Alberto Alvim de Azevedo, Comte de Rio de Janeiro for the construction and operation of a railway from Cuyaba, the capital of the State of Mato Grosso, through the town of Sant' Anna, on the Paranaíba River, to communicate with the Araguaia Railway at Itagarda, or at San Jose do Rio Preto. This total extension will be about 620 miles in length and will furnish direct rail communication between the city of Cuyaba and the ports of Rio and Santos. During the period of the concession (60 years) the government will not authorize the construction of any other railway within a zone of 12 miles on each side of the center of the roadbed, but will permit the laying of branch lines for private use. Plans for the first section 6 miles, must be submitted to the government before June 30, 1919, and construction work must be begun within one year from the date of approval of these plans by the government. Construction must be carried on at the rate of 31 miles a year. The concession calls for a single line of meter (5' 8 1/2") gage.

Panama

In May, 1917, the National Assembly of Panama approved a contract made with British Harland & Wolff for the construction of a railway from the Atlantic coast to the Pacific coast, a distance of 100 miles. The proposed line requires extensive work and will require an investment of about \$1,000,000. The proposed line is to be built by the Panamanian Government and the American manufacturer, who can travel extensively and seize opportunities as they arise. The President of Panama, by decree of August 30, 1910, granted a concession to Alberto Alvim de Azevedo, Comte de Rio de Janeiro for the construction and operation of a railway from Cuyaba, the capital of the State of Mato Grosso, through the town of Sant' Anna, on the Paranaíba River, to communicate with the Araguaia Railway at Itagarda, or at San Jose do Rio Preto. This total extension will be about 620 miles in length and will furnish direct rail communication between the city of Cuyaba and the ports of Rio and Santos. During the period of the concession (60 years) the government will not authorize the construction of any other railway within a zone of 12 miles on each side of the center of the roadbed, but will permit the laying of branch lines for private use. Plans for the first section 6 miles, must be submitted to the government before June 30, 1919, and construction work must be begun within one year from the date of approval of these plans by the government. Construction must be carried on at the rate of 31 miles a year. The concession calls for a single line of meter (5' 8 1/2") gage.

Uruguay

Uruguay is planning to construct a railway from Montevideo to Punta del Este. The proposed line requires extensive work and will require an investment of about \$1,000,000. The proposed line is to be built by the Uruguayan Government and the American manufacturer, who can travel extensively and seize opportunities as they arise. The President of Uruguay, by decree of August 30, 1910, granted a concession to Alberto Alvim de Azevedo, Comte de Rio de Janeiro for the construction and operation of a railway from Cuyaba, the capital of the State of Mato Grosso, through the town of Sant' Anna, on the Paranaíba River, to communicate with the Araguaia Railway at Itagarda, or at San Jose do Rio Preto. This total extension will be about 620 miles in length and will furnish direct rail communication between the city of Cuyaba and the ports of Rio and Santos. During the period of the concession (60 years) the government will not authorize the construction of any other railway within a zone of 12 miles on each side of the center of the roadbed, but will permit the laying of branch lines for private use. Plans for the first section 6 miles, must be submitted to the government before June 30, 1919, and construction work must be begun within one year from the date of approval of these plans by the government. Construction must be carried on at the rate of 31 miles a year. The concession calls for a single line of meter (5' 8 1/2") gage.

a 5 per cent basis of guaranty it may be stated that usually earnings up to 6 per cent are retained by the railway company, while the excess over 6 per cent belongs wholly or partly to the government. Improvements to the value of \$30,000,000 have been made in the port of Montevideo, which in point of depth, capacity and ease of access ranks among the first of the ports of the South Atlantic. The port railway system is a connecting link between sea and land traffic, and passengers as well as freight may be transferred from steamers at the docks to railway cars. The department in charge of all matters connected with the railways is the Ministerio de Obras Publicas, Montevideo.

Venezuela

An American company obtained a concession in Venezuela in August, 1917, for a railway from deep water to its mining properties in the Goajira peninsula. The contract calls for the construction of a port at Castilletes. From the port a railway 93 miles long and with branches three miles in length is to be constructed. The line is to be American standard gage and to have a one-way capacity of 10,000 tons daily.

Asia

Turning from Latin America to Asia, it is now certain that America's part in the railroad development of China will in the future by no means be confined to furnishing part of the construction material and equipment needed by the many new lines of communication with which the teeming millions of the Celestial Empire are to be provided. American surveyors are already at work. American capital is in the field. The Siems-Carey Railway and Canal Company of St. Paul, Minn., will construct as soon as possible, with money furnished by the American International Corporation of New York, 1,500 miles of railroad through the richest section of China, with an optional contract to build another 1,500 miles later. Negotiations for the project were started in May, 1916, during the visit to China of W. F. Carey, and it is said that the probable cost will be in the neighborhood of \$100,000,000. The concession covers principally the provinces of Szechuen, Hunan and Chihli. These provinces are rich and thickly populated. They contain large deposits of coal, and the tea trade is likely to furnish considerable traffic, while the dense populations—106,652,501 in the three provinces—obviously offers a field for development of a general business which these new railroads will do much to stimulate. The American surveyors are proceeding as rapidly as possible, and in a short time actual construction should commence.

The following statement has just been issued by the American International Corporation:

"The expedition in China has made good progress in spite of the unsettled conditions which have prevailed in the country since the signing of our contract. Reconnaissance of 1,090 miles and preliminary survey of 540 miles have been carried out on the Chouchiakou-Hsiangyang line from Chouchiakou in Hunan province to Hanchungfu in Shensi. A reconnaissance is now being made to determine whether this line cannot be extended to Chengtu in order to tap the province of Szechuen, said to be the richest in China, which has a population estimated at about 70,000,000. The survey of the Chuchow-Chinchow line, which is to open up a rich coal and antimony mining district, from Chuchow in Hunan to Chinchow in Kwantung, has been completed with 994 reconnaissance and 503 preliminary miles, making a total for both lines of 2,084 reconnaissance and 1,043 preliminary miles. These lines, if constructed, will be the first lines to be built west of the Peking-Hankow and Hankow-Canton Railways, and will open up six new provinces to foreign trade."

In March, 1917, Japan was granted the right to lay five railroad lines in Manchuria and Mongolia. A scheme is being prepared by the authorities conceived for the extension

of the line to Taonanfu, while laying a line between Kaiyuan and Hailung Cheng. This Kaiyuan-Hailung Cheng line will be 120 miles long, touching many prosperous towns of Eastern Manchuria.

When Commodore Perry made his first trip to Japan in 1854 he presented a miniature locomotive to the Shogun, and from that period dates the remarkable advance made by the Japanese in the development of their railways. Twenty years later the pioneer line was opened between Yokohama and Tokyo, and today the islands of Japan, from Hokkaido on the north to Kyushu on the south, are well equipped with railroads built upon the most approved standards, and handling heavy tonnage and passenger movement. Japan has about 5,000 miles of railroad. Through trains carrying sleeping and dining cars operate on several of the main lines. The cities have electric suburban lines.

A special mission representing the Imperial Japanese Railways recently arrived in the United States to study American transportation and industrial methods. The Imperial Japanese Railways are represented on the mission by Jiro Nakamura, assistant traffic manager; Akio Kasama, secretary and purchasing agent; Dr. Yasujiro Kama, director of machinery and rolling stock, and S. Kobayashi, resident engineer of New York.

The Imperial Japanese Diet in October, 1917, passed a bill authorizing the expenditure of 10,000,000 yen (\$4,980,000) for the extension of the Boryo and Giran Railway in Taiwan. The purchases for the government railways are all made by the Imperial Railway Board at Tokyo, usually by public tenders. Bids are accepted only from such bidders as have qualified and been placed on the list of bidders of the railway board. These bidders must conform to certain requirements of the board regarding their financial responsibility, and foreign firms or manufacturers must have a branch or agency regularly maintained in Japan to have their bids received. An official is, however, sometimes sent abroad to investigate the merits of various makes of appliances, and in some instances he makes purchases. There is a Japanese Government representative in New York who is empowered to make purchases of railway materials. Mr. Iyama, of 17 Madison avenue.

Africa

In Africa we find that there is a project to extend the railway from Quelimane, in Portuguese East Africa, for another 50 kilometres (31 miles) as soon as possible. Quelimane, one of the ports for the Zambesi delta, is without question the outlet for the richest and most productive section of Portuguese East Africa. The Zambesi Company, which holds a large land grant from the Portuguese government, owns the present railway. The gage is 3 ft. 6 in. The government railways in Portuguese East Africa have introduced American locomotives of the Mallet type. American manufacturers should address A Direccao do Porto e dos Caminhos de Ferro, Laureno Marquez, Portuguese East Africa.

Spain

The Spanish Ministerio de Fomento granted a concession on January 12, 1917, to Don Miguel Otamendi for the construction and operation for 90 years of an underground electric railway system in Madrid. There will be four double-track lines and a total length of 8.7 miles. A period of eight years will be allowed for the work.

SPAIN TO BUILD ITS OWN LOCOMOTIVES.—Commercial Attaché C. W. A. Veditz reports from Paris, France, that the four great Spanish railway companies—the Northern of Spain, the Madrid-Sarragosa, the Andalusian Railway and the Madrid-Cateres Company—have joined in the formation of an important company to manufacture locomotives.

Railway Earnings and Expenses for the Year 1917

Heavy Falling Off in Operating Income in Spite of Unprecedented Traffic Which Was Handled

By Frank Hugh Dixon
Chief Statistician, Bureau of Railway Economics

RAILWAY REVENUES for the calendar year 1917 have in all probability crossed the four billion mark, which is higher by some four hundred million dollars than the point attained in 1916, which broke the record by many millions. It is within the memory of young men that revenues were less than one-half what they are now. The aggregate crossed the two billion mark in 1905 and the

before this year has scarcely at the same level of traffic volume of 1917, we had passed the billion of railway operating gross during the past five years.

Net revenue from railway operations has advanced in 1917 by not less than fifty million, while the amount paid of about fifty million will bring the total figure of operating expense for the year to a point lower than that of 1916 by one hun-

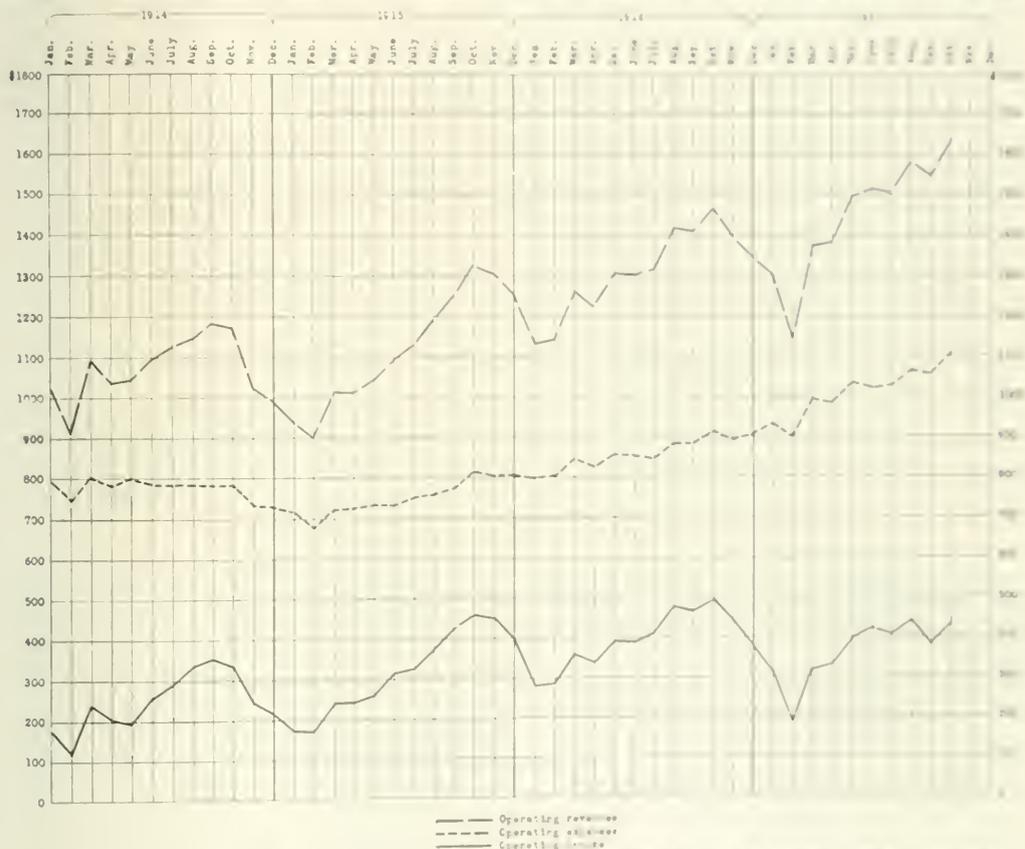


Diagram Showing Operating Revenues, Expenses, and Income Per Month at Rate for Months Closed, 1917

three-billion mark in 1915; it has needed but four years to bridge the gap between three and four billions. Even in these days of war financing by one billion, this record of growth in railway service to the American public cannot be led one to pause and wonder.

Railway expenses are on an even steeper incline. They amounted to more than \$2,500,000,000 in 1917, which is nearly five hundred million more than in 1916. The

total amount of these. This operating expense, which in 1916 was well over the billion-dollar mark, has not that probably dropped back under a billion.

The decline in operating income has been more marked in the Eastern Division, where the result for one year and one has been disappointing and the presence of traffic surpluses and the absence of some serious factors on the Eastern coast and at industrial centers. From twelve

of the total decrease in operating income for 1917 occurred in the East, the remaining fourth being divided rather unequally between the West and the South, the West having the larger share. Eastern roads suffered a loss in operating income during every month of 1917; in fact, their operating income has been on the decline since September, 1916. For the Western roads, the sharp downward turn occurred in August, while the Southern roads showed slight decreases in August, September and October, and nearly held their own for the year as a whole.

This phenomenal turn in operating income is clearly indicated in Table I. In that table, the operating income per mile for each month of 1917 for which statistics are available is compared with the operating income for the corresponding month in each of the preceding three years, that for 1917 being taken as 100, and the earlier years being shown as a percentage of that for 1917. The extreme falling off in some of the months of 1917 as compared with 1916 is evident for the United States as a whole, for the Western district, and especially for the Eastern district. In the South operating income has followed a more even course.

As compared with the years 1915 and 1914, operating income in 1917 was usually greater. But it will be noted that the general tendency from month to month in 1917 has been to exceed these earlier years by a smaller and smaller margin, except as compared with 1914 in the South. In this, again, the exceptional situation of the Eastern roads stands out conspicuously.

Standing out in bold relief against the year's gross receipts is the steady, restless rise in operating costs. Every month of 1917, and each of the three districts in every

on, the rate of increase in expenses was distinctly upward; and third, that the gap between the rates of increase in revenues and expenses was growing steadily wider as the months went on.

This increase in operating expenses, which, with an even greater increase in taxes, has created the remarkable result already noted, that operating income has actually fallen off in 1917, notwithstanding an extraordinary increase in gross operating revenues, is set out in the chart. Operating revenues are there seen to have followed in the last four years their regular cycle, with a generally ascending trend. The appearance of a markedly greater rate of ascent in 1917 is due to the fact that revenues recovered from an abnormally low slump in February. The line representing expenses, after falling with the great decline in business in the last part of 1914, rises almost steadily until 1917, when it turns rapidly upward. The effect of this more rapid rise of expenses, as also of taxes, is reflected in the lower general level of the line representing operating income in 1917.

To appreciate the significance of this outstanding fact in the railway operations of 1917, we may turn to an analysis of the expenditures during the first ten months—January to October—for which statistics are now at hand. Operating expenses per mile increased 19.2 per cent during these nine months; it was almost certainly over twenty per cent, or one-fifth, for the twelve months closing with December 31. Transportation expenses, which represent one-half of total operating expenses, during the ten months increased 28.0 per cent. This marked increase was largely due to the rise in unit cost of the two largest items of transportation expense, namely, fuel and labor, especially labor involved in train operation. The upward trend in fuel prices is well

TABLE I
RATIO TO OPERATING INCOME PER MILE IN 1917 OF OPERATING INCOME IN 1916, 1915 AND 1914, BY MONTHS

Month	UNITED STATES				EASTERN DISTRICT				SOUTHERN DISTRICT				WESTERN DISTRICT			
	1917	1916	1915	1914	1917	1916	1915	1914	1917	1916	1915	1914	1917	1916	1915	1914
January	100.0	90.4	55.3	56.6	100.0	119.8	52.3	44.9	100.0	81.5	50.1	60.0	100.0	70.4	59.9	64.4
February	100.0	152.1	90.9	62.7	100.0	27.8	129.0	50.0	100.0	105.9	58.0	62.1	100.0	115.6	89.8	69.5
March	100.0	113.2	76.5	75.2	100.0	125.7	80.9	69.8	100.0	100.0	67.4	75.9	100.0	108.4	76.5	79.3
April	100.0	102.7	72.3	62.0	100.0	117.0	87.3	67.0	100.0	101.0	72.8	63.8	100.0	89.8	58.1	56.2
May	100.0	99.0	64.9	48.9	100.0	114.6	76.9	50.5	100.0	101.0	65.0	55.9	100.0	83.9	53.9	44.9
June	100.0	92.7	73.7	60.7	100.0	101.3	85.6	61.2	100.0	98.3	64.1	59.3	100.0	82.7	65.2	59.9
July	100.0	100.7	80.6	71.3	100.0	106.6	88.2	69.8	100.0	87.5	74.0	67.4	100.0	98.1	74.8	73.3
August	100.0	107.9	85.0	76.3	100.0	107.9	92.4	78.7	100.0	101.0	73.9	62.9	100.0	110.1	80.6	77.4
September	100.0	121.6	110.4	91.4	100.0	115.5	114.9	88.4	100.0	101.3	88.4	60.1	100.0	134.0	112.9	104.8
October	100.0	114.1	104.8	76.7	100.0	115.6	121.0	77.0	100.0	101.4	79.8	52.2	100.0	114.7	98.4	81.1

month, showed increased expenses over 1916. It is true that revenues were also increased during every month, but the increase in expenses far outstripped the growth of revenues. Putting the growth of these two factors on a relative or percentage basis, we find that the first ten months of 1917 give the following results:

PER CENT. OF INCREASE, 1917 OVER 1916

Month	Revenues per mile	Expenses per mile
January	14.7	16.5
February	6.6	12.3
March	9.0	17.4
April	13.1	19.2
May	14.7	20.7
June	16.3	19.8
July	14.6	21.3
August	11.4	20.8
September	9.7	19.5
October	12.5	23.2
Ten months to October	11.8	19.3

The table indicates, first, that the rate of increase in expenses was greater than that of revenues, during every one of the ten months for which statistics are available at the time of writing; second, that while the rate of increase in revenues was roughly on the downward trend from June

known, and its causes are too well understood to call for extended discussion. Railway train operation in 1917 called for the consumption of approximately 150,000,000 tons of coal. If this coal cost the roads a dollar more per ton than in 1916—some of the Eastern roads testified in the Fifteen Per Cent Case that the increase was greater than a dollar—this one price-change would add \$150,000,000 to the railway expense account. In the matter of trainmen's compensation, the year 1917 is the first full year under the Adamson Eight-hour law, which became effective January first. In addition, nearly all other classes of railway labor have received wage increases and adjustments during 1917 that have contributed their force toward the upward trend of transportation costs. On top of these comes the increased cost of general supplies, which has had a telling effect on all branches of railway operation.

Passing over traffic, general and miscellaneous expenses, which in the aggregate represent only one-fifteenth of the total expenses, and in 1917 showed an increase of 11.7 per cent over 1916, we come to the significant maintenance accounts. Here, in some respects, will be found the key to the year's operations, for while transportation must be conducted in accordance with the demands of the travelling and shipping public, maintenance work on the one hand

Receiverships and Foreclosure Sales in 1917

Two Important Systems Sold Under Foreclosure With Drastic Scaling Down of Bonds and Interest

THESE were no important railroads placed in the hands of receivers in 1917, while on the other hand three important systems, which at the beginning of the year were in receivership, were reorganized, two of them through foreclosure and one through voluntary reorganization, and were returned by the courts to their securityholders.

The Kansas City, Mexico & Orient, with 964 miles of

had been paid by the new company. The court, to avoid a new receivership, ordered \$24,000,000 bonds of the original company to be deposited with it as security for the balance of the purchase price. In April, 1917, however, it was found necessary for the court to appoint W. T. Kemper as receiver.

The Wichita Falls & Northwestern is a part of the Missouri, Kansas & Texas system, but for some time after the

RAILROADS IN THE HANDS OF RECEIVERS

Name of road	Mileage	Date of receivership	Bonds of old company	Stock of old company	Total old company securities
Alabama, Tennessee & Northern	195	Nov. 22, 1913	\$3,161,000	\$7,350,000	\$10,511,000
Artesian Belt	38	April 25, 1917	.....	70,000	70,000
Birmingham, Columbus & St. Andrews	38	Dec. 24, 1908	250,000	4,500,000	4,750,000
Boston & Maine	2,298	Aug. 29, 1916	56,644,060	42,655,191	99,299,251
Connecticut River	88	Aug. 31, 1916	4,744,000	3,233,300	7,977,300
Vermont Valley	25	Aug. 31, 1916	3,800,000	1,000,000	4,800,000
Boyer, City, Gaylord & Alpena	90	Nov. 19, 1913	150,000	501,200	651,200
Cape Girardeau Northern	104	April 14, 1914	1,500,000	110,000	1,610,000
Chicago & Eastern Illinois	1,136	May 27, 1913	62,679,150	18,302,752	80,981,902
Chicago, Peoria & St. Louis	255	July 31, 1914	4,000,000	4,000,000	8,000,000
Cincinnati, Findlay & Fort Wayne	93	May 12, 1917	1,150,000	1,250,000	2,400,000
Creston, Winterset & Des Moines	22	June 25, 1914	200,000	90,000	290,000
Dansville & Mt. Morris	15	June, 1894	150,000	50,000	200,000
Denver & Salt Lake	255	Aug. 16, 1917	12,514,000	12,182,500	24,696,500
Elkin & Allegheny	25	Dec. 13, 1915	482,000	472,500	954,500
Evansville & Indianapolis	146	May 27, 1913	2,500,000	2,600,000	5,100,000
Fellsmere Railroad	16	Jan. 5, 1917	.....	.....	.....
Florida, Alabama & Gulf	26	Feb. 27, 1914	500,000	150,000	650,000
Fort Smith & Western	97	Feb. 9, 1915	5,833,600	5,000,000	10,833,600
Georgia & Florida	320	Mar. 27, 1915	8,452,000	8,750,000	17,202,000
Georgia Coast & Piedmont	98	July 14, 1916	1,873,200	1,572,000	3,445,200
Gould Southwestern	18	April 14, 1914	8,929	51,000	59,929
Greenville & Western	23	Aug. 29, 1917	460,000	50,000	510,000
Greenville Northwestern	12	Dec., 1915	.....	.....	.....
Gulf, Florida & Alabama	157	May 9, 1917	4,446,000	4,410,000	8,856,000
Haynesville & Montgomery	9	Mar. 1, 1917	41,000	50,000	91,000
Houston & Brazos Valley	26	Nov. 27, 1915	420,000	24,000	444,000
International & Great Northern	1,160	Aug. 11, 1914	26,347,000	4,822,000	31,169,000
Kansas City & Memphis	56	July 18, 1914	862,000	852,000	1,714,000
Kansas City, Mexico & Orient	964	April 17, 1917	31,000,000	20,000,000	51,000,000
Kansas City Northwestern*	200	Feb., 1917	.....	.....	.....
Kansas City, Ozark & Southern	15	Dec. 23, 1914	.....	.....	.....
Leavenworth & Topeka	50	Mar. 31, 1916	250,000	50,000	300,000
Liberty-White	56	Nov. 12, 1914	7,550	300,000	307,550
Louisiana & North West	121	Aug. 23, 1913	2,250,000	2,300,000	4,550,000
Mason & Birmingham	97	Feb. 1, 1908	500,000	500,000	1,000,000
Marshall & East Texas	92	Jan. 25, 1917	1,180,000	200,000	1,380,000
Missouri & North Arkansas	365	April 1, 1912	8,340,000	8,340,000	16,680,000
Missouri, Kansas & Texas	1,744	Sept. 27, 1915	101,728,750	76,283,257	178,012,007
Missouri, Kansas & Texas of Texas	1,292	Sept. 27, 1915	35,638,054	10,155,500	45,793,554
Missouri, Oklahoma & Gulf	334	Dec. 12, 1912	7,363,521	8,474,000	17,837,521
Nevada Short Line	12	Jan., 1916	.....	.....	.....
New Mexico Central	116	Jan. 10, 1910	2,500,000	2,500,000	5,000,000
Orangeburg	90	June 17, 1916	17	100,000	100,000
Pacific & Idaho Northern	90	Feb. 4, 1915	2,646,911	2,929,800	5,576,711
Palatine, Lake Zurich & Wauconda	15	Oct. 19, 1914	.....	230,000	230,000
Pine Bluff & Northern	10	Feb. 9, 1916	43,000	160,000	203,000
Pittsburg, Shawmut & Northern	184	Aug. 1, 1905	14,491,600	15,000,000	29,491,600
Richmond & Rappahannock	16	Oct. 25, 1917	458,000	500,000	958,000
Ridgefield & New York	16	Nov. 2, 1917	.....	.....	.....
Rome & Northern	23	Feb. 28, 1911	.....	1,000,000	1,000,000
St. Louis & Missouri Southern	42	April 13, 1915	.....	.....	.....
St. Louis, El Reno & Western	8	Oct. 9, 1915	817,000	970,800	1,787,800
Salina Northern	81	July 27, 1917	936,000	1,164,000	2,100,000
San Antonio, Fredericksburg & Northern	25	Oct. 28, 1914	153,352	30,000	183,352
San Antonio, Uvalde & Gulf	316	Aug., 1914	4,413,000	280,000	4,693,000
Sharpsville	30	Jan. 20, 1897	68,778	350,000	418,778
Southwestern Railway	30	Nov. 12, 1917	354,000	389,000	743,000
Stockton Terminal & Eastern	19	June 11, 1917	84,400	263,900	348,300
Tennessee & North Carolina	37	Sept. 14, 1916	465,638	306,100	771,728
Tennessee Central	292	Dec. 31, 1913	12,232,900	7,941,450	20,174,350
Tennessee Railway	61	July 1, 1913	1,129,000	1,000,000	2,129,000
Texas & Pacific	1,944	Nov., 1916	55,883,000	38,763,810	94,646,810
Tidewater & Western	93	May 14, 1917	300,000	300,000	600,000
Toledo, Peoria & Western	247	July 2, 1917	4,895,000	4,076,900	8,971,900
Toledo, St. Louis & Western	951	Oct. 29, 1914	27,602,000	19,847,600	47,449,600
Trinity & Brazos Valley	315	June 16, 1914	8,760,000	304,000	9,064,000
Wabash, Chester & Western	65	July 15, 1914	600,000	1,250,000	1,940,000
Waupaca Green Bay	29	Aug., 1917	75,000	1,400	76,400
Wauvega & Vandalia	29	Nov., 1914	.....	3,136,000	3,136,000
Wichita Falls & Northwestern	329	June, 1917	.....	2,000,000	2,000,000
Williamsport & North Branch	56	Jan. 8, 1917	545,000	1,324,662	1,869,662
Totals	17,773		532,968,784	335,968,022	868,936,806

*Formerly operated by B. F. Bush, of the Missouri Pacific, but put in separate receiver's hands February, 1917.

†Chartered but never built, and after charter expired company was put in receiver's hands to wind up its affairs.

road, was declared bankrupt in 1917 and a receiver appointed, but as a matter of fact the road had been on the verge of bankruptcy ever since its sale under foreclosure July 6, 1914. The purchase price at that time was fixed at \$6,001,000, but up to October, 1916, only \$3,000,000 of this

bankruptcy of the rest of the system it was operated as an independent solvent property. During 1917, however, it was found desirable to have a receiver appointed.

The Denver & Salt Lake was the successor company to the Denver, Northwestern & Pacific. The Denver, Northwestern

& Pacific had been proposed from Denver to San Francisco, a line about 100 miles south of the Union Pacific, and 123 miles north of the Denver & Rio Grande. It was no farther than Craig, Colo., 256 miles. Opposed here by the Union Pacific (in 1905) and the Grand Junction committee, the Denver & Rio Grande is failed and now (announced in 1913) under a plan one of the provisions of which was that the city of Denver should build a tunnel through the continental divide and from it to the Denver & Salt Lake had other

been considered by the committee. A preliminary report was made in 1905. It was estimated that the cost of the tunnel would be \$10,000,000. The

TABLE 1.—RAILROAD RECEIPTS

Name of Company	1917	1916	1915
*At & I. M. Co.	1,000,000	1,000,000	1,000,000
California N. C.	1,000,000	1,000,000	1,000,000
Central N. C.	1,000,000	1,000,000	1,000,000
Chicago & N. W.	1,000,000	1,000,000	1,000,000
Chicago & N. W.	1,000,000	1,000,000	1,000,000
Colorado M. R.	1,000,000	1,000,000	1,000,000
Denver, Lawrence & N. W.	1,000,000	1,000,000	1,000,000
Denver & T. Inters.	1,000,000	1,000,000	1,000,000
Indiana & Pennsylvania	1,000,000	1,000,000	1,000,000
Marion & Eastern	1,000,000	1,000,000	1,000,000
Missouri Pacific	1,000,000	1,000,000	1,000,000
Pure Marquette	1,000,000	1,000,000	1,000,000
Pine Bluff & N. W.	1,000,000	1,000,000	1,000,000
Pine Bluff, She. & S.	1,000,000	1,000,000	1,000,000
*San Antonio, Irving & N. W.	1,000,000	1,000,000	1,000,000
St. Louis & Hannibal	1,000,000	1,000,000	1,000,000
St. Louis, Iron Mt. & N. W.	1,000,000	1,000,000	1,000,000
Valdosta, Moultrie & Western	1,000,000	1,000,000	1,000,000
Wellers Falls	1,000,000	1,000,000	1,000,000
Washington & Michigan	1,000,000	1,000,000	1,000,000
Totals	10,000,000	10,000,000	10,000,000

* This road was shown in the 1917 statement as having no receipts because the former sale was under contract.
 † This is an electric road and is shown in 1916 and 1917 as having no receipts and passenger business.
 ‡ Figures taken from last available report.
 § Excluding 643,000,000 in 1917 and 643,000,000 in 1916.
 ¶ Road sold on December 4, 1915, but not subject to payment of taxes until December 27.

roads, but on July 8, 1914, the supreme court of the state of Colorado held this undertaking of the city illegal. As a local road the project was unable to pay expenses and tax charges.

The Toledo, Peoria & Western is a company controlled jointly by the Pennsylvania and the Chicago, Burlington & Quincy. The Burlington and the Pennsylvania both own

TABLE 2.—RAILROAD RECEIPTS

Name of Company	1917	1916	1915
At & I. M. Co.	1,000,000	1,000,000	1,000,000
California N. C.	1,000,000	1,000,000	1,000,000
Central N. C.	1,000,000	1,000,000	1,000,000
Chicago & N. W.	1,000,000	1,000,000	1,000,000
Chicago & N. W.	1,000,000	1,000,000	1,000,000
Colorado M. R.	1,000,000	1,000,000	1,000,000
Denver, Lawrence & N. W.	1,000,000	1,000,000	1,000,000
Denver & T. Inters.	1,000,000	1,000,000	1,000,000
Indiana & Pennsylvania	1,000,000	1,000,000	1,000,000
Marion & Eastern	1,000,000	1,000,000	1,000,000
Missouri Pacific	1,000,000	1,000,000	1,000,000
Pure Marquette	1,000,000	1,000,000	1,000,000
Pine Bluff & N. W.	1,000,000	1,000,000	1,000,000
Pine Bluff, She. & S.	1,000,000	1,000,000	1,000,000
*San Antonio, Irving & N. W.	1,000,000	1,000,000	1,000,000
St. Louis & Hannibal	1,000,000	1,000,000	1,000,000
St. Louis, Iron Mt. & N. W.	1,000,000	1,000,000	1,000,000
Valdosta, Moultrie & Western	1,000,000	1,000,000	1,000,000
Wellers Falls	1,000,000	1,000,000	1,000,000
Washington & Michigan	1,000,000	1,000,000	1,000,000
Totals	10,000,000	10,000,000	10,000,000

freightlines, therefore, involved an important change in control, and since the Missouri Pacific owns about 75 per cent of the stock of the Denver & Rio Grande, this latter had as a distribution in that event of the control of the Grand over

TABLE 3.—RAILROAD RECEIPTS

Name of Company	1917	1916	1915
Artesian Belt	1,000,000	1,000,000	1,000,000
Cincinnati, Finlay & East W.	1,000,000	1,000,000	1,000,000
Denver & Salt Lake	1,000,000	1,000,000	1,000,000
Fellsmere Railroad	1,000,000	1,000,000	1,000,000
Greenville & Western	1,000,000	1,000,000	1,000,000
Gulf, Florida & Alabama	1,000,000	1,000,000	1,000,000
Hinesville & Moultrie	1,000,000	1,000,000	1,000,000
Kansas City, Mexico & O.	1,000,000	1,000,000	1,000,000
Kansas City, Northwestern	1,000,000	1,000,000	1,000,000
Marshall & East Texas	1,000,000	1,000,000	1,000,000
Richmond & Kansas	1,000,000	1,000,000	1,000,000
Rockfield & New York	1,000,000	1,000,000	1,000,000
Salina Northern	1,000,000	1,000,000	1,000,000
Southwestern Railway	1,000,000	1,000,000	1,000,000
Stockton Terminal & Inters.	1,000,000	1,000,000	1,000,000
Tidewater & Western	1,000,000	1,000,000	1,000,000
Toledo, Peoria & Western	1,000,000	1,000,000	1,000,000
Waupaca-Green Bay	1,000,000	1,000,000	1,000,000
Wichita Falls & Northwestern	1,000,000	1,000,000	1,000,000
Williamsport & North	1,000,000	1,000,000	1,000,000
Totals	10,000,000	10,000,000	10,000,000

* The receiver's claim is not valid as to the amount received when a receiver was appointed. The amount actually received, however, is the amount of the first mortgage. This is not a new receiver's claim, but a claim of the receiver.
 † See large table showing receipts of all roads.

about \$2,011,200 of the existing \$4,074,000 stock. The road was placed in the hands of its president as receiver because of default on the 4 per cent interest on the \$3,895,000 first mortgage bonds.

By far the most important feature of the reorganization was that of the Missouri Pacific system, which included the 3,931 miles of the old Missouri Pacific and 1,075 miles of the old St. Louis-Iron Mountain & Southern. Prior to the reorganization of the Missouri Pacific this company and its subsidiary—the St. Louis-Iron Mountain & Southern—had

TABLE 4.—RAILROAD RECEIPTS

Name of Company	1917	1916	1915
At & I. M. Co.	1,000,000	1,000,000	1,000,000
California N. C.	1,000,000	1,000,000	1,000,000
Central N. C.	1,000,000	1,000,000	1,000,000
Chicago & N. W.	1,000,000	1,000,000	1,000,000
Chicago & N. W.	1,000,000	1,000,000	1,000,000
Colorado M. R.	1,000,000	1,000,000	1,000,000
Denver, Lawrence & N. W.	1,000,000	1,000,000	1,000,000
Denver & T. Inters.	1,000,000	1,000,000	1,000,000
Indiana & Pennsylvania	1,000,000	1,000,000	1,000,000
Marion & Eastern	1,000,000	1,000,000	1,000,000
Missouri Pacific	1,000,000	1,000,000	1,000,000
Pure Marquette	1,000,000	1,000,000	1,000,000
Pine Bluff & N. W.	1,000,000	1,000,000	1,000,000
Pine Bluff, She. & S.	1,000,000	1,000,000	1,000,000
*San Antonio, Irving & N. W.	1,000,000	1,000,000	1,000,000
St. Louis & Hannibal	1,000,000	1,000,000	1,000,000
St. Louis, Iron Mt. & N. W.	1,000,000	1,000,000	1,000,000
Valdosta, Moultrie & Western	1,000,000	1,000,000	1,000,000
Wellers Falls	1,000,000	1,000,000	1,000,000
Washington & Michigan	1,000,000	1,000,000	1,000,000
Totals	10,000,000	10,000,000	10,000,000

the Denver & Rio Grande. The plan of reorganization was completed at 11 A. M. on January 1, 1918, and included all of the St. Louis-Iron Mountain & Southern assets, netting \$2,011,200, but not including the land and equipment

obligations maturing June 30, 1918. The \$24,845,000 Missouri Pacific 6 per cent notes, due June 1, 1916, were paid, as were also \$3,861,000 equipment trust certificates maturing June 30, 1915, up to and including June 30, 1918. A total of \$123,169,000 bonds and notes were exchanged for securities in the new company. The cash requirements of the plan, which totaled \$41,419,792, were raised by an assessment of \$50 per share on the \$82,839,581 Missouri Pacific stock outstanding in the hands of the public. The new company issued \$91,322,442 bonds, \$76,751,635 new convertible 5 per cent preferred stock and \$82,839,585 in exchange for the stock and cash assessment of the old company and the aforementioned \$123,169,000 old securities in exchange for new. This plan was dated July 1, 1915, and became effective June 1, 1917, with some modifications.

The Pere Marquette, which had been in the hands of receivers since April, 1912, was sold under foreclosure of the consolidated mortgage, refunding mortgage, improvement and refunding general mortgage, Flint & Pere Marquette consolidated mortgage and first mortgage, Port Huron first mortgage, Grand Rapids, Belding & Saginaw first mortgage, Chicago & West Michigan first mortgage, Chicago & North Michigan first mortgage, Pere Marquette of Indiana first mortgage, and Detroit, Grand Rapids & Western first consolidated mortgage. The reorganization plan provided for wiping out all of the old mortgages on the property except \$5,870,000 undisturbed collateral trust bonds on the Canadian lines. The total amount of bonds, equipment trust certificates, notes and receiver's certificates which were wiped out by exchange into securities of the new company was \$81,142,919, calling for interest charges annually of \$3,877,540. The total interest charges, including the interest on the Canadian undisturbed bonds, was \$4,127,340. The total bonds issued under the plan of reorganization, including the undisturbed Canadian bonds, was \$36,325,000, with fixed interest charges of \$1,687,760. There is approximately \$6,000,000 cash provided for in the reorganization plan for

working capital, betterments, etc., for the new company.

The most important reorganization which took place during the year from the point of view of mileage and amount of securities is not shown in the table of foreclosures because the Chicago, Rock Island & Pacific, which at the beginning of the year was in the hands of receivers, was reorganized without a foreclosure sale. The reorganization was effected by the sale of \$29,743,889 7 per cent preferred stock (the company had outstanding approximately \$75,000,000 common stock) and the sale of \$5,000,000 6 per cent preferred stock to former directors to provide for floating debt, reorganization expenses, etc., and by the exchange of \$20,000,000 debentures for \$20,000,000 new preferred stock. The Chicago, Rock Island & Pacific operates 8,131 miles.

As shown by the first table, there is still a large mileage in the hands of receivers, the most important roads being the Boston & Maine system, the International & Great Northern, the Missouri, Kansas & Texas system, and the Texas & Pacific.

Dividend Changes

THE DIVIDEND CHANGES IN 1917 as compared with 1916 were comparatively few and unimportant, with the exception of the 10 per cent extra dividend on the Chicago, Burlington & Quincy stock. The stock, however, is held half by the Great Northern and half by the Northern Pacific, so that this extra dividend was not directly a disbursement to the public. The continuance of extra dividends on the Union Pacific, which gives stockholders 10 per cent a year, although the regular annual rate is 8 per cent, is a manifestation of the Union Pacific's ability to earn a comfortable margin over 10 per cent, even after disposal of its Southern Pacific stock.

The initial dividends noted for the Pere Marquette and Pittsburgh & West Virginia, in the table, represent the return which investors are getting on the new money which was put up for these properties in the course of very drastic reorganizations under which bond interest was scaled down to only a fraction of what it had been before:

DIVIDEND CHANGES

	Declared in 1917	Declared in 1916	Present annual rate	Annual rate in 1916
Alabama Great Southern, common.....	7	8	5	5
Bangor & Aroostook	4	3	4	3
Bellefont Central	2	1	1	1
Boston & Maine—				
Vermont Valley	None	None	None	10
Buffalo & Susquehanna, common.....	7	5	5	5
Chicago, Burlington & Quincy.....	13	8	8	8
Chicago, Milwaukee & St. Paul.....	4½	5	4	5
Chicago, Rock Island & Pacific—				
7 per cent pref.	3½	None	7	..
6 per cent pref.	3	None	6	..
Chicago, St. Paul, Minneapolis & Omaha, common	7	6	7	5
Colorado & Southern, 2nd pref.	2	None	2	None
Detroit & Mackinac, common.....	2½	5	5	5
Grand Trunk (of Canada)—				
Guaranteed stock	None	4	None	4
Preference stock	None	4	None	4
Hocking Valley	5½	4	6	6
Illinois Central	6	6	6	6
Morris & Essex	7¾	7	7¾	7
Norfolk & Western	8	7¾	7	7
Pennsylvania Company	6	8	5	8
Pere Marquette, prior preference.....	\$2.81	5	5	5
Pittsburgh & West Virginia pref.	3	None	6	None
Pittsburgh, Cincinnati, Chicago & St. Louis	2	..	..	..
Rutland	2½	None	..	..
Southern Railway	10	..	..	..
Union Pacific, common	10	10	8	8
Wabash, pref. A.....	4	1	4	4



Canadian War Relief Photo

Yvonne, the Railway Crossing Gate Keeper, and an Obliging Canadian

¹An extra dividend of 10 per cent was declared in August, 1918.
²Hocking Valley practice is to declare dividends according to rate of earnings and there is, therefore, apparently no regular annual rate.
³In 1917 an extra dividend of 1 per cent was declared and in 1916 the rate was changed and an extra dividend of 1 per cent was declared.
⁴An initial dividend of 1½ per cent was declared in August from the earnings of the quarter ended June 30.
⁵The dividend of 2½ per cent declared in August was the first dividend on the new consolidated stock of the P. C. C. & St. L., which was the successor company to the P. C. C. & St. L. Railway, the Vandalia, Pittsburgh, Wheeling & Kentucky, Anderson Belt, and Chicago, Indiana & Eastern. Prior to the consolidation the annual rate in 1916 on the preferred stock of the P. C. C. & St. L. was 6 per cent and the last dividend on the common was 5 per cent and on the Vandalia stock 4 per cent.
⁶In December, 1916, a 2 per cent extra dividend was declared and in 1917 extra dividends were declared quarterly of half of one per cent.

1300 MILES OF RAILROAD ABANDONED



Unprofitable lines, some in operation for a quarter of a century, at last sold for junk.

THIS IS THE FIRST YEAR since the first railroad in the United States was built, in 1825, that there has been any considerable mileage of road voluntarily abandoned by its owners or taken up and sold as junk. The Railway Age has kept a record for 25 years of new railroad construction, and in one year this amounted to over 6,000 miles and in a number of years has been over 8,000 miles, but it has never before been worth while to keep a record of the few miles of logging road or spur tracks taken up. In 1917, however, there was 451 miles of railroad actually taken up or in the process of being taken up and sold for junk. In addition there was 491 miles of road on which operation was abandoned, and 396 miles of road which the owners had asked permission from State commissions or legislatures to abandon, and, as a matter of fact, this latter figure does not represent all of the road which would be taken up and sold as junk if the owners could get permission so to do.

State commissions have in the past almost invariably refused to permit the abandonment and actual taking up of railroad mileage. It has been necessary to go to courts and the courts have apparently definitely established the rule that owners of an unprofitable railroad may shut out the operation of it and dispose of the rails, ties, etc., as junk.

The owners of many of the roads listed probably would ascribe their difficulties to peculiar conditions in State commissions. There is quite a volume of literature and public surrounding many of these railroad ventures which have at last proved failures. Hopes, sacrifices, grandiose plans, rebellion against the laws of government—this is the story of which most of these failures is made. In most cases it was bad business judgment, or some or other economic condition caused the failure, but it is hardly consistent that the products should be given up and sold for junk. In general are not manifest.

The abandonment, or, as a considerable part of abandoned mileage is worthy of thoughtful study. It is a striking fact that more railroad mileage was abandoned in 1917 than was abandoned than was built in 1917. The fact which underlay the building of these roads and the fact which has so often been justified in the past by the growth of population and expansion of business in this country. There has been no lessening in the need for transportation, and yet after years of hanging on, in 1917, more than 1,300 miles of railroad have been sold for junk.

The present high price of lumber, ties, etc., is a contributing factor, but only to a limited extent. It is a

THE ABANDONMENT OF THE FIRST RAILROAD IN THE UNITED STATES. The Farmers & Merchants, on the property of the Tule Lake & Western, was built and merged with the Freight House Railway in 1825. The abandonment of Farmers had

Name of Road	Miles	Year	Value
Alabama	100	1917	\$1,000,000
Arizona	50	1917	\$500,000
California	200	1917	\$2,000,000
Colorado	75	1917	\$750,000
Illinois	150	1917	\$1,500,000
Indiana	120	1917	\$1,200,000
Iowa	100	1917	\$1,000,000
Michigan	130	1917	\$1,300,000
Minnesota	110	1917	\$1,100,000
Missouri	140	1917	\$1,400,000
Montana	80	1917	\$800,000
Nebraska	90	1917	\$900,000
Nevada	60	1917	\$600,000
New York	160	1917	\$1,600,000
North Carolina	70	1917	\$700,000
North Dakota	50	1917	\$500,000
Ohio	120	1917	\$1,200,000
Oklahoma	40	1917	\$400,000
Oregon	30	1917	\$300,000
South Carolina	20	1917	\$200,000
South Dakota	30	1917	\$300,000
Texas	180	1917	\$1,800,000
Virginia	10	1917	\$100,000
Washington	20	1917	\$200,000
West Virginia	10	1917	\$100,000
Wisconsin	110	1917	\$1,100,000
Wyoming	40	1917	\$400,000
Total	1,300	1917	\$13,000,000

At last it was found that the road's decision in the application to discontinue and dismantle the road.

¹At last accounts the company was only awaiting the removal of some quantity of slappers to tear up the rails.

²This electric interurban road was built as part of a project to build an low line electric road from New York to Chicago. This was the only part of that projected road which was ever actually built.

³Permission has been granted by the Colorado Public Utilities Commission to discontinue operation only until April 1, 1918.

⁴This is an interurban road and the application to abandon is still pending before the Public Service Commission of Indiana.

⁵Operation has been discontinued for 20 months.

⁶Operation was to have been discontinued on December 31 and presumably has been discontinued.

⁷Small logging road. Mileage is not ascertainable.

⁸Application was made to the Arkansas commission to entirely discontinue the operation of 6 miles between Pine Bluff and Sheridan, and to discontinue the entire 25 miles of line as a common carrier. The first application was denied by the commission and the second is now under advisement.

⁹An application is now before the courts to have the receiver dispose of such parcels of the road as would yield the most advantageous price. If a decree is entered following the recommendation of the receiver, that part of the line between Marshall, Tex., and Esler, 73 miles, will presumably be dismantled and sold as junk.

¹⁰A petition supplemental to a petition asking for the appointment of a new receiver asks that the road be dismantled and sold. The case is now before the supreme court of the state of New Mexico.

¹¹Permission was asked the Railroad Commission of Florida to discontinue operation. Presumably the intention was to dismantle the road and sell it for junk. Permission, however, was refused by the commission.

Chesterfield counties, Virginia, during more than 25 years failed to make the Tidewater & Western a paying railroad.

Some of the roads listed were built with the money and labor of farmers. The Chicago, Anamosa & Northern and the Creston, Winterset & Des Moines, both in Iowa, were built in this way. Both of these roads were the result of a desire for transportation facilities—the farmers wanted railroad facilities and assessed themselves to pay for building the roads. In the case of the Denver, Laramie & Northern, however, the money to build the road was raised not in the territory served—Central Colorado—but from Kansas farmers' savings.

The list is pretty surely incomplete, even for all roads that have actually been abandoned; neither does it show some very important roads which the owners wish they could abandon. It is probable that many holders of Kansas City, Mexico & Orient securities would be glad to see that road torn up and sold for junk. Raising the money to

build it was one of the most remarkable feats of promotion in American railroad history. It was an example of how deeply fixed was the investor's faith in the future of American railroads.

The significance of the present abandonment of some hundreds of miles of railroad is that it shows the faith which made possible the building of the Kansas City, Mexico & Orient not shaken but actually destroyed. The abandonment of railroads in the past year marks a very important stage in the economic development of the country.



Canadian War Records Photo.

Wounded Canadians, Who Took Part in the Capture of Hill 70, Leaving a Casualty Clearing Station for "Blighty"



Canadian War Records Photo.

Canadians Use Slate and Bad Coal for Ballasting Light Railroads Near Lens

tional tracks, yards and engine terminals are the principal items, although work is under way on large passenger terminals at Chicago, St. Paul, Minn., and one of smaller magnitude at Jacksonville, Fla. Another \$4,000,000 is also being spent on the Kansas City Terminal to provide adequate approaches to the station for certain of the railroads.

On the whole, however, most of the improvements in progress during the year have been directed toward facilitating the handling of freight. As a rule the improvements have not been of a large scale, the tendency being rather toward smaller increases in the facilities at as many points as possible. Exceptions to this rule include the Cedar Hill yard of the New Haven and the terminal improvements at Indianapolis, Ind.

Auxiliary terminal facilities have had a prominent part in this year's activities. New coal docks for the Pennsylvania Railroad and the Baltimore & Ohio have been completed at Baltimore, those of the latter being marked by a decided departure from usual practice. The Norfolk & Western has built two warehouses at Lamberts Point, at a

occupied with work of this kind at Indianapolis, the former having completed a similar project at Columbus, Ohio, during the year.

In Canada the longest piece of new line constructed is on the Edmonton, Dunvegan & British Columbia in Alberta,

MILES OF NEW LINE COMPLETED IN THE UNITED STATES SINCE 1893.

1893.....	3,024	1906.....	5,623
1894.....	1,760	1907.....	5,212
1895.....	1,420	1908.....	3,214
1896.....	1,692	1909.....	3,746
1897.....	2,109	1910.....	4,122
1898.....	3,265	1911.....	3,066
1899.....	4,569	1912.....	2,987
1900.....	4,894	1913.....	3,071
1901.....	5,368	1914.....	1,532
1902.....	6,026	1915.....	933
1903.....	5,652	1916.....	1,098
1904.....	3,832	1917.....	979
1905.....	4,388		

73.3 miles, while the Canadian Northern completed the largest amount of new mileage in aggregate, 92.3 miles. Other improvements of importance include the terminal work of the Great Northern and the Canadian Northern at Van-

NEW TRACK BUILT IN 1917.

UNITED STATES—	No. Cos. building	Miles				Total
		First track	Second track	Third track	Fourth or more track	
Alabama.....	2	6.30	36.64	.....	.....	42.94
Alaska.....	1	108.00	.....	.....	.....	108.00
Arkansas.....	3	10.05	.....	.....	.....	10.05
California.....	7	108.89	.....	.....	.....	108.89
Colorado.....	1	.62	3.77	.....	.....	4.39
Connecticut.....	1	.21	.....	.45	3.50	4.16
Florida.....	1	5.00	.....	.....	.....	5.00
Georgia.....	3	18.43	23.71	.....	.....	42.14
Idaho.....	2	23.36	.....	.....	.....	23.36
Illinois.....	4	9.01	24.89	11.80	4.10	49.80
Indiana.....	.....	.....	47.85	.....	.....	47.85
Kansas.....	1	11.50	27.12	.....	.....	48.62
Kentucky.....	3	29.80	13.20	1.69	.....	44.09
Louisiana.....	5	39.80	.....	.....	.....	39.80
Maryland.....	1	1.68	6.70	.....	.....	8.38
Massachusetts.....	.....	.....	.....	1.21	1.99	3.20
Michigan.....	4	7.73	2.13	.....	.....	9.86
Minnesota.....	1	11.75	22.14	.....	.....	33.89
Mississippi.....	4	28.42	12.50	.....	.....	40.92
Missouri.....	2	3.55	.79	.....	.....	4.34
Montana.....	2	94.40	36.00	.....	.....	130.40
Nevada.....	2	10.00	.....	.....	.....	10.00
New Jersey.....	2	2.70	3.96	4.83	3.31	14.80
New Mexico.....	1	.16	5.11	.....	.....	5.27
New York.....	3	3.74	8.45	12.50	12.46	37.15
North Carolina.....	3	16.85	4.85	.....	.....	21.35
Ohio.....	1	27.19	18.18	.....	.....	45.37
Oklahoma.....	3	23.80	18.20	.....	.....	42.00
Oregon.....	2	17.06	.....	.....	.....	17.06
Pennsylvania.....	15	61.89	21.62	2.70	1.77	87.98
South Carolina.....	1	21.50	82.90	.....	.....	104.40
South Dakota.....	1	.19	.....	.....	.....	.19
Tennessee.....	4	27.81	.70	.....	.....	28.51
Texas.....	3	63.50	41.35	.....	.....	104.85
Utah.....	3	67.20	15.82	.....	.....	83.02
Virginia.....	3	19.73	33.35	.....	.....	53.08
Washington.....	3	13.68	.....	.....	.....	13.68
West Virginia.....	6	35.84	6.72	.....	.....	42.26
Wisconsin.....	2	2.99	.....	1.20	1.24	3.24
Wyoming.....	1	7.81	95.11	.....	.....	102.92
Totals.....	108	978.98	613.41	35.78	28.37	1656.44
Canada.....	6	206.95	.....	.....	.....	206.95

NEW TRACK BUILT IN 1916.

UNITED STATES—	No. Cos. building	Miles				Total
		First track	Second track	Third track	Fourth or more track	
Alabama.....	4	32.50	.....	.....	.....	36.00
Alaska.....	1	50.00	.....	.....	.....	50.00
Arizona.....	1	8.50	.....	.....	.....	8.50
Arkansas.....	7	13.21	1.36	.....	.....	14.57
California.....	5	78.77	.....	.....	.....	78.77
Colorado.....	1	1.80	.....	.....	.....	1.80
Connecticut.....	.....	.....	.55	8.72	5.02	14.29
Florida.....	5	44.05	.....	.....	.....	44.05
Georgia.....	3	32.50	26.06	.....	.....	78.56
Idaho.....	2	19.59	.....	.....	.....	19.59
Illinois.....	3	10.11	36.15	.25	.14	46.65
Indiana.....	.....	.....	14.38	.....	.....	14.38
Kansas.....	3	32.50	.....	.....	.....	96.31
Kentucky.....	1	24.00	.....	.....	.....	26.26
Louisiana.....	2	29.81	.....	.....	.....	29.81
Maryland.....	1	3.50	5.62	.....	.....	9.12
Massachusetts.....	1	1.00	.....	.....	.....	1.00
Michigan.....	3	37.06	.....	.....	.....	56.31
Minnesota.....	2	10.20	14.90	.....	.....	25.10
Mississippi.....	4	36.90	19.00	.....	.....	55.90
Missouri.....	.....	.....	3.00	.....	.....	3.00
Montana.....	3	99.36	.....	.....	.....	99.36
New Jersey.....	3	2.56	2.80	.....	2.02	5.47
New Mexico.....	1	1.46	.....	.....	.....	1.46
New York.....	3	5.63	.68	6.17	4.32	16.80
North Carolina.....	3	22.00	6.50	.....	.....	29.50
North Dakota.....	2	36.94	.....	.....	.....	36.94
Ohio.....	2	7.10	25.75	2.06	1.76	36.67
Oklahoma.....	3	22.80	6.19	.....	.....	28.99
Oregon.....	4	65.80	1.75	.....	.....	67.55
Pennsylvania.....	10	43.16	6.20	.14	.46	49.96
South Carolina.....	2	91.76	12.20	.....	.....	103.96
South Dakota.....	.....	.....	10.30	.....	.....	10.30
Tennessee.....	4	19.47	4.02	.....	.....	23.49
Texas.....	3	19.66	.....	.....	.....	10.86
Utah.....	.....	.....	2.90	.....	.....	2.90
Virginia.....	3	14.58	82.69	.....	.....	97.27
Washington.....	5	55.65	.....	.....	.....	55.65
West Virginia.....	4	28.27	6.20	.....	.....	28.27
Wisconsin.....	3	11.26	7.15	.....	.....	18.41
Wyoming.....	1	8.00	.....	.....	.....	8.00
Totals.....	108	1098.41	312.31	17.34	13.72	1441.78
Canada.....	11	290.04	7.90	.....	.....	297.94
Panama.....	1	40.00	.....	.....	.....	40.00

cost of \$1,800,000; the Chicago & North Western has completed a large grain elevator at Chicago, and has awarded contracts for another one at Council Bluffs, Iowa, and the Pennsylvania has placed an elevator in service at Erie, Pa. The \$4,000,000 local freight terminal now being completed by the Pennsylvania Lines at Chicago, is a structure worthy of special mention. Projects of recent inception include coal piers for the Baltimore & Ohio on Staten Island and for the Central New Jersey at Jersey City.

Grade separation work, while aggregating a smaller expenditure than in former years and involving few new projects is still occupying the attention of engineering forces. At Chicago the Baltimore & Ohio; the Chicago & Western Indiana; the Chicago, Rock Island & Pacific, and the Pennsylvania Lines are engaged on work started previous to the beginning of this year. The Cleveland, Cincinnati, Chicago & St. Louis and the Indianapolis Union Railway are

covered and the Toronto Union Station on which work is 55 per cent complete. The line through the tunnel of the Canadian Northern, Mount Royal, at Montreal, was placed in operation in April.

The comparative amounts of various classes of new tracks built and other important improvement work under way during 1917 are shown below by states.

UNITED STATES

ALABAMA	Miles	Miles
Birmingham, Selma & Mobile—Nichols to Stewart.....	4.00	
Dauphin Island Railway & Dock Co.—Between Alabama Port and Cedar Point.....	2.30	6.30
Second Track		
Alabama Great Southern—Not specified.....	32.64	
Birmingham, Selma & Mobile—Nichols to Stewart.....	4.00	36.64
Other Important Work Under Construction		
St. Louis-San Francisco—Big Warrior lift bridge at Cordova, cost \$125,000, 30 per cent completed. Strengthening bridges between Thayer, Mo., and Birmingham, Ala., cost \$300,000, 95 per cent completed.		

ALASKA

Alaska Railway Co. (See page 10)

United States Government Railway—Fishing River Basin, crossing at Fishing Creek, 16 mi. S. Minto, Chena Valley, Alaska. The entire basin to be built in 1918. Estimated cost, \$1,000,000. Estimated completion, 1920.

United States Government Railway—Fishing River Basin, crossing at Fishing Creek, 16 mi. S. Minto, Chena Valley, Alaska. The entire basin to be built in 1918. Estimated cost, \$1,000,000. Estimated completion, 1920.

Alaska Railway—Fishing River Basin, crossing at Fishing Creek, 16 mi. S. Minto, Chena Valley, Alaska. The entire basin to be built in 1918. Estimated cost, \$1,000,000. Estimated completion, 1920.

ARIZONA

Chino, Tempe & Southern Railway Co.—Chino, Tempe & Southern Railway Co. (See page 10)

Chicago, Rock Island & Pacific—Chicago, Rock Island & Pacific (See page 10)

Missouri Pacific—Fishing River Basin, crossing at Fishing Creek, 16 mi. S. Minto, Chena Valley, Alaska. The entire basin to be built in 1918. Estimated cost, \$1,000,000. Estimated completion, 1920.

CALIFORNIA

California & Hawaiian Steamship Co.—California & Hawaiian Steamship Co. (See page 10)

Inter-California (S. P.)—Inter-California (S. P.) (See page 10)

Los Angeles & Salt Lake—Los Angeles & Salt Lake (See page 10)

San Diego & Southern—San Diego & Southern (See page 10)

Western Pacific—Western Pacific (See page 10)

Union Pacific—Union Pacific (See page 10)

Archibald, Forest & Sims Fe.—Archibald, Forest & Sims Fe. (See page 10)

New York, New Haven & Hartford—New York, New Haven & Hartford (See page 10)

New York, New Haven & Hartford—New York, New Haven & Hartford (See page 10)

New York, New Haven & Hartford—New York, New Haven & Hartford (See page 10)

New York, New Haven & Hartford—New York, New Haven & Hartford (See page 10)

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New York, New Haven & Hartford—New York, New Haven & Hartford (See page 10)

New York, New Haven & Hartford—New York, New Haven & Hartford (See page 10)

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Alaska Railway—Fishing River Basin, crossing at Fishing Creek, 16 mi. S. Minto, Chena Valley, Alaska. The entire basin to be built in 1918. Estimated cost, \$1,000,000. Estimated completion, 1920.

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California & Hawaiian Steamship Co.—California & Hawaiian Steamship Co. (See page 10)

Inter-California (S. P.)—Inter-California (S. P.) (See page 10)

Los Angeles & Salt Lake—Los Angeles & Salt Lake (See page 10)

San Diego & Southern—San Diego & Southern (See page 10)

Western Pacific—Western Pacific (See page 10)

Union Pacific—Union Pacific (See page 10)

Archibald, Forest & Sims Fe.—Archibald, Forest & Sims Fe. (See page 10)

New York, New Haven & Hartford—New York, New Haven & Hartford (See page 10)

New York, New Haven & Hartford—New York, New Haven & Hartford (See page 10)

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New York, New Haven & Hartford—New York, New Haven & Hartford (See page 10)

New York, New Haven & Hartford—New York, New Haven & Hartford (See page 10)

INDIANA

Second Track

Miles Miles

Baltimore & Ohio & Chicago (B. & O.)—Lapaz Junction to Milford Junction.....	27.00	
Chicago & Erie (Erie)—Between Boone Grove and Griffith.....	19.00	
New York, Chicago & St. Louis—Through Ft. Wayne.....	1.85	47.85

Other Important Work Under Construction

Chicago & Eastern Illinois—Single track bridge at Hazleton, cost \$131,400, completed.
 Cincinnati, Indianapolis & Western—Track elevation at Indianapolis, cost \$100,000, 5 per cent completed. General office building and freight house and team tracks at Indianapolis, cost \$300,000, 15 per cent completed, and branch 3.50 miles track to mine, cost \$103,000, 60 per cent completed.
 Cleveland, Cincinnati, Chicago & St. Louis—Grade separation through center of Indianapolis, cost \$1,025,000, 25 per cent completed. Separation of grade at Tennessee street, Indianapolis (Peoria & Eastern), cost \$161,000, 50 per cent completed.

Evansville & Indianapolis—Reinforcement work and reducing curvature between Worthington and Petersburg, 4.50 miles completed.

Indianapolis & Frankfort (Pa. R.)—Building from Frankfort to Ben Davis, 41 miles; contractors, Dunn-McCarthy Company, Chicago.

Indianapolis Union Railway—Grade separation on Union tracks division, and elevation of train shed, Indianapolis, cost \$5,000,000, 20 per cent completed.

Pennsylvania Lines, Northwest & Central Systems—Engine yard and facilities at Fort Wayne, cost \$125,000, 90 per cent completed.

Pittsburgh, Cincinnati, Chicago & St. Louis (Pa. L. W.)—Building from Philadelphia to Irvington, 9.08 miles second track; rearrangement and extension of yards and car repair facilities at Richmond, cost \$530,000, 60 per cent completed. Joint freight terminal yard east of Belt Railway at Indianapolis, cost \$1,726,000, 50 per cent completed. Grade separation Ray to Downey streets, Indianapolis, cost \$123,000 completed. New inbound freight house and tracks on Pennsylvania street, Indianapolis, cost \$1,331,000, completed. Additional tracks and grade reduction Peoria Junction to Royal Center, cost \$572,000, 30 per cent completed. New freight house at Kokomo, cost \$133,000, 5 per cent completed.

Toledo, St. Louis & Western—Rebuilding bridge over Wabash river at Silverwood, cost \$150,000, 60 per cent completed.

IOWA

Other Important Work Under Construction

Chicago & North Western—Reinforced concrete grain elevator and 6.50 miles yard tracks at Council Bluffs, cost \$1,375,000, 60 per cent completed.

Chicago, Burlington & Quincy—New shops at West Burlington, cost \$485,500, completed.

KANSAS

First Track

Anthony & Northern—Larned to north line of Pawnee county.....	21.50	21.50
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Second Track

Aetchison, Topeka & Santa Fe—Not specified.....	6.62	
Union Pacific—Manhattan to Junction City.....	20.50	27.12

Other Important Work Under Construction

Barton County & Santa Fe (A. T. & S. F.)—Building from Holyrood to Galatia, 32 miles.

Kansas City Southern—Reconstruction of bridge over Kansas river at Kansas City, cost \$250,000, completed.

Kansas City Terminal Railway—See Missouri.

Union Pacific—At Kansas City, 35-stall roundhouse, cost \$238,280, 51 per cent completed; power house, 12 per cent completed, and turntable, 73 per cent completed, cost of both \$122,037; at Ellis, 14-stall roundhouse, power house and cinder pit, cost \$369,700, 70 per cent completed; at Marysville, roundhouse, power house, cinder pit, turntable, trackage, water tank, cost \$270,550, completed.

KENTUCKY

First Track

Chesapeake & Ohio Northern (C. & O.)—Point near Limeville to Kentucky-Ohio state line.....	2.12	
Long Fork (B. & O.)—Alpharetta to Weeksberry.....	26.00	
Louisville & Nashville—Benham to Lynch, 0.83 miles; North Hazard to Ailios, 0.85 miles; total.....	1.68	29.80

Second Track

Cincinnati, New Orleans & Texas Pacific—Not specified....	13.20	13.20
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Third Track

Chesapeake & Ohio—Limeville to C. & O. Northern connection.....	1.09	1.09
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Other Important Work Under Construction

Kentucky & Indiana Terminal—Engine terminal at Louisville, total cost \$274,600, completed except cinder pits to be finished April, 1918.

Louisville & Nashville—Building from Allair to Burlington and Whitesett, 8.01 miles; Kilday to Seagrave, 9.58 miles; Grays Knob to Turtle Creek, 2.22 miles; Blackey to Caudill branch, 3.28 miles; total 23.09 miles, and surveys under way from Homers to Staceys branch, 6.2 miles; terminal facilities at De Coursey, cost \$429,000, 95 per cent completed.

LOUISIANA

First Track

Garyville Northern—Garyville to Livingston.....	18.00	
Iberia, St. Marys Eastern—Shidyside to Patterson.....	8.80	
Leesville East & West—Mill Creek to Front.....	2.00	
Orange Northeastern—At Vinton.....	1.00	
Ouachita & Northwestern—Clarks to Standard.....	10.60	39.80

Other Important Work Under Construction

Missouri Pacific—New yard tracks, engine house, back shop and other buildings and facilities at Monroe, cost \$215,000, 98 per cent completed.

Oakdale & Gulf—Surveys made for extension Godwin to Mamon, 18.00 miles.

Orange Northeastern—Building from Stark to Leesville, 40 miles.

MAINE

Other Important Work Under Construction

Maine Central—Lewiston station and yard, cost \$105,000, completed; grade division and second track from Waterville tower to Clinton, cost \$766,000, 80 per cent completed.

MARYLAND

First Track

Miles Miles

Pennsylvania Railroad—Odontown branch to Camp Meade, 1.66 miles; total.....	1.68	1.68
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Second Track

New York, Philadelphia & Norfolk—F. G. block station to N. side Pocomoke river, 0.27 mile; S. side Pocomoke river to A. J. block station, 0.21 mile; total.....	0.48	
Pennsylvania Railroad—Odontown branch to Camp Meade, 0.57 miles; total.....	.57	
Western Maryland—From a point about one mile west of Big Pool to Clearspring.....	5.65	6.70

Other Important Work Under Construction

Baltimore & Ohio—Building from Baltimore to Patapsco Creek, 5.00 miles; improvements at Baltimore, New Pier No. 6, at Locust Point, cost \$1,500,000, completed; two transfer bridges at Locust Point, cost \$196,200, 90 per cent completed; new transfer, bridge at President street, cost \$112,200, 54 per cent completed; at Curtis Bay, new export coal pier and yard, cost \$2,800,000, completed; at Cumberland, change of line at site of Kelly Springfield Tire Plant, cost \$225,000, 19 per cent completed; at Annapolis Junction, additional track facilities, cost \$100,000, 90 per cent completed.

Pennsylvania Railroad—Rebuilding the B. & P. tunnel of the Baltimore division of the P. B. & W., work completed on 1.68 miles of first track and 0.57 mile second track.

MASSACHUSETTS

Third Track

Boston & Albany—Athol Jct. to Oak street.....	1.21	1.21
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Fourth Track

New York, New Haven & Hartford—Mansfield to East Foxboro.....	1.99	1.99
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Other Important Work Under Construction

Boston & Maine—Additional yard facilities at Ayer, including 11 miles of new track and increasing capacity about 800 cars, cost \$244,500, completed; additional yard facilities at East Deerfield, capacity of yards has been doubled and new engine house shop being built, cost \$1,196,000, 95 per cent completed; new bridge over Connecticut river near East Deerfield, cost \$274,000, 30 per cent completed.

New York, New Haven & Hartford—Engine facilities at Southampton street, Boston, cost \$638,000, completed; engine facilities at Dover street, Boston, cost \$130,000, completed; South Boston, cut for four-track approach to Boston freight terminal, cost \$972,000, 25 per cent completed; rebuilding about 75 bridges on the system, cost \$835,000, 25 per cent completed.

MICHIGAN

First Track

Copper Range—Between Calumet Jct. and Mohawk.....	1.47	
Detroit Terminal Railroad—Station 416+74 to Station 529 +25.....	2.13	
East Jordan & Southern—Extensions of branches.....	3.00	
Rapid Railroad—Detroit to Mt. Clemens.....	1.23	7.83

Second Track

Detroit Terminal Railroad—Building from Station 416+74 to Station 529+25; total.....	2.13	2.13
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Other Important Work Under Construction

Detroit, Toledo & Ironton—Train terminal yard, 600 car capacity, cost \$250,000, 75 per cent completed; West Detroit "South yards" completed.

Grand Trunk—New car shops at Port Huron, cost \$250,000, 90 per cent completed; new classification yard at Gillett, cost \$375,000, completed.

New York Central—Engine facilities and extension of yard at River Rouge, 75 per cent completed; new freight terminal at Detroit completed and grade separation at Detroit 75 per cent completed.

MINNESOTA

First Track

Duluth & Northern Minnesota—Mile post 87½ to mile post 99¼.....	11.75	11.75
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Second Track

Chicago, Milwaukee & St. Paul—Ortonville west.....	0.97	
Duluth, Missabe & Northern—Wolf to Virginia Yard.....	5.50	
Northern Pacific—Rice's to Gregory, 14.67 miles; Duluth to Superior, Wis., 1 mile; total.....	15.67	22.14

Other Important Work Under Construction

Great Northern Terminal (Gr. Nor.)—Freight terminal at St. Paul, cost \$400,000, 20 per cent completed.

Minneapolis & St. Louis—Terminal improvements at Minneapolis, cost \$105,000, completed.

Minnesota Belt Line (Gr. Nor.)—Hump classification yard, engine house with terminal facilities at Northtown, cost \$250,000, completed.

St. Paul Union Depot Company—Work started on union station and terminal yard to cost \$11,000,000.

MISSISSIPPI

First Track

Jackson & Eastern—At Union.....	1.00	
Kosciusko & Southeastern—Kosciusko to Zama.....	16.00	
Pearl River Valley—Between Nicholson and Emery.....	4.80	
Yazoo & Mississippi Valley—Yerger to end of track, 2 miles; Stout to Galloway, 6.5 miles; total.....	6.62	28.42

*Relocation work takes the place of 6.73 miles of old line.

MISSISSIPPI—Continued

Second Track

Y. & M. Valley—Cretzer to Gulf, 1917, 1918

Other Important Work Under Construction

Alabama & Vicksburg—Repaired and replaced 100 ft. trestle over Big Black river with three spans, each 100 ft. long, and changing approach, and reworking bridge over White river track work and bill being done by company...

Missouri

First Track

Missouri Pacific—Old passenger train station at St. Louis, City passenger station, new station at St. Louis, Mo., connection Neelyville, Mo., passenger station...

Second Track

Chicago, Burlington & Quincy—Kansas City branch

Other Important Work Under Construction

Chicago, Burlington & Quincy—Bridge over Mississippi river at Napoleon, Mo., cost \$1,134,800, 85 per cent completed. Kansas City branch, Kansas City, Mo., and Kansas City, Mo., bridge, the bridge of steel viaduct and double track, bridge work, bridge work, track work and bill being done by company...

MISSOURI

First Track

Chicago, Milwaukee & St. Paul—Gross River, Wis., 1917, 1918 Northern Pacific—Hesper to Raphael, 1917, 1918, 1919

Second Track

Great Northern—Pacific Jet. to Havre, 4.00 miles, Seeley to Cutbank, 2.00 miles; Columbia Falls to Willoughby, 8.00 miles, total

Other Important Work Under Construction

Chicago, Milwaukee & St. Paul—Basing from Pacific Junction to Clearwater Junction, 23.00 miles. Great Northern—Completed following work: freight terminal at Wolf Point, cost \$400,000; freight terminal at Bismarck, cost \$400,000; enlargement of Havre yard and enlargement of engine house at Bismarck; heavy classification yard at Great Falls, cost \$20,000; water treatment plant at points on Billings line, cost \$150,000; incline line at Great Falls, cost \$400,000.

NEBRASKA

Other Important Work Under Construction

Chicago, Burlington & Quincy—Building from Omaha to York, 11.00 miles, contractor, Edward Peterson Construction Company. Omaha to York track from Ashland to Greenwood, 6.84 miles, cost \$1,000,000, 10 per cent completed; bridge over Platte river, cost \$300,000, 80 per cent completed; bridge over Platte river, cost \$105,000, 40 per cent completed. Chicago Great Western—Additional track between Omaha and Clearwater Junction, complete. Hastings & North Western (U. P.)—Building water tank, etc., cost \$30,000. Missouri Pacific—Track elevation at Dodge, 1917, 1918, 1919; crossings at Dodge, Douglas and Lincoln, 1917, 1918, 1919; crossings at Dodge, Douglas and Lincoln, 1917, 1918, 1919; crossings at Dodge, Douglas and Lincoln, 1917, 1918, 1919.

NEVADA

First Track

Nevada Northern—Between Reno and Washoe Valley, 1917, 1918 Western Pacific—Between Reno and Washoe Valley, 1917, 1918

*Relation work on part of N. P.

Table with multiple columns and rows, containing various data points and text fragments, likely a continuation of the railway construction report or a separate index table.

NORTH CAROLINA

OKLAHOMA

	First Track	Miles	Miles
Appalachian R. way—Cherokee to Oceana Lufly.....	3.50		
Carolina & Northeastern—Jackson to Rehoboth.....	4.00		
Goldstone Union Station Co.—At Goldsboro.....	1.35		
Madison County-Lurel River Logging Company line.....	5.00		
Southern Railway—At Catawba river near Belmont.....	3.00*	16.85	

	First Track	Miles	Miles
Miami Mineral Belt—Oupau to Kansas state line.....	12.00		
Oklahoma, New Mexico & Pacific—Rushing Mt. to Heaton.....	5.80		
Texas, Oklahoma & Eastern—Not specified.....	6.00	23.80	

Second Track

St. Louis-San Francisco—Between Tulsa stock yards and Sapula.....	17.20		
Sand Springs—Not specified.....	1.00	18.20	

Other Important Work Under Construction

Chicago, Rock Island & Pacific—Bridge over Arkansas river at Jefferson, cost \$15,000, 95 per cent completed.
 Miami Mineral Belt—Building from Kansas state line to Baxter Springs, 3 miles, contractors Allhands-Hedges Construction Company (grading), Barrett Construction Company (bridge and building), both of Springfield, Mo.
 Oklahoma, New Mexico & Pacific—Building extension from Healdton north, 11 miles.
 Osage County & Santa Fe (A. T. & S. F.)—Building from Owen to Fairfax, 62 miles.
 St. Louis-San Francisco—New mechanical facilities and yards at Oklahoma City, cost \$228,000, completed; new mechanical facilities and yard at West Tulsa, cost \$14,000, 84 per cent completed; strengthening between Monett, Mo., and Sapula, Okla., cost \$260,000, 50 per cent completed.
 Texas, Oklahoma & Eastern—Building from Broken Bow, Okla., to De Queen, Ark., 25 miles; grade completed for 5 miles of second track, and 12 miles under construction.

*Relocation work takes the place of old line.

Second Track

Seaboard Air Line—Through city of Raleigh.....	1.50		
Southern Railway—At Catawba river near Belmont.....	3.00	4.50	

Other Important Work Under Construction

Appalachian Railway Surveys under way for extension Oceana Lufly to Swayney, 7.00 miles.
 Carolina & Northeastern—Building extensions, Rehoboth to Lasker, 4.00 miles, and Lasker to Ahooskie, 3.3 miles
 Seaboard Air Line—Grade revision between Hamlet, N. C., and Charles-ton, S. C., cost \$350,000, completed; grade revision on portion of line between Sanford, N. C., and Hamlet, cost \$225,000, completed; additional shop and yard facilities at Hamlet, cost \$125,000, completed; double track, yard extension and shop extension work at Raleigh, cost \$225,000, completed.
 Southern Railway—Rebuilding bridges on Salisbury-Morristown line.
 Statesville Air Line—Building from Statesville to Yadkinville, 29 miles.

OHIO

First Track

Chesapeake & Ohio Northern (C. & O.) Kentucky-Ohio state line to Waverly.....	27.19	27.19	
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Second Track

Baltimore & Ohio & Chicago (B. & O.)—Through Defiance.....	1.30		
Cleveland, Cincinnati, Chicago & St. Louis—Between Harper and Gretna.....	4.50		
New York, Chicago & St. Louis—Through Cleveland.....	1.18		
Pennsylvania Lines, Northwest and Central Systems—At Delaware, 8.10 miles; at Sandusky, 3.10 miles; total.....	11.20	18.18	

Other Important Work Under Construction

Baltimore & Ohio & Chicago (B. & O.)—Second track through Defiance, elimination of grade crossings and improved freight and passenger facilities, cost \$675,000, 95 per cent completed.
 Baltimore & Ohio Southwestern (B. & O.)—Additional yard tracks at Brighton, cost \$103,000, completed.
 Bessemer & Lake Erie—Enlargement of yard and facilities, etc., Conant Harbor, 95 per cent completed.
 Chicago & Erie (Erie) Improved engine terminal facilities at Marion, 97 per cent completed.
 Cleveland & Mahoning Valley (Erie)—Separation of grades at Youngstown, 40 per cent completed.

Cleveland, Cincinnati, Chicago & St. Louis—Building second track between Harper and Gretna, 4.5 miles; grading and masonry work for elevation of tracks in Columbus, cost \$642,700, completed; new freight house, etc., at Middletown, cost \$103,500, 50 per cent completed; rebuilding bridge No. 6 over Cuyahoga river at Cleveland, cost \$160,000, 30 per cent completed.
 Dayton Union Railway—Reconstruction of Miami river bridge at Dayton, cost \$360,500, completed.

Hocking Valley—Grading under way for second track on about 27 miles out of 87 miles between Delaware and Le Mogue; subway to carry 7 tracks over Parsons avenue, at South Columbus, cost \$240,000, 20 per cent completed.

Lake Erie & Eastern—Extension to Gerard, 1.20 miles, including yard facilities, cost \$112,500, 25 per cent completed.

New York Central—Classification yard and repair yard at Coalburg, 65 per cent completed; Himrod avenue viaduct and separation of grades at Youngstown, 30 per cent completed; additional tracks in yard at Collinwood, 75 per cent completed; subway at Cleveland 60 per cent completed; new yard facilities at Rockport, 75 per cent completed; subways, new station and track elevation through Elyria, 20 per cent completed, and Camp street subway at Sandusky, 60 per cent completed.

New York, Chicago & St. Louis—Two high level freight stations at East Ninth street and Hill street, Cleveland, cost \$128,000, completed.

New York, Pennsylvania & Ohio (Erie)—Enlarging yard at Kenmore and switch track to South Akron, 94 per cent completed; freight station and increased freight handling facilities at Akron, 70 per cent completed; improved yard facilities at Kent, 96 per cent completed.

Pennsylvania Lines, Northwest and Central Systems—Yard at Stark, cost \$795,000, 25 per cent completed; coaling station at Yankee Crossing, cost \$236,500, 10 per cent completed; yard at Anstenburg, cost \$108,000, 57 per cent completed; dock No. 6 new coaling apparatus at Ashtabula, cost \$205,000, completed; new avenue viaduct at Cleveland, cost \$107,000, 80 per cent completed; Kinman street yards at Cleveland, cost \$300,000, 10 per cent completed; coal handling facilities at Sandusky, cost \$629,000, completed; Bay Junction yards at Sandusky, cost \$266,000, 95 per cent completed; yard tracks at Columbus, cost \$16,500, completed; engine house and coaling station at South Akron, cost \$350,000, 75 per cent completed; building Summitville to Kinsington, 7.7 miles second track; Warren to Bristolville, 11.8 miles second track; Letonia to Alliance Junction, 13 miles third track; Alliance Junction to Alliance, 3 miles fourth track; Alliance Junction, 12 miles third and fourth track; Canton to M. N. Tower, 6 miles third and fourth track.

Pittsburgh & Lake Erie—Remodeling Haseltin terminal yard, cost \$1,250,000, 35 per cent completed. Struthers yard extension, cost \$775,000, 75 per cent completed.

Pittsburgh, Cincinnati, Chicago & St. Louis (P. A. L. W.)—New freight house and team track facilities at Newark, cost \$117,000, 10 per cent completed; improvements at power plant at shops, Columbus, cost \$133,000, completed; additions to shops, Columbus, cost \$256,000, 10 per cent completed; separation of grades at Cincinnati, cost \$519,000, completed; additional yard facilities at Bradford, cost \$351,500, 50 per cent completed; grade separation at Cincinnati, total cost \$140,000, of which railway pays \$91,000 and city \$49,000, 10 per cent completed.

Toledo & Ohio Central—Erecting shop at Bucyrus costing \$165,000, completed.

Toledo & Cincinnati (B. & O.) Building from East Dayton to North Dayton, 2.00 miles.

OREGON

First Track

Columbia & Nehalem River—Not specified.....	7.00		
Klamath Falls Municipal—Klamath Falls to Olene.....	10.00	17.00	

Other Important Work Under Construction

Columbia & Nehalem River—Building from end of present line into timberland, 6 miles.
 Oregon-Washington Railroad & Navigation Co.—Second track work is to be carried out between Henton and Kamela, 2.50 miles; separation of grade at Portland, cost \$469,000, 47 completed; fill 4,200 ft. trestle at Albina, cost \$100,000, completed.
 Klamath Falls Municipal—Building from Olene to Dairy, 10 miles.

PENNSYLVANIA

First Track

Cambria & Indiana—Regan Junction to Ralco.....	14.00		
Chesapeake Southern—Station 96 to Station 130.....	0.62		
Johnstown & Stony Creek—Not specified.....	1.00		
Letonia Railway—Branch line.....	3.00		
Lehigh & New England—Gemmel to Lizard Creek Junction.....	0.85		
Lehigh Valley—Bear Creek branch, main line to Bear Creek, 9.17 miles; at end of Jeddo No. 4 Cally branch, 0.12 miles; total.....	9.29		
McKeesport Connecting—At Riverton.....	0.50		
Monaca Railroad Millin Junction to McVoor.....	0.42		
Morgantown & Wheeling—Pennsylvania-West Virginia state line to Blacksville.....	1.00		
Pennsylvania Railroad—Fairchance to terminus, 1.03 miles; Toltz to terminus, 0.97 mile; Farnassas to terminus, 1.50 miles; West Morrisville yard, N. Y. div., 1.53 miles; Chestnut Hill branch, Chelton avenue 0.30 mile, Highland to Seminole avenues 0.54 mile; South Philadelphia improvements, Delaware avenue, 0.28 mile; Coatesville branch, Pomeroy yard, 1.27 miles; Chester & Philadelphia branch, Ft. Mifflin to Darby Creek, Essington, 6.24 miles; Darby Creek to Chester, 0.92 mile; connection with main line (P. B. & W.), Eddystone, 0.34 mile; South Chester branch, Stoney Creek to Townsend street, 1.03 miles; total.....	15.75		
Philadelphia & Reading—At Minersville, Wolf Creek branch.....	0.10		
Pittsburgh & Shawmut—At Freeport.....	0.10		
Pittsburgh, Allegheny & McKees Rocks—Not specified.....	1.04		
Sharon Railroad (Erie)—At Ferrona.....	0.95†		
Tionesta Valley—On Farnsworth branch, 3.28 miles; on Watson branch, 3.34 miles; on Dix Run branch, 4.65 miles; total.....	11.27	61.89	

*Relocation work takes the place of 5.33 miles of old line.
 †Relocation work takes the place of main tracks through old yard.

Second Track

Bessemer & Lake Erie—K. O. Junction to Henlein.....	5.00		
Buffalo, Rochester & Pittsburgh—Marion Center to Home.....	3.55		
Cumberland Valley—Harrisburg to Le Moyne.....	1.06		
Lehigh Valley—Seek to Tamaqua.....	0.25		
Lehigh Valley—Ebervale to Jeddo No. 4.....	1.05		
New York, Chicago & St. Louis—Springfield to Thornton Junction.....	1.91		
Pennsylvania Railroad—Chestnut Hill branch, Chelton avenue, 0.11 mile, and Highlands to Seminole avenues, 0.54 mile; South Philadelphia improvements, Delaware, 0.28 mile; Chester & Philadelphia branch, Ft. Mifflin to Darby Creek, Essington, 4.58 miles; South Chester branch, Stoney Creek to Townsend street, 0.92 mile; Stoney Creek to Marcus Hook, 0.47 mile; total.....	6.80		
Sharon Railroad (Erie)—At Ferrona.....	0.95	21.62	

Third Track

Philadelphia & Reading—Harrisburg to Pastang, 1.9 miles; Palmyra to Swatara, 0.8 mile; total.....	2.70	2.70	
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Fifth Track

Pennsylvania Railroad—Eddington to Cornwells, 1.34 miles; connecting railway Philadelphia, Montgomery avenue to Diamond street, 3.43 mile; total.....	1.77	1.77	
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RAILROADS UNDERWAY

Baltimore & Ohio—The additional track between Baltimore and Washington, Md., between the city and the city, is being constructed at a cost of \$1,000,000. The work is being done by the Baltimore & Ohio Railroad Co. The new line will be 1.5 miles long and will have a capacity of 100,000 tons per year.

Chattanooga Southern Railway—The new line from Chattanooga to Dalton, Ga., is being constructed at a cost of \$1,000,000. The work is being done by the Chattanooga Southern Railway Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

Pennsylvania Lines—The new line from Philadelphia to Reading, Pa., is being constructed at a cost of \$1,000,000. The work is being done by the Pennsylvania Lines Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

Florida Railway—The new line from Jacksonville to Tallahassee, Fla., is being constructed at a cost of \$1,000,000. The work is being done by the Florida Railway Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

Union Railroad—The new line from Chicago to St. Louis, Mo., is being constructed at a cost of \$1,000,000. The work is being done by the Union Railroad Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

Atlantic Coast Line—The new line from Norfolk, Va., to Washington, D.C., is being constructed at a cost of \$1,000,000. The work is being done by the Atlantic Coast Line Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

Southern Railway—The new line from Atlanta, Ga., to Memphis, Tenn., is being constructed at a cost of \$1,000,000. The work is being done by the Southern Railway Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

Watertown & Spaulding Falls—The new line from Watertown, N.Y., to Spaulding Falls, N.Y., is being constructed at a cost of \$1,000,000. The work is being done by the Watertown & Spaulding Falls Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

Knoxville Sevierville & Eastern—The new line from Knoxville, Tenn., to Sevierville, Tenn., is being constructed at a cost of \$1,000,000. The work is being done by the Knoxville Sevierville & Eastern Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

Tennessee Railway—The new line from Chattanooga, Tenn., to Knoxville, Tenn., is being constructed at a cost of \$1,000,000. The work is being done by the Tennessee Railway Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

Other Important Work Underway—The new line from New York to Philadelphia, Pa., is being constructed at a cost of \$1,000,000. The work is being done by the New York & Philadelphia Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

Other Important Work Underway—The new line from Washington, D.C., to Baltimore, Md., is being constructed at a cost of \$1,000,000. The work is being done by the Washington & Baltimore Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

Other Important Work Underway—The new line from Philadelphia, Pa., to New York, N.Y., is being constructed at a cost of \$1,000,000. The work is being done by the Philadelphia & New York Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

Other Important Work Underway—The new line from New York, N.Y., to Philadelphia, Pa., is being constructed at a cost of \$1,000,000. The work is being done by the New York & Philadelphia Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

Other Important Work Underway—The new line from Philadelphia, Pa., to New York, N.Y., is being constructed at a cost of \$1,000,000. The work is being done by the Philadelphia & New York Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

Other Important Work Underway—The new line from New York, N.Y., to Philadelphia, Pa., is being constructed at a cost of \$1,000,000. The work is being done by the New York & Philadelphia Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

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Other Important Work Underway—The new line from New York, N.Y., to Philadelphia, Pa., is being constructed at a cost of \$1,000,000. The work is being done by the New York & Philadelphia Co. The new line will be 100 miles long and will have a capacity of 1,000,000 tons per year.

WEST VIRGINIA—(Continued)

Chesapeake & Ohio—Building from mouth Huffs Creek up Huffs Creek, 2.7 miles, and Mon to mouth of Gilbert Creek, 13.6 miles, contractors Ballard, Herrings & Severs, Yaney Mills, Va.; Seth to Whitesville, 3.6 miles; Whitesville up Big Elk Creek, 3.5 miles, contractors Doxley Brothers Company, Orange, Va.; mouth of Little Marsh Fork to mouth Hazy Creek, 6.5 miles, contractors Bowman Lumber Company, St. Albans, W. Va.; from present end of line up Berech Creek, 2.0 miles, contractors Board & Duffield, Charleston, W. Va.; building second track from West Hamlin to Salt Rock, 3.0 miles, and from Peck's Mill to Peach Creek, 4.7 miles.

Gauley & Eastern (K. & M.)—Building from Gauley Bridge to Belva, 5.50 miles, with company forces.

Pittsburgh, Cincinnati, Chicago & St. Louis (Pa. L. W.)—Building from Chester, W. Va., to 1/2 mile west of Raccoon Creek, Pa., 12.16 miles, contractors Ferguson & Edmondson Company, Pittsburgh, Pa., and MacArthur Brothers Company, New York; building from Wheeling Junction to East Steubenville, 1.95 miles second track, and from Wheeling to Glens Run, 5.19 miles, second track.

Virginian Railway—Building from Fireco to Leckie Coal Company, mine track, 1.34 miles; Fireco to Piney Fire Creek Company, tipple, 2.4 miles; Robson to Loup Creek Colliery Company, mine track, 2.5 miles; Elmore to Pocahontas Fuel Company, tipple, 2.4 miles; building from Parks Gap 5 miles of second track.

WISCONSIN

First Track

Etticck & Northern—Blair to Etticck.....	Miles	Miles
Wisconsin & Northern—South of Shawano to Black Creek, 19.50 miles; from Hollister northeast, 0.49 mile; total.....	10.00	19.99

Second Track

Northern Pacific—See Minnesota.

Third Track

Chicago, Milwaukee & St. Paul—In Milwaukee.....	1.20	1.00
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Fourth Track

Chicago, Milwaukee & St. Paul—In Milwaukee.....	1.24	1.04
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Other Important Work Under Construction

Ashland, Odanah & Marengo—Building from Vaughn Creek to Spring Creek, 6 miles, contractors Peppard & Fulton, Minneapolis, Minn.

Chicago & North Western—Construction of 35-stall engine house and other buildings and improvements, including 15,000 ft. of trackage, at Milwaukee, cost \$350,000, 9 per cent completed.

Chicago, Burlington & Quincy—Bridge work and second track at Lytle-bluff siding, cost \$370,000, 75 per cent completed.

Great Northern—Machine shop at Superior, cost \$425,000, completed. Replacement of ore dock at Allouez, cost \$650,000, 10 per cent completed.

Minneapolis, St. Paul & Sault Ste. Marie—Revision of line at Chippewa and grade of about five miles and construction of bridge, cost \$365,000, 65 per cent completed.

WYOMING

First Track

Union Pacific—From Reliance branch to Coal mines.....	7.81	7.81
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Second Track

Union Pacific—Pine Bluffs to Archer, 33.35 miles; Buford to Hermosa, 9.86 miles; Wamsutter to Point of Rocks, 51.90 miles; total.....	95.11	95.11
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Other Important Work Under Construction

Union Pacific—Building second track from Hermosa tunnel to Hermosa, 1.25 miles; at Rock River snow shed construction, cost \$815,680, 85 per cent completed; at Evanston machine shop, cost \$182,123 completed.

CANADA

First Track

Alberta & Great Waterways (E. D. & B. C.)—In Alberta from mile 202.1 to mile 275.4.....	73.30	
Canadian Northern—In Ontario, Duncan to Leaside, 1.50 miles. In Quebec, Montreal tunnel line, 3 miles; ex- tension from Roberval, 18 miles; in Saskatchewan, El- rose to Glidden, 16.28 miles; in Alberta, Oliver to Rad-		

way Centre, 44.51 miles; in British Columbia, Victoria, towards Alberni, 9 miles; total.....	Miles	Miles
Canadian Pacific—Vantage, Sask., to Congress.....	92.29	7.00
Grand Trunk Pacific Branch Lines—St. Louis, Sask., to Prince Albert.....	24.86	
St. John & Quebec (Can. Gov't)—Gagetown, N. B., to Queenstown.....	8.50	
Vancouver, Victoria & Eastern (Gr. Nor.)—At Vancouver, B. C.....	1.00	206.95

Other Important Work Under Construction

Alberta & Great Waterways (E. D. & B. C.)—Building extension of Egg Lake branch from mile 11 to mile 41, 30 miles, contractors J. D. McArthur Company, Winnipeg, Man.

Canadian Northern—Terminal station freight sheds and yards at Vancouver, B. C.

Canadian Pacific—Extension to Pier D, Vancouver, B. C., cost \$623,700, completed.

Central Canada (E. D. & B. C.)—Building from mile 49, Peace River to mile 63, 14 miles, contractor J. D. McArthur Company, Ltd., Winnipeg, Man.

Hudson Bay Railway—Building from mile 332 to Port Nelson, Man., 92 miles, contractors J. D. McArthur, Winnipeg, Man.

St. John & Quebec (Can. Gov't)—Building between Queenstown, N. B., and Westfield, 37.8 miles; contractors, Nova Scotia Construction Company, Ltd., Halifax, N. S.

Temiskaming & Northern Ontario—Revision of main line from mile 63 to mile 66.5, 3.5 miles, contractors Port Arthur Construction Co., Toronto, Ont., Toronto, Hamilton & Buffalo—Sorting yard at Bridgeburg, Ont., cost \$500,000, 40 per cent completed.

Toronto Terminal Railway—Station at Toronto. Out through tracks, headhouse, postoffice and office building at side, cost \$4,500,000, 55 per cent completed.

Vancouver, Victoria & Eastern (Gr. Nor.)—Passenger station and facilities at Vancouver, B. C., cost \$500,000 completed.



Canadian War Records Photo

Canadian Railway Men Bending a Rail in France



Photo from International Film Service

A German Munition Train After It Had Been Bombed by British Airmen. Photograph Found on a German Prisoner



1917 a Record Breaker in Locomotive Orders

Orders Totaled 7,642 As Compared With 5,893 in 1916
Bright Prospects for Coming Year

THE NUMBER OF LOCOMOTIVES ordered in 1917 was the largest for the last 17 years, no less than 7,642 locomotives, of all sorts and kinds, large and small, for domestic or foreign use, having been placed on the books between January 1 and December 31. The output of locomotives, as distinguished from orders placed, during the same period, namely, 5,446, was not similarly a record breaker, but it represented a production that has been exceeded but three times since 1899—in 1905, in 1906 and in 1907.

It will be observed from Table I, giving the orders for locomotives in 1917 in detail, that they were divided as follows: Domestic, 2,704; for the United States government for service in France, 2,057; and for foreign countries, 2,881. The domestic figures are not at all extraordinary, for, as

for 1917 were approximately equal for 1916, and give a glimpse of the market for domestic production.

The new developments in the year just past in the locomotive market orders, no less than 7,642 locomotives having been ordered by the department of which James M. Feltus, director general of the American Locomotive Co. is in the lead. This total, he said, he would be pleased to see the demand increase to the best of interest in the coming year, estimated 9,000 to 10,000 locomotives, a steady order or two of the production for

TABLE I—THE LOCOMOTIVE ORDERS IN 1917

Domestic—Including railroad and government orders for the United States and Canada		Total
From builders	1,000	1,000
From company shops	1,704	1,704
Total domestic	2,704	2,704
United States Government		Total
For service overseas	2,057	2,057
Total foreign	2,881	2,881
Total of all orders	7,642	7,642

*Including the Russian orders for 1917.

will be seen from Table II, they are approximately along the average for the past 10 years. There was, it will be remembered, a tremendous buying movement in the year just preceding, continuing over from the heavy buying in the year preceding. For a time it seemed as if this buying movement, if continued, would make 1917 one of the heaviest years as to domestic orders, but our guests on the world stage, on the difficulty of getting material and the fact that 1917 was

the greatest and most locomotive buying market year, probably in world history. It takes a good deal of time to build up a business in such an industry, and it is a matter of some time before the production of 1917 is all that can be made. It is possible that will be true in the coming year, when they are put in the field to build locomotives and supply behind the lines in France.

The foreign orders for locomotives, totaling 2,881, are not so great, however, as last year, but in last year's total they were included 270 overseas production locomotives for the American government, which, through the War Relocation Administration, were placed in the hands of the United States government, which, through the War Relocation Administration, were placed in the hands of the United States government. These should largely serve as to whether they should be included in the 1917 total or not. The order book for 1917, for the American Locomotive Co., is now in the hands of the British Locomotive Works. It is now

were definitely signed, but the locomotives were scheduled on the shop programs ahead of many large orders for American railroads, some placed as far back as May or March. The orders even now have not been canceled; they have, however, been held in abeyance. They still remain on the shop schedules, although they will undoubtedly be set back from time to time. In other words, they have still to be reckoned with as orders, and for that reason they are here put with the 1917 figures.

These Russian orders, as a whole, have proved at once a blessing and a curse for the American railway supply field and through it for the railroads. The first Russian order for locomotives placed in June, 1915, when orders were scarcer than they had been at any time for the preceding six or seven years, was received with something closely akin to joyfulness, and so were the others immediately following. The

TABLE III—CLASSIFICATION OF DOMESTIC LOCOMOTIVES ORDERED 1911-1917

	1917	1916	1915	1914	1913	1912	1911
Mikado	894	754	962	333	796	1,309	590
Switching	110						
Eight-wheel	282	730	231	201	638	821	443
Six-wheel	47						
Four-wheel	60	63	194	166	823	858	577
Consolidation	175	218	120	59	72	168	112
Mallet	342	278	102	174	566	594	486
Santa Fe	370	325	75	63			
Ten-wheel	8	40	39	48	255	364	238
Mogul	13	28	12	24	42	61	127
Mountain or Mohawk	55	182	9	12	24		2
Atlantic	7	1	34	46	5	9	
American	1	1	19	8	8	27	
Electric	43	32	69	59	94	75	133
Other	188	238	168	73	103	252	406
Total	2,704	2,891	1,573	1,265	3,467	4,515	2,850

last two orders, that for 500 placed last July and that for 1,500 mentioned in the preceding paragraph, have simply had to be looked upon as an unwelcome duty, as something that America as one of the opponents of Kaiserism has been properly called upon to do for one of its brother opponents. But it is still true that these Russian orders were given priority over engines urgently needed for transportation requirements at home and with all the English, French, Russian and American government engines which were placed, the American orders were pretty well down on the builders' lists.

Editorial comment on another page treats of this situation, and notice is taken that the locomotive situation is now seeing the light. The Russian order for 500 locomotives placed in July, 1917, is now almost completed, some of the locomotives having been shipped and others which were prepared for shipment are being stored until the time comes when use can be made of them by better folks than the Kaiser or the Bolshevik. It is even announced that 200 of the locomotives will be remodeled and put in temporary service in our own country. With the other 1,500 locomotives being held in abeyance the whole situation is that the American railroads can now look forward to receiving in the near future the power they put on order six months or a year ago, and specialty manufacturers have already received notification to ship the specialties for these orders.

The situation as to the orders placed by the United States government for service with the American troops in France has had much more to commend it than the Russian orders. Deliveries on the War Department orders have been better spaced, with regard, of course, to the shipping situation. But what has counted most has been the standardization and the fact that standardization began at the first stage of the game. Railway and supply men alike, reading the accounts of the delays over the standardization of the Liberty motor, the Liberty truck, the Enfield rifle, the Browning gun, the ships, have expressed their relief that in one industry at least the War Department was represented by a man who could take an instrument of warfare, in this case, a locomotive, and have it turned out, ready for shipment and a standard for a year's future production in 20 working days. As

a result these U. S. A. Consolidation locomotives are keeping out of the way in the builders' plants and locomotives for American roads now have a clear path to completion and shipment.

Enough has been said to indicate that the situation as to domestic orders during the past year has been bad. Builders and specialty manufacturers alike have been postponing orders periodically and railway men have had to be pacified with the information that deliveries have been held up for them on account of more urgent war orders. This situation is now being remedied, so that the outlook both for deliveries and production in 1918 looks exceedingly favorable. Whether additional orders will be placed in the next few months is a question. The fact that the government has taken over the railroads is looked upon favorably, and with the easing up in prices and the improved deliveries, the supply field is confidently expecting a large buying movement. Upholding this belief is the fact that many railroads have reserved space for the coming year. The Norfolk & Western's order for the Mallet locomotives reported this week in part takes advantage of such a reservation and the New York Central has had a reservation of space for 250 locomotives with the American Locomotive Company since last September.

The tables on the following pages are detailed lists of the locomotives, freight cars and passenger cars ordered by the railroads and industrial companies in the United States and Canada and also of the orders for equipment for export. A great effort has been made to make these lists as complete as possible. It will be found, however, that the orders do not add up to as great amounts as the totals given in the tables. In addition to the orders concerning which data is given, orders were also placed (as reported by the equipment builders) for 120 locomotives, concerning which it was impossible to obtain detailed information. Although, even with this, there may be some omissions of both domestic and foreign orders, it is likely that these omissions are very few and,

TABLE IV—THE LOCOMOTIVES BUILT

1917		IN PREVIOUS YEARS	
Domestic	Foreign	Locomotives	Year
.....	.....	1909	2,342
.....	2,585	1908	2,887
.....	2,861	1907	4,755
Total	5,446	1910	3,530
		1911	4,915
		1912	5,332
		1913	2,235
		1914	2,085
		1915	4,075
		1916	

Includes Canadian output.

Includes Canadian output and equipment built in railroad shops.

under any condition, the results are sufficiently accurate to meet the general purpose for which these statistics are prepared, namely, to show the character and extent of the purchases of motive power this year as compared with preceding years.

The information given herewith is compiled from official sources. The *Railway Age* in answer to its inquiries has received communications from practically all of the railroads and private car lines in the United States and Canada. In the case of foreign orders and where no replies were received from purchasers in this country, the details were taken from the weekly records or from the reports of builders.

As far as the domestic orders are concerned it will be noted from Table III that there have been, even with the smaller total of orders placed, increases in the number of Mikado, Pacific and Santa Fe locomotives. The Decapod, a new development in domestic locomotive design, has increased in favor as indicated by its adoption by the Canadian Pacific

and the Pennsylvania for heavy freight service. The number of Mallet locomotives slow in the other lines to decrease. There is also a considerable drop in the number of Mountain and Mohawk locomotives ordered, but this is merely the result of the New York Central's not having ordered any additional engines of this type since the last year's tracts for these locomotives last year. The heavy railroads decrease in any one kind of locomotive was 26, providing locomotives; indeed the larger part of the decrease in the total is to be found in the light locomotives for general and industrial companies.

The total number of locomotives ordered for industrial service in 1917 was 1,000, a decrease of 100 from the 1,100 ordered in 1916. The total number of locomotives ordered for general service in 1917 was 1,000, a decrease of 100 from the 1,100 ordered in 1916. The total number of locomotives ordered for industrial service in 1917 was 1,000, a decrease of 100 from the 1,100 ordered in 1916. The total number of locomotives ordered for general service in 1917 was 1,000, a decrease of 100 from the 1,100 ordered in 1916.

Locomotive Orders in 1917
From Companies in the United States and Canada

Company	Quantity	Value	Notes
Alabama & Vicksburg	1	\$100,000	
Altona Northern	1	\$100,000	
Aluminium Company of America	1	\$100,000	
American Lumber & Lumber Co.	1	\$100,000	
American International Shipbuilding	1	\$100,000	
Arizona Railway	1	\$100,000	
Arizona Eastern	1	\$100,000	
Ashland, Odanah & Marengo	1	\$100,000	
Atmospheric & Santa Fe	1	\$100,000	
Atlanta & West Point	1	\$100,000	
Atlantic Coast Line	1	\$100,000	
Atlantic Refining Company	1	\$100,000	
Baldwin Locomotive Works	1	\$100,000	
Bee Tree Lumber Company	1	\$100,000	
Belgrade Lumber Co.	1	\$100,000	
Belt Railway of Chicago	1	\$100,000	
Big Creek Logging Co.	1	\$100,000	
Bliss, Dallet & Co.	1	\$100,000	
Boston & Albany	1	\$100,000	
Boston & Maine	1	\$100,000	
Brooks-Carlson Lumber Co.	1	\$100,000	
Buffalo, Rochester & Pittsburgh	1	\$100,000	
Cambria & Indiana	1	\$100,000	
Cambria Steel Company	1	\$100,000	
Canadian Government Railways	1	\$100,000	
Canadian Northern	1	\$100,000	
Canadian Pacific	1	\$100,000	
Carnegie Steel Co.	1	\$100,000	
Carolina, Clinchfield & Ohio	1	\$100,000	
Central of New Jersey	1	\$100,000	
Central Pacific	1	\$100,000	
Chicago & Alton	1	\$100,000	
Chicago & Eastern Illinois	1	\$100,000	
Chicago & Fox River	1	\$100,000	
Chicago & North Western	1	\$100,000	
Chicago, Burlington & Quincy	1	\$100,000	
Chicago, Indianapolis & Louisville	1	\$100,000	
Chicago, Milwaukee & St. Paul	1	\$100,000	
Chicago, North Shore & Milwaukee	1	\$100,000	
Chicago, Rock Island & Pacific	1	\$100,000	
Chicago, Terre Haute & St. Louis	1	\$100,000	
Cleveland, Cincinnati, Chicago & St. Louis	1	\$100,000	
Cohs & Mitchell	1	\$100,000	
Colorado & Wyoming	1	\$100,000	
Colorado, Wyoming & Eastern	1	\$100,000	
Columbia & Nehalem River	1	\$100,000	
Columbia, Newberry & Laurens	1	\$100,000	
Copper Range	1	\$100,000	
Copper River & Northwestern	1	\$100,000	
Craig Mountain Lumber Co.	1	\$100,000	
Creamery Packing Manufacturing	1	\$100,000	

Purchaser.	No.	Cylinders	Weight	Type	Super-heater	Brick arch	Valve Gear	Mechanical Stoker	Builder
Crowell & Spencer Lumber Co. Ltd.	1	19 x 26	140,000	4-6-0	Yes	No	Walschaert		Baldwin
Cumberland Valley	2	22 x 24	180,300	0-6-0	Yes	Yes	Walschaert		Penn. Alt. shops
Darnell, R. J.	1	.....	64,000	Geared	.....	.....	.....	.....	Heisler
Detroit & Toledo Shore Line	2	22 x 28	203,000	0-8-0	Yes	Yes	Walschaert		American
Detroit Edison Company	1	21 x 26	140,000	0-6-0	No	Yes	.....		Baldwin
Diamond & Caldor	1	3-11 x 12	120,000	Shay	.....	.....	.....		Lima
Donora Southern	1	22 x 26	163,000	0-6-0	Yes	Yes	.....		Baldwin
Dubach Lumber Co.	1	3-10 x 12	84,000	Shay	.....	.....	.....		Lima
East Broad Top	1	20 x 24	161,000	2-8-2	Yes	No	.....		Baldwin
East Tennessee & Western North Carolina	1	16 x 22	100,000	4-6-0	No	No	Walschaert		American
Elgin, Joliet & Eastern	8	24 x 28	218,000	0-8-0	Yes	Yes	Baker		American
El Paso & Southwestern	5	29 x 30	321,000	2-8-2	Yes	.....	.....	Street	American
Elwood Logging Co.	1	3-10 x 10	72,000	Shay	.....	.....	.....		Lima
Fort Smith & Western	2	22 x 28	200,300	2-8-2	Yes	Yes	Southern		Baldwin
Frost Johnson Lumber Co.	1	3-11 x 12	120,000	Shay	.....	.....	.....		Lima
Galveston, Harrisburg & San Antonio Ry.	12	27 1/2 x 32	348,000	2-10-2	Yes	No	.....		American
Garfield Smelting Co.	4	19 x 26	154,000	0-6-0	Yes	No	.....		Baldwin
Georgia R. R.	1	10 x 16	39,000	0-4-0	No	No	.....		Lima
Goodyear Lumber Co.	1	27 x 30	280,000	2-8-2	Yes	Yes	.....		Lima
Goodyear Lumber Co.	1	3-12 x 15	150,000	Shay	.....	.....	.....		Lima
Grafton & Upton	2	3-11 x 12	100,000	Shay	.....	.....	.....		Lima
Grand Trunk	10	27 x 30	60,000	4-0-4	Electric	freight	.....		Gen. Electric
Great Northern	50	27 x 30	276,000	2-8-2	Yes	Yes	Baker		Canadian
Great Northern	25	27 x 30	276,000	2-8-2	Yes	Yes	Young		American
Great Northern	15	28 x 32	222,000	0-8-0	Yes	No	Walschaert	Duplex	Baldwin
Green Bay & Western	2	26 x 28	220,000	0-8-0	Yes	No	Walschaert		Baldwin
Hammond Lumber Co.	1	.....	.....	2-6-0	.....	.....	.....		American
Haskell Carpenter Co.	1	3-11 x 12	100,000	Shay	.....	.....	.....		Lima
Haskell Carpenter Co.	1	3-10 x 12	84,000	Shay	.....	.....	.....		Lima
Illinois Central	20	26 x 28	278,000	4-6-2	Yes	Yes	Walschaert		American
Illinois Central	35	27 x 30	282,700	2-8-2	Yes	Yes	Walschaert		American
Illinois Central	50	27 x 30	282,700	2-8-2	Yes	Yes	Walschaert		Lima
Illinois Central	25	21 x 26	169,000	0-6-0	Yes	Yes	Walschaert		American
Illinois Central	5	29 x 32	367,000	2-10-2	Yes	Yes	Walschaert		American
Illinois Terminal	1	20 x 24	121,000	2-6-0	No	No	.....		Baldwin
Illinois Traction System	6	.....	120,000	Electric	.....	.....	.....		Decatur shops
Illinois Zinc Company	1	18 x 24	120,000	0-6-0	No	Yes	.....		Baldwin
Imperial Oil Co., Ltd.	1	2-8 x 12	40,000	Shay	.....	.....	.....		Lima
Independent Coal & Coke Co.	10	27 x 30	56,000	Shay	.....	.....	.....		Lima
Indiana Harbor Belt	5	23 1/2 x 30	217,000	0-8-0	Yes	Yes	Baker		Lima
Inman Poulson Logging Co.	1	3-11 x 12	100,000	Shay	.....	.....	.....		Lima
Kanawha, Glen Jean & Eastern	1	22 x 28	218,500	2-8-2	No	No	.....		Baldwin
Kansas City Southern	7	24 x 28	494,000	2-8-0	Yes	Yes	Walschaert		American
Kelly Island Lime & Transport Co.	3	3-8 x 8	48,000	Shay	.....	.....	.....		Lima
Larkins Green Logging Co.	1	.....	106,000	Geared	.....	.....	.....		Heisler
Lehigh Valley	11	27 x 28	301,500	4-6-2	Yes	Yes	Walschaert	Street	Baldwin
Lehigh Valley	10	27 x 28	301,500	4-6-2	Yes	Yes	Baker	Street	Baldwin
Lehigh Valley	30	29 x 32	370,600	2-10-2	Yes	Yes	Walschaert	Street	Baldwin
Lehigh Valley	10	29 x 32	370,600	2-10-2	Yes	Yes	Baker	Street	Baldwin
Long Pine Lumber Co.	1	3-11 x 12	100,000	Shay	.....	.....	.....		Lima
Longville Lumber Co.	1	3-12 x 12	130,000	Shay	.....	.....	.....		Lima
Los Angeles & Salt Lake	6	29 1/2 x 30	357,600	2-10-2	Yes	Yes	Walschaert		Baldwin
Louisville & Nashville	6	23 1/2 x 30	219,000	0-8-0	Yes	Yes	Walschaert		Company shops
Louisville & Nashville	18	27 x 30	302,000	2-8-2	Yes	Yes	Walschaert		Company shops
Louisville & Nashville	18	28 x 30	337,000	2-8-2	Yes	Yes	Walschaert		Company shops
Louisville & Nashville	6	22 x 28	232,000	4-6-2	Yes	Yes	Walschaert		Company shops
Lukens Steel Co.	1	.....	72,000	Geared	.....	.....	.....		Heisler
Lunkenheimer Co.	1	3-10 x 12	84,000	Shay	.....	.....	.....		Lima
McKeesport Connecting	2	22 x 28	165,000	0-6-0	No	No	.....		Baldwin
McLean Arkansas Lhr.	1	.....	44,000	Geared	.....	.....	.....		Heisler
Manufacturers' Ry.	2	.....	160,000	0-4-0	Electric	switch	.....		Gen. Electric
Manville Asbestos Co.	2	18 x 24	116,285	0-6-0	.....	.....	.....		Canadian
Mayer Bros. Construction Co.	2	10 x 16	39,000	0-4-0	.....	.....	.....		Lima
Michigan Alkali Co.	1	19 x 24	115,000	0-6-0	No	Yes	.....		Baldwin
Michigan Central	10	23 1/2 x 26	276,000	4-6-2	Yes	Yes	Walschaert		American
Michigan Central	10	23 1/2 x 30	217,000	0-8-0	Yes	Yes	Baker		American
Middletown Car Co.	1	18 x 24	120,000	0-6-0	No	Yes	.....		Baldwin
Midland Valley	1	22 x 28	186,500	2-8-0	No	Yes	.....		Baldwin
Midland Valley	1	19 x 24	128,000	0-6-0	Yes	Yes	Southern		Baldwin
Milwaukee Coke & Gas Co.	1	.....	.....	0-6-0	.....	.....	.....		Lima
Missouri, Kansas & Texas	1	10 x 16	39,000	0-4-0	No	No	.....		Lima
Mitchell, W. G., Lhr. Co.	1	.....	64,000	Geared	.....	.....	.....		Heisler
Moekezuma Copper Co.	1	18 x 20	114,000	2-8-0	Yes	Yes	.....		Baldwin
Monongahela Railway	1	22 1/2 x 30	173,000	2-8-0	Yes	Yes	.....		American
Monongahela Valley Traction	1	.....	80,000	Electric	.....	.....	.....		Westinghouse
Morgan & Wright	1	3-12 x 12	120,000	Shay	.....	.....	.....		Lima
Morgantown & Kingwood	1	22 x 28	181,000	2-8-0	Yes	Yes	Walschaert		Baldwin
Mountain Copper Co.	1	3-10 x 10	72,000	Shay	.....	.....	.....		Lima
Nashville, Chattanooga & St. Louis	10	25 x 30	272,000	2-8-2	Yes	Yes	Walschaert		Baldwin
Newburgh & South Shore	3	22 x 28	178,000	0-6-0	Yes	Yes	.....		Baldwin
Newport Chemical Works, Inc.	1	24 x 30	221,700	0-8-0	Yes	Yes	.....		Baldwin
New York Central	35	18 x 24	100,000	0-6-0	No	Yes	.....		American
New York Central	45	23 1/2 x 26	271,000	4-6-2	Yes	Yes	Walschaert		American
New York Central	45	28 x 28	343,000	4-8-2	Yes	Yes	Walschaert		Lima
New York, Chicago & St. Louis	10	23 1/2 x 30	217,000	0-8-0	Yes	Yes	Baker		Lima
New York, Chicago & St. Louis	4	21 x 28	173,000	0-6-0	Yes	Yes	Walschaert		Lima
New York, New Haven & Hartford	50	23 1/2 x 30	217,000	0-8-0	Yes	Yes	Walschaert		Lima
New York, New Haven & Hartford	5	30 x 32	365,000	2-10-2	Yes	Yes	Baker	Duplex	American
New York, New Haven & Hartford	50	.....	360,000	Electric	.....	.....	.....		Westinghouse
Nipmishk Timber Co.	1	.....	290,000	4-4-4	Electric	passenger	.....		Gen. Electric
Norfolk & Western	11	3-12 x 12	120,000	Shay	.....	.....	.....		Lima
Norfolk & Western	20	24 1/2 x 39 x 32	535,000	2-8-8-2	Yes	Yes	Baker	Duplex	Roanoke shops
Norfolk & Western	20	23 x 35 x 32	420,000	3-6-6-2	Yes	Yes	Baker	Duplex	American
Norfolk & Western	20	24 1/2 x 39 x 32	535,000	2-8-8-2	Yes	Yes	Baker	Duplex	American
North American Sugar Co.	1	.....	.....	2-8-0	.....	.....	.....		Baldwin
North American Sugar Co.	1	.....	.....	2-6-0	.....	.....	.....		Baldwin
Northern Ohio Traction & Light Co.	1	.....	100,000	4-0-4	Electric	freight	.....		Gen. Electric
Northwestern Pacific	60	28 x 30	328,000	2-8-2	Yes	Yes	Walschaert		American
Northwestern Pacific	5	26 & 40 x 30	465,000	2-8-2	Yes	Yes	Walschaert		American
O'Connell, N. J.	1	3-10 x 12	84,000	Shay	.....	.....	.....		Lima
Ogden, Logan & Idaho	2	.....	103,000	Electric	.....	.....	.....		Westinghouse

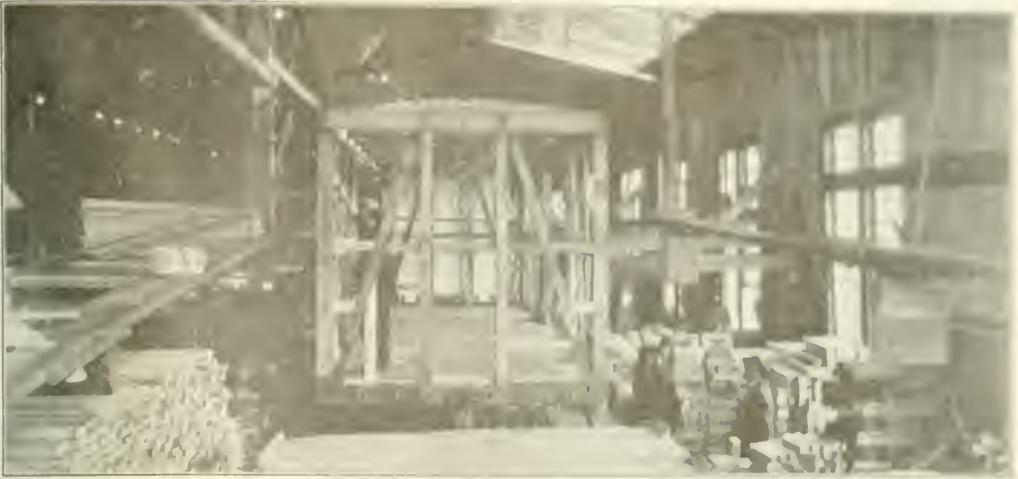
Purpose	No.	Cylinders	Weight	Type	Super-heater	Brick arch	Valve Gear	Mechanical Stoker	Builder
Western Steel Co. & Foundry Co.	1	20 x 26	129,000	0-6-0	.....	.....	.....	.....	American
West Side Belt	3	25 x 32	234,000	2-6-0	Yes	Yes	Walschaert	.....	American
Wheeler Lumber Co.	1	.....	84,000	Geared	.....	.....	.....	.....	Heiser
White, J. G., Engine Co.	1	300 hp.	Gasoline	Mech. drive	.....	.....	.....	.....	McKeen
Wilderness Lumber Co.	1	3-10 x 10	72,000	Shay	.....	.....	.....	.....	Lima
Wood, Alan, Iron & Steel Co.	1	12 x 16	24,000	0-4-0	No	No	.....	.....	Baldwin
	1	14 x 18	45,000	0-4-0	No	No	.....	.....	Baldwin
	1	14 x 18	62,000	0-4-0	No	No	.....	.....	Baldwin
Wood Russ Lumber Co.	1	3-10 x 10	72,000	Shay	.....	.....	.....	.....	Lima
Woodstock Lumber Co.	1	3-11 x 12	100,000	Shay	.....	.....	.....	.....	Baldwin
Worth Bros. Co.	1	14 x 16	63,600	0-4-0	No	No	.....	.....	Baldwin
	1	22 x 26	156,700	0-6-0	No	No	.....	.....	Baldwin
Wyandotte Terminal Railroad	1	.....	.....	0-6-0	.....	.....	.....	.....	.....
Youngstown & Ohio River	1	.....	100,000	Electric	.....	.....	.....	.....	Westinghouse
Youngstown Sheet & Tube Co.	4	22 x 26	151,000	0-6-0	No	No	.....	.....	Baldwin

For the American Railways in France

United States War Department (for France)	830	21 x 28	166,400	3-8-0	Yes	No	Stephenson	.....	Baldwin
	150	23 x 26	161,000	2-8-0	Yes	Yes	Walschaert	.....	American
	20	7 1/2 x 12	46,400	0-4-0	(Gasoline)	.....	.....	.....	Baldwin
	50	12 x 18	60,000	0-4-0	No	No	.....	.....	Vulcan
	195	9 x 12	34,500	2-6-2	No	No	Walschaert	.....	Baldwin
	126	5 1/2 x 7	14,000	0-4-0	(Gasoline)	.....	.....	.....	Baldwin
	65	8 x 6	8,000	0-4-0	(Gasoline)	.....	.....	.....	Baldwin
	6	10 x 16	38,000	0-4-0	No	Yes	.....	.....	Vulcan
	36	12 x 18	48,000	0-6-0	No	No	.....	.....	Porter
	610	.....	.....	0-4-0	(Gasoline)	.....	.....	.....	Baldwin

Orders from Railways in Other Countries

Alapash Mining Co. (Russia)	4	14 x 20	81,000	4-6-0	Yes	Yes	.....	.....	Baldwin
American R. R. of Porto Rico	2	13 x 18	70,500	0-6-0	No	Yes	.....	.....	Baldwin
	2	14 & 20 x 20	.....	2-8-0	.....	.....	.....	.....	American
	2	15 x 20	85,000	2-6-2	No	No	.....	.....	Baldwin
Antofagasta Nitrate Co. (Chile)	1	12 x 18	34,000	0-6-0	No	No	.....	.....	Baldwin
Aranco Co., Ltd. (Chile)	1	15 x 22	110,900	2-6-2	No	Yes	.....	.....	Baldwin
Ayacucho Paz Ry. (Chile)	50	16 & 25 x 22	150,000	0-6-0-0	Yes	Yes	.....	.....	Baldwin
British War Office	50	.....	.....	2-8-0	.....	.....	.....	.....	Baldwin
	20	.....	.....	2-6-2	.....	.....	.....	.....	Baldwin
	100	.....	.....	0-6-0	.....	.....	.....	.....	Baldwin
	100	.....	.....	2-8-0	.....	.....	.....	.....	Baldwin
Central Algodones (Cuba)	2	18 x 25	118,900	2-8-0	Yes	No	.....	.....	Baldwin
Central Constancia (Cuba)	10	13 x 18	50,400	2-6-0	Yes	Yes	.....	.....	Baldwin
Central Cuneaga (Cuba)	10	20 x 18	69,200	0-4-0	Fireless	No	.....	.....	Baldwin
Central El Lagareno (Cuba)	1	.....	.....	2-6-0	.....	.....	.....	.....	Baldwin
Central Nareisa (Cuba)	1	14 x 20	73,000	2-8-0	No	No	.....	.....	Baldwin
Central R. R. of Brazil	2	16 x 20	97,000	3-8-0	Yes	Yes	.....	.....	Baldwin
Central Portuguesa (Cuba)	1	12 x 16	32,000	2-8-0	No	No	.....	.....	Baldwin
Central San Ramon (Cuba)	1	13 x 18	52,800	2-6-0	No	No	.....	.....	Baldwin
Central Soledad (Cuba)	2	12 x 18	46,000	2-6-0	No	No	.....	.....	Baldwin
Central Victoria (Cuba)	1	14 x 20	76,600	2-8-0	No	No	.....	.....	Baldwin
Chapariz Sugar Co. (Cuba)	1	15 x 20	74,000	2-6-0	No	No	.....	.....	Baldwin
Chemins de Fer du Midi (France)	40	23 x 26	161,000	2-8-0	.....	Yes	.....	.....	American
Chosen Railway Bureau (Korea)	12	21 x 26	155,000	4-6-0	Yes	Yes	.....	.....	Baldwin
Cie Francaise de Metaux (France)	1	.....	.....	0-4-0	.....	.....	.....	.....	Baldwin
Cuba Cane Sugar Corp. (Cuba)	3	18 x 22	118,600	2-8-0	Yes	No	.....	.....	Baldwin
Cuba Cane Sugar Corp. (Cuba)	3	14 x 18	60,200	2-6-0	No	Yes	.....	.....	Baldwin
Egyptian State Railways	70	.....	.....	4-6-0	.....	.....	.....	.....	Baldwin
Estate Monymusk (Jamaica)	2	7 x 10	16,500	0-4-2	No	No	.....	.....	Baldwin
F. C. de Caidas (Colombia)	1	14 x 18	66,200	2-6-0	No	No	.....	.....	Baldwin
F. C. de Lima a Lunin (Peru)	1	14 x 18	69,350	2-8-0	No	No	.....	.....	Baldwin
F. C. del Pacifico (Colombia)	3	16 x 20	92,350	2-6-0	No	Yes	.....	.....	Baldwin
Ferrocarril Central Dominicano	1	3-10 x 12	84,000	Shay	.....	.....	.....	.....	Lima
Ferrocarril La Paz-Yungas	2	3-10 x 12	84,000	Shay	.....	.....	.....	.....	Lima
Fuji Minobu Ry. (Japan)	2	15 x 20	90,500	2-6-2	No	Yes	.....	.....	Baldwin
Graham, Hinkley & Co. (Yucatan)	1	15 x 20	75,400	2-6-0	No	No	.....	.....	Baldwin
Guantanamo Sugar Co. (Cuba)	1	13 x 18	70,400	4-6-0	No	No	.....	.....	Baldwin
Hunan Mining Bureau (China)	1	8 x 12	18,200	0-4-0	No	No	.....	.....	Baldwin
Inter Engineering & Trading Co. (Russia)	1	.....	.....	0-6-0	.....	.....	.....	.....	American
Jayne Arthur Marques (Africa)	1	11, 000	0-4-0	No	No	.....	.....	.....	Baldwin
Knox, Wm. H., & Co., Inc. (Peru)	1	13 x 18	56,450	2-8-0	No	No	.....	.....	Baldwin
Kure Naval Yard (Japan)	1	.....	97,000	0-4-0	.....	.....	.....	.....	American
	1	.....	42,000	0-4-0	.....	.....	.....	.....	American
Liluae Plantation Co. (Hawaii)	1	11 x 16	45,000	0-6-2	No	No	.....	.....	Baldwin
Linde Brothers (Jamaica)	1	.....	.....	0-4-2	.....	.....	.....	.....	Baldwin
Lindeteves Stokvis (Dutch East Indies)	1	9 1/2 x 14	33,000	0-8-0	.....	.....	.....	.....	American
Manati Sugar Co. (Cuba)	4	15 x 20	78,650	2-8-0	No	Yes	.....	.....	Baldwin
Morrell, John, & Co.	50	30 x 24	129,600	0-6-0	No	No	.....	.....	Baldwin
Northern Railway of France	50	.....	.....	2-8-2	.....	.....	.....	.....	Baldwin
Northern Railway of Spain	40	23 x 25 1/2	196,000	3-8-2	Yes	Yes	.....	.....	American
Ono Ry. (Japan)	1	15 x 20	90,500	2-6-2	No	Yes	.....	.....	Baldwin
Owing, H. E., Jr. (Java)	1	6 x 10	12,500	0-4-0	No	No	.....	.....	Baldwin
Paris Orleans Railway (France)	50	597 x 711 mm	200,000	2-6-2	Yes	.....	.....	.....	American
Peruvian Corp. Ltd.	1	16 x 24	93,500	2-6-0	No	No	.....	.....	Baldwin
Ponce & Guayama R. R. (Porto Rico)	1	14 x 20	80,000	2-8-0	No	No	.....	.....	Baldwin
Porvenir Sugar Co. (Santo Domingo)	1	11 x 16	45,300	2-6-0	No	No	.....	.....	Baldwin
Rhodesian Railway	6	22 x 24	172,000	4-8-2	Yes	Yes	.....	.....	American
Robla Railway	1	16 x 24	118,000	0-8-0	.....	.....	.....	.....	American
Russian Government	53	.....	.....	Ng. Mallet	.....	.....	.....	.....	Baldwin
	75	25 x 28	197,000	2-10-0	Yes	Yes	.....	.....	Baldwin
	750	25 x 28	197,000	2-10-0	Yes	Yes	.....	.....	Baldwin
	250	25 x 28	197,000	2-10-0	Yes	Yes	.....	.....	American
	68	11 x 16	45,000	0-6-0	.....	.....	.....	.....	American
	750	25 x 28	197,000	2-10-0	Yes	Yes	.....	.....	American
	750	25 x 28	197,000	2-10-0	Yes	Yes	.....	.....	American
Shantung Railway (China)	2	20 1/2 x 26	160,000	2-8-0	Yes	Yes	.....	.....	American
Sorocabana Railroad (Brazil)	3	19 x 20	134,000	2-8-2	Yes	.....	.....	.....	American
	5	17 1/2 x 20	118,000	4-6-2	Yes	.....	.....	.....	American
	5	16 1/2 x 26 x 24	94,000	Mallet	.....	.....	.....	.....	American
South African Railways	10	22 x 28	200,000	4-8-2	.....	.....	.....	.....	American
	30	22 x 26	175,000	4-8-2	Yes	.....	.....	.....	American
South Manchurian Railway	2	.....	112,000	404	Electric	freight	.....	.....	Gen. Electric
Sun Ning Railway (China)	1	15 x 24	84,500	2-6-0	No	Yes	.....	.....	Baldwin
Trinidad Shipping & Trading Co. (Trinidad)	1	9 x 14	34,000	0-4-0	.....	.....	.....	.....	American
Union Miniere du Haut Katanga	4	10 x 16	48,000	0-6-0	.....	.....	.....	.....	American
Usina Sao Bento (Brazil)	1	12 x 18	55,900	2-4-2	No	No	.....	.....	Baldwin



Freight Car Orders in 1917 Reach Low Level

Total of 158,965 Compares With 205,368 in 1916. Domestic Orders Lowest Since the Year 1908

THE ORDERS FOR FREIGHT CARS in 1917 totaled 158,965 including 74,274 for domestic uses, 18,844 for the United States Government and 65,676 for France, Russia and other foreign countries. The total of all orders compares with 205,368 in 1916; the difference, however, is four

times as great as during the early part of the year when the price and deliveries of the building were at their worst. With this large number of shop cars and the shortage of steel, there were a great number of orders for all wood construction cars ordered than would be expected.

Of the nearly 80,000 cars ordered only about 4,000, or 5 per cent, were all-wood cars. This is in about the same proportion as last year and the figures for both years are

TABLE I.—THE FREIGHT CAR ORDERS IN 1917

Domestic—Including railroads and private car lines in the United States and Canada	
From builders	73,441
From company shops	30,934
Total domestic	104,375
United States Government	
For service overseas	18,844
For use in this country	1,800
Total United States Government	20,644
France	11,924
Russia	47,508
Other foreign	4,677
Total foreign	64,113*
Total of all orders	158,965*

*Including the 30,500 Russian cars, which will be built in America.

greater than indicated by these figures because the 1917 figures include 30,500 cars for Russia, the orders for which are now held in abeyance and which indeed may never be executed.

The passenger cars ordered total 1167, including 1114 for domestic uses, this figure being one of the smallest since the Railway Age began its compilations in 1901.

Of freight cars ordered this year about 41 per cent are for foreign delivery either for the United States Government or for its Allies. The orders for 79,997 cars ordered by the railways in this country for domestic use is the smallest number ordered since the record was first kept, with the exception of 1908 at which time 62,647 cars were ordered. Of this 79,997 there were about 11,000, or 14 per cent, ordered to be built by the railways themselves. In number this slightly exceeds those ordered to be built in company shops last year, but in percentage of total cars ordered, the ratio is about double that of last year.

TABLE II.—THE FREIGHT CAR ORDER IN 1917

Domestic	
From Builders	73,441
From Company Shops	30,934
Total Domestic	104,375
U. S. Government	
Foreign	20,644
Total	125,019

of cars made larger than the previous previous years. As steel for the construction became more available during the year less all-wood cars were ordered.

Of all the cars ordered there was a proportionate decrease in one-way freight cars and a proportionate increase in

TABLE III.—FREIGHT CAR ORDER IN 1917

Year	Total	Domestic	Foreign	U. S. Govt.
1901	100,000	80,000	20,000	0
1902	100,000	80,000	20,000	0
1903	100,000	80,000	20,000	0
1904	100,000	80,000	20,000	0
1905	100,000	80,000	20,000	0
1906	100,000	80,000	20,000	0
1907	100,000	80,000	20,000	0
1908	100,000	80,000	20,000	0
1909	100,000	80,000	20,000	0
1910	100,000	80,000	20,000	0
1911	100,000	80,000	20,000	0
1912	100,000	80,000	20,000	0
1913	100,000	80,000	20,000	0
1914	100,000	80,000	20,000	0
1915	100,000	80,000	20,000	0
1916	205,368	104,375	100,993	0
1917	158,965	104,375	54,590	0

of freight cars. The year 1917 was one of the poorest years. The percentage of all-wood and all-steel cars and the percentage of passenger cars ordered practically the same. The record for passenger cars during the year has not been

exactly favorable either with the railways or the builders. The prices have been so high that the railways have not dared to come into the markets. As a result the builders have been operating in some cases at as low as 50 or even 25 per cent of capacity and as one manufacturer has put it, "when there were orders there was a shortage of labor and material, or when there was material, a shortage of labor." The United States Government orders for the forces in France have helped the situation considerably and it is to

Russian requirements, as was the case for locomotives, as mentioned elsewhere in this issue. While 1917 may not have been exceedingly bright from the standpoint of freight car orders, the situation as to the immediate future is exactly the opposite. The opportunities for the railways to obtain cars were never better than at present. With the material situation much better than it was last year at this time and with a smaller number of orders on their books, the car builders are in a position to give

TABLE A—CLASSIFICATION OF FREIGHT CARS ORDERED DURING 1917

	All-steel	Steel frame and St. U. F.	Steel underframe	Steel center sills	Wood	Net Specified	Total
Hox	3,253	9,300	3,634	7,902	518	652	25,259
Refrigerator	.....	400	6,889	100	351	.....	7,740
Hopper, including ore	9,737	1,160	86	50	300	.....	11,273
Gondola	5,597	3,925	2,864	2,702	13	104	15,205
Coal (not otherwise specified)	.....	.....	1,095	.....	1	.....	1,096
Stock	.....	1,650	1,100	1,711	.....	1	4,462
Flat	749	.....	142	754	373	128	2,146
Tank	7,842	.....	6	.....	.....	230	8,078
Caboose	.....	9	300	50	70	174	820
Miscellaneous or not specified	1,284	.....	666	100	1,096	142	3,288
Total	28,679	14,734	17,332	12,758	4,433	1,431	79,367

the credit of the authorities of Washington that the deliveries on these cars have been called for with full regard to both the shipping situation and to the situation in car builders' establishments.

The Russian orders for cars have not had anything like

from three to four months' delivery, which is the condition in normal times. With a plant capacity of about 25,000 cars per month and with current orders to absorb this capacity for the next three months, one-fourth of which is for foreign delivery, the car companies could, if sufficient orders were placed, organize their forces for maximum full production and provide over 100,000 cars within the next six months. This would assist materially in relieving the car shortage. They have been handicapped throughout the year by the scarcity of labor and the delayed receipt of material. Even now if a large number of cars was ordered for immediate delivery, it might be necessary for the Government to assist in the matter of materials. A shortage of material not only delays the delivery of the cars but disrupts the shop organization and greatly increases the cost of the cars. In other words, the conditions must be stabilized if the car production is to be sufficient to meet the needs of the country for new freight cars.

TABLE IV—THE FREIGHT AND PASSENGER CARS BUILT IN 1917.

	Freight cars	Passenger cars
Domestic	119,363	1,969
Foreign	32,038	31
Total	151,401	2,000
All-steel	61,115	1,874
Steel frame	29,310	.....
Steel underframe	40,386	93
Steel center sills	8,317	33
Wood	12,273	.....
Total	151,401	2,000

COMPARISON WITH PREVIOUS YEARS

Year	Freight cars	Passenger cars
1899	119,886	1,305
1900	115,631	1,636
1901	136,950	2,055
1902	162,599	1,948
1903	153,195	2,007
1904	60,806	2,144
1905*	165,155	2,551
1906*	240,503	3,167
1907*	284,188	5,457
1908*	76,555	1,716
1909*	93,570	2,849
1910*	180,945	4,412
1911*	72,161	4,246
1912*	152,429	3,060
1913*	307,684	3,296
1914*	104,541	3,691
1915*	74,112	1,949
1916*	135,001	1,839

*Includes Canadian output.

*Includes Canadian output and equipment built in railroad shops.

the effect on the car market that the Russian locomotives orders have had. There have not been large car orders placed and there were not sufficient domestic orders to establish a conflict between deliveries on domestic and on

And this still omits from consideration the new developments at Washington, which, as noted editorially, have been received on the whole with favor in the supply field.

There were 151,401 freight cars built during the year, of which 119,363 were for domestic use and 32,038 for foreign delivery. Of the 119,363 for domestic use, 12,273, or over 10 per cent, were of wood and over 11 per cent, or 13,488, were built by the railroads themselves. The total number built is a material increase over 1916 and 1915.

In the following tables are given lists of the orders for freight and passenger cars during the twelve months of 1917. The article on the locomotive situation on another page tells how the items were obtained. Suffice it to say here that the lists are received from official sources. Replies were received from practically every railway and car line in the country, and the reports were then further checked up by reference to lists furnished by the builders.

Passenger Car Orders in 1917

Purchaser	No.	Class	Construction	Weight	Trucks, No. of wheels	Lighting	If electric lighting		Builder
							Axle generator equip't	Batteries	
Alabama & Vicksburg	1	Bagg. & mail	All steel	.....	6	Electric	Safety	Willard	Am. Car & Fdy.
American Traction Co.	1	Stor. battery	St. underframe	28,000	4	Electric	.....	.....	Ry. Stor. Bat. Car
Arlison, Topeka & Santa Fe	2	Private	All steel	.....	6	Electric	.....	.....	Pullman
Atlanta, Birmingham & Atlantic	1	Stor. battery	St. underframe	60,000	4	Electric	.....	.....	Ry. Stor. Bat. Car
Atlantic & Carolina	1	80 hp. Gasoline, passenger and express car.	.....	.....	.....	.....	.....	.....	.....
Atlantic Coast Line R. R.	2	Driving	All steel	.....	6	Electric	Stone-Franklin	Edison	Pullman
	3	Coaches	All steel	.....	6	Electric	Stone-Franklin	Edison	Pullman
	3	Pass. & bagg.	All steel	.....	6	Electric	Stone-Franklin	Edison	Pullman
	8	Mail & bagg.	All steel	.....	6	Electric	Stone-Franklin	Edison	Pullman
	18	Express	All steel	.....	6	Electric	Stone-Franklin	Edison	Pullman
Baltimore & Ohio R. R.	*135	Express	St. underframe	43,370	4	Oil	.....	.....	Company shops

*Items marked with an asterisk in this and the following tables are not included in the totals.

†Rebuilt from box cars.

Purchaser	Quantity	Material	Weight	Value
Boston & Maine	4	Steel	100,000	4,000
*Boston Elevated Ry	4	Steel	100,000	4,000
Cambria & Indiana	4	Steel	100,000	4,000
Central of Georgia	4	Steel	100,000	4,000
Central Pacific	4	Steel	100,000	4,000
Central Vermont	4	Steel	100,000	4,000
Chattahooche Valley	4	Steel	100,000	4,000
Chicago & North Western	4	Steel	100,000	4,000
Chicago, Burlington & Quincy	4	Steel	100,000	4,000
Chicago, Milwaukee & St. Paul	4	Steel	100,000	4,000
Cosden, I. S.	4	Steel	100,000	4,000
Cuba Northern	4	Steel	100,000	4,000
Deer River R. R.	4	Steel	100,000	4,000
Delaware, Lackawanna & Western	4	Steel	100,000	4,000
East Broad Top R. R.	4	Steel	100,000	4,000
East Tenn. & West. North Carolina	4	Steel	100,000	4,000
Ferrocarril del Pacifico	4	Steel	100,000	4,000
Galveston, Harrisburg & San Antonio	4	Steel	100,000	4,000
Great Northern	4	Steel	100,000	4,000
Great Western	4	Steel	100,000	4,000
Harkness, Edw. S.	4	Steel	100,000	4,000
Hocking Valley	4	Steel	100,000	4,000
Houston & Texas Central R. R.	4	Steel	100,000	4,000
Illinois Central	4	Steel	100,000	4,000
*Interborough Rapid Transit	4	Steel	100,000	4,000
Interstate Public Service Co.	4	Steel	100,000	4,000
Louisiana & Arkansas	4	Steel	100,000	4,000
Louisiana Western	4	Steel	100,000	4,000
Louisville & Nashville	4	Steel	100,000	4,000
Memphis & Rugby	4	Steel	100,000	4,000
Montana, Wyoming & Southern	4	Steel	100,000	4,000
Morgans Louisiana & Texas	4	Steel	100,000	4,000
New York Central R. R.	4	Steel	100,000	4,000
New York, New Haven & Hartford	4	Steel	100,000	4,000
New York, Ontario & Western	4	Steel	100,000	4,000
Oregon & California	4	Steel	100,000	4,000
Pennsylvania Railroad	4	Steel	100,000	4,000
Peoria & Pekin Union	4	Steel	100,000	4,000
Pere Marquette R. R.	4	Steel	100,000	4,000
Philadelphia & Reading	4	Steel	100,000	4,000
Philadelphia, Baltimore & Washington	4	Steel	100,000	4,000
Pullman Company	4	Steel	100,000	4,000
Quebec Central	4	Steel	100,000	4,000
Richmond, Fredericksburg & Potomac	4	Steel	100,000	4,000
Rouss, Peter W.	4	Steel	100,000	4,000
San Antonio & Aransas Pass	4	Steel	100,000	4,000
Southern Pacific	4	Steel	100,000	4,000
Sumpter Valley Ry	4	Steel	100,000	4,000
Texas & New Orleans	4	Steel	100,000	4,000
Texas & Pacific	4	Steel	100,000	4,000
Union Pacific	4	Steel	100,000	4,000
United States Government	4	Steel	100,000	4,000
Virginia & Truckee	4	Steel	100,000	4,000
West Jersey & Sea Shore	4	Steel	100,000	4,000
W. Jener, Joseph E.	4	Steel	100,000	4,000

Freight Car Orders in 1917

From Companies in the United States and Canada

Purchaser.	No.	Class.	Capacity	Construction	Weight	Draft gear	Trucks.	Roofs.	Builder
Ahlene & Southern.....	1	Coal	80,000	St. and frame	.....	.....	Bettendorf	.....	Company shops
Alabama & Vicksburg.....	1	Flat	60,000	Wood	.....	Cardwell	.....	.....	Am. Car & Fdy.
Alaska Engineering Commission.	*3	Steel underframes and steel end frames	.....	.....	.....	.....	.....	.....	Seattle
Allegheny Steel Co.....	8	Gondola	100,000	Steel	37,000	Farlow-West'ghouse	Arch bar	.....	Ralston
Alauppa & Southern.....	3	Gondola	100,000	Steel	56,800	Farlow-West'ghouse	Arch bar	.....	Pressed Steel
American Brass Co.....	2	Gondola	100,000	Steel	32,200	Spring	Arch bar	.....	Am. Car & Fdy.
American Linsed Co.....	20	Tank	10,000 lb.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
American Steel & Wire Co.....	25	Tank	100,000	Steel	42,000	Cardwell	Arch bar	.....	General Am.
Archer-Daniels Linseed Co.....	4	Scale test	.....	Steel	.....	Miner	.....	.....	Am. Car & Fdy.
Armour Car Lines.....	500	Tank	60,000	Steel	.....	Cardwell G-11	Arch bar	.....	Company shops
Atchison, Topeka & Santa Fe.....	800	Refrigerator	80,000	St. and frame	50,000	Cardwell G-11	Cast steel	Dble. hoard	Company shops
Baltimore & Ohio.....	1,000	Tank	6,000 lb.	Steel	40,000	Cardwell G-11	Arch bar	.....	Chicago St'l Car
Bangor & Aroostook.....	350	Steel underframes for beef cars	.....	.....	.....	.....	.....	.....	Bettendorf
Bethlehem Steel Co.....	50	Refrigerator	80,000	St. and frame	43,000	Miner A-19-B	Cast steel	.....	Murphy
Birmingham Southern.....	10	Concentrate	100,000	St. frame	44,900	Miner A-12-B	Cast steel	Wood	Am. Car & Fdy.
Boston & Maine.....	1	Caboose	.....	.....	.....	.....	.....	.....	Pullman
Boynton Refining Co.....	25	Hopper	110,000	All steel	41,500	Farlow-Sessions	Barber	.....	Company shops
Brier Hill Steel Co.....	10	Hopper	110,000	Composite	42,500	Farlow-Sessions	Barber	.....	Am. Car & Fdy.
Buffalo, Rochester & Pittsburgh.	15	Caboose	60,000	St. and frame	40,000	Farlow spring	Cast steel	Canvas	Company shops
Butler County R. R.....	25	Flat	50,000	Wood	25,000	Tandem spring	Arch bar	.....	Am. Car & Fdy.
Butterworth-Judson Co.....	75	Tank	8,000 lb.	Steel	.....	.....	.....	.....	Company shops
California Dispatch Line.....	25	Tank	8,000 lb.	Steel	.....	.....	.....	.....	Penn. Tank Car
Calumet & Hecla Mining Co.....	10	Rock	80,000	Wood	.....	Miner	.....	.....	General Am.
Canadian Car & Foundry Co.....	8	Flat	80,000	Steel frame	32,000	.....	.....	.....	Am. Car & Fdy.
Canadian Government Railways.....	3,000	Box	80,000	Steel frame	40,000	Miner twin spring	Arch bar	Chic. Winflow	Can. Car & Fdy.
Can. Gov. Rys. (East. Lines).....	500	Box	80,000	Steel frame	40,000	Miner twin spring	Arch bar	Chic. Winflow	Can. Car & Fdy.
Canadian Pacific.....	76	Auto. Furn.	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
Cambria Steel Co.....	6	Flat	100,000	Steel	38,400	Slick	Arch bar	.....	Can. Car & Fdy.
Cambria Steel Co.....	6	Flat	100,000	Steel	39,600	Slick	Arch bar	.....	Cambria
Cambria Steel Co.....	4	Flat	100,000	Steel	32,900	Slick	Arch bar	.....	Cambria
Cambria Steel Co.....	18	Coke bin	100,000	Steel	71,400	Slick	Arch bar	.....	Cambria
Cambria Steel Co.....	4	Gondola	100,000	Steel	54,100	Slick	Arch bar	.....	Cambria
Cambria Steel Co.....	7	Coke	100,000	Steel	71,400	Slick	Arch bar	.....	Cambria
Cambria Steel Co.....	20	Hopper (H21a)	140,000	Steel	57,300	Slick	Arch bar	.....	Cambria
Cambria Steel Co.....	30	Gondola	140,000	Steel	51,400	Slick	Arch bar	.....	Cambria
Cambria Steel Co.....	1	Quencher	.....	.....	.....	Westinghouse	Slick side fr.	.....	Cambria
Cambria Steel Co.....	30	Dump	.....	.....	.....	.....	.....	.....	Cambria
Cambria Steel Co.....	2	Quencher	.....	.....	.....	Westinghouse	Slick side fr.	.....	Cambria
Cambria Steel Co.....	5	Hopper (H21a)	140,000	Steel	57,300	Slick	Arch bar	.....	Cambria
Cambria Steel Co.....	40	Gondola bodies	140,000	Steel	35,200	Slick	.....	.....	Cambria
Cambria Steel Co.....	*100	Trucks	.....	.....	.....	.....	.....	.....	Cambria
Cambria Steel Co.....	250	Mine	.....	.....	.....	.....	.....	.....	Cambria
Cambria Steel Co.....	20	Hopper	100,000	Steel	48,400	Farlow-West'ghouse	Arch bar	.....	Ralston
Cambria Steel Co.....	20	Dump	140,000	.....	.....	Farlow-West'ghouse	.....	.....	Standard Steel
Cambria Steel Co.....	60	Gondola	140,000	Steel	51,260	Farlow-West'ghouse	Arch bar	.....	Pressed Steel
Cambria Steel Co.....	7	Tank	100,000	Steel	.....	Cardwell	.....	.....	Am. Car & Fdy.
Cambria Steel Co.....	6	Dump	.....	.....	.....	Farlow-West'ghouse	.....	.....	Company shops
Cambria Steel Co.....	7	Flat	.....	.....	.....	Farlow-West'ghouse	.....	.....	Standard Steel
Central of Georgia.....	100	Stock	80,000	Wood	39,000	Bradford	Schoen	Wood	Company shops
Central of Georgia.....	100	Stock	60,000	Wood	39,000	Bradford	Arch bar	Wood	Company shops
Central of Georgia.....	2	Flat	80,000	St. ctr. sills	30,000	Transom	Arch bar	.....	Company shops
Central of Georgia.....	2	Flat	80,000	St. ctr. sills	30,000	Transom	Arch bar	.....	Company shops
Central of Georgia.....	2	Caboose	50,000	Wood	29,800	W. & P.	Arch bar	.....	Company shops
Central of Georgia.....	4	Gondola	80,000	St. ctr. sills	33,200	Transom	Arch bar	.....	Company shops
Central of Georgia.....	*100	Caboose	60,000	Wood	.....	.....	.....	.....	Company shops
Central Vermont.....	1	Tank	8,050 lb.	Steel	.....	Friction	.....	.....	Penn Tank Car
Certainfeed Products Corp.....	50	Caboose	80,000	Eco.dft.arms	32,500	Farlow twin spring	Arch bar	.....	Company shops
Chicago & Alton.....	60	Stock	80,000	Eco.dft.arms	35,240	Tandem spring gear	Arch bar	Board	Company shops
Chicago & Alton.....	200	Gondola	80,000	St. ctr. sills	37,500	Miner Class G	Pressed steel	.....	Haskell & Bark.
Chicago & Alton.....	25	Gondola	100,000	Steel	40,300	Slick	Arch bar	.....	Pressed Steel
Chicago & North Western.....	2,000	Gondola	100,000	Steel frame	41,800	Miner A-24-A	Cast steel	.....	Am. Car & Fdy.
Chicago & North Western.....	30	Caboose	.....	St. and frame	.....	Miner	.....	.....	Am. Car & Fdy.
Chicago & North Western.....	*375	Steel underframes	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Chicago, Indianapolis & L'ville.....	*5	Steel underframes	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.

Purchaser.	No.	Class	Quantity	Material	Value	Remarks
Chicago, Burlington & Quincy	1,500	Wagon	100	Steel	100,000	
Chicago Junction	150	Flat	100	Steel	100,000	
Chicago, Milwaukee & St. Paul	1,000	Flat	100	Steel	100,000	
Chicago, St. P., Minn. & Omaha	1,000	Flat	100	Steel	100,000	
Cincinnati Abattoir Co.	100	Flat	100	Steel	100,000	
Cincinnati, Indianapolis & West.	100	Flat	100	Steel	100,000	
Clarendon Refining Co.	100	Flat	100	Steel	100,000	
Clev., Cin., Chi. & St. Louis	100	Flat	100	Steel	100,000	
Colorado & Southern	100	Flat	100	Steel	100,000	
Commonwealth Edison Co.	100	Flat	100	Steel	100,000	
Consolidation Coal Co.	100	Flat	100	Steel	100,000	
Constantine Refining Co.	100	Flat	100	Steel	100,000	
Cook, N. B., Oil Co.	100	Flat	100	Steel	100,000	
Copper Range	100	Flat	100	Steel	100,000	
Cornplanter Refining Co.	100	Flat	100	Steel	100,000	
Cosler & Co.	100	Flat	100	Steel	100,000	
Crew Levick Co.	100	Flat	100	Steel	100,000	
Cudahy Milwaukee Refrig. Line	100	Flat	100	Steel	100,000	
Cudahy Refrigerator Line	100	Flat	100	Steel	100,000	
Cumberland Valley	100	Flat	100	Steel	100,000	
Delaware & Hudson	100	Flat	100	Steel	100,000	
Delaware River & Union	100	Flat	100	Steel	100,000	
Delray Canneting	100	Flat	100	Steel	100,000	
Detroit Chemical Works	100	Flat	100	Steel	100,000	
Detroit Edison Co.	100	Flat	100	Steel	100,000	
Detroit, Toledo & Ironton	100	Flat	100	Steel	100,000	
Dist. of Columbia, Comm. of	100	Flat	100	Steel	100,000	
D. J. Jacob Packing Co.	100	Flat	100	Steel	100,000	
Dominion Iron & Steel Co.	100	Flat	100	Steel	100,000	
Dunbar Steel Co.	100	Flat	100	Steel	100,000	
East Oil Co.	100	Flat	100	Steel	100,000	
East & Iron Range	100	Flat	100	Steel	100,000	
DuPont, E. I., de Nemours Co.	100	Flat	100	Steel	100,000	
East Broad Top	100	Flat	100	Steel	100,000	
Eastern Refining Co.	100	Flat	100	Steel	100,000	
East Tenn. & Western N. C.	100	Flat	100	Steel	100,000	
Edorado Refining Co.	100	Flat	100	Steel	100,000	
Elgin, Joliet & Eastern	100	Flat	100	Steel	100,000	
El Paso & Southwestern	100	Flat	100	Steel	100,000	
Essex Terminal	100	Flat	100	Steel	100,000	
Evans Thwing Refining Co.	100	Flat	100	Steel	100,000	
Federal Oil & Supply Co.	100	Flat	100	Steel	100,000	
Fels & Co.	100	Flat	100	Steel	100,000	
Fiera American Plywood Co.	100	Flat	100	Steel	100,000	
Florida East Coast	100	Flat	100	Steel	100,000	
Foster Lumber Co.	100	Flat	100	Steel	100,000	
H. C. Frank (aka)	100	Flat	100	Steel	100,000	
Fruit Growers' Express	100	Flat	100	Steel	100,000	
Galveston, Harrisburg & San Ant.	100	Flat	100	Steel	100,000	
General Petroleum Corp.	100	Flat	100	Steel	100,000	
Georgia Railroad	100	Flat	100	Steel	100,000	
Gillette, L. C., & Sons	100	Flat	100	Steel	100,000	
Glen View Tank Line	100	Flat	100	Steel	100,000	
Goodyear Tire & Rubber Co.	100	Flat	100	Steel	100,000	
Grand Trunk	100	Flat	100	Steel	100,000	
Granville, Joseph F.	100	Flat	100	Steel	100,000	
Great Northern	100	Flat	100	Steel	100,000	
Gulf Refining Company	100	Flat	100	Steel	100,000	
Hagerstown & Frederick	100	Flat	100	Steel	100,000	
Hamlin Doughty E.	100	Flat	100	Steel	100,000	
Hamman, T. E.	100	Flat	100	Steel	100,000	
Heald, John H., & Co., Inc.	100	Flat	100	Steel	100,000	
Highland Glass Co.	100	Flat	100	Steel	100,000	
Illinois Central	100	Flat	100	Steel	100,000	
Illinois Northern	100	Flat	100	Steel	100,000	
Illinois Steel Co.	100	Flat	100	Steel	100,000	
Independent Oil Co.	100	Flat	100	Steel	100,000	
Independent Refining Co.	100	Flat	100	Steel	100,000	
Indiana Refining Co.	100	Flat	100	Steel	100,000	

Purchaser.	No.	Class.	Capacity	Construction	Weight	Draft gear	Trucks.	Class.	Roofs.	Builder
Indian Refining Co., Inc.	60	Tank	8,050g.	Steel	31,300	Cardwell G-11	Side frame	.....	.....	Std. Car Cons.
	15	Tank	6,050g.	Steel	36,600	Cardwell G-11	Side frame	.....	.....	Std. Car Cons.
	9	Tank	6,000g.	Steel	30,900	Bradford	Arch bar	.....	.....	Chic. Steel Car
Inland Steel Co.	25	Tank	8,050g.	Steel	41,200	Cardwell G-11	Side frame	.....	.....	Std. Car Cons.
	72	General Service	100,000	Steel	41,000	Spring	Bettendorf	.....	.....	Bettendorf
	35	Hopper	100,000	Steel	49,500	Spring	Bettendorf	.....	.....	Bettendorf
International Refining Co.	50	Tank	80,000	Steel	.....	.....	Cast steel	.....	.....	Gen. American
	1	Tank	100,000	Steel	.....	.....	Cast steel	.....	.....	Std. Car Cons.
Interstate R. R.	500	Hopper	100,000	Steel	38,550	National	Arch bar	.....	.....	Western Steel
Interstate Tank Car Corp.	40	Tank	8,000g.	Steel	40,000	Farlow spring	Arch bar	.....	.....	Chic. Steel Car
Island Petroleum Co.	15	Tank	80,000	Steel	35,000	.....	Arch bar	.....	.....	Am. Car & Fdy.
Keith Railway Equipment Co.	28	Tank	100,000	Steel	.....	.....	.....	.....	.....	Am. Car & Fdy.
Kentucky Solvay Coke Co.	9	Hopper	50,000	Steel	.....	.....	.....	.....	.....	.....
Kingan Refrigerator Line	3	Hopper	100,000	Steel	39,600	Cardwell	Bettendorf	.....	.....	Am. Car & Fdy.
Koppers, H. Co.	3	Acid tank	100,000	Steel	.....	Cardwell	.....	.....	.....	Am. Car & Fdy.
La Belle Iron Works	3	Tank	100,000	Steel	.....	Miner	.....	.....	.....	Am. Car & Fdy.
Lackawanna Steel Co.	8	Tank	10,000g.	Steel	44,000	Cardwell	Arch bar	.....	.....	Gen. American
	300	Hopper	100,000	Steel	37,000	Miner A-18	Arch bar	.....	.....	Am. Car & Fdy.
Lake Park Refining Co.	10	Hopper	100,000	Steel	34,470	.....	Arch bar	.....	.....	Am. Car & Fdy.
Lake Terminal	12	Tank	8,050g.	Steel	.....	Friction	.....	.....	.....	Penn. Tank Car
Lehigh Valley	183	Hopper bodies	100,000	Steel	20,335	Miner-G	.....	.....	.....	Pressed Steel
Liberty Oil Co.	10	Automobile	80,000 St. and frame	44,800	.....	Farlow	Cast steel	.....	.....	Standard Steel
Lorain Steel Co.	25	Tank	10,050g.	Steel	.....	Friction	.....	.....	.....	Penn. Tank Car
Louisiana	6	Gondola	100,000	Steel	37,500	Farlow-West house	Arch bar	.....	.....	Ralston
Louisiana & Arkansas	10	Caboose	.....	Wood	35,250	Miner	.....	.....	.....	Mt. Vernon
	2	Box	.....	Wood	.....	.....	.....	.....	.....	Company shops
	5	Flat	.....	Wood	.....	.....	.....	.....	.....	Company shops
Louisiana & Northwest	100	Tank	12,500g.	Steel	45,200	.....	.....	.....	.....	Am. Car & Fdy.
Louisiana Western	500	Vent. Box	80,000 St. and frame	40,800	.....	Farlow	Bettendorf	.....	.....	Murphy
Louisville & Nashville	200	Box	80,000 St. and frame	38,300	.....	Farlow	Bettendorf	.....	.....	Company shops
	200	Stock	80,000 St. and frame	41,000	.....	Farlow	.....	.....	.....	Company shops
	100	Refrigerator	80,000 St. and frame	50,200	.....	Farlow	Bettendorf	.....	.....	Company shops
	300	Gondola	100,000 St. and frame	40,800	.....	Farlow	Cast steel	.....	.....	Company shops
	50	Caboose	100,000 St. and frame	35,000	.....	Farlow	Arch bar	.....	.....	Tin
	*200	Steel underframes for box cars	.....	.....	.....	.....	.....	.....	.....	Company shops
	*500	Steel underframes for ventilator cars	.....	.....	.....	.....	.....	.....	.....	Bettendorf
	*200	Steel underframes for stock cars	.....	.....	.....	.....	.....	.....	.....	Bettendorf
	*100	Steel underframes for refrigerator cars	.....	.....	.....	.....	.....	.....	.....	Bettendorf
	*300	Steel underframes for gondola cars	.....	.....	.....	.....	.....	.....	.....	Western Steel
Louisville Gas & Electric Co.	25	Hopper	100,000	Steel	.....	Friction	Cast steel	.....	.....	Pullman
M. E. Ry & Light Co.	2	Tank	8,050g.	Steel	.....	Friction	.....	.....	.....	Penn. Tank Car
Magnolia Petroleum Co.	10	Tank	80,000	Steel	.....	.....	.....	.....	.....	Gen. American
Maine Central	300	Box	80,000 St. and frame	42,545	.....	Miner A-18	Arch bar	.....	.....	Chicago
	200	Stock	80,000 St. and frame	39,500	.....	Miner A-18	Arch bar	.....	.....	Wood
	40	Refrigerator	70,000 St. and frame	49,500	.....	Andrews	.....	.....	.....	Keith
	20	Refrigerator	70,000 St. and frame	49,500	.....	Miner A-18	Arch bar	.....	.....	Lehon
	50	Hopper	100,000	Steel	.....	Miner A-18	Arch bar	.....	.....	Standard Steel
Mark Manufacturing Co.	12	Hopper	100,000	Steel	38,530	Farlow spring	Arch bar	.....	.....	Pressed Steel
	4	Flat	100,000 St. and frame	35,500	.....	Friction	.....	.....	.....	Bettendorf
	18	Gondola	140,000	Steel	.....	.....	Bettendorf	.....	.....	Am. Car & Fdy.
Marsh Refrigerator Service Co.	2	Refrigerator	60,000 St. and frame	40,600	.....	Farlow	Bettendorf	.....	.....	Company shops
Meridian & Memphis	5	Flat	.....	Wood	.....	.....	.....	.....	.....	Company shops
Mexican Petroleum Corp.	75	Tank	10,000g.	Steel	40,000	Cardwell G-11	Arch bar	.....	.....	Gen. American
Michigan Alkali Co.	50	Hopper	100,000	Steel	38,530	Spring	Arch bar	.....	.....	West. Steel
Mid-Co. Gasoline Co.	100	Tank	10,500g.	Steel	40,000	.....	.....	.....	.....	Penn. Tank Car
Mississippi Riv. & Bonne Terre	1	Caboose	60,000 St. and frame	.....	.....	Miner	Arch bar	.....	.....	Am. Car & Fdy.
Missouri Pacific	500	Box	.....	Wood	.....	.....	.....	.....	.....	Company shops
Moncton & Ductache	1	Snow plow	.....	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Monongahela Connecting R. R.	100	Gondola	200,000	Steel	.....	Westinghouse	Arch bar	.....	.....	Jones & Laugh.
	50	Gondola	240,000	Steel	.....	Miner A-18	Arch bar	.....	.....	Jones & Laugh.
	50	Hopper	200,000	Steel	.....	Westinghouse	Arch bar	.....	.....	Jones & Laugh.
	50	Coke	100,000	Steel	.....	Westinghouse	Arch bar	.....	.....	Jones & Laugh.
	10	Flat	200,000	Steel	.....	Westinghouse	Arch bar	.....	.....	Jones & Laugh.
Monongahela Valley Traction	4	Tank	8,250g.	Steel	.....	Friction	.....	.....	.....	Penn. Tank Car
Montana, Wyoming & Southern	25	Gondola	80,000 St. and frame	45,200	.....	Miner A-18	Arch bar	.....	.....	Mt. Vernon
Morgan's Louisiana & Texas	100	Tank	12,500g.	Steel	45,200	.....	.....	.....	.....	Am. Car & Fdy.
	400	Gondola	100,000	Steel	37,000	.....	.....	.....	.....	Ralston
Morris & Co., Refrig. Line	4	Refrigerator	60,000	Steel frame	40,000	Farlow spring	Vulean	.....	.....	Wood
	20	Tank	80,000	Steel	.....	Cardwell G-11	Arch bar	.....	.....	Am. Car & Fdy.
Mnising, Marquette & S. E.	65	Flat	.....	.....	.....	.....	.....	.....	.....	Company shops
Michigan Alkali Co.	25	Tank	8,050g.	Steel	.....	Friction	.....	.....	.....	Penn. Tank Car
Mutual Refining Co.	5	Tank	8,050g.	Steel	.....	Friction	.....	.....	.....	Penn. Tank Car
	5	Tank	80,000	Steel	.....	.....	.....	.....	.....	Am. Car & Fdy.
National Refining Co.	20	Tank	80,000	Steel	.....	.....	.....	.....	.....	Am. Car & Fdy.
Nevada County Narrow Gauge	40	Tank	100,000	Steel	.....	.....	.....	.....	.....	Am. Car & Fdy.
New Orleans, Texas & Mexico	300	Box	80,000 St. and frame	39,700	.....	.....	.....	.....	.....	Murphy-XL-A
	200	Gondola	80,000 St. and frame	36,100	.....	.....	.....	.....	.....	Am. Car & Fdy.
	6	.....	.....	.....	.....	.....	.....	.....	.....	Company shops
	4	.....	.....	.....	.....	.....	.....	.....	.....	Company shops
	13	.....	.....	.....	.....	.....	.....	.....	.....	Company shops
New York Central	*250	Steel underframes for refrigerator cars	.....	.....	.....	.....	.....	.....	.....	Bettendorf
New York, New Haven & Hart.	50	Refrigerator	80,000 St. and frame	55,000	.....	Miner A-18	Vulean	.....	.....	Winslow
New York, Ontario & Western	11	Flat	.....	.....	.....	Miner	Arch bar	.....	.....	Company shops
	1	Refrigerator	60,000	Wood	36,500	.....	.....	.....	.....	Company shops
	1	Gondola	60,000	Wood	27,000	Miner	Pressed steel	.....	.....	Company shops
	1	Caboose	.....	Steel frame	35,000	Farlow twin spring	Cast steel	.....	.....	Canvas
Norfolk Southern	250	Box bodies	80,000 St. ctr. sills	42,000	.....	Farlow spring	Arch bar	.....	.....	Winslow
	250	Box bodies	80,000 St. ctr. sills	38,600	.....	Spring	Bettendorf	.....	.....	Am. Car & Fdy.
Northern Pacific	1,600	Box	80,000 St. ctr. sills	38,600	.....	Spring	Bettendorf	.....	.....	Metal
	500	Gondola	100,000	Steel	42,000	Spring & friction	Arch bar	.....	.....	West. Steel
	500	Refrigerator	70,000 St. and frame	55,340	.....	Spring	Bettendorf	.....	.....	Pullman
	1	Coke	100,000	Steel	48,740	.....	Arch bar	.....	.....	Pressed Steel
Northwestern Iron Co.	15	Tank	8,000g.	Steel	.....	Cardwell	.....	.....	.....	Penn. Tank Car
Ohio Valley Refining Co.	6	Tank	10,050g.	Steel	.....	Friction	.....	.....	.....	Penn. Tank Car
Oklahoma Petroleum & Gas Co.	100	Tank	10,050g.	Steel	.....	Friction	.....	.....	.....	Penn. Tank Car
Oneta Refining Co.	6	Tank	8,050g.	Steel	.....	Friction	.....	.....	.....	Penn. Tank Car
Oreana Grain Co.	1	Box	.....	.....	.....	.....	.....	.....	.....	Ken. L. & Car.
Pacific Fruit Express	900	Refrigerator	60,000 St. and frame	51,000	.....	Miner Class G	Bettendorf	.....	.....	Company shops
	1800	Refrigerator	60,000 St. and frame	51,000	.....	Miner Class G	Bettendorf	.....	.....	Plastic
Peerless Transit Line	60	Tank	.....	Steel	.....	.....	.....	.....	.....	Gen. American
Pennsylvania Railroad	3,000	Box (X-25)	100,000	Steel	49,100	Farlow-West house	P.R.R. side fr.	.....	.....	P.R.R. Steel
	940	Hopper (H21a)	140,000	Steel	49,500	Farlow-West house	P.R.R. side fr.	.....	.....	P.R.R. Steel
	191	Cabin (C-5)	100,000	Steel	38,000	Farlow-West house	Arch bar	.....	.....	P.R.R. Steel
	76	Work Flat (F-21)	100,000 St. and frame	41,300	.....	Farlow-West house	Arch bar	.....	.....	Altoona shops
	25	Flat (F-25)	140,000	Steel	57,600	Farlow-West house	P.R.R. side fr.	.....	.....	Altoona shops
	9	Work Equip. (F24)	80,000 St. and frame	38,600	.....	Farlow-West house	Arch bar	.....	.....	Altoona shops
	3	Work Flat (F21b)	100,000 St. and frame	41,800	.....	Farlow-West house	Arch bar	.....	.....	Altoona shops
Penn. American Ref. Co.	2	Tank	8,000g.	Steel	.....	Westinghouse	.....	.....	.....	Monarch
Pennsylvania Tank Line	460	Tank	8,050g.	Steel	.....	Friction	.....	.....	.....	Penn. Tank Car
	200	Tank	10,050g.	Steel	.....	Friction	.....	.....	.....	Penn. Tank Car
	4	Tank	8,050g.	Steel	.....	Friction	.....	.....	.....	Penn. Tank Car
Pere Marquette	750	Automobile	80,000 St. ctr. sills	44,300	.....	.....	.....	.....	.....	Hutchins
	250	Automobile	80,000 St. ctr. sills	44,300	.....	Cardwell	Bettendorf	.....	.....	Hutchins

Purchaser	No.	Class	Quantity	Value	Remarks	Notes
Pextona Lumber Co.	1	Trucks	1	100.00		
Philadelphia & Reading	1	Trucks	1	100.00		
Philadelphia, Balt. & Wash.	4	W. Cars	4	400.00		
Phillips Sheet & Tin Plate	1	Trucks	1	100.00		
Pierce Oil Corp.	1	Trucks	1	100.00		
Pitts., Alleg. & McKees R.R.	1	Trucks	1	100.00		
Power Gasoline Co.	1	Trucks	1	100.00		
Proctor & Gamble Trans. Co.	1	Trucks	1	100.00		
Publicker Ward Dist. Co.	1	Trucks	1	100.00		
Quebec Central	1	Trucks	1	100.00		
Raymond Ice Loader Co.	1	Trucks	1	100.00		
Reid Newfoundland Co.	1	Trucks	1	100.00		
Republic Iron & Steel Co.	3	Trucks	3	300.00		
Rich., Fred'ksh'g. & Potomac	1	Trucks	1	100.00		
Roessler & Hassdacher	4	Trucks	4	400.00		
Roma Wine Co.	4	Trucks	4	400.00		
Saint Clair Terminal	1	Trucks	1	100.00		
St. Louis, Brownsville, & Mex.	1	Trucks	1	100.00		
St. Louis, City of	1	Trucks	1	100.00		
St. Louis County Gas Co.	8	Trucks	8	800.00		
St. Louis Southwestern	1.5	Trucks	1.5	150.00		
Seaboard Air Line	10	Trucks	10	1000.00		
Seaboard Air Line	10	Trucks	10	1000.00		
Semet Solvay Co.	23	Trucks	23	2300.00		
Seneca Oil Works	5	Trucks	5	500.00		
Shell Co.	5	Trucks	5	500.00		
Shippers' Car Line	1	Trucks	1	100.00		
Sinclair Oil & Refining Co.	50	Trucks	50	5000.00		
Snyder, C. U., & Co.	5	Trucks	5	500.00		
Sontheimer, E., Co.	100	Trucks	100	10000.00		
Southern Iron & Equip. Co.	1	Trucks	1	100.00		
Southern Pacific	100	Trucks	100	10000.00		
Southern Pacific-Pac. System	1,400	Trucks	1,400	140000.00		
Southern Railway	400	Trucks	400	40000.00		
Standard Oil Co. of Ind.	100	Trucks	100	10000.00		
Sumner Valley	1	Trucks	1	100.00		
Sun Co.	1	Trucks	1	100.00		
Superior Oil Works	1	Trucks	1	100.00		
Swift Refrigerator Transp. Co.	1	Trucks	1	100.00		
Temiskaming & North. Ontario	100	Trucks	100	10000.00		
Texas Company	100	Trucks	100	10000.00		
Texas & Pacific	100	Trucks	100	10000.00		
T. & N. Hamilton & B. Co.	1	Trucks	1	100.00		
Union R. R.	1	Trucks	1	100.00		
Union Trust Co.	1	Trucks	1	100.00		
Union Coal & Coke Co.	1	Trucks	1	100.00		
Union Pacific	100	Trucks	100	10000.00		
Union Petroleum Co.	100	Trucks	100	10000.00		

TABLE A—AUTOMATIC BLOCK SIGNALS INSTALLED DURING THE PAST YEAR

Road	Miles of Road ¹ S. T. D. T.	From	To	No. of Signals ²	Type of Signals	Control System	Remarks ³
Alabama & Vicksburg	16	Clinton	Champion Hill	28	Union "S"	3-pos. Modified train dir.	
Ala. G. S. (See So. Ry.)	4	La Junta	Casa	8	3-pos. U. O. d. c.	Non-polarized	
Atchison, T. & S. F.	1	Albuquerque	Ilahn	6	3-pos. U. O. d. c.	Non-polarized	
	1	Albuquerque	Abajo	5	3-pos. U. O. d. c.	Non-polarized	
	1	Cleburne	Donetta	4	3-pos. U. O. a. c.	Non-polarized, line	
	25	N. Pomona	S. Berno	40	3-pos. U. O. a. c.	Non-polarized, line	
	1	Redoubt	Hobart	5	3-pos. U. O. d. c.	Non-polarized, line	
	4	Stockholm	Larson	8	3-pos. U. O. d. c.	Non-polarized, line	
Atlanta & West Point	33	East Point	Newman	8	3-pos. U. Q.	A. P. B.	Union.
Baltimore & Ohio	12	Patterson Ck.	N. Branch	8	"T"		General Electric Co.
	3	N. Branch	Evitts Creek	8	"T"		Union.
	23	Milford G.	La Paz J.	36	"T"		Union; changed from S. T. to D. T.; supersedes manual block system.
	4	N. Dayton	Johnson	12	"T"		Supersedes manual. Supersedes manual.
	26	A. N.	Miami City J.	43	"T"		Supersedes manual.
	13	Tippecanoe Cy.	Piqua J.	23	"T"		Supersedes manual.
	10	Kirkwood, O.	Swanders	19	"T"		Supersedes manual.
Buffalo, R. & Pitts'gh	8	Swanders	Clarion J.	41	"2 A" Top-of-mast.	Polarized line	G. R. S.—Road owned by Eric.
	20	J. & B. J.	J. & B. J.	2	"3 A" Top-of-mast.	Polarized line	
	2	Boyer	Stevens	2	Union "B"		
Boston & Maine	1	N. Andover	Stevens	1	Union "B"		A. C. Track Circuit.
	1	Fitchburg	(Tunnel)	9	Light, 3-color		A. C. Track Circuit.
Boston Elevated	1	Times Square	Canal St.	82	Light, 3-color		A. C. Track Circuit.
Brooklyn Rapid Tr. Co.	1	Canal St.	Rector St.	51	Light, 3-color		A. C. Track Circuit.
	2	Canal St.	Ft. Valley	49	Union "S"		
Central of Georgia ²	26	Terra Gotta	Irving	102	Union "S"		
	57	Macon J.	Hopeville	57	Union "S"		
	33	Experiment	Weems	34	Union "S"		
	16	Vandiver	Weems	34	Union "S"		
Chesapeake & Ohio ³	76	Rosemere	Shoreline	151	"2-A" 3 pos. U. Q.	"A. P. B."	G. R. S.
Chicago & N. Western	2	Rosemere	Calumet	194	"2-A" 3 pos. U. Q.	"A. P. B."	G. R. S.
	102	Clyman	Weyville	4	"2-A"		G. R. S.
Chicago & W. Ind. ⁴	1	Hammond J.	Lytle	162	Two-pos. L. Q.		Federal Signal Co.
Chicago, B. & Q.	74	Crawford, Wis.	Mo. Pleasant, Ia.	173	Two-pos. L. Q.		Federal Signal Co.
	33	St. Joseph, Mo.	Napier	69	Two-pos. L. Q.	"A. P. B."	Federal Signal Co.
	28	Lincoln, Neb.	Gibson	17	Two-pos. L. Q.		Federal.
	4	Omaha, Neb.	Hayfield	33	"4-A" 3-pos. U. Q.		Federal.
Chicago Gt. Western	34	McIntire	Jeff	4	"4-A" 3-pos. U. Q.		Federal.
	2	Oelwein	Jeff	39	Light, 3-color	A. C. track-ckt.	Union.
	22	Lennex	Smiling	68	Light, 3-color	A. C. track-ckt.	Union.
Chicago, M. & St. P.	42	Butte	Beet Lodge	16	Light, 3-color	A. C. track-ckt.	Union.
	12	Superior	St. Regis	30	Light, 3-color	A. C. track-ckt.	Supersedes manual block system;
	19	St. Regis	Haugan	30	Semaphore, 3-pos. A.	D. C. Track-ckt.	signals were taken from electrified lines (noted above).
	97	Marengo	Beverly	124	Semaphore, 3-pos. A.	D. C. Track-ckt.	which now have light signals.
East St. Louis & Sub.	2	Gauntlet	Eola	3	Union light	A. C. track-ckt.	
Elgin, J. & E.	1	Shelburne, N. H.	Bethel, Me.	22	"2-A"	D. C. 10-volt.	G. R. S.
Grand Trunk	19	Louisville, Ky.	Tip Top	71	"K" 3-pos. U. Q. n. c.	Traffic direction	Hall.
Illinois Central	141	Coldwater, Miss.	Vaughn	223	"K" 3-pos. U. Q. n. c.	Traffic direction	Hall.
	108	Nogan, Miss.	Amite, La.	190	"K" 3-pos. U. Q. n. c.	Traffic direction	Automatic stops.
Interb'gh R. T. (N. Y.)	1	Buffalo	Hazleton	6	Light	A. C. track-ckt.	Hall; superseded S. T. manual.
Lehigh Valley	1	Buffalo	Hazleton	4	3-pos. U. Q.		
Long Island	3	Oakdale	Sayville	7	3-pos. U. Q.		
Los Angeles & S. L.	56	Los Angeles	Riverdale	117	3-pos. U. Q.		
	60	Rox	Caliente	96	3-pos. U. Q.		
Louisiana R. & N. Co.	2	Frelsen	Orleans J.	53	3-pos. U. Q.	A. P. B.	
Louisville & N.	28	Howell, Ind.	Mamie Hill	66	3-pos. U. Q.	A. P. B.	
	41	Henderson, Ky.	Earlington	53	3-pos. U. Q.	A. P. B.	
	2	Cedar Hill, T.	Amqui	46	3-pos. U. Q.	A. P. B.	Changed from S. T. to D. T.
	28	Waterville	Fairfield	4			
Maine Central	4	Fairfield	Fairfield	5	Union "S" U. Q.		
Missouri, K. & T.	4	M. P. 382	Cole J.	1	3-pos. U. Q.		
Missouri Pacific	68	Wash. Mo.	Camp Pike	2			
	2	Military J.	N. Little Rk.	70		A. C. cks.	
	2	So. Browns	W. Va.	70			
Monongahela	34	N. Y. Tower	Lewis St.	2	"S" Union		Superseded manual b. s.
Nashville, C. & St. L.	1	Ghent	Chatham	4	Hall "L" 3-pos. U. Q.		Superseded controlled m. and automatic on parts of four-track line.
Nashville, C. & St. L. (Eastern)	10	W. Albany	Schenectady	8	Hall "L" 3-pos. U. Q.		
	3	Schuyler J.	Utica	3	Hall "L" 3-pos. U. Q.		Superseded controlled manual.
	3	Hoffmans	Rotterdam J.	2	Hall "L" 3-pos. U. Q.		Reconstruction.
	16	N. Buffalo	Niagara Falls	35			Reconstruction.
	10	Herkimer	Schuyler J.	10	2 3-pos. U. Q.	D. C. n. d.	Third track.
	1	Athol J.	Springfield	6		Traffic direction.	
Boston & Albany C., C. & St. L.	1	Cold Springs	Springfield	6			
N. Y. Municipal (see Brooklyn R. T. Co.)	187	New Haven	Bridgeport	84	3-pos. U. Q.	A. C. Circuits	Supersedes controlled manual.
N. Y., N. H. & H.	13	Stamford	Mamaroneck	8	3-pos. U. Q.	A. C. Circuits	Supersedes controlled manual.
	59	E. Radford	Pearisburg	135	3-pos. U. Q.	A. P. B.	A. C. 60-cycle.
Norfolk & Western	59	Biplemead	Penrisburg	20	3-pos. U. Q.	Polarized track ckt.	Changed from single track.
	8	Awlick	Joe	8	3-pos. U. Q.	A. P. B.	Union; in place of electro-pneumatic semaphores.
Northern Pacific	216	Mandan, Mont.	Glendive	364	Union light	A. C. track circuit.	
Pennsylvania	7	Camden	Bladdonfield	19			
Pennsylvania, West of Pittsburgh	37	Richmond	Knightstown	85			Supersedes manual b. s.
	3	Roby	Morrissett Ave.	6			Supersedes manual b. s.
	5	Dinsmore	Newberry J.	16			Supersedes manual b. s.
Philadelphia & Reading	36	Bentley	Sandy Gut	58	3-pos. U. Q.	A. C. circuits	Supersedes manual b. s.
Pittsburgh & L. E.	26	Doswell	Sandy Gut	76	"2-A"	A. C. circuits	Supersedes manual b. s.
Richmond F. & P.	56	Sandy Gut	N. Glasgow	37	"2-A"	A. C. circuits	Supersedes manual b. s.
Washington South.	33	Wed Hill	N. Glasgow	41	3-pos. U. Q.	A. C.	
Southern	31	N. Switzerland	Gainesville	39	3-pos. U. Q.	A. C.	
	10	Whittle	Dry Fork	10	3-pos. U. Q.	A. C.	
	6	Duluth, Ga.	Suwanee	6	3-pos. U. Q.	A. C.	
Southern Pacific	3	Deming, N. M.	Steinman	14			Union.
	4	Wall Creek, Ore.	Cypress	12	"B"		Union. Supersedes manual.
So. Pac. (Tex. and La.)	26	Hempstead	Cypress	41	"B"		Union. Supersedes manual.
	1	Silva J.	Nasavota	5	"B"		Union. Supersedes manual.

TABLE A—AUTOMATIC BLOCK SIGNALS INSTALLED DURING THE PAST YEAR—Continued

Road	Miles of Road	From	To	Signal	Notes
So. Pac. Tex. & La. (Cont'd)	1	...	...	...	...
St. Louis & N. O.	10	...	...	...	...
Union Pacific	4	...	...	...	...
...	11	...	...	...	...
...	11	...	...	...	...
Oregon Short Line	62	...	...	...	...
...	41	...	...	...	...
...	12	...	...	...	...
...	4	...	...	...	...
One W. R. & N. O.	16	...	...	...	...
Union Traction (Ind.)	11	...	...	...	...
Walash	1	...	...	...	...
Wash. So. (See R. E. P.)	...	...	...	...	...
Western Maryland	...	...	...	...	...
Total	1,667	...	...	...	...
Canadian Pac. (Eastern)	3	...	...	...	...
Canadian Pac. (Western)	1	...	...	...	...
Grand Trunk	2	...	...	...	...
Montreal & So. Counties	2	...	...	...	...
Total	3	...	...	...	...
Total United States and Canada	1,670	...	...	...	...

* The asterisk indicates a length of less than one mile.
 † Brooklyn R. T. Co.—Four-track, 3 miles 80 signals, 1,000 feet of cable, 73 signals. All blocks have a float, stop and start signal, the center approaching stations and on steep grades.
 ‡ Central of Georgia—Manual block system, 44 miles, 44 signals, 1,000 feet of cable.
 § Chesapeake & Ohio—This road is installing automatic block system of the American Train Control Company between Chesapeake, Va. and Charlottesville, Va., 21 miles. One third of these signals are already installed.
 ¶ C. & N. W.—Replaces manual block system.
 ** C. & W. L.—Four-track, replaces manual block system.
 †† Chicago, M. & St. P.—Signals removed from Rock M. line.
 ‡‡ N. Y., N. H. & H.—Four-track line, signals removed from the left-hand quadrant.

TABLE B—AUTOMATIC BLOCK SIGNALS UNDER CONSTRUCTION, DECEMBER 31, 1917

Road	Miles of Road	From	To	Signal	Notes
Alabama & Vicksburg	8	Champion Hill	Smith's	...	...
Atchison, T. & S. Fe.	9	Shelton	New Boston	...	...
...	10	Sibley	Lin	...	...
...	5	Braddock	Wilton	...	...
...	2	Cameron	Rice	...	...
...	8	Dodge City	Wright	...	...
...	68	Richmond, Cal.	Stockton	...	...
...	119	Larson, Cal.	Truman	...	...
...	65	Yoff's, Cal.	Imperial	...	...
Atlanta & West Point	32	Newman	La Grange	...	...
...	6	Atlanta	Point	...	...
Atlantic Coast Line	6	Plorence	Java	...	...
Baltimore & Ohio	5	Miami City J.	Darwin	...	...
...	19	Piqua J.	Kirkwood	...	...
...	92	Pickens	Frie L.	...	...
...	1	Cumberland	Chambers	...	...
...	1	Cumb'l. W. St.	Viaduct J.	...	...
...	20	Greenwich	Atmos	...	...
B. & O. C. T.	1	St. St.	Hunt	...	...
Buffalo, Roch. & P.	3	Marion City	Hunt	...	...
Boston Elevated	2	Irving	Wapewick	...	...
Central of Georgia	9	Wapevick	Atlanta	...	...
Chesapeake & Ohio	47	Mt. Pleasant	Chesapeake	...	...
Chicago, B. & Q.	3	S. M. ...	...	...	...
Chicago, Mil. & St. Paul	2	Milwaukee	...	...	...
...	36	...	...	...	...
...	34	...	...	...	...
...	42	...	...	...	...
El Paso & S. W.	6	...	...	...	...
...	15	...	...	...	...
...	30	...	...	...	...
...	4	...	...	...	...
...	25	...	...	...	...
Erie	15	...	...	...	...
Grand Trunk	17	...	...	...	...
Illinois Central	91	...	...	...	...
...	3	...	...	...	...
...	103	...	...	...	...
...	12	...	...	...	...
...	1	...	...	...	...
...	1	...	...	...	...
Yazoo & M. V.	1	...	...	...	...
Lake Erie and Eastern (See Pitts. & L. E.)	60	...	...	...	...
Los Angeles & S. L.	67	...	...	...	...
Louisville & Washington	10	...	...	...	...
New York Central (E.)	7	...	...	...	...
Michigan Central	8	...	...	...	...
...	4	...	...	...	...
N. Y., N. H. & H.	83	...	...	...	...
...	20	...	...	...	...
N. Y. Phila. & Norfolk	38	...	...	...	...

TABLE B—AUTOMATIC BLOCK SIGNALS UNDER CONSTRUCTION, DECEMBER 31, 1917—Continued.

Road	Miles of Road S.T. D.T.	From	To	No. of Signals	Type of Signals	Control System	Remarks ¹⁶
N. York & Western	49	Atkins	Bristol	99	3-pos. U. Q.	A. P. B.; A. C.	60-cycle. Union; replacing manual.
Pennsylvania	7	Selingsgrove	Northumberland	29	Position Light	A. C.	Union; replacing manual signals.
Pennsylvania (wild)	6	N. Philadelphia	Chestnut Hill	27	Position-light	A. C. track circuit	Union; replacing manual signals.
Penn. (West of Pitts.)	26	Leetonia	Alliance J.	23			
Pere Marquette	17	So. Lyon	Fowlerville	34	3-pos. U. Q.		
	18	Fannville	G. Junction	13	3-pos. U. Q.		
	18	Grass	Riverside	25	3-pos. U. Q.		
Pittsburgh & L. E.	8	Struthers	Mosier J.	22	"T 2" Union		
Southern	183	Charlotte	N. Switzerland	228	3-pos. U. Q.	A. C.	Union.
Southern Pacific	2	White Pt., Or.	Siskiyou	15			Union.
	8	Stockham	Pelvo, Ariz.	47			Union.
So. Pac. (La. and Tex.)	9	Stella J.	Eureka	22	"B"		Union. Supersedes manual.
Union Pacific	18	Burns, Wyo.	Archer	66	"B" 2-pos. L. Q.		Union; S. T. changed to D. T.
Oregon Short Line	13	Pocatello	Ft. Hall	34	"2 A" L. Q.		G. R. S.
Wahash	13	Clymers	Delphi	17	"S" 3-pos. U. Q.		Union.
	13	Delphi	Lafayette	14	"S" 3-pos. U. Q.		Union.
W. Maryland	—	Big Pool	Clear Spring	7			S. T. converted to double track.
Total	973						
Canada							
Canadian Pacific (E.)	1	1	Vaudreuil	6			
Canadian Pacific (W.)	2	2	Pasqua	2			
	2	3	Java	5			
Total	—	—		13			
Total United States and Canada	975	669					

¹⁶See Note 16 under Table A.

* Chesapeake & Ohio—Even "tonnage signals" on ascending grade; also, two-position L. Q. on 12 miles are being changed to 3-position U. Q.

^bN. Y., N. H. & H.—Four-track.
^cPeun. (W. P.)—Third track.

TABLE C—AUTOMATIC BLOCK SIGNALS—CONTEMPLATED CONSTRUCTION FOR 1918

Road	Miles of Road S.T. D.T.	From	To	No. of Signals	Type of Signals	Control System	Remarks ¹⁶
Atchison, T. & S. Fe.	2	Glorietta	Decatur	8	3-pos. D. C. U. Q.	Non-polarized	
	39	Hutchinson		6	3-pos. D. C. U. Q.	Non-polarized	
	24	Gainesville	Ardmore	70	3-pos. D. C. U. Q.	Non-polarized	
	4	Dougherty	Gulf I.	42	3-pos. D. C. U. Q.	Non-polarized	
	4	Lindsay Br. J.	Gulf I.	7	3-pos. D. C. U. Q.	Non-polarized	
	24	Calwa, Cal.	Corcoran	80	3-pos. A. C. U. Q.	Polarized, line	
	24	Defiance	Perea	31	3-pos. A. C. U. Q.	Polarized, track	
	69	Daggett	Bagdad	72	3-pos. A. C. U. Q.	Polarized, track	
	9	Laguna	Rito	12	3-pos. A. C. U. Q.	Polarized, track	
	10	Riverside	San Bernardino	12	3-pos. A. C. U. Q.		
Boston & Maine	32	N. Cambridge	Clinton J.	75	"B"		Union.
Boston Elevated	1	Sullivan St.	Everett	11	Light, 3-color	A. C. Circuits	On elevated structure.
Brooklyn R. T. Co.	32	See note in text.	Westham	11	3-pos. U. Q.		G. R. S.
Chesapeake & Ohio	2			5			
Chicago, Ind. & Louis.	17	Salem, Ind.	Borden	30	3-pos. U. Q.	A. P. B.	
Chic., Mil. & St. Paul.	98	Savanna	G. Island	16	"2-A" 3-pos. D. C.		G. R. S.; to replace 2-pos. L. Q.
	28	Orhelo	Cle Elum	136	Light, 3-color	A. C.	
	72	Cle Elum	Maple Valley	101	Light, 3-color	A. C.	
	28	Black River J.	Tacoma	48	Light, 3-color	A. C.	
	2				"B" 2-pos.		
Chi., T. H. & S. E.	2						Union.
Cumberland Valley	6	Newville	Oakville	15	"B"	A. C.	Union.
El Paso & S. W.	19	Forrest	Lee	38	"S" U. Q.		Union.
	28	Three Rivers	Carrizozo	56	"S" U. Q.		Union.
Los Angeles & S. L.	120	Lynnndyl	Salt Lake City	180			
Louisville & Nashville	12	Jackson, Ky.	Oakdale	27	3-pos. U. Q.	A. P. B.	
New York Central	4	Galion	Crestline	6	3-pos.		
Cleve. C. & St. L.	29	Atlantic	Middleboro	3-pos. U. Q. left h'd.	A. C.		Replacing controlled manual.
N. Y., N. H. & Hartford	30	Readville	Boston Sw.	3-pos. U. Q. left h'd.	A. C.		Replacing controlled manual.
N. Y. State Rys.	2	Bradley's B.	Walker's	8		A. C.	
Norfolk & Western	17	Rice, Minn.	L. Falls	22			
Northern Pacific	92	Toston, Mont.	Garrison	162		A. P. B.	
	7	Missoula	De Smet	11			
	71	De Smet	St. Regis	117		A. P. B.	
	22	St. Regis	Paradise	37		A. P. B.	
	24	Easton, Wash.	Lester	38			
Philadelphia & Reading	15	Del. River	Skillmans	70	3-pos. U. Q.	A. C.	Part 3-track; part 4-track. Superseded enclosed disk sig.
Southern Pacific	10	Snowdon, Cal.	Hornbrook	34			Union.
	1	Hilt, Cal.		4			Union.
	3	Siskiyou	Wall Creek	2			Union.
	13	Grant's Pass	Hugo	24			Union.
	25	Roseburg	Yoncalla	96			Union.
	10	Walker	Goshen	18			Union.
	32	Red Rock	Tucson	76			Union.
	5	Oswego, Or.	Cook	13	Light		
So. Pac. (La. and Tex.)	13	Courtney	Hempstead	24	"B"		Union; supersedes manual.
	7	El Paso	Alfalfa	22	"B"		Union; supersedes manual.
	9	Withers	San Antonio	34	"B"		Union; supersedes manual.
Union Pacific	20	Manhattan, Kan.	Junction City	83	"B" 2-pos. L. Q.		Union; S. T. changed to double track.
	27	Le Roy, Wyo.	Evanston	112	"B" 2-pos. L. Q.		Union; S. T. changed to double track.
	11	King Hill	Deran	32	"2 A" L. Q.		G. R. S.; S. T. changed to double track.
Wabash	13	Peru	Clymers	21	"S" 3-pos. U. Q.		Union.
	8	Birmingham	Murray	6	"S" 3-pos. U. Q.		Union.
Total	864	376					
Canada							
Canadian Gov. (Eastern)	2	2	Quebec Bridge	12		D. C.	On single track the staff will be used.
	4	3	Newcastle	Derby J.	11	A. P. B.	
	3	3	Various		6	A. P. B.	
9 2 Total	9	2					
Total United States and Canada	873	378					

¹⁶See Note 16 under Table A.

Table D, manual block signaling, exemplified during the year, is even shorter than in other recent years; the brevity compared with the record of automatic block systems again illustrates the increasing appreciation among railroad managers everywhere, of the value of the automatic system and of its varied elements of superiority over any method known.

Tables E and F are still shorter. Under Table E, Manual Block Signaling Under Construction, there is reported only one item—New York, New Haven & Hartford, Bridge, Conn., to Middletown, 9 miles, single-track, electric, semi-staff.

Table F, New Manual Block Signaling Proposed for 1918, is omitted entirely, there being nothing to report.

Position-Light Signals

It will be noted that on the Pennsylvania and on the New York, Philadelphia & Norfolk, position-light signals are being installed quite extensively. The use of these signals is perhaps the most notable novelty in the signaling record of the year, and pictures of some of the latest installations (on the West Jersey & Seashore) are shown at the head of this article. Reading from left to right the first of the three views illustrates a signal at an interlocking showing the

TABLE D—MANUAL BLOCK SIGNALS COMPLETED IN 1917

	Miles	From	To
Atchison, Topeka & Santa Fe*	44	Holyoke, Mo.	Atchison, Mo.
Chesapeake & Ohio*	29	Leesville, Va.	Waynesboro, Va.
Long Island	7	Leeds, Pa.	Leeds, Pa.
Northern Pacific	15	S. 2 mi. W.	North Dakota
	73	St. Charles, Ill.	St. Charles, Ill.
	14	St. Charles, W.	St. Charles, Ill.
Pennsylvania (W. P. J.)	1	St. Charles, Pa.	St. Charles, Pa.
Texas & Pacific	118	Abilene, Tex.	Abilene, Tex.
Total	401		
Canadian Pac.	44	Canada	Canada
	44	Canada	Canada
	42	Canada	Canada
Total	130		
Grand Total	531		

*Communication by telegraph.
 †Long Island, double track, automatic block, 100 miles, double track.
 ‡Controlled Manual.
 §Staff system.

proceed indication for low speed. The second picture shows an automatic signal indicating proceed. The marker light, some distance below the vertical row of four lights, is not energized; this light shows only when the lights at the top indicate stop (four lights in a horizontal row). The third picture shows a distant signal to an interlocking plant; it indicates that the next signal will be found to show proceed at medium speed." If, for any reason the top row of lights in this signal should go out, the bottom row would also be extinguished, so that there is no danger that the lower row may be mistaken for a proceed signal.

The items shown against the two roads named above are about 25 position-light signals installed in 1917 and 170 now under construction; and altogether there are now about 648 of these signals in service. Adding to this number those now under construction, and including also some distant switch signals, which have not appeared in any statistical review, approximately 870 of these signals have been installed or are now under construction.

Block Signaling Proposed

The 523 signals embraced in the statement of the Brooklyn Rapid Transit Company in Table C are for the two subways now being built for operation in 1918, respectively, on both Manhattan and Brooklyn boulevards, New York city. The Fifty-ninth street line, Manhattan, is two-track, from Fifty-ninth street southward to Fort Street, where the line is four-track; from Rector street to Prospect Park four miles, two-track. Fifteen miles of this subway system are now being done to equip existing tracks, already equipped with

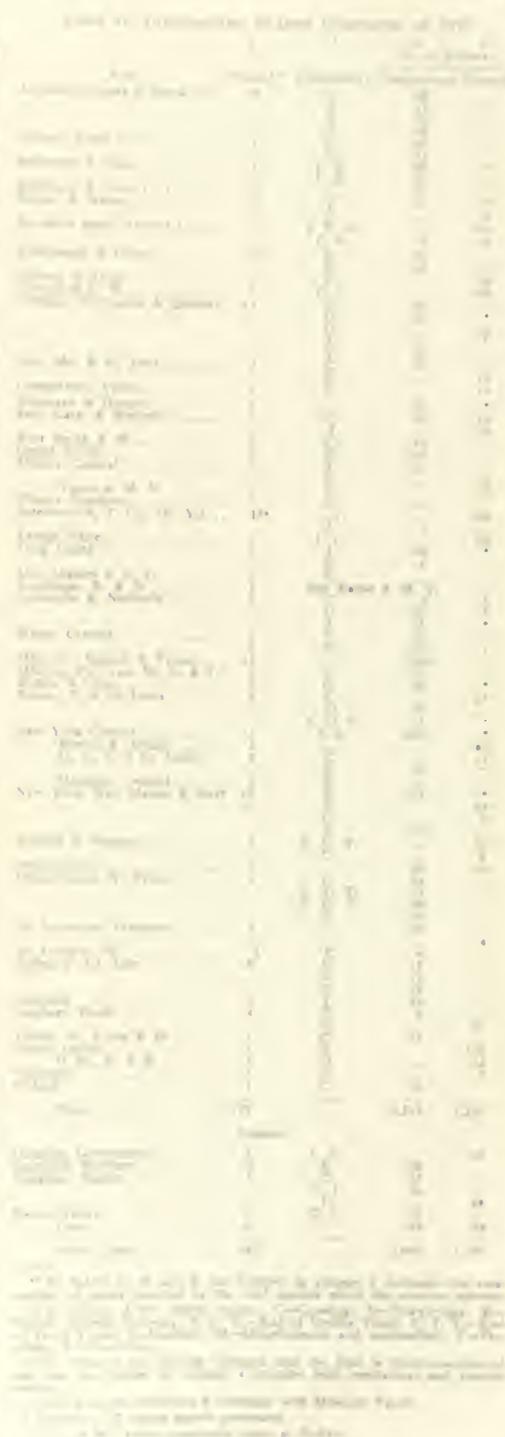


FIG. 1.—Automatic Block Signaling System at New York City.

apparatus for the operation of the automatic block system in either direction on the same track. Where the signaling is arranged for the movement of trains in either direction on the same track, the signals which, for the time being, are for movements against the current of traffic, are locked so that they cannot be moved. Automatic train stops are used throughout, and, in connection with these, time or speed con-

struction during the past two years and which are now in partial operation. A large amount of electro-pneumatic work on the Interborough is to be finished in 1918, as will be seen by the statements in Tables H and I.

New Interlocking Completed

The figures in Table G are to be taken as an exhibit, not of the precise amount in the increase in interlocking apparatus in use in the country, but rather as showing the work that has been done during the past twelve months; for a considerable proportion of the items represent, not an entirely new plant, but reconstruction of an old one, or important enlargements to provide for new tracks or rearrangement of tracks. Some duplications are included, also, the same joint plant being reported by two roads. These observations apply also to Tables H and I.

The new work done by the Brooklyn Rapid Transit Company and shown in Table G is on the subways now partly completed in both the Brooklyn and Manhattan boroughs, New York City. In Manhattan there are interlockings (electric) at 34th street; Union square, Canal street, City Hall. In Brooklyn one at Greenwood avenue, ten levers, electric. There are mechanical interlockings at Coney

TABLE H—INTERLOCKING PLANTS UNDER CONSTRUCTION DECEMBER 31, 1917

Road	Plants**	Character††	No. of Levers	
			Mechanical	Electric
Aitchison, Topeka & Santa Fe.	8	C. J.	119	42
Atlantic Coast Line.	7	C.	15	..
Baltimore & Ohio.	3	J. X.	36	..
Buffalo, R. & P.	4	D.	21	..
Chicago & Alton.	1	J. X.	47	..
Chicago, Burlington & Quincy.	6	E. D. T.	37	..
Chicago, Milwaukee & St. Paul.	1	J.	8	..
Del., Lack. & Western ¹ .	1	C.	12	11
Fort Dodge, D. M. & S.	1	C.	24	20
Illinois Central.	2	C.	66	..
Yazoo & M. V.	2	T.	..	84
Illinois Traction.	1	D.	..	..
Interborough R. T. Co. ²	36	J. X.	..	..
Louisville & W.	5	D.	24	471
Missouri Kansas & Texas.	7	E. D. T.	9	..
Missouri Pacific.	1	J.	40	..
Nash., C. & St. L.	2	C.	127	..
New York Central (East).	5	C. J.	35	34
New York Central (West).	3	T.	49	..
C. C., C. & St. L.	2	J. X.	65	..
New York, N. H. & H.	14	N.	15	..
New York, P. & N.	1	J. T.	..	6
Northern Pacific.	4	X.	..	37
Pennsylvania.	24	D.	37	..
Penn. (W. Pitts.).	2	D. X.	64	41
St. Louis S. F.	5	T. X.	76	..
Seaboard Air Line.	6	J. T.	124	16
Southern.	8	J. X.	80	39
Southern Pacific ¹ .	2	N.	60	..
Southern Pacific (Tex. and La.)	1	D.	16	..
Total	163		1,886	1,310
Canada				
Grand Trunk	1	E.	7	..
Grand Total	164		1,893	1,310

¹ Electro-pneumatic; D. L. & W.; Interboro; N. C. & St. L.; Pennsylvania (Philadelphia); Southern Pacific (San Francisco).
² Electro-mechanical; see note under Table G.
³ See note under Table G.
^{††} See note under Table G.

TABLE I—NEW INTERLOCKING PROPOSED FOR 1918

Road	Plants**	Character††	No. of Levers	
			Mechanical	Electric
Aitchison, Topeka & Santa Fe.	8	C.	6	..
Balt. & O., C. T.	1	C. J.	30	..
Boston & Maine ¹ .	3	J.	45	..
Boston Elevated ¹ .	2	X.	20	..
Brooklyn Rapid Transit Co. ²	16	C. J.	35	..
Chesapeake & Ohio.	5	C. J.	68	..
Chicago, Ind. & L.	1	D. J.	50	68
Chicago, Milwaukee & St. Paul.	3	T.	..	70
Delaware & Hudson.	2	D. J. X.	..	5
Erie.	2	X.	..	8
Interborough.	22	M.	..	62
Kansas City Terminal.	2	J. X.	..	522
Louisville & Nashville.	2	N.	..	65
Maine Central.	1	J.	..	16
Missouri, K. & T.	3	C.	..	54
Nashv., C. & St. L.	4	J.	..	20
N. Y. C. (T. & O. C.).	1	T.	..	64
Philadelphia & Reading.	10	J. X.	..	228
Richmond F. & P.	1	C.	..	481
Southern Pacific.	3	J.	..	10 ³
Southern Pacific (Tex. and La.)	4	J.	..	53
Union Pacific.	8	E. D. T.	..	4
Wabash.	1	C.	..	22
Western Pacific.	3	C.	..	14
Total	107		785	1,911
Canada				
Canadian Government.	1	C. J.	20	..
Grand Total	108		805	1,911

^{*} Electro-mechanical; see note under Table G.
^{**} See note under Table G.
^{††} See notes under Table G.
¹ Electro-pneumatic; B. & M.; B. Elevated; Interboro; Kansas City Terminal; N. C. & St. L.
² B. R. T.; includes one plant electro-pneumatic.

trol apparatus is used approaching stations and on steep grades.

Electro-Pneumatic Interlocking

The reports received indicate that electro-pneumatic interlocking has been installed during the past year on only two roads; on the Delaware, Lackawanna & Western, at the Buffalo Terminal, 23 levers, and on the Interborough Rapid Transit Company, 268 levers. The statement of the Interborough covers a large number of plants on the new subway and elevated lines in New York city—boroughs of Manhattan, Bronx, Queens and Brooklyn—which have been under

Island, Rockaway Parkway and 105th street. Light signals are used at all of these plants and automatic train stops are to be used generally. The machines have illuminated track diagrams and lever lights. All plants have approach locking and electric switch locking.

The interlocking on the New York Central at Berea, Ohio,

the per diem expense. "And they have done this cheerfully at the mere request of the Commission on Car Service. Probably the requirements have been tempered so as to equalize the expense of sending the empty cars but now the director, if he sees fit, could pick out one route to move empties out of the congested district."

In reply to a question by Senator Poindexter as to why this abnormal movement of empty cars was necessary, Mr. Hall described how currents of traffic have been changed and how the amount of freight exported through North Atlantic ports has been out of all proportion to that moved by the South Atlantic and Gulf ports.

"Was there anything to prevent the government from ordering traffic moved via the Southern ports without taking over the railroads?" asked Senator Poindexter.

Mr. Hall replied that the government control of the roads would not affect this situation, which has been caused to a considerable extent by the fact that the boat lines preferred the ports which gave them a shorter race with the submarines. He also explained that the railroads have handled a greater volume of traffic then ever before and that congestion has been increased by abuse of preference orders.

Senator Cummins asked to what extent the railroads have indicated a willingness to sacrifice selfishness and individual interests to the common good.

"I should not call it selfishness but rather a sense of duty toward their employers," said Mr. Hall, "but there have been many instances in which they have done so as far as they reasonably could. The first thing the Pittsburgh committee did was to order off the Pennsylvania Broadway Limited, although the New York Central was allowed to continue its competitive train." He also mentioned the diversion of traffic and the transfer of locomotives from the western lines to the east at a time when a locomotive is not only worth twice as much as formerly but has an earning capacity even greater.

"If the railroads could have divested themselves of their selfish interests, could they have got along without government operation," he was asked.

"Yes, that was indicated by the commission's report, but not without a repeal of the laws," replied Chairman Hall.

Senators Poindexter and Kellogg, who made it clear that they did not consider it necessary for the government to take over the roads, asked many questions as to why the President could not have remedied the abuse of preference orders under the powers he already possessed.

Preference Matter Must be Simplified

"Is there any reason to believe that the preference matter will be simplified?" asked Senator Kellogg.

"It should be immensely simplified," replied Chairman Hall. "The government has learned by experience and I understand that a change is already contemplated. There were many bureaus each undertaking to direct that their own shipments should have preference and when you try to single out cars for preference it tends to produce congestion and delay the entire movement. These orders probably didn't seem unnecessary to those that issued them but seem unnecessary to those who didn't issue them. I think now that the government appreciates the necessity for a change."

"Then the congestion is due to the fact that the President allowed various departments to issue these orders rather than to any lack of power to remedy the situation before?" said Senator Kellogg.

"I don't wish to criticise anyone. You can draw your own inferences," said Chairman Hall.

"Do you believe the government can operate railroads any more efficiently and economically than private enterprise?"

"In normal times, no; I believe under present conditions it can do so more efficiently, because the organization and men will be retained and they will have an opportunity to disre-

gard the restrictions heretofore imposed upon them. As to economy, that will depend on the men who operate them."

"Why couldn't the government direct the roads to operate as a unit?"

"That was one of our recommendations," was the reply.

Mr. Hall expressed the opinion that possibly the existing facilities and equipment will suffice for the immediate present, but that later replacements will be necessary. He thought that the necessity for capital expenditures would be "very much less than the estimates one frequently hears" and that perhaps none will be needed right away.

Chairman Hall continued his testimony on Monday and the hearing at once became involved in a maze of statistical technicalities when Chairman Hall tried to explain to Senator Cummins the exact meaning of the terms "railway operating revenue," "railway operating income" and "net income" as used in the statement of statistical information compiled by the commission in response to requests by the committee. The committee apparently desired comparable statements showing the amounts which the railroads had available for the payment of interest and dividends over a series of years and the amount of their stocks and bonds, but the questions had not been asked in such a way as to bring out just what the committee wanted. The commission's statistician, M. O. Lorenz, who was finally called in, arranged to supply the material as quickly as possible. It was explained that one of the questions asked by the committee would require the services of 150 men for three or four months to compile, but the commission had given a rough estimate instead. Senator Watson asked Chairman Hall if he would agree with the statement of the railroads that they had co-ordinated their lines in a single continental system.

"Well, I should not express it in just that way," replied Chairman Hall. "If there were but one system all purchases would have been made in common, for instance, and as long as each railroad was obliged to earn its own living it is not, to my mind, conceivable that they could have been operated as a single system under one management without the repeal of the anti-pooling law."

"Then the principal result of the new plan of government control is that it gets away from the effect of the laws," said Senator Watson. "Could the railroads not have been run as successfully under their own management if the laws had been repealed?"

"I think the commission's report speaks clearly on that point," replied Chairman Hall, "but as a war measure, control of the railroads by the President presents certain advantages."

"If it is good as a war measure, why would it not be a good thing as a general policy?" asked Senator Townsend.

"We have yet to see what the result will be," replied Chairman Hall. "I have not let my thoughts dwell on the idea of government ownership. There are a number of elements which exist in ordinary times which do not enter into the problem in war time. That would be a very different question and would require study from a different angle of approach. Many problems would be involved that are not now, such as the political problem, and I do not understand that the President would have any such powers in time of peace as he has now."

Movement of Coal

Senator Pomerene tried to bring out reasons why the Interstate Commerce Commission or some organization had not done more to promote the movement of coal. He cited a case where a plant at Alliance, O., had been closed down almost in sight of many cars of coal which had stood on the tracks for weeks because the terminals to which they were destined were blocked. Chairman Hall replied that neither the Interstate Commerce Commission nor the carriers had authority to deliver the coal to any one but the consignee to whom

it had been ordered and that the proposed commission had agreed to be to move lake cargo coal to the westward where it could be moved by water.

"Many users of coal," he said, "have requested to be notified or if they have ordered it the West. Arrangements have been considered it turned over to someone else. It is not true, being a matter of merely car supply and movement. As I remember he suggested the plan proposed by the railroads in November by which the country would be divided into zones of districts and coal sent from these zones by the road to points routes to points in the district to avoid crowding."

Senator Pondexter also referred to the committee of freight cars in the vicinity of large cities because some lines would not unload them promptly and asked what the commission had done in that respect. Chairman Hall said that the commission is dealing with that problem every day and Commissioner McChord said that two inspectors of the commission were at work in the Washington yards.

Chairman Hall said that the commission had shortened the free time allowed for loading and unloading and in

shortened the time allowed for the company in permitting unloading of cars and that Commission of four of which had been appointed by the Interstate Commerce Commission had been named by Senator The Douglas the general coal and iron commission the only body authorized to investigate all other matters in regard to freight cars. He also said that the commission had been authorized to the extent of planning the "charge" because that would permit on the basis of some plan a procedure.

Mr. Hall then mentioned the transportation of coal and iron. "It is a 'hot' subject," he said, "because it is the only one that has all the great business interests, including the iron and steel industry."

Chairman Hall said that the commission had been authorized to investigate the matter and that the commission had been authorized to investigate the matter and that the commission had been authorized to investigate the matter.

It was also said that the commission had been authorized to investigate the matter and that the commission had been authorized to investigate the matter. The commission had been authorized to investigate the matter and that the commission had been authorized to investigate the matter.

Commissioner Clark mentioned, in some detail, the work done by the Railroads War Board and that he had been authorized to investigate the matter and that the commission had been authorized to investigate the matter.

Commissioner Adams was the last to be heard in Washington and that he had been authorized to investigate the matter.



Copyright, Canadian Official Photographs
The Officers Who Commanded the Engineers Who Fought at Cambrai



Copyright, Canadian Official Photographs
Canadian Railway Troops Passing Through the Joints of a Trench After Laying the Track



Erie Employees Participating in New York City Liberty Loan Parade. Copyright, Press Illustrating Service.

Railway Employees Subscribed For \$36,000,000

Subscriptions to the Second Liberty Loan by Railroad Men
Almost Double Those to First Loan

MENTION OF THE HIGH SPOTS in railway history for 1917 must not fail to include the subscriptions by companies and employees alike to the first and second issues of the Liberty Loan. The railways themselves subscribed about \$50,000,000 to the first loan and nearly \$80,000,000 to the second. Reports just made public by the Liberty Loan Committee on Railroads, of which A. H. Smith, president of the New York Central, is chairman, show in addition that subscriptions to the second loan by railway employees totaled \$36,077,450, that amount being subscribed by 396,958 employees. As 241,280 employees subscribed \$20,027,966 to the first loan, this means that the railway companies and employees together subscribed over \$70,000,000 to the first and \$116,000,000 to the second, a total of \$186,000,000 for the two issues.

In a letter sent out by the Liberty Loan Committee on December 22 to the railway presidents who co-operated, the railway men are thanked for their efforts and the hope is expressed that the committee may anticipate "your continued co-operation in behalf of similar issues by the government." The detailed figures sent out by the committee are as follows:

	1st Liberty Loan	2nd Liberty Loan
	Individ. Amount	Individ. Amount
Abilene & Southern.....	23	\$65,500
Akron, Canton & Youngstown.....	59	83,750
Alabama & Vicksburg.....	36,000	358
Arizona & New Mexico.....	31	4,000
Arkansas Central.....	35	2,500
Atlanta, Birmingham & Atlantic.....	20,400	No report
Atlanta & West Point.....	200	25,000
Atlantic Coast Line.....	1,819	729,350
Atch., Topoka & Santa Fe.....	6,827	714,050
Augusta Southern.....	5	450
Aurora, Elgin & Chicago.....	236	19,000
Baltimore & Ohio.....	4,940	397,300
B. & O. Chi. Terminal.....	89	8,050
Bangor Aroostook.....	455	40,550
Boston & Maine.....	6,222	322,250
Buffalo & Susquehanna.....	99	49,150
Buffalo Creek Railroad.....	122	7,850
Buffalo, Roch. & Pittsburgh.....	3,390	275,650

Carol. Clinch & Ohio.....	695	57,400	No report
Central of Georgia.....	63,150	1,366	116,500
Central R. R. of N. J.....	1,050	87,900	2,180
Central Vermont.....	725	45,000	No report
Charles City Western.....	11	26,500	
Charleston & W. Carolina.....	191	16,950	117
Chesapeake & Ohio.....	3,500	350,000	3,525
Chicago & Alton.....	11,650	250,000	
Chicago & East Illinois.....	475	50,000	2,361
Chicago & North Western.....	1,776	128,250	2,306
Chicago, Terre Haute & S. E.....	105	15,050	
Chicago & West Indiana.....	427	38,150	1,447
Chicago, Ind. & Louisville.....	163	21,500	325
Chicago, Burl. & Quincy.....	1,424	152,960	13,131
Chicago Great Western.....	75,000	1,779	124,150
Chicago, Milwaukee & St. Paul.....	2,090	217,000	5,271
Chicago, St. Paul, Min. & O.....	44,450	1,205	76,700
Chicago, Ind. & Western.....	211	25,000	No report
Cincinnati, Ind. & Western.....	323	22,850	
Colorado Midland and Colo. & So.....	70	4,100	
Copper Range.....	113	10,250	
Cripple Creek & Colo. Springs.....	10	800	
Cumberland.....	14	2,650	
Cumberland & Penn'a.....	89	6,350	
Delaware & Hudson.....	7,367	510,200	18,250
Delaware, Lack. & Western.....	16,886	1,091,336	17,671
Duluth, So. Shore & Atlantic.....	325,000		
Denver & Rio Grande R. R. Co. J.....	1,065	107,100	
Rio Grande Southern R. R. Co. J.....	12,800	77	16,950
East Tenn. & N. Carolina.....	200,850		
Elgin, Joliet & Eastern.....	100,000		
El Paso & So. Western.....	14,103	1,005,870	15,610
Erie.....	436	49,850	738
Florida East Coast.....	19,200	187	12,400
Fort Smith & Western.....	45	4,000	
Georgia & Florida.....	375	56,900	
Georgia Railroad.....	1,850	153,650	1,772
Grand Rapids & Indiana.....	29	30,000	4,321
Great Northern.....	150	30,000	1,741,750
Gulf, Mobile & Northern.....	596	61,900	4,356
Hocking Valley.....	150	30,000	1,669
Illinois Central.....	931	104,750	1,180
Internat. & Gt. Northern.....	3,000	254	27,500
Interstate R. R.....	102	7,500	
Kansas City Terminal.....	1,001	62,300	
Kansas City Northwestern.....	61	4,500	
Kansas City Southern.....	931	104,750	1,180
Lakeside & Marblehead.....	348	24,000	
Lehigh & Hudson River.....	9,678	701,050	9,915
Lehigh & New England.....	2,293	220,050	
Lehigh Valley.....	157	No report	
Linnville River.....(Combined with	5,654	490,200	6,433
Long Island.....	521,050		
Louisiana & Arkansas.....	157	No report	
Louisville & Nashville.....	5,654	490,200	6,433

the United States Fuel Administration and authorized by the priority director in any special instance.

Dr. Garfield also said in part:

"We are now putting into effect plans which will place the entire coal industry on a war basis. These plans will be wholly effective beginning with April 1, 1918, when the present coal year will come to an end.

"In this connection, the Fuel Administration is establishing a zone system of distribution. Under this zone system the output of a given coal field will be assigned generally to a given consuming territory. It will be arranged that the producing field and its consuming territory shall be connected by the shortest possible transportation distance. This will eliminate, so far as possible and practicable, all cross-hauling.

"In order that in 1918 the whole coal output, including the coal which the mines had contracted to deliver, shall be under the direct and effective control of the Fuel Administration, an order has been issued regulating the terms of all contracts for the future delivery of coal. The order makes it plain

that all contracts for the sale of coal or coke are subject to cancellation by the President or by the Fuel Administration acting by his authority.

"The order limits contracts by providing that no contract shall call for the delivery of coal or coke over a period of longer than one year, and the order directs that the year period thus allowed shall terminate not later than 18 months from the date the contract is made. Contracts must be placed at the prices fixed by the President and the Fuel Administration, and must provide that the coal or coke affected by the order is subject at all times to requisition or diversion by the Fuel Administration.

"Contracts made under this order will not be recognized if they involve 'Railroad cross-hauling of coal, except in the case of gas coal or coal to be used for by-product purposes.' This provision will eliminate one of the transportation difficulties now confronting the Fuel Administration, and will insure the movement of coal from mine to consumer along the shortest possible transportation lines."

Accomplishments of the Railroads' War Board

Report to Senate Committee Tells Also of What It Had Hoped to Do and of Its Obstacles

WHAT THE RAILROADS' WAR BOARD has already accomplished in stimulating American railroads to greater efficiency and to cut out unnecessary competitive practices, some things it had hoped to accomplish, and the difficulties that have hampered the railroads in their efforts to secure greater transportation output were outlined in a report to the Senate Committee on Interstate Commerce, by Fairfax Harrison, chairman of the Railroads' War Board, in reply to questions asked by the committee.

The committee asked regarding the increase in traffic being handled and as to "what changes of administration have been adopted within the past year to relieve congestion of freight and increase the efficiency of the railroads, and what further changes in methods of administration would you suggest?"

The railroads had already co-ordinated their activities before their taking over by the government and for eight months have been operated as a unified continental system, said Mr. Harrison, and the increase alone in traffic handled by the railroads in 1917 as compared with that of two years ago has been over 135,000,000,000 ton miles, or substantially equal to the combined total traffic for a year of the railroads of Canada, Germany, Great Britain, Russia, France and Austria. In the first six months after we entered the war, he added, the railroads handled as much freight traffic as they did in the entire year 1906.

Some of the things the War Board had done were described in part as follows: Some of the statistics are omitted because they have been published in these columns heretofore.

Some Things the War Board Has Done

1. Formulated probably the most satisfactory car service rules which the railroads have ever had. Arranged at once to pool box cars so that they circulate as freely over the United States as bank notes, and thereafter arranged to pool coal-carrying cars to promote their equally free circulation and to transfer locomotives from one line to another to meet unusual traffic requirements.

2. Established the most cordial and co-operative relations with commercial bodies, individual shippers, state railroad commissions, manufacturers' associations, etc., through

the organization of six departments coextensive with those of the army and 33 subcommittees of the commission on car service covering the entire United States.

3. In conducting an active campaign for the conservation of facilities through intensive loading of cars, locomotives, etc.

Efficiency of the plant has been increased in every direction. The number of freight locomotives in service has been increased by greater speed in repairing in order to reduce the time in shops. The same result has been accomplished as to freight equipment. Tons handled per car and per train have increased, as have the average miles run per locomotive and per car per day. The resultant effect of all of these economies is shown in the 1,094,800 ton-miles handled per month per locomotive, an increase of 16 per cent, for the six months ending September 30, 1917, and the 14,670 ton-miles handled per freight car, in the same period—an increase of 14.2 per cent—in each case over the preceding year. In effect, this added 4,897 locomotives and 339,427 freight cars to the equipment of the carriers. Two thousand eight hundred and forty locomotives and 141,475 freight cars on the average were ordered annually between 1907 and 1916; this additional equipment, therefore, was equivalent to the immediate delivery, without cost, of one year and nine months' locomotive orders and two years and four months' car orders.

Through the acquiescence of the public and the consent of state commissions, 28,656,983 unnecessary passenger train-miles have been discontinued, resulting in saving 1,800,000 tons of coal per annum, and the release of 570 locomotives and 2,800 train and engine men for freight service.

4. Developed a policy of relocating cars by ordering their movement empty. Since May 1 orders for moving 222,027 cars have been issued, of which 188,286 have been delivered off the initial lines. This change from previous policy is the most radical and far-reaching act that the committee has ever authorized. The movement has been very expensive to the roads that moved the empties, but all orders have been cheerfully and promptly obeyed.

5. Created the co-ordinating committee on exportations, whose function is to assemble information in relation to the

Lottom, both in port and in transit, available for military shipments in order to divert traffic where necessary to prevent congestion and to expedite shipment. The committee consists of Chairman of the Commission, Mr. S. A. Vose, a special representative of the executive committee, together with representatives of the army, the navy, the Shipping Board, the Food Administration, the British Ministry of Shipping and the traffic representative at the Allied Governments. This committee has regulated the movement of goods by water, reducing the number of cars required without blocking port facilities.

6. In collaboration with the Committee on Vessel Protection of the Council of National Defense it brought about the pooling of lake and tilewater cars, raising the number of classifications from 677 to 97 of the former, and from 900 to 125 of the latter, which resulted in the much more expeditious movement of cars and vessels, and thereby increased transportation.

Great anxiety prevailed throughout the summer and autumn for fear that the necessary tonnage of lake coal to the northwest and of ore from lower lake docks could not be moved before the close of navigation. These requirements have been satisfactorily met. These fears were inspired by alarming reports of shortage of coal published in many parts of the country. This shortage is due chiefly to the enormous increase in the demand for coal and to faulty distribution, and can not fairly be attributed altogether to lack of transportation. The railroads have not been able at all times to carry all the coal offered, but has any other industry responded more efficiently to the demands created by the war than these statistics show the railroads to have done? And the railroads have accomplished what they have under the greatest difficulties, which we shall mention in detail hereafter. The coal problem is not as has been represented, altogether one of transportation. It is primarily a problem of distribution, for which the public must share the responsibility. The present system of distribution involves a great amount of cross-haul of coal, and a resulting large waste of transportation. The remedy, which doubtless requires surrender of convenience and old habits, is clear: it is to cause coal to be supplied to every section from the mines nearest that section. No one unacquainted with the facts can conceive the unnecessary long hauls of coal which have grown up under the rule of the shipper to route his coal as he pleases. Whatever may have been the justification for it in normal times, this practice effectively reduces the efficiency of the transportation facilities in the time of the heaviest traffic ever experienced.

7. It has recommended to the Food Administrator to transfer the movement of foodstuffs and other export material to southern and Gulf ports to as large a degree as compatible with public interest in order to relieve the congested eastern territory of an equivalent amount of train service. The recommendation was not in effect at time.

8. In conferences with the Priorities Committee of the General Munitions Board it has taken steps to expedite material that is required in the construction of locomotives and cars.

9. It has arranged for the great simplification of the accounts relating to government transportation, which expedited the movement of government freight, and for a central accounting bureau through which the centralization of all transportation accounts would be government and to be handled.

10. It has submitted to the War Department a simplified basis for military war freight and terminal operations and assessing freight charges on Army transportation.

11. It has prepared plans for increased use and special equipment for hospital and troop train service and for arrangements to build sample cars.

12. It has prepared complete freight classification lists for

the governments, including Army, Air Force, military, naval, and territorial freight, communications, and passenger. The Mexican freight and military and Gulf ports military 1917-18 freight lists have already been issued, and the 1918 passenger and Gulf ports military lists, consisting of 1,000 special trains.

13. It has devised a new organization of operations and has recommended additional changes for government and military transportation, long-distance and short-distance, and for United States, through government, consisting of the movement of freight and territorial mail of their requirements, and the handling of their business in connection with the military movement of the war.

14. It has created a transportation operations committee, now composed of the Government and the American, British, French, American, and Canadian representatives, to coordinate the work of their governments under the general guidance of transportation.

15. It has received a special order for building material and supplies for transportation for the government and for all use for service of the United States Shipping Board, a value of \$44,013,000.

Things the War Board Had Hoped to Do

Some of the things the board had hoped to accomplish were as follows:

1. To absolutely reorganize all rail. The program of the Fuel Administration was directed on November 22 in the great importance of making a system of prompt contracts and methods of purchase and shipment of coal, so as to insure the rail haul from mines to consumers and to determine as far as possible all cross-hauling of coal by the railroads. This reorganization, accomplished in a time following that devoted in England for the same purpose, certainly showed up under the direction of the War Board, was reported on December 19, and it carried out full capacity where necessary one mile and provided the best movement of coal to be available degree.

2. To remove a traffic cause of congestion by creating coordination of government business agencies. A number of military railroads of the committee of the general character of the government, by means of special car orders and a special way bill schedule was suggested. The other railroads' application of that system to major shipments but entitled to preference in freight, especially for the movement of the country trunk lines, one of the most important of which is that of the coal of the entire traffic is covered by government direction. To reduce the congestion it has been necessary to restrict the operation of the able passing service on the War Board's recommendation that a government traffic director in operation, who shall control have all agencies of the government concerned with the shipping of freight, determine to what it may, preference in movement they are entitled, and prevent conflicts by priority by means of all resources as well as government freight.

3. To create greater improvement in the service of freight cars. Much has been said, but much more is to be done. The kind of cars or trucks have been found that the nation's business, especially those in the East. A considerable amount of money is being spent. Present arrangements require a large increase in the number of freight cars. This is a task that has been the center of attention since the government's withdrawal of its support of the freight car industry, which has been the center of attention since the government's withdrawal of its support of the freight car industry. The matter has given long talks to the Fuel Administration. A solution is now being arrived at which will permit immediate shipment and will meet the needs of the government's freight car industry. The government's withdrawal of its support of the freight car industry has been a serious loss to the industry, and the government has been obliged to provide the

adequacy of the remedy. The co-operation of the public that was there secured should be obtainable elsewhere.

4. To curtail passenger travel greatly by imposition, through the appropriate agencies, of sufficiently restrictive rates.

5. To increase the common use of terminals of one carrier by another. The common use of terminals and running tracks under trackage contracts is by no means uncommon, and under the stress of threatened congestion the principle is being urged and increasingly used.

6. To interest federal authorities in the paramount necessity of providing and conserving railroad labor, which we refer to hereafter in greater detail.

Difficulties That Have Hampered the Railroads

The report added:

We have shown what the War Board has done and what it hopes to do; it is not out of place to mention some of the obstacles in the way of securing greater transportation output.

1. The difficulties presented in handling a movement of freight exceeding by far anything ever experienced were greatly increased by the call to move over 2,000,000 troops, and thereafter to meet the demands created by their absence from home for facilities to visit their families and to permit their families to visit them. This stimulus and that of unparalleled industrial activity have steadily increased passenger traffic, which showed an increase of 23 per cent in October this year over last. The latest data available show increases of 6 per cent and 14 per cent, respectively, in mail and parcel-post traffic (years ended June 30, 1916 and 1917), and 20 per cent in express traffic (nine months of calendar years 1916 and 1917).

2. The serious congestion on eastern lines caused by the abuse of waybill preference envelopes by government agents has already been mentioned.

3. The railroads have not motive power enough. Approximately 3,400 locomotives and 33,000 cars are still under order, the delivery of which has been deferred for military reasons. The national government, recognizing its duty to its allies, determined that it was more necessary, first, that the needs of railways in France, which were to be used by our troops, for 2,331 locomotives, should be taken care of; second, that certain requirements of the British, for 296 locomotives, should be protected; and, third, and most of all, that Russia's requirements, for about 1,600, must be filled. We were told that we must take care of the transportation needs of Russia, and every energy was bent on that, and we were deprived of our locomotives and cars. Many of the 3,400 locomotives still undelivered were ordered by the eastern trunk lines now suffering so severely from congestion, for whose immediate relief 125 locomotives were drafted by the war board, not from lines that could spare them—because there are no lines in this condition today—but arbitrarily from lines outside the congested area. Our railroads, however, are determined to deal with their problems as best they can and get the largest use out of existing plant. We repeat what our executive committee has said publicly, that we believe the American railroads are getting as much service out of the existing plant as is possible by any form of management. There are, of course, more things we can yet do to increase efficiency and public service. These things we hope to do, with the assistance of our associates; we have not had a failure of co-operation by any railroad in the country. The support which we have had has been all that could be given under the most strict government control. We have had the support of shippers and receivers of freight, of commercial bodies, manufacturers' associations, and state commissions.

4. (a) By the impressment of steamships engaged in Atlantic coast traffic, of the Southern Pacific Co., Ocean Steamship Co., and Mallory and Clyde Lines, the railroads have been called upon to transport 962,000 tons of freight, in the

last half of the calendar year, which heretofore has been transported by water.

(b) The New York, New Haven & Hartford, Boston & Albany, and Boston & Maine, serving New England, have actually transported 2,817,000 tons more anthracite and bituminous coal into New England this year than last, in response to the needs of that part of our country that heretofore have been supplied by ocean carriers plying between New York, Philadelphia, Baltimore, and Hampton Roads and New England points.

(c) During the first year's operations of the Panama canal (September, 1914, to August, 1915, inclusive), 2,060,000 tons of freight were handled between Atlantic and Pacific ports of the United States. The vessels handling this traffic were attracted by bids for ocean bottoms in the trans-Atlantic trade at substantially any rate the owner might demand, and with the exception of about 70,000 tons of coal carried by United States Government in its own vessels, the 1916 traffic of the canal was negligible, and continues so; therefore the transcontinental railroads were obliged to furnish facilities to handle substantially all of the 2,060,000 tons above referred to without taking into account the large but unknown increase of traffic following the entry of the United States into the war. To move the above tonnage is equivalent to the constant monthly use during 1917 of 46,200 freight cars and 619 locomotives, or to the entire present freight traffic on about 5,000 miles of line.

5. The railroads are finding it increasingly difficult to keep their equipment, and particularly their locomotives, in proper repair and efficient condition, on account of the shortage of skilled labor. The selective draft and the attractions offered by such rates of pay in munition and government plants as most of the roads are financially unable to meet has resulted in a depletion of the shop forces of the carriers, some reporting a shortage in numbers of as much as 12½ per cent, and all reporting a much greater fall in efficiency due to the necessity of recruiting with unskilled men. The War Board has publicly called attention to these matters and has also suggested to government agencies possible measures of relief, which so far have not been granted. It should not be forgotten that the increased movement of passengers, troops, mail, parcel post, and freight has been accomplished with forces greatly depleted as to number and weakened as to efficiency.

Use of Priority Order

Regarding the extent of the use of priority orders of shipments, and its effect on traffic, the statement said:

The use of requests for priority in car supply and movement has been very general for the past six months or more on the part of the Army, the Navy, and the United States Shipping Board. The original plan contemplated that the Commission on Car Service should be furnished with copies of all such requests, but the method of handling, especially by representatives of the Army, has been lax, and it is believed that there were a great many such requests made on the railroads, direct copies of which never reached us. Furthermore, much of the movement represented by these requests extends into the future, so that it is not possible to make any figures that would fairly represent the volume of traffic that has been handled by the railroads in compliance with requests for preference. It is proper to state that the careless manner in which preference requests have been handled heretofore has now been corrected.

As stated above, however, the blanks for the purpose were used freely and the volume of traffic handled in this manner was undoubtedly large; but it is impossible to state in figures what effect this has had on the movement of other traffic.

The foregoing relates to preference shipments for the United States Government. Added to this have been shipments for the allies, amounting to many thousands of cars, which have been given a degree of preference by special order.

L. E. Johnson and N. D. Maher

PRESIDENT L. E. JOHNSON, after 30 years with the Norfolk & Western has retired and N. D. Maher, former president for the last 10 years, has been elected president. When Mr. Johnson went to the Norfolk & Western as general superintendent the company had come through receivership and Henry Fink was president. In the first nine months of operation the new company earned a profit of less than \$500,000 over its fixed charges. In the calendar year 1916 the company earned \$1,800,000 surplus above fixed charges. This is one of the really great achievements

achieved in the history of any railway property in the United States. On the one hand there has been most remarkably conservative and successful financing of the company's needs, and on the other hand a degree of foresight in the physical development of the property that has few parallels. Ranking almost in importance with these has been the development of an operating organization that has many of the good points of the Pennsylvania's, and greater flexibility.

The credit for these results belongs to Henry Fink, L. E. Johnson and N. D. Maher, and in a broad way also to beneficent and wise control by the Pennsylvania. Henry Fink, like his older brother, Albert, was a profound student of economics and especially of railroad production. How far ahead of most of his contemporaries and of the statesmen at Washington he was is rather strikingly illustrated by a paragraph in one of his annual reports. "Experience has demonstrated that such regulations as are to be made relative to such as the Act to Regulate Commerce prohibit the appointment or division of competitive lines, even the payment of money of any balance that may be due to the weaker transportation lines. It is hoped that the Congress at its next session will amend the Act to authorize Congress to permit the division of competitive lines, commonly termed 'pooling.'" This was in 1907. The next year L. E. Johnson came to the Norfolk & Western. It was fortunate under the best kind of leadership that Mr. Johnson gave his broader training. He had received practical work in the

operation of the Pennsylvania, and was familiar with the conditions of the Norfolk & Western. He was elected president in 1908, and the success of Mr. Johnson in the presidency of the Norfolk & Western, far over the responsibilities and obligations which others the country was to its common good. He learned the need of economy in public and in private. Approaching as he was to his contemporaries and the world in its general trend, he was not only a student of the development of the Pennsylvania and Norfolk & Western, but a student of the development of the Pennsylvania and Norfolk & Western, and a student of the development of the Pennsylvania and Norfolk & Western.

L. E. Johnson was born in Annapolis, Md. He began railway work in 1884 as a brakeman on the Chesapeake and Delaware Canal, and later transferred to the Pennsylvania Department of the



L. E. Johnson



N. D. Maher

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From March 5, 1902, to September 30, 1903, he was vice-president and general manager, and from September 30, 1903, to February 1, 1904, president and general manager. On February 1, 1904, he was elected president.

N. D. Maher is the man who has built up the Norfolk & Western's operating organization. This organization is the admiration of every railroad man who has studied it. For the combination of simplicity, effectiveness and *esprit de corps* it is almost unique. Even if Mr. Maher had never been elected president of the Norfolk & Western he would have built a monument to American railroad genius that will stand out in history. Mr. Maher knows the 2,000 miles of the Norfolk & Western, its officers and employees in minutest detail; as intimately as a creator knows his masterpiece. Although he has been vice-president for the last ten years only, he has been with the road even longer than Mr. Johnson, having been made chief clerk to the general manager in 1883. Years of service is not really an adequate measure in Mr. Maher's case, because we ordinarily think of a year as about 300 working days. During the last ten years Mr. Maher has lived day and night, day after day and week after week, out on the road. The standard of supervision he set himself was 100 per cent and he more nearly attained it than would have been possible for anyone with a less rugged physique.

Nicholas D. Maher was born at Blairsville, Pa. He began railway work in 1871 as a surveyor on the Pittsburgh, Virginia & Charleston. From 1873 to 1874 he was clerk in the office of the superintendent of transportation on the Pennsylvania at Altoona, Pa., and from 1874 to June 1, 1883, he was clerk in the general superintendent's office. From June 1, 1883, to August 1, 1889, he served as chief clerk to the general manager of the Norfolk & Western; from August 1, 1889, to August 3, 1890, as trainmaster of the Flat Top division; from August 3, 1890, to June 21, 1901, as superintendent of the Pocahontas division. On June 21, 1901, he was made general superintendent of the Seaboard Air Line at Portsmouth, Va.; but on January 3, 1903, returned to the Norfolk & Western as general superintendent. On February 1, 1904, he was made general manager, and from July 1, 1907, to November, 1912, was also second vice-president. In November, 1912, he was appointed vice-president in charge of operation.

The Shepherdsville Collision

THE REAR COLLISION of passenger trains on the Louisville & Nashville, December 20, killing 47 persons, was briefly reported in our last issue, page 1185. A full copy of the statement issued by the railroad company and published in the Louisville papers has since been received and from this are taken the following details which were brought out at Superintendent W. F. Sheridan's investigation. (The local train was No. 41, not No. 9, as given in our account.)

Train No. 41 left Louisville on time at 4:35 p. m. Train No. 7, the through passenger train for Nashville, due to leave at 3 p. m., did not depart from Louisville until 4:53 p. m. No. 41 made its usual local stops and arrived at Shepherdsville six minutes late. It consumed about two minutes in discharging its passengers. It then moved forward, that is, southward, until the rear coach was about 360 feet south of the station building. It here came to a stop for the purpose of backing in upon the siding to permit No. 7 to pass, and almost at that instant No. 7 swept by the station and into the rear of train No. 41. No. 7 plowed through the rear coach and half way through the second coach of No. 41 and shoved the wreckage forward a distance of about 800 feet. The flagman and conductor of No. 41 were in one of the coaches and both were killed. The engineer and fireman on No. 7 were unhurt. * * *

When No. 41 arrived at Brooks, a station five miles north

of Shepherdsville, the conductor received information from the dispatcher that No. 7 had passed F. X. tower at 5:08 p. m. and that if he could not get to Bardstown Junction on time he had better let No. 7 pass at Shepherdsville. As he was leaving Brooks, Conductor Campbell said to his train porter, Earnest Chase, "we are to let No. 7 by at Shepherdsville." At Gap in the Knob, a station between Brooks and Shepherdsville, the train porter asked Conductor Campbell if the engineer understood that he was to head in at Shepherdsville. * * * At Shepherdsville Conductor Campbell went into the telegraph office and himself telephoned to the dispatcher at Louisville and was informed that No. 7 was close and that he had better get into the siding. Campbell came out of the office and told the train porter to inform the engineer to back into the siding for No. 7.

The porter ran forward and delivered this message to the engineer while the train was slowly moving off, and jumping upon the engine he rode it until he reached the south switch, where he alighted. He threw the switch. The effect of this was to display an additional red light to the north as soon as the train had passed the switch. The rear of No. 41 was not protected in any way by its crew as required by the rules, in that no fusee was put out or torpedoes placed between Gap in the Knob and Shepherdsville, though the train was failing to maintain schedule time; and in that no flagman with a red lantern was sent back at Shepherdsville.

After leaving Louisville train No. 7 was stopped one minute at Oak street and one minute at the Southern railway crossing and after that proceeded without any further stops until the collision. The line from Louisville to a point beyond Shepherdsville is double tracked, and trains move under standard American Railway Association rules.

In approaching Shepherdsville the track is straight for a mile and a half, except for one slight curve about half a mile north of the station, which, however, does not affect the view of the signals at the station.

Under the rules, it was the duty of the engineer of train No. 7 to approach the station with his train under control and not to pass it unless he received a "proceed" signal. This signal in the night is the changing of a red light to a green, and the approaching engineer must stop unless he actually sees this movement; that is, the change from red to green.

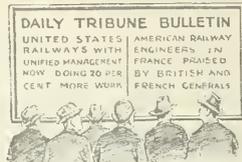
Upon this occasion the engineer, Wolfenberger, states that he saw the green signal in its then position when he was about 2,200 feet from the station, and that when he was about 1,800 feet from the station he sounded four short blasts, which was a request to the operator to indicate whether he must stop or proceed. The engineer states that he saw no change in the signal and admits that he knew that, not being moved in his presence, it was his duty to stop; but he thought that the signal to proceed would be given later, so he went ahead without taking any steps toward slackening the speed of his train, except that he applied the air brakes lightly. When he was within about 400 yards of the station, still observing that the signal had not been changed, he called again by sounding the four short blasts.

He says that at that time he saw the signal drop to red, and that he then applied his emergency brakes and thought that he closed or almost closed the throttle.

Upon the arrival of No. 41 at Shepherdsville, Operator Jesse Weatherford, as is customary, assisted the agent in handling the baggage, mail and express. He was working at this at about a distance of fifty-five feet from his office, and upon completing it started to return to his office when he met Conductor Campbell coming from his office and was told by him of his conversation with the train dispatcher, and informed him that he, Campbell, was going to move up and back in on the side track to let No. 7 pass. Then



General News



The shops of the Pennsylvania Railroad at Pitcairn, Pa., 15 miles east of Pittsburgh, were damaged by fire on the night of December 26; estimated loss \$35,000.

In a fire at Long Island City, N. Y., on the night of December 30, a storage and office building of the Long Island Railroad was destroyed, together with two freight cars; estimated total loss \$125,000.

The Atchison, Topeka & Santa Fe, which recently announced that it had granted a 10 per cent bonus for the six months' period just ended to unorganized employees, will pay the bonus in regular monthly installments in the coming year with the regular salaries of the men.

By the decision of arbitrators, recently appointed, the telegraphers of the Baltimore & Ohio are to have an increase in pay of 10 per cent—half the amount asked for—and they are granted the 26-day month; that is, they receive extra pay, at regular week day rates, when they work on Sundays.

Because of the importance of the local situation at Baltimore and Washington, where there has recently been a great deal of congestion, a sub-committee of the General Operating Committee of Eastern Railroads has been appointed at Baltimore with M. H. Cahill, general superintendent of the Baltimore & Ohio, as chairman. C. W. Galloway, general manager of the Baltimore & Ohio, has been appointed chairman of the Cincinnati sub-committee, succeeding W. J. Jenks.

Orders relative to providing an adequate supply of bituminous coal to the Pere Marquette, the Seaboard Air Line, the Atlantic Coast Line and the Norfolk Southern have been issued by the United States Fuel Administrator. The order recites that the present method of procuring coal under contract for these roads is causing delay in the shipment and supply of such coal, interference with commercial coal distribution and that an adequate and regular supply of coal for these roads is necessary. The order directs coal operators under contract with these roads to furnish a regular supply of coal each week, provided the mines are in operation.

The United States Civil Service Commission announces an open competitive examination for junior civil engineer, grade 1, for men only, on January 23. Vacancies in the Interstate Commerce Commission under the act providing for the valuation of the property of common carriers at salaries ranging from \$1,320 to \$1,680 a year will be filled from this examination. In addition to salaries, necessary expenses will be allowed during absences from headquarters in discharge of official duties. Competitors will be examined in the following subjects which will have the relative weights indicated: (1) Theory and practice of railway surveying and note book keeping and the mathematics used in this branch of engineering, including algebra, geometry, and trigonometry, but not including calculus, weight 50; (2) Education, training and experience, weight 50. Applicants should at once apply for Form 2039, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C.

Government Steel Prices in Effect Until March 31

The President has approved the recommendation of the War Industries Board that the maximum prices heretofore fixed by the President upon ore, coke, pig iron, steel, and steel products, subject to revision on January 1, 1918, be continued in effect until March 31, 1918. New contracts calling for delivery on or after April 1, 1918, must be subject to revision by any authorized United States Government agency, so that deliveries after that date shall not exceed the maximum price then in force, although ordered or contracted for in the meantime.

Railway Regiments' Tobacco Fund

Last week was one of the best the Railway Regiments' Tobacco Fund has yet experienced, the feature of the week being the announcement that the Railway Business Association will donate \$1,000 to the Fund from the proceeds of its annual dinner. A contribution was also received during the week from the Corning Glass Works, Corning, N. Y., for \$120.

Headlight Order Modified

In view of the pressure upon the railroads for cars and engines to move war materials the Interstate Commerce Commission has postponed the effective date of its order requiring locomotives to be equipped with high power headlights from January 1 to July 1 as to all new locomotives placed in service. For locomotives in service prior to that date the changes required are to be made the first time locomotives are shopped for general or heavy repairs after July 1, 1918, and all locomotives must be so equipped before July 1, 1920.

Freight Bill Clearing Bureau in San Francisco

The three transcontinental railroads serving San Francisco have formed what is known as the San Francisco Railroad Clearing Bureau which, it is believed, will prove a source of economy in settling freight bills. All freight bills except those paid at the station on the delivery of freight will be sent daily to this clearing bureau by the local agents and be scheduled for one transmittal daily to each receiver of freight, who will make but one payment of freight charges to the bureau. G. H. Courtney has been appointed manager of the new bureau. A clearing bureau of this kind has been tried with success at Kansas City where 14 railroads are operating successfully under the plan and it is soon to be put in effect at Chicago.

Prices Fixed for Track Materials

The committee of the American Iron and Steel Institute, in charge of price establishment, has recommended maximum prices on angle bars, standard railroad track bolts, track spikes and scrap rail. The recommended base price per 100 lb. f. o. b. maker's mill for angle bars is \$3.25; for track bolts 3/4 in. by 3 1/2 in., \$4.90; and for track spikes 9/16 in. by 4 1/2 in., \$3.90. The recommended price for old steel rails 56 lb. per yard or heavier and 5 ft. and over in length, suitable for re-rolling purposes is \$33 per gross ton. The recommendation carries with it a set of extras for special requirements and sizes other than those specified for the base prices. Fixed prices are also recommended for bars rolled from old steel rails at a base price of \$3 per 100 lb.

Collision at North Vernon, Ind.

In a butting collision of passenger trains on the Baltimore & Ohio, one mile east of North Vernon, Ind., on December 29, one passenger and seven trainmen were killed and 12 persons were injured. General Manager C. W. Galloway issued a statement, saying:

"The engine crews of both trains were killed and the conductor of train No. 2 (east bound) was injured to such an extent that we have not been able to interview him. Investigation clearly indicates that No. 2 held an order to wait at North Vernon for second 23 (west-bound). For some reason not yet determined this order was disregarded. The automatic signal just ahead of where the engine of No. 2 was standing, while doing station work at North Vernon, and in full view, was in the caution position, indicating that the next signal east, and lo-

ated at the pull in switch of the main line siding, were in the stop position. This signal at the Illinois station was in the stop position because second 23 was in the block between Chicago and North Vernon, but this signal was disregarded and passed by train No. 2 which in the stop position. The automatic signal system has been tested and found to be operative.

Large New Grain Elevator at Chicago

On January 2, the Chicago & North Western opened a new grain elevator on the Calumet river in South Chicago. It will have an ultimate capacity of 10,000,000 bu. The entire plant is of modern fireproof construction and includes a freight yard having a capacity of 1,250 cars and an engine terminal. The plant consists of a working house, a river house, storage tanks and 11 other auxiliary facilities. The working house, which is 25 ft by 77 ft, 192 ft high. Above a first story platform roadway, there are 95 reinforced concrete bin 15 ft in diameter by 74 ft high, having a capacity of 931,000 bu and the bins are surmounted by a cupola several stories in height. Adjacent to the storage house is a receiving shed 100 ft by 300 ft in which 4 cars standing on 5 tracks are unloaded into 24 track hoppers. The working house will handle 1,250,000 bu of grain in 24 hours. The storage house consists of 104 reinforced concrete bins 22 ft 6 in in diameter by 104 ft high, affording a capacity of 4,382,000 bu. The river house consists of a first story 18 ft 9 in high supporting 24 grain bins like those in the storage house and having a total capacity of 778,000 bu. It is equipped with six shipping legs for loading grain into boats and a large marine tower 145 ft high for unloading ships. All of the tanks are of reinforced concrete supported on a substructure of the same material while the cupolas surmounting the tanks are of steel frame construction covered with wire mesh and plaster. Other facilities include a power house, machine shop, dust house and employees' welfare building.

Western Railroad Executives Meet at Chicago

At a meeting of the executives of a number of Western railroads at Chicago on December 31 thorough consideration was given to all phases of the President's proclamation assuming control of the railroads and order No. 1 of the Director General of Railroads. Each railroad will put into effect immediately as far as possible the direct routing of freight. For the purpose of making a further study of this subject and to establish new through routes for freight wherever it was considered advisable the following committee was appointed: J. G. Winstowrth, vice-president of the Northern Pacific, chairman; A. C. Johnson, general traffic manager of the Chicago & North Western; W. L. Park, vice-president of the Chicago Great Western; J. E. Fortner, superintendent of transportation of the Illinois Central; H. E. Pierpont, freight traffic manager of the Chicago, Milwaukee & St. Paul. To save clerical labor the custom of making various reports of freight shipments both by wire and mail will be discontinued and tracing of freight will be done only after reasonable time has elapsed for the car or shipment to reach its destination. The common use of terminals as receiving points by the Director General will be effected at larger centers through committees of operating officials with the view to securing the fullest possible use of all terminal facilities regardless of ownership. Every effort will be made to expedite the movement of freight and to conserve locomotives and fuel.

The new committee convened for the first time on January 2 and an additional committee was organized to consider proposed reductions in passenger service over the line. J. W. Stewart, director of traffic of the United States Railway Administration, vice-president of the Santa Fe Lines, and C. G. Hamilton, vice-president of the Chicago, Burlington & Northern.

Railway Business Association Dinner

The ninth annual meeting of the Railway Business Association will be held at the Waldorf Astoria Hotel, New York City, January 25, beginning at 11 a. m. and the annual dinner will be held at the same place at 7 p. m. The meeting will be followed by a "Hoover" dinner and an afternoon reception given by the American Red Cross and by the Railway Business Association. The fund for the dinner price will be paid by the Association. There will be no wine, and the dinner will be a simple affair, consonant with the present times. The program will include

the annual dinner and will feature reports by the Rail Council. The dinner will be given in the Waldorf Astoria Hotel, New York City, and will be followed by a reception given by the American Red Cross. The program will include the annual dinner and will feature reports by the Rail Council. The dinner will be given in the Waldorf Astoria Hotel, New York City, and will be followed by a reception given by the American Red Cross. The program will include the annual dinner and will feature reports by the Rail Council. The dinner will be given in the Waldorf Astoria Hotel, New York City, and will be followed by a reception given by the American Red Cross.

... (The text continues with a detailed report on the Pennsylvania Railroad's plans to eliminate 104 weekday trains, mentioning the impact on freight service and the specific routes affected.)

Pennsylvania Will Eliminate 104 Weekday Trains

The Pennsylvania Railroad will, on January 1, eliminate 104 weekday passenger trains, with a reduction in the length of 1,100 miles of weekday train service. These cuts will be made in order to save the operation of other trains that will be added.

The principal changes in weekday service will include the withdrawal of the Altoona-Buffalo through express, the Erie-Port Jervis through express, the Erie-Dunkirk express, the Erie and West Chester, the Erie-Camden, the Erie-Philadelphia and Erie-Lancaster. The Erie-Philadelphia through express will be replaced by a freight train, and the Erie-Lancaster through express will be replaced by a freight train.

The "Commodore" express, probably the most famous train operated in the Pennsylvania system, has been running continuously for 32 years, having been first introduced on December 2, 1885. It will be replaced by a freight train, and the Erie-Lancaster through express will be replaced by a freight train.

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3:30 p. m.; 5:08 p. m., and 9:30 p. m. In addition on Sunday night an extra sleeping car section will leave at 11:34 p. m.

The northbound trains on the Pennsylvania for New York will leave Washington as follows: 12:10 a. m. (sleepers and coaches); 12:40 a. m. (sleepers and coaches); 8 a. m.; 9 a. m.; 10 a. m.; 11 a. m.; 2:40 p. m. and 4 p. m. This schedule will eliminate from the northbound service the trains leaving Washington for New York at 12:30 p. m. and 4:27 p. m.

The train leaving Washington at 4 o'clock will replace the "Congressional Limited," and will consist of day coaches, one parlor car and one restaurant car. The "Congressional Limited," southbound, will not be replaced.

The train now leaving Philadelphia at 12:30 p. m. for Washington, will be eliminated, as will also the trains leaving Washington at 4:03 p. m., and 7 p. m. for Philadelphia. The "Federal Express," now leaving Washington at 7:30 p. m., will be changed to leave at 7 p. m., and will accept passengers for points south of New York. The "Federal Express," southbound, will arrive at Washington at 8:30 a. m.—one hour later than at the present time. The "Federal Express" will carry a restaurant car, both northbound and southbound.

In arranging for the reduction of local and commutation service the management has followed the policy of avoiding interference with trains carrying workmen to and from important industrial plants, and also has sought as far as possible, to obviate serious disarrangement of other schedules.

The reduction in the service between Philadelphia and Atlantic City will include the elimination of the bridge train leaving Broad Street station at 1:34 p. m. on week days. But this train will continue to operate on Sundays. The steam trains from Market Street Wharf, Philadelphia, at 9:20 a. m. and 4 o'clock p. m., weekdays, will be withdrawn, as will also be the weekday and Sunday electric trains leaving at 11 a. m., 3 p. m. and 8 p. m. Northbound, the bridge train leaving Atlantic City at 7:45 a. m. will be cancelled, as will also be the steam trains from Market Street Wharf leaving at 9:30 a. m. and 5:15 p. m. The northbound electric trains leaving Atlantic City at 11 a. m., 3 p. m. and 9 p. m. will be taken off. Electric train leaving at 11 p. m. will be changed to leave at 10 p. m.

Train service between New York, Long Branch, Asbury Park, Ocean Grove and Point Pleasant will be alternated between the Pennsylvania Railroad and the Central Railroad of New Jersey, the Pennsylvania Railroad eliminating two round trips under the revised schedules adopted by the two companies.

The train leaving Philadelphia at 8 p. m. for New York will be discontinued. Trains leaving Philadelphia at 8:30 a. m. and New York at 4:20 p. m. will be discontinued between Philadelphia and Trenton. Otherwise the service between those two cities will be practically unchanged, except as it is affected by the discontinuance of through trains.

Train No. 33—(the "Pan Handle Express"), from New York for the West, which now runs into Broad Street station, Philadelphia, leaving there at 4:32 p. m., will be changed to run via North Philadelphia only.

Train No. 34—(the "Seaboard Express"), from the West to New York, which now arrives at Broad Street station, Philadelphia, at 12:24 p. m., will run via North Philadelphia only, arriving at 12:48 p. m.

Changes to become effective on the Schuylkill division have already been announced, and a revised and reduced schedule between Philadelphia and Cape May is already jointly in effect by the Pennsylvania and the Philadelphia & Reading Railway.

Effective January 6, not more than one parlor car will in any case be operated on Pennsylvania trains carrying coaches. Parlor cars will be discontinued entirely on Schuylkill division trains.

In addition a number of reductions will be made in club and restaurant cars, including the discontinuance of the restaurant cars on the 1 p. m. and 7 p. m. trains between New York and Philadelphia, in each direction, and also from train No. 8—(the "Eastern Express").

On the Sunbury division, between Pottsville and Shenandoah, and Pottsville and Sunbury, via Hazleton, 12 or more trains will be withdrawn and the schedules of others revised. The purpose of this is to clear that division for the transportation of anthracite coal to Philadelphia, as the division traverses some of the most important anthracite coal-producing regions on the Pennsylvania.

A number of midday trains will be eliminated on branch lines on practically all portions of the Pennsylvania east of Pittsburgh, to facilitate the movement of coal and other freight.

Traffic News



The Cleveland, Cincinnati, Chicago & St. Louis inaugurated the sailing day plan of handling l. c. l. freight in Cincinnati, Ohio, on January 2.

The Chicago & Alton has lengthened its fast freight schedules between Chicago and Kansas City, Mo., via St. Louis, from 30 and 33 hours to 40 hours.

The final statistics on the movement of the California fruit crop show that 24,628 carloads of deciduous fruit were shipped out of the state in 1917. This is an increase over 1916 of 6,737 carloads, or 37.6 per cent. The total shipments of all the leading varieties of fruit exceeded the 1916 totals, grapes leading the way with an increase of 5,000 carloads.

The postoffice department proposes to establish a mail route by motor car between Philadelphia, Pa., and Easton, 80 miles; and already has started one between Philadelphia and Oxford, Pa., 50 miles. Contracts are being prepared also for a similar run from Pittsburgh, Pa., to Wheeling, W. Va., 60 miles; and another from Pittsburgh to Cumberland, Md., 140 miles. Similar action is contemplated in other States.

Increase in Rates on Canadian Railways

The Board of Railway Commissioners of Canada, on December 26, issued a decision providing for a general increase of 15 per cent in passenger rates throughout the Dominion, except in British Columbia, where the rate at present is three cents a mile. With a considerable number of exceptions the order allows also an increase in freight rates of 10 per cent in western Canada and 15 per cent in the east.

War Department Takes Bush Terminal

The War Department, through Acting Quartermaster General Geo. W. Goethals, has requisitioned the Bush Terminal piers and warehouses in New York City (South Brooklyn). These terminal facilities will pass immediately under the control of the War Department. Eight piers and 130 warehouses will be taken over, leaving to the Bush Terminal Company the railroad terminal and the industrial buildings. It is estimated that the net income of this property at present is more than \$1,000,000 a year. The Bush Terminals and Bush Terminal Railroad represent an investment of about \$20,000,000. The industry covers nineteen city blocks, and contains twenty-one miles of railroad tracks. Its waterfront space is more than 3,000 feet, and factories and other buildings cover nine blocks. The piers that the Government will acquire are each a quarter of a mile in length. The railroad yards can accommodate 2,000 cars, and more than 12,000 persons are employed in warehouses, railroads and manufactories.

Developments in the Coal Situation

Judge Robert S. Lovett, government priority director, has issued a supplement to Priority Order No. 5 granting priority in car supply and in movement of certain preferred commodities, to include in the third subdivision of preferences provided by that order, structural material when consigned to constructing quartermasters for account of contractors engaged in emergency construction work under the cantonment division of the quartermaster general's office. The first and second preferences under the order are given to steam railroad fuel and to livestock, perishable freight, food and feed.

The voluntary curtailment of all-rail shipments of coal to the northwestern states during the next 90 days is proposed by John F. McGee, state fuel administrator for Minnesota, after conferences held by the northwestern administrators with W. H. Grover-

Court News

Improper Packing of Freight

In an action against a carrier for damages caused by the freezing of a shipment of a bottled beverage, the Oregon Supreme Court holds that a carrier to whom barrels containing a bottled beverage were delivered and which transported them without negligence was not liable for any injury due to improper packing of the bottles in the barrels. It was not authorized to open the barrels, but was bound to ship the goods in the form in which they were delivered to it, unless they were manifestly in bad order.—*Michellod v. Oregon-Washington R. & Nav. Co. (Ore.)*, 168 Pac., 620 Decided November 13, 1917.

Removal of Rejected Ties

Cross-ties were placed on a right of way for the railroad's acceptance and use. The company duly inspected the ties, expressly rejected them as unsuited to its needs and so notified the person offering them. In an action against the railroad the Georgia Court of Appeals held that the bare fact that the ties were subsequently removed by some one, it not appearing when, how, or by whom, did not create any presumption that the ties had been accepted and used by the company, and there was no obligation on its part to pay therefor.—*Atlantic Coast Line v. Drake (Ga.)*, 94 S. E., 65. Decided October 31, 1917.

Cost of Short-Distance Passenger-Carriage

The Pennsylvania Public Service Commission dismissed a petition against a railroad company for discrimination in passenger rates. On appeal it appeared that the company charged the same rates of fare to a station 2.7 miles from its terminal as to a station 4.1 miles, and the commission found, from sufficient and competent evidence, that the business between the terminal and the first station was carried on at a considerable loss, and that there was a greater relative cost of transportation to the first station than to the second. The order of the commission was affirmed.—*Bradley v. Pennsylvania*, 66 Pa. Superior Ct. 428. Decided April 30, 1917.

Fencing—Public Roads

In an action against a railroad for killing a horse and a mule the Springfield Court of Appeals holds that the Missouri statute requiring railroads to fence their right of way does not require the fencing of roads which are in fact, though not legally, highways, and a railroad company is justified in omitting to fence, and constructing a crossing for a well-traveled road, the company not being bound to determine the legality of the road. The animals were killed at such a crossing which the public had used as a highway for 10 years. A judgment for the defendant was sustained.—*Walker v. Southwest Missouri (Mo.)*, 198 S. W., 441. Decided November 13, 1917.

Carrying Passenger Past Station—Damages Recoverable Must Not Be Remote

A woman with two little children was carried past her station some four miles because the conductor, when she paid him her fare, failed to tell her the train did not stop there. When the discovery was made that she had been carried by, she became so frightened and excited that she became seriously ill. She was subjected to no insults, inclement weather or to any of the usual causes of sickness or mental anguish, but was politely assisted from the train at the next station, taken by the company's agent to a hotel which was conducted by a woman whom she knew, and on the following morning was returned free of charge to her station, where another friend assisted her to her home. She obtained a verdict from a jury of \$1,250 on which judgment was entered. On appeal this was reversed by the Texas Court of Civil Appeals, which held that her injuries were not the proximate result of the conductor's failure to stop the train at her station, as the probability of such serious consequences could not have been anticipated; and for breach of a contract in carrying a passenger beyond his destination the damages recoverable are limited to those which are proximate and not remote or contingent.—*Gulf, C. & S. F. v. Nichols (Tex.)*, 198 S. W., 338. Decided October 26, 1917. Rehearing denied November 14, 1917.

Supply Trade News



Frank L. Brown, president of the Ransome Concrete Machinery Company, New York, died Tuesday night in his apartment in that city, from heart disease. Mr. Brown was 57 years old.

The P. & M. Company, Chicago, has established a southwestern sales office in the Railway Exchange building, St. Louis, Mo., in charge of **W. H. Reeves**, who has been associated with this company for the past year.

The Union Supply Company, Chicago, Ill., has opened a branch office in the Call building, San Francisco, Cal., in charge of **A. A. Dawley**, western representative. Mr. Dawley was formerly purchasing agent of the Denver & Salt Lake at Denver, Colo.

E. K. Carter, representative of the Standard Asphalt & Refining Company, Chicago, Ill., has received a commission as captain in the Engineer Officers Reserve Corps and has been ordered to report for active duty at Camp Lee, Petersburg, Va., on January 5.

F. S. Wilcoxon, who for the past nine years has been mechanical representative for the Pilliod Company, New York, has resigned and has accepted a position with the Perolin



F. S. Wilcoxon

Railway Service Company as special representative. Mr. Wilcoxon commenced his mechanical career with the Pennsylvania Company at Wellsville, Ohio. He has served as locomotive fireman and engineer on the C. C. and S. Ry. (now a part of the Wheeling & Lake Erie), also as locomotive engineer and roundhouse foreman on the Alabama Great Southern Railway at Birmingham, Ala., and with the Toledo, St. Louis & Western Railway as locomotive engineer, road foreman of engines, general foreman and division master mechanic. He assumes his duties as special representative of the Perolin Railway Service Company on January 15.

I. R. Garretson, lumber agent of the Chicago & Eastern Illinois, was appointed traffic manager of the Marsh & Truman Lumber Company, Chicago, Ill., effective January 1, to succeed **A. F. Marsh** and **F. L. Bronez**, who have entered the U. S. Army service.

John Henry Goehst, president of the Federal Sign System (electric) and the Federal Electric Company of Chicago, died at his home in Chicago on January 1, at the age of 53. At the time of his death Mr. Goehst was also treasurer of the Mineral Electric Manufacturing Company and construction superintendent of the Commonwealth Edison Company of Chicago.

J. M. Hopkins, president of the Camel Company of Chicago, became chairman of the board of directors on January 1, and was succeeded as president by **P. M. Elliott**, formerly vice-president. **W. W. Darrow**, formerly general manager, is now vice-president, and **A. B. Wegener**, general manager of sales, was made secretary.

of transportation with headquarters at Chicago, Ill., effective December 26. Mr. Willis was succeeded as chairman of the fuel committee by G. A. Healey, road foreman of locomotives at Galesburg, Ill.

T. M. McLaughlin, assistant division superintendent of the Maine Central with office at Waterville, Me., has been appointed superintendent of the Eastern division, with office at Bangor, vice **M. F. Dunn**, resigned.

F. B. Miller was appointed general superintendent of the Colorado, Wyoming & Eastern, with headquarters at Laramie, Wyo., succeeding **G. R. Simmons**, assigned to other duties, effective December 20.

Joseph W. Foote, superintendent of the Delaware and Jefferson divisions, of the Erie, with office at Susquehanna, Pa., has been appointed superintendent of the Wyoming division and **Edward J. Edmunds**, superintendent of the Wyoming division, with office at Dunmore, has been appointed superintendent of the Delaware and Jefferson divisions.

Arthur DeGarmo, inspector in the freight train department of the Chicago, Milwaukee & St. Paul, was appointed trainmaster of the Racine & Southwestern division with jurisdiction also over that part of the Illinois division from Ashdale to Nabant and from Savanna to Ebner, with headquarters at Savanna. The territory of **D. E. Rossiter**, trainmaster at Savanna, will be confined to the Illinois division except as above, effective January 1.

Charles Burlingame, whose appointment as superintendent of the Terminal Association of St. Louis and the St. Louis Merchants' Bridge Company of St. Louis, with the same headquarters, was mentioned in these columns December 21, was born at Wilmington, Ind., on May 31, 1871. He began his railway career in July, 1886, and from that date to September, 1890, was messenger and clerk in the offices of the agent and superintendent of the St. Louis Bridge & Tunnel Company. From September, 1890, to May, 1899, he was chief clerk to the superintendent of terminals of the Missouri Pacific; from May, 1899, to February, 1900, he was chief yard clerk with the St. Louis, Iron Mountain & Southern; from February, 1900, to August, 1902, he was assistant yardmaster with the same road; from August, 1902, to January, 1903, he was assistant chief clerk in the superintendent's office of the Terminal Association of St. Louis; from January to December, 1903, he was chief clerk to the superintendent of the Terminal Association of St. Louis; from December, 1903, to April, 1907, he was night trainmaster with the same company, and in April, 1907, he was appointed superintendent of the Wiggins Ferry Company, the St. Louis Connecting Railway, the St. Louis Transfer Railway and the Interstate Car Transfer Company, which position he held until his appointment as noted above.

W. J. Jenks, general superintendent of the western general division of the Norfolk & Western, with office at Bluefield, W. Va., has been appointed general manager, with office at Roanoke, vice **A. C. Needles**, promoted; **J. T. Carey**, superintendent of the Scioto division, with office at Portsmouth, Ohio, has been appointed general superintendent of the Western general division, with office at Bluefield, vice **Mr. Jenks**; **H. C. Weller**, superintendent of the Pocahontas division, with office at Bluefield, W. Va., succeeds **Mr. Carey**; **W. O. Franklin**, trainmaster, with office at Bluefield, succeeds **Mr. Weller**; **A. S. Payne** has been appointed assistant superintendent of the Radford division, with office at Roanoke, Va.;

J. W. Robinson, assistant trainmaster, with office at East Radford, has been appointed trainmaster of the Radford division, with office at Roanoke, vice **J. T. Goodykoontz**, transferred, as trainmaster of the Pocahontas division, with office at Bluefield, and **G. H. Gilmer** has been appointed assistant trainmaster of the Radford division, with office at East Radford, vice **Mr. Robinson**.

Traffic

G. B. Haynes, general passenger agent of the Chicago, Milwaukee & St. Paul, with office at Chicago, has assumed the duties of **F. A. Miller**, passenger traffic manager, resigned, effective December 31. Retaining the same title, **T. W. Proctor**, assistant general freight agent, with office at Minneapolis, Minn., has been transferred to Chicago in the same capacity. **A. A. Wilson**, division freight and passenger agent, with office at Des Moines, Iowa, has been appointed general agent of the freight department, with office at Minneapolis. **E. K. Garrison**, division freight and passenger agent, with office at Portland, Ore., has been appointed general agent, with office at Milwaukee, Wis., in charge of both freight and passenger traffic. **W. H. Dodsworth**, general agent, with office at Milwaukee, has been appointed assistant general agent, with headquarters at the same place. **C. E. Hilliker**, Canadian freight and passenger agent, with office at Toronto, Ont., has been appointed division freight and passenger agent, with office at Des Moines.

Engineering and Rolling Stock

R. C. Beaver has been appointed assistant mechanical engineer of the Bessemer & Lake Erie, with office at Greenville, Pa.

P. S. Winter has been appointed general car foreman of the Bessemer & Lake Erie, with supervision over the car department shops at Greenville, Pa.

Douglas Leard has been appointed right of way engineer of the Seaboard Air Line with office at Portsmouth, Va., vice **I. H. Farmer**, who has entered military service.

Charles T. Sugars has been appointed master mechanic of the Louisiana & North West with office at Homer, La., succeeding **J. S. Motherwell**, resigned to go to another company.

J. D. Esposito, assistant chief engineer of the Chicago Union Station Company at Chicago, has gone to Washington with the Emergency Fleet Corporation, and his former duties have been assumed by **A. J. Hammond**, principal assistant engineer.

J. K. Booth, general foreman of the Bessemer & Lake Erie with office at Greenville, Pa., has been appointed master mechanic, with supervision over the locomotive department shops at Greenville, and **E. F. Richardson** has been appointed assistant to the engineer of motive power.

F. M. Seifer has been appointed division engineer on the Sacramento division of the Southern Pacific with office at Sacramento, Cal., to succeed **W. H. Kirkbride**, whose appointment as assistant superintendent of the same division was announced in these columns on December 14.

Thomas Allison has been appointed road foreman of engines on the Pasco division, of the Northern Pacific, with headquarters at Pasco, Wash., vice **C. A. Wirth**, promoted, and **J. H. Weston** has been appointed road foreman of engines on the Minnesota division, with headquarters at Staples, Minn., vice **M. S. Montgomery**, resigned.

Obituary

J. S. Bartle, assistant freight traffic manager of the Atchison, Topeka & Santa Fe, died at Chicago, Ill., on December 26.

S. W. Eccles, president of the Copper River & Northwestern and Nevada Northern, and vice-president of the Bingham & Garfield Railways, died on December 30, 1917, at St. Augustine, Fla.



C. Burlingame

EDITORIAL

Railway Age

EDITORIAL

Trains of cars and engines of the U. S. A., instead of with the name or initials of a railroad company, may soon become a common sight in this country.

The U. S. A. Railroad

A newspaper the other day described the tax status of government-owned railroads of the United States with a story by a reporter who had seen

a locomotive so lettered on one of the wheels that it had been one of the engines, of which a photograph was published in the *Railway Age* *Chronicle* of August 17, being on the War Department for service on our military route in France. One hundred of these have been borrowed temporarily to help some of the eastern roads clear up their comparative of freight. However, the government is apparently contemplating the purchase of additional cars and locomotives for domestic service on the lines it has taken over. The administration bill introduced January 4 to provide the train for the government's use of the railroads provides for an appropriation of \$500,000,000, to be used, among other purposes, for the purchase of equipment and locomotives. President Wilson also indicated the possibility that the government would itself buy equipment when he said in his message to Congress: "It is probably too much to expect that even under the unified railway administration without ownership can be effected * * * to make it possible to add to their equipment and extend their operative facilities as much as the present extraordinary demands upon their use will render desirable without resorting to the treasury for funds." The bill also provides for advances to be made to railroads out of the "revolving fund" for needed expenditures; but cars paid for by the government would thereafter be considered for the common use rather than as the property of any one company.

The necessity of producing dividends constitutes a primary reason for the high standards of efficiency usually achieved in private enterprises, with the lack of that disciplining principle often inherent in government-owned undertakings. In the case of American railroads, it profits are not obtained

Railways Create Prosperity

from existing traffic, steps are taken to increase the traffic. This motive actuating the policy of providing sound carriers, though selfish, has proved to be beneficial, apart to the development of agricultural and industrial resources and, consequently, generally beneficial to the nation. James J. Hill was one of the first railroad leaders to inaugurate an extensive development policy. Under his direction thoroughbred stock and high grade seed were distributed among the farmers; later the Great Northern raised cereal farming was introduced in two new sections, and better agricultural methods were taught by agents stationed by the company or loaned by our federal schools. In 1897, Mr. Hill saved thousands of farmers from financial disaster by extending them credit when their resources were practically suspended operations. Other carriers have been similarly much to encourage settlement and by increasing agricultural productivity. Special care has been given to the maintenance of passenger rates fixed to protect business as well as farming in-

terest. Federal legislation based upon laws introduced by general crop producers in the country, demonstrated a more general popularity, extending to a great proportion of American farmers, by recognizing the need of such a policy, and the policy of work and seed loans. Following the war, the government, by drawing in the way of loans of seed and fertilizer to assist in the progress of 1917, the more to give assistance to farmers will be able to do so with more liberality. The government, by having been successful in the past in the production of seed, may be able to do so in the future. It is very doubtful whether the success of the United States could have secured its present position had not the government been the first to give seed loans to farmers in the United States. The government, by having been successful in the past in the production of seed, may be able to do so in the future. It is very doubtful whether the success of the United States could have secured its present position had not the government been the first to give seed loans to farmers in the United States. The government, by having been successful in the past in the production of seed, may be able to do so in the future. It is very doubtful whether the success of the United States could have secured its present position had not the government been the first to give seed loans to farmers in the United States.

legislation for government which, unfortunately, possibly will generally be found to have been more effective in the future.

The Economy of Investigation

has proved to be the most effective way of increasing the productivity of the nation. The government, by having been successful in the past in the production of seed, may be able to do so in the future. It is very doubtful whether the success of the United States could have secured its present position had not the government been the first to give seed loans to farmers in the United States. The government, by having been successful in the past in the production of seed, may be able to do so in the future. It is very doubtful whether the success of the United States could have secured its present position had not the government been the first to give seed loans to farmers in the United States.

President Wilson's Railroad Message

THE MESSAGE regarding government control of the railroads during the rest of the war, which President Wilson delivered to Congress on January 4, has caused much gratification to railway owners, officers and employees. It included a gracious and generous recognition of the fact that no dereliction on their part had caused government control to be adopted, and an explicit statement that no more radical changes would be made in present organizations and methods than are found necessary in accomplishing the war purposes of the government.

"It was in the true spirit of America," said the President, "that we should first try to effect the necessary unification under the voluntary action of those who were in direct charge of the great railway properties. * * * The directors of the railways responded to the need promptly and generously. The group of railway executives who were charged with the task of actual co-ordination and general direction performed their difficult duties with patriotic zeal and marked ability, and did, I believe, everything that it was possible for them to do in the circumstances." But "it had become unmistakably plain that only under government administration can the entire equipment of the several systems of transportation be fully and unreservedly thrown into a common service without injurious discrimination against particular properties." The President added: "Nothing will be altered or disturbed which it is not necessary to disturb. We are serving the public interest and safeguarding the public safety, but we are also regardful of the interest of those by whom these great properties are owned and are glad to avail ourselves of the experience and trained ability of those who have been managing them."

These words of the President are as good an answer as can be made to those who charge now, and to those who may allege in future, that private control of railroad management was superseded during the war because it was "inefficient." The managers of the railways, the President declares, did as well as they could "in the circumstances." This is a frank statement that there were circumstances in the absence of which they could have done better. What were those circumstances?

The answer as to some of them is to be found in the things which the Director General of Railroads has done since he took office. He has ordered the managements of all the railroads to route traffic over the most direct open routes regardless of the effects on earnings. The Railroads' War Board did not assume the responsibility of issuing such a sweeping order, because to have handled freight regardless of the effects on the earnings of individual lines to any greater extent than was necessary to move the business would have been to do unnecessary harm to some individual lines. Such harm could have been avoided if the railroads had been legally authorized to pool their earnings. Such harm cannot be done by the Director General's order, because the income of individual lines is to be guaranteed.

One of the "circumstances" which greatly embarrassed the private managers of the railways was the abuse of freight preference orders by representatives of the various government departments. One of the first acts of the Director General was to suspend all priority and preference orders. He has the legal power to do this. The Railroads' War Board did not have it.

Another of the "circumstances" which embarrassed the managers was their inability to accelerate the movement of cars by securing prompter loading and unloading. They could not increase demurrage rates without the consent of state and interstate commissions. The Director General does not have to heed laws or orders of commissions regarding demurrage. Therefore, he has ordered a general increase in demurrage rates of 50 to 100 per cent, and it is understood that still greater increases may be made. It is also

understood that the free time allowed for loading and unloading cars may be reduced. The Director General can do this without the consent of anybody. The Railroad managers could not do it without the consent of the numerous regulating bodies.

Whatever may be the disadvantages of government control of management in time of war, it certainly has some advantages. But since, as the President pointed out, it can use methods which private management was not allowed to use, and since some of them are methods which even government management might not be allowed to use in time of peace the results will hardly afford any very instructive lessons as to the relative merits of government and private management in time of peace.

Proposed Legislation for War Control of Railroads

IMMEDIATELY after President Wilson delivered his message regarding railroad control to Congress on January 4, a bill embodying the Administration's views as to the financial and other arrangements which should be made during the period of control was introduced in both branches of Congress. The most interesting provisions of this bill are those relating to financial terms, and to the duration of government control.

The salient provision of the financial sections of the bill is that the President is "authorized to agree with and guarantee to any such carrier that during the period of federal control it shall receive as its just compensation an income at an annual rate equivalent as nearly as may be to its average net railway operating income for the three years ending June 30, 1917." The use of the term "net railway operating income" has caused much confusion and discussion. It has never had any place in the published statistical reports of the Interstate Commerce Commission. Probably a provision will have to be added to the bill clearly stating what it means.

We believe, however, that the intent of the measure is clear. This is to secure to each railway annually a rate of return equal to the average annual rate of the return which it earned in the three years mentioned for the payment of interest and dividends, and for other uses of benefit to its security-owners, such as investment in the property. If this be the intent of the bill its provisions fail to give it full effect. For example, between June 30, 1917, and December 31, 1917, there was an increase of the investment in road and equipment. A net return based on the results of the three years ending June 30, 1917, would apparently provide no return on this increased investment. This defect of the bill can be remedied by providing for the same rate of return on this additional investment as is to be allowed on investment made before June 30, 1917; or for the same rate of return as may be agreed upon for investment made during the period of federal control.

The real issue, so far as financial return is concerned, is as to whether the return earned in the three years ending June 30, 1917, or the return earned in some other period, shall be guaranteed by the government. Some members of Congress contend that the two years ended on June 30, 1916 and 1917, were unusually good for the railroads and that, therefore, the guarantees provided by the bill would be too large. On the other hand, spokesmen for the railroads contend that the years 1916 and 1917 taken together were not extraordinarily favorable to the railways, while the fiscal year 1915 was the most unfavorable to them for 15 years, and that, therefore, the fiscal year 1915 should be excluded and the two years ended June 30, 1917, taken as the basis.

This divergence of view is not surprising. There are some prominent members of Congress who have been largely responsible for the system of government regulation which

made a contract with a private enterprise at a time during the war, and those who transferred their private careers have profited because while railway men have regarded as a commodity. Agreement between their owners and those of representatives of the railways was hardly to be expected. There is some merit in the contention of both sides. It is true, since the fiscal year 1914 was the year for the railways, and the depression following the panic of 1893—and that the fiscal year 1910 was the last that the railways ever had. The year ended June 30, 1917 was not as good as 1916, but was much better than 1915. The average operating income of the three years was recorded by J. Keith Smith in his testimony before the Senate Interstate Commerce Committee in 1916. The *Railway Age's* estimate is a little less than that, but the exact figure would be around 5.4 per cent. This is less than was earned in 1906, 1907, 1908, 1910, 1916 or 1917.

When the government fixed the prices of wheat, of iron and steel and of coal it fixed them at a base much higher than those which prevailed before the war began in Europe, and which enabled the producers to carry larger percentages of return than they were able to earn in the pre-war period. The government having taken control of the management of the railroads away from their owners, it ought to guarantee them a reasonable return, and a return less than returns earned in years of normal gross and net earnings would not be reasonable. It would hardly be contended that the years 1901 to 1910 were abnormally favorable to the railways, and yet in that period, according to the reports of the Interstate Commerce Commission, the operating income of the railways amounted to about 5.4 per cent. No basis less favorable than that recommended by the President should be adopted by Congress, nor could it be accepted by many railroads. Therefore the adoption of any less favorable basis probably would result in protracted and harmful litigation.

One of the most interesting sections of the bill is Section 13, which provides that "the federal control of transportation systems herein and heretofore provided for shall continue for and during the period of the war and until Congress shall thereafter order otherwise." (The italics are ours.) There are two fundamental objections to this provision. First, it probably is unconstitutional. The government, as a war measure, can assume control of the operation of the railways while still privately owned, but that it can constitutionally retain control of their management as long as it pleases after the war seems highly improbable. Second the government ought not, as a matter of public policy, or in justice to the owners of the railroads to keep possession of the roads any longer than the war emergency and the subsequent necessary readjustment of the relations of the government and the companies make imperative.

Probably it will be both desirable and constitutional for the government to retain control for a brief period after the war. Some important readjustments doubtless will have to be made at that time. For example, the government may so control management that the operating income of many roads will become insufficient to pay their expenses, fixed charges and ordinary dividends. In that case, there ought to be some readjustment of passenger and freight rates before the government guarantee is withdrawn. But the length of time after the war the railways are to be retained by the government should be fixed in law. Perhaps a year will be required for readjustments, but it seems likely that six months will be enough.

It is unfortunate that a provision of this kind should have been put into a bill the sole purpose of which was supposed to be to carry out the President's program for government control as a war measure. The wording of the provision makes it read like a "joker" having a purpose quite different from that of the rest of the measure. It sounds too much as if it was intended to subject the owners of the railways to the necessity of making a fight to save their properties (24)

If a bill of this kind were the outcome of the President's program, it would be a "joker" of a different kind, and it would be a "joker" of a different kind.

The Wage Problem

A common contention that has prevailed since the end of the last "boom" is that the general wage movement, since the year 1900, has been simply a reaction to the excess of money in circulation, arising out of the many unproductive investments in the various industries since the middle of the century. One of General Governor McAdoo's official acts was to stop a plan of withdrawal of the amount of the bondholders of 1917, and he has a right to ask why? It will be their wages on the basis of a return equal to that for a commodity after an investment.

This will not be an attempt to get administrative out of the government. The purpose of these is to study the train employees at a time when their services are being called to the nation and when this sort of thing has been mentioned as a result of conditions created by the war. Some Mr. McAdoo will have to deal with men who have been other railway employees whose services are also essential and most of whom can show a greater need for an increase than can the better paid train employees. They also desire to set out for themselves the attitude of the government to the employer.

Aside from the effect of the increased cost of nearly all necessities of life, the government will find it difficult to refuse higher wages not only because it cannot afford the argument of the private employer that it cannot afford to pay them, but also because it must recognize the fact that many of these men cannot be retained by the railroads unless their compensation is made more attractive as compared with that offered by munitions plants and especially by the various contractors for government work who are bidding for labor.

The railroads have already been seriously injured by the loss of thousands of mechanics and other mechanics because they could not afford to pay as much as other employers. They could not do so because their own revenues were subject to a regulation which took no account of increased expenses, but now the government can raise wages so it does not and delay the cost either from taxation or by raising the rates for freight and passenger travel.

But there comes the rail. Many of the government contractors are being paid on the basis of cost plus a percentage and within certain limits the more the cost the greater are their profits. It is even said in good authority that one of the causes of the freight condition has been their indifference to demurrage charges. If the government paid more as they do, and there are available men now working for the railroads, it can then justify to other the same necessity to attract them.

The government would like to pay its employees on the basis of cost plus a percentage, but it cannot do so because the railroads and many other private enterprises for the purpose of getting in now have the same money in circulation, and the government will not be able to do so because of the increased cost of the railway equipment.

Knowledge of railroads having failed, some of the public mind is being aroused—and it is being aroused to effect the railroads' condition that is the result of the increased money in circulation. It is a matter of public policy to pay the railroads on the basis of cost plus a percentage.

C. E. Thompson, Washington, representative of the Great Railway Commission, says a bill that would increase the wages of the railroads would be a "joker" of a different kind. A wage increase would, after having been studied with care, should reach the cost of doing up a completed problem and give the second year, which is divided between the State's

fec. Just as he had congratulated himself on having performed the operation successfully his wife called to him: "John, it's twins," and hardly had the twins been properly received into the family when she called to him again. In despair John telephoned to the doctor: "Come quick, I have started something I can't stop."

Government's Fairness Calls for Loyal Response

THE GOVERNMENT is playing fair with the railways, and with their officers and employees. They should play fair, and more than fair, with it in return, and give it the most efficient service of which they are capable.

When it was announced that President Wilson intended to take control of railroad management on behalf of the Government, profound fears were felt and expressed by railway security-owners, officers and employees as to the way in which this would be done and the effects which it would produce.

It was feared that security-owners might be unjustly dealt with, and that the result would be financial disaster. The plan of compensating security-owners which President Wilson has proposed, while not generous, is not entirely unfair, and if adopted by Congress, will tend to stabilize the financial situation.

It was feared that there would be put in control of railroad management some man without railroad experience and proved administrative capacity, who would surround himself with and act upon the advice of a cabinet of transportation theorists and amateur social and economic reformers. On the contrary, the President appointed as director general of railroads a man with railroad experience who had demonstrated great administrative ability in several fields; and the director general has been getting his advice on matters of public policy chiefly from members of the Interstate Commerce Commission and on matters of railroad administration chiefly from prominent and experienced railroad managers.

It was feared that politics would influence railroad control; but politics has not yet been in evidence.

Of course, no one knows whether Congress will adopt the President's financial plan, or whether the administrative policies thus far followed by Director General McAdoo will be permanently carried out. But while railway officers opposed and dreaded the adoption of government control itself, there has not yet been anything done or officially proposed to be done under government control which has tended to justify their former apprehensions or to render it difficult for them to give unstinted loyalty and support to Mr. McAdoo.

The effects of the adoption of the fair course of the Government already are manifest. The period of greatest uncertainty and apprehension being past, railway officers, from top to bottom, are working as hard under the new form of control as they did under the old. There has been evident, recently, an impairment of official morale, the effects of which will be felt for some time; but the morale itself is being restored, and a continuance of the course which Director General McAdoo is taking will be admirably adapted to maintain it.

But something more must be done than merely maintain it. It must be improved. It must be improved because the material interests of the nation and the successful prosecution of its part in the war demand it. If the Government made a mistake in not leaving the management of the railways entirely in the hands of their own officers, then it is the duty of their officers to spare no effort to reduce the harmful effects of that mistake to a minimum. If it did not make a mistake—if the present system actually is better adapted, as a war measure, to securing good results than a system of

complete private management would have been—then it is the duty of railway officers to make the present system the most complete success possible. The demands of traffic are constantly growing; the difficulties of handling it are constantly increasing; and only by increasing the energy and efficiency with which they work can railway officers hope successfully to cope with the situation.

And in doing their work one point which it is of the greatest importance they should never for a moment forget is that, under the present system of management, every vestige of the competitive rivalries of other days must be rigorously suppressed. The one great purpose to which the Government wishes all energies directed is that of *moving the business*; and the production of evidence that railway men were using any part of their energies to hold business for the individual lines on whose payrolls they happen to be, or to get it from other lines, would do the cause of the railways great and permanent harm. So long as the present scheme of control exists all railway men must regard themselves as working for a single railroad system and do all things with the one purpose of making the operation of that single system as efficient as energy and brains and ability, and the finest co-operation and patriotism, can make it.

This is the course which the fair policy the Government is taking invites. It is the course which the selfish interests of railway men and of the railways themselves enjoin. It is the course which patriotism demands. And it is the course which, we predict, railway officers will follow from now to the end of the war with a loyalty and enthusiasm which will confound their critics, vindicate their defenders and be of inestimable value to the nation.

New Books

Railway Accounting. By Irvile Augustus May, C. P. A. vice-president, American Electric Railway Accountants' Association. Published by the Roland Press, New York. Half leather. 454 pages. Price, \$5.

This is the first authoritative and comprehensive work, so far as we know, covering street railway accounting. Mr. May, in addition to being second vice-president of the American Electric Railway Accountants' Association, is comptroller of the Connecticut Company and auditor of the Berkshire Street Railway. The sub-title of the book is really more accurately descriptive of its nature than is the title. It is more than a book on street railway accounting and is quite truly "a manual of operating practice for electric railways." Mr. May takes the system of accounts prescribed by the Interstate Commerce Commission for street railways as the basis of the various systems of street railway accounts which he touches on and then describes very clearly and in a quite remarkably interesting way the procedure required in applying the Interstate Commerce Commission's classification to actual conditions. The book is divided into three main subjects of discussion: (1) the organization of the accounting department; (2) accounting work mainly outside the comptroller's office, and (3) accounting work mainly inside the comptroller's office. There is a fourth part of the book which describes various forms which are in the nature of operating statistics. In the second part of the book there is contained a full description of methods of street railway operation. Although the main purpose of the author is to describe how the records of the company are kept, the corollary of making the operations themselves clear before the reader's mind is of almost equal importance. The book should be read by all bankers, bond buyers and salesmen who deal in public utility securities. It should be of interest also to steam railroad accounting officers and executives who are interested in street railway properties because of ownership or as a closely allied industry.

Letters to the Editor

Average Life of Ties for Valuation Purposes

ROBERT S. RIBBES

TO THE EDITOR:

The statement is frequently made by writers on valuation, that on an old, well maintained railroad, where individual ties have been replaced at the end of each one's useful life, so that the present ties are a fair mixture of old, middling, and new, the average "life remaining unexpired" of all the ties in the track at any time is equal to half the average life of ties. This statement has apparently been very generally accepted as self evident and axiomatic, and upon it is based the figure for depreciation of ties, 50 per cent, which the Division of Valuation of the I. C. C. seems to favor.

As a matter of fact, this statement is true only if every tie has the same length of life. Actually, of course, the life of individual ties varies above and below the average life. If it varies uniformly all the way from zero to twice the average, as assumed by Mr. Kruttschnitt in his letter published in your issue of December 21, the average "life remaining unexpired" is two thirds of the average life instead of one-half, and the depreciation is 33 1/3 per cent, not 50 per cent. The actual condition is somewhere between these two extremes; not all the ties will have exactly equal life, neither will their lives vary so widely as from zero to twice the average. If we assume a range of individual lives from 25 per cent to 175 per cent of the average life, then the average "life remaining unexpired" is 0.594 of the average life, and the depreciation is 40.6 per cent. If the average life of all the ties be represented by L, and the maximum and minimum lives of individual ties by L + BL and L - BL, then the general expression is:

$$\text{Average "Life Remaining Unexpired"} = \left(\frac{1}{2} - \frac{B^2}{6} \right) L$$

Values worked out from this expression for various values of B are given below:

B	Average "Life remaining unexpired"	Depreciation per cent
0.0	0.5	50.0
0.1	0.5017	49.83
0.2	0.5067	49.33
0.3	0.515	48.5
0.4	0.5267	47.33
0.5	0.5417	45.83
0.75	0.5938	40.62
1	0.6667	33.33

The correction given above may be derived in several ways and is capable of rigid mathematical proof. The following demonstration avoids higher mathematics. Assume that the average life of ties is 10 years, and that the life of individual ties varies from 0 to 20 years. Consider a single tie location and suppose it filled successively by a series of ties covering the entire range from long life to short life. In the year 1900 a 20 year tie is installed, then replaced in 1920 by a 19 year tie, in 1919 by a 18 year tie, etc. The "life remaining unexpired" is in 1900, 20 years; in 1901, 19 years, etc., falling each year until 1919, rising then to 19 years, and so on. These values, if plotted at arbitrary on a base representing years elapsed, form a series of similar right triangles having altitudes decreasing regularly from 20 to 0. The average ordinate of such a series is 1/3 the maximum altitude, or 6 2/3 years. This is the average value throughout the term of the average "life remaining unexpired," and is 2/3 of the average life which checks the value given in the second paragraph and appearing in the table for B = 1. The same result may be obtained by adding up the value of average "life remaining unexpired" for each year of the term and dividing by the number of years in the term.

Another simple line of reasoning, also, shows that the statement referred to in the opening paragraph is incorrect. Imagine a track equipped with two kinds of ties in equal quantity, having lives of 5 and 15 years, respectively, averaging 10 years. Equal quantities of the two kinds are purchased for replacements. For simplicity, ties having lives between these values are ignored. It is obvious that after a few years, more of the short life ties will have been retired than of the long-life ties, and as replacements will be made with equal quantities of long-life and short-life ties, there will come to be a preponderance of long-life ties in the track. As the long-life ties have an average "life remaining unexpired" of 7 1/2 years, and the short-life ties 2 1/2 years, and there are more of the former than of the latter, the grand average "life remaining unexpired" will be not 5, but more than 5 years.

The writer has no data on the actual range of the life of ties above and below the average life, but if even so limited a range as from 50 per cent to 150 per cent be agreed upon, (B = 5), so that the depreciation is changed from 50 per cent to 45.83 per cent, the aggregate valuation of the ties on the railroads in this country will be increased by about \$46,000,000.

ROBERT S. RIBBES

TRANS-SIBERIAN RAILWAY SEVERED.—Press dispatches report that the Trans-Siberian Railway has been severed near Irkutsk, in Eastern Siberia, where the Bolsheviks have destroyed the locomotive sheds and workshops.



British General Photograph. Copyright by Underwood & Underwood, N. Y.

A Big German Shell Has Hit the Middle of This French Supply Train

President Wilson's Railroad Message to Congress

Asks It Ungrudgingly to Protect the Security Values and Maintain Solidity of Credit Structure

URGING THE IMPORTANCE of maintaining the unquestioned solidity of the structure of railroad credit, President Wilson in his address before a joint session of the Senate and House on January 4 asked Congress to pass "ungrudgingly" and as "promptly as circumstances permit" the legislation he had promised to recommend in his statement accompanying his proclamation taking over the railroads. The holders of stocks and bonds, he said, should receive from the government an unqualified guarantee that their properties should be maintained throughout the period of federal control in as good repair and as complete equipment as at present, and that the several roads will receive under federal management such compensation as is equitable and just alike to their owners and to the general public. As a basis he suggested the average net railway operating income of the three years ending June 30, 1917. It will probably be necessary also, he said, to resort to the national treasury for funds to add to the railway equipment and extend their operative facilities, and the Secretary of the Treasury will advise with the proper congressional committees if it becomes necessary to ask for grants of money for that purpose, but for the present he asked only the guarantees and such appropriations as are necessary at the outset of the task. The administration bill providing for an appropriation of \$500,000,000 and fixing other terms for the exercise of government control was introduced later in the day.

While he emphasized the necessity for a single and unified direction of the railroads and the common use of all facilities which he thought could be obtained only under government administration, no criticism of the railroads is either expressed or implied in the message. On the contrary, the President said that it was right first to try to effect the necessary unification by voluntary action and that the railway executives who constituted the Railroads' War Board "did everything that was possible for them to do in the circumstances." The task was taken out of their hands "not because of any dereliction or failure on their part" but "only because there were some things which the government can do and private management cannot."

Under the new regime, the President asserted "nothing will be altered or disturbed which it is not necessary to disturb" and "the interest and convenience of the private shipper will be as carefully served and safeguarded as it is possible to serve and safeguard it in the present extraordinary circumstances."

The text of the message follows:

The President's Address

Gentlemen of the Congress: I have asked the privilege of addressing you in order to report to you that on the 28th of December last, during the recess of the Congress, acting through the Secretary of War and under the authority conferred upon me by the act of Congress approved August 29, 1916, I took possession and assumed control of the railway lines of the country and the systems of water transportation under their control. This step seemed to be imperatively necessary in the interest of the public welfare, in the presence of the great tasks of war with which we are now dealing. As our own experience develops difficulties and makes it clear what they are, I have deemed it my duty to remove those difficulties wherever I have the legal power to do so. To assume control of the vast railway systems of the coun-

try is, I realize, a very great responsibility, but to fail to do so in the existing circumstances would have been a much greater. I assumed the less responsibility rather than the weightier.

I am sure that I am speaking the mind of all thoughtful Americans when I say that it is our duty as the representatives of the nation to do everything that it is necessary to do to secure the complete mobilization of the whole resources of America by as rapid and effective means as can be found. Transportation supplies all the arteries of mobilization. Unless it be under a single and unified direction, the whole process of the nation's action is embarrassed.

Railway Executives Praised

It was in the true spirit of America, and it was right, that we should first try to effect the necessary unification under the voluntary action of those who were in charge of the great railway properties; and we did try it. The directors of the railways responded to the need promptly and generously. The group of railway executives who were charged with the task of actual co-ordination and general direction performed their difficult duties with patriotic zeal and marked ability, as was to have been expected, and did, I believe, everything that it was possible for them to do in the circumstances. If I have taken the task out of their hands, it has not been because of any dereliction or failure on their part, but only because there were some things which the government can do and private management cannot. We shall continue to value most highly the advice and assistance of these gentlemen and I am sure we shall not find them withholding it.

It had become unmistakably plain that only under government administration can the entire equipment of the several systems of transportation be fully and unreservedly thrown into a common service without injurious discrimination against particular properties. Only under government administration can an absolutely unrestricted and unembarrassed common use be made of all tracks, terminals, terminal facilities and equipment of every kind. Only under that authority can new terminals be constructed and developed without regard to the requirements or limitations of particular roads. But under government administration all these things will be possible—not instantly, but as fast as practical difficulties, which cannot be merely conjured away, give way before the new management.

The common administration will be carried out with as little disturbance of the present operating organizations and personnel of the railways as possible. Nothing will be altered or disturbed which it is not necessary to disturb. We are serving the public interest and safe-guarding the public safety, but we are also regardful of the interest of those by whom these great properties are owned and glad to avail ourselves of the experience and trained ability of those who have been managing them. It is necessary that the transportation of troops and of war materials, of food and of fuel, and of everything that is necessary for the full mobilization of the energies and resources of the country should be first considered, but it is clearly in the public interest also that the ordinary activities and the normal industrial and commercial life of the country should be interfered with and dislocated as little as possible, and the public may rest assured that the interest and convenience of the private shipper will be as carefully served and safeguarded as it is pos-

sible to serve and safeguard it in the present extraordinary circumstances.

Should Receive Unqualified Guarantee

While the present authority of the executive suffices for all purposes of administration, and while of course all private interests must for the present give way to the public necessity, it is, I am sure you will agree with me, right and necessary that the owners and creditors of the railroads, the holders of their stocks and bonds, should receive from the government an unqualified guarantee that their properties will be maintained throughout the period of federal control in as good repair and as complete equipment as at present, and that the several roads will receive under federal management such compensation as is equitable and just alike to their owners and to the general public. I would suggest the average net railway operating income of the three years ending June 30, 1917. I earnestly recommend that these guarantees be given by appropriate legislation, and given as promptly as circumstances permit.

I need not point out the essential justice of such guarantees and their great influence and significance as elements in the present financial and industrial situation of the country. Indeed, one of the strong arguments for assuming control of the railroads at this time is the financial argument. It is necessary that the values of railway securities should be justly and fairly protected and that the large, financial operations every year necessary in connection with the maintenance, operation and development of the roads should, during the period of the war, be wisely related to the financial operations of the government. Our first duty is, of course, to conserve the common interest and the common safety and to make certain that nothing stands in the way of the successful prosecution of the great war for liberty and justice, but it is also an obligation of public conscience and of public honor that the private interests we disturb should be kept safe from unjust injury, and it is of the utmost consequence to the government itself that all great financial operations should be stabilized and co-ordinated with the financial operations of the government.

Should Preserve Values

No borrowing should run athwart the borrowings of the federal treasury, and no fundamental industrial values should anywhere be unnecessarily impaired. In the hands of many thousands of small investors in the country, as well as in national banks, in insurance companies, in savings banks, in trust companies, in financial agencies of every kind, railway securities, the sum total of which runs up to some ten or eleven thousand millions, constitute a vital part of the structure of credit, and the unquestioned solidity of that structure must be maintained.

The Secretary of War and I easily agreed that, in view of the many complex interests which must be safeguarded and harmonized, as well as because of his exceptional experience and ability in this new field of governmental action, the Hon. William G. McAdoo was the right man to assume direct administrative control of this new executive task. At our request, he consented to assume the authority and duties of organizer and director general of the new railway administration. He has assumed those duties and his work is in active progress.

It is probably too much to expect that even under the unified railway administration which will now be possible sufficient economies can be effected in the operation of the railroads to make it possible to add to their equipment and extend their operative facilities as much as the present extraordinary demands upon their use will render desirable without resorting to the national treasury for the funds. If it is not possible, it will, of course, be necessary to resort to the Congress for grants of money for that purpose. The

Secretary of the Treasury will, I give you my assurance with regard to that very practical aspect of the matter. For the present I suggest only the measures I have mentioned and such appropriate ones as are necessary at the outset of the task. I take the liberty of expressing the hope that the Congress may grant them promptly and unreservedly. We are dealing with great matters and will, I am sure, deal with them greatly.

To Investigate Wage Demands

DIRECTOR GENERAL McADOO on January 4 arranged for a plan of settlement of the wage demands of the Brotherhood of Train Employees, after two days of conferences with their executive officers and legislative representatives.

He will appoint a committee of four to investigate the question and submit to him a report as a basis for his decision. The brotherhoods were asked to suggest to him the names of possible members of the committee. Mr. McAdoo announced the plan in the following statement:

"I have had a gratifying conference with William G. Lee, president, and W. N. Doak, vice-president, Brotherhood of Railroad Trainmen, A. B. Garretton, president, and W. M. Clark, vice-president, Order of Railway Conductors, W. S. Carter, president, and P. J. McNamara, vice-president, Brotherhood of Locomotive Firemen and Engineers, and H. E. Wills, assistant grand chief, Brotherhood of Locomotive Engineers, as to the relations of the employees to the railroads while under Government control and the demands which have heretofore been presented by some of the brotherhoods to the railroad companies. I have been impressed with the spirit of co-operation and fairness shown by the brotherhood chiefs in their discussions with me, and feel confident that an adjustment fair to the men as well as to the country will be reached.

"As a result of the discussion, I have determined to appoint a committee of four representative men, whose reputations will be a guarantee of fair dealing to all, to make a full investigation of the whole matter and report their findings and conclusions to me at the earliest possible moment. The names of the members of this committee will be announced in a few days.

"As soon as the committee makes a report the director general will render a decision which will be effective as to wages from January 1, 1918. Every employee affected by this inquiry may, therefore, devote himself unreservedly and patriotically to his work with the assurance that his rights and interests will be justly dealt with.

"This is a time of great stress, and the attitude of every employee should be determined by the supreme need of the hour—duty to his country first of all. I cannot state too strongly the necessity for devoted and loyal service by every man in this emergency. Every railroad employee is now in effect a government employee and as such in duty bound to give his best service to his country as if he were in uniform of the United States army and occupied the trenches at the front. Every unnecessary delay in a train movement vitally affects our soldiers and sailors and wounds our ability to defend our rights and our liberties. Every man whose neglect or indifference causes such delays must be responsible for the loss of the son of some noble American mother or father. It is as serious to the country for an employee to be a slacker to his work as for a man to be a slacker in the army.

The present serious emergency and actual suffering for the want of coal and other supplies will be promptly remedied and need not be entirely remedied if every employee will do his utmost in his ordinary task. In the name of patriotism

therefore, for the protection of our sons abroad and for the safety of the nation, I hope that every man, wherever placed, will do his level best. Let us who stay at home be ashamed not to be willing to make sacrifices equally as great as those our gallant sons are already making for us on the bloody fields of France."

While this plan applies only to the demands which have been presented by the conductors, trainmen and firemen, it would undoubtedly be applied also to any similar demands from other employees.

Mr. McAdoo has been informed by railroad executives that one of their greatest difficulties has been the shortage of labor due to the draft and enlistments and to the loss of men, especially machinists, to other industries that could afford to pay higher wages.

Parcel Post Routes by Motor Trucks to Be Extended

THE POST OFFICE DEPARTMENT announces that within, perhaps, the next three months motor truck parcel-post routes will be in operation in various parts of the country aggregating between 3,000 and 4,000 miles. One chain of motor routes will extend from Portland, Me., to New Orleans. Another will cover much of a large stretch of territory in Ohio, Indiana, Illinois, and West Virginia. On the Pacific coast routes will be established between San Francisco and Sacramento, Cal., via Stockton and Fruitdale, a distance of 125 miles, and between Redlands and Los Angeles, Cal., via Ontario and Pomona, Cal., a distance of 76 miles.

It is the belief of the Post Office Department that the operation of these routes and others to be established will materially aid in the distribution and in lowering the cost of food products.

The existing law does not provide for the employment of government-owned motor trucks on rural-delivery routes, nor does it require the rural carriers to use motor vehicles.

In the star-route service, however, where the mail is carried under contract, a recent law permits the Post Office Department to designate the sort of vehicles to be employed, and in awarding new contracts the department will specify that motor trucks shall be employed on all routes where the roads are such as to admit of their use. These contracts are advertised for bidders, and where payment asked for the service is deemed to be excessive the department is authorized to provide government-owned motor trucks and to employ drivers for the operation of these routes.

A further extension of the employment of government-owned motor vehicles by its adoption for the parcel-post service of the rural routes will be made whenever Congress enacts a law now pending for that purpose.

Operating under the law as it now stands as applied to the star-route service, motor-truck routes, some under contract and some operated with government-owned motor trucks, are in process of establishment from New York City to Port Jervis, N. Y., via Belleville, Montclair, and Dover, N. J., a distance each way of 86 miles; New York City to Hammonton, N. J., via Mount Olive, Bordentown, Trenton, Princeton, and Elizabeth, N. J., a distance each way of 114 miles; New York City to Easton, Pa., via Montclair, Morristown, and Somerville, N. J., a distance each way of 94 miles; New York City to New Milford, Conn., via Pawling, Yorktown Heights, Briar Cliff, and Yonkers, N. Y., a distance each way of 91 miles; New York City to Hartford, Conn., via White Plains, N. Y., Danbury, and Waterbury, Conn., a distance each way of 105 miles; New York City to Port Jervis, N. Y., via Goshen and Suffern,

N. Y., a distance each way of 84 miles; and from Philadelphia, Pa., to Easton, Pa., via Hallowell and Doylestown, Pa., a distance each way of 56 miles; Easton to Reading, Pa., via Bethlehem and Allentown, Pa., a distance each way of 52 miles; Pittsville, Pa., to Easton, Pa., via Orwigsburg and Danielsville, Pa.; Harrisburg, Pa., to Reading, Pa., via Lebanon and Robesonia, Pennsylvania, a distance each way of 51 miles, and Harrisburg, Pennsylvania, to Hagerstown, Maryland.

Routes extend from Cincinnati to Springfield, Ohio, via Dayton and Miamisburg, a distance each way of 76 miles; Portland, Me., to Nashua, N. H., via Portsmouth and Exeter, N. H., a distance each way of 105 miles; Nashua, N. H., to Hartford, Conn., via Stafford Springs, Conn., and Worcester and East Pepperell, Mass., a distance each way of 127 miles; Hagerstown, Md., to Staunton, Va.; Staunton, Va., to Roanoke, Va.; Winston-Salem to Charlotte, N. C.; Concord to Statesville, N. C.; Charlotte to Camden, N. C., Camden, N. C., to Columbia, S. C.; Florence to Columbia, S. C., via Darlington and Lydia; Columbia, S. C., to Chapin and Lexington, a distance of 70 miles and return; Charleston, S. C., to Columbia, S. C., via Somerville and Orangeburg, S. C., a distance each way of 126 miles; Orangeburg, S. C., to Augusta, Ga., via Langley and Williston, S. C., a distance each way of 77 miles; Savannah to Statesboro, Ga., via Pooler, Bloomingdale, Marlow, and Brooklet, a distance each way of 55 miles; Augusta to Macon, Ga.; Macon to Columbus, Ga.; Columbus to Montgomery, Ala.; Greenville, S. C., to Atlanta, Ga.; Atlanta, Ga., to Montgomery, Alabama, and Birmingham to Montgomery, Alabama, via Verbera and Marbury, Alabama, a distance each way of 106 miles.

With the exception of a branch between Washington, D. C., and Richmond, Va., the course of which has not yet been decided on, a chain of routes has been adopted linking Portland, Me., with Nashua, N. H.; Nashua with Worcester, Mass.; Worcester with Hartford, Conn.; Hartford with New York City; New York City with Easton, Pa.; Easton with Philadelphia; Philadelphia with Oxford, Pa.; Oxford with Baltimore, Md.; Baltimore with Washington, D. C.; Lynchburg, Va., with Winston-Salem, N. C.; Winston-Salem with Charlotte, N. C.; Charlotte with Greenville, S. C.; Greenville with Atlanta, Ga.; Atlanta, Ga., with Birmingham or Montgomery, Ala.; Birmingham or Montgomery with Jackson, Miss. Routes will be established Jackson to New Orleans, La., and Jackson to Mobile.

These routes are now surveyed and are being advertised for bids. Where satisfactory bids are not received Government-owned trucks will be used.

The routes already in operation with Government-owned trucks are from Washington, D. C., to Leonardtown, Md., a distance each way of 54 miles; from Annapolis, Md., to Solomons, Md., a distance each way of 65 miles; from Washington, D. C., to Baltimore, Md., via Ridgeville; from Baltimore to Philadelphia, Pa., via Belair, Md., Oxford, and West Chester, Pa., a distance each way of 110 miles; and from Baltimore to Gettysburg, Pa., via Westminster, a distance each way of 53 miles.

Routes in the Middle States will form a chain from Indianapolis, Ind., to Columbus, Ohio; Columbus to Zanesville, Ohio; Zanesville, to Wheeling, W. Va.; Wheeling to Pittsburgh, Pa.; Pittsburgh to Uniontown, Pa.; Uniontown to Cumberland, Md.; Cumberland to Hagerstown, Md.; Hagerstown to Staunton, Virginia; Staunton to Lynchburg, Virginia.

Further extensions contemplated but not yet surveyed are from Charleston, W. Va., to Columbus, Ohio; Columbus to Cincinnati, Ohio; Cincinnati, Ohio, to Louisville, Ky.; Louisville to Chattanooga, Tenn.; and Chattanooga to Atlanta, Ga.

A Railway's Part in Developing Western Canada



How Canadian Pacific Attracts Settlers to Its Lands; Its Methods of Increasing Agricultural Productivity

The Canadian Pacific Dam at Bassano, Alta., which irrigates 400,000 acres.

A COMPANY WHICH HAS DEVELOPED 419 "ready-made" farms, each complete with house, barn, fencing, well, and a portion of the land under cultivation; which has established 100 farms with similar improvements for veterans returning from the war; which, as a part of its loan policy for assisting settlers, has also built houses and barns on 298 farms; which has opened up as many as 60 townships in a single year, co-operating in the establishment of the necessary retail businesses and industries; which has encouraged live stock production by distributing among farmers 150 horses, 7,000 cattle, 6,900 sheep and 1,300 swine, and which in the last nine months has colonized nearly 500 bona-fide immigrant settlers upon its lands, deserves to be classed as a nation builder rather than as a transportation system alone.

The Canadian Pacific not only carries on the activities mentioned, but is the settlers' banker and teacher in agricultural science in addition. Demonstration trains, fairs, farmers' institutes and experimental farms conducted by experts all tend to keep the farmer abreast with the latest developments in agricultural methods. A loan of \$2,000 to new settlers on certain lands makes it possible for desirable farmers with limited capital to get a start on the railroad's lands. The extension of the payment for all farms over a period of 20 years also proves an attractive feature to prospective settlers of small means. In Alberta the Canadian Pacific has developed the largest irrigation project on the American continent and has also acquired what is known as the Lethbridge Irrigation District, originally developed by the Alberta Railway and Irrigation Company. Together these two tracts supply water to approximately 720,000 acres of land.

History

The history of the development of the western provinces of Canada is to a large extent a chronicle of the achievements of the Canadian Pacific. In 1871, British Columbia, then a separate British colony, joined the Dominion of Canada on the condition that a railway be built within 10 years to unite it with the eastern Canadian provinces. In 1880 the road had not been built and was not even in prospect. Finally, for a consideration of \$25,000,000 in cash and 25,000,000 acres of land in western Canada, the Canadian Pacific undertook the construction of the road which was completed in the early part of the decade. Under the terms of the agreement the railway company had the privilege

of selecting its land from the odd numbered sections within strips 10 miles wide on each side of the right of way. Subsequently it acquired other charters and subsidies with additional land. The early policy of the road was to sell land to any purchaser in any amount for prices as low as \$3 an acre, to be paid within ten years in the case of actual settlers, and within six years in the case of others. As a result considerable land passed into the hands of speculators.

Organization of Development Departments

In 1912 the Canadian Pacific organized a Department of Natural Resources for the purpose of developing the agricultural and industrial possibilities of the western provinces more intensively and scientifically. In 1916 a further organization, known as the Department of Colonization and Development, was created, and now has charge particularly of the colonization enterprises of the company. The Department of Natural Resources includes an engineering branch, which operates and maintains the irrigation tracts of the road; a townsite branch, which locates, plans and prepares townsites for the market; a coal mines branch, which operates the Canadian Pacific coal mines in Alberta and Saskatchewan; an agricultural and animal industry branch, which carries on a campaign of agricultural education among the farmers, conducts demonstration farms and trains and distributes high grade live-stock and seed among settlers, in some cases on easy terms of credit; and a forestry branch, which stimulates the growth of trees on the prairies, patrols the valuable timber holdings of the company, supervises the company's lumbering operations, and plants trees along the right of way for wind breaks. The Department of Colonization and Development includes an industrial branch, which attracts manufacturers, wholesalers and retailers to the towns and cities of western Canada; a publicity branch, devoted to the dissemination of information about western Canada, particularly as to the opportunities which the cheap lands of the Canadian Pacific afford to new settlers, and an organization which aims to come into personal contact, through agents and representatives, with the prospective settler, assisting him with information and advice, and actually accompanying him to the land of his choice.

Work of the Departments

A railroad's main function is to carry passengers and freight, and likewise its revenue is dependent upon the volume of traffic it handles. Both in the United States and

Canada, railways have literally created the traffic they desired by extensive development of unsettled country. This has involved conducting propaganda to induce settlement along railways, financial and practical assistance to settlers in their pioneering days; and the creation of industries to employ surplus labor and provide a market for the farmers' products. The Department of Natural Resources and the Department of Colonization and Development on the Canadian Pacific constitute a most comprehensive organization for the achievement of these ends. For colonization purposes the road formerly had some 4,000 agents in Canada, the United States, Great Britain, Holland, Belgium and the Scandinavian countries to promote immigration to the western Canadian provinces. At the time the war commenced the influx of settlers to Canada dropped off to a marked degree and a reduction was made in the staff of agents. Despite the obstacles created by the world conflict, the work of the Department of Colonization and Development has been prosecuted vigorously, with special attention to districts where the best results can be obtained. The emigra-

cash of 10 per cent. of the list price is required of all purchasers, and settlement for the balance, with interest at 6 per cent., is extended over 19 additional years. The payments are so arranged that the settler pays no more principal until the fourth year, and if he carries out certain settlement duties, he is allowed a rebate of part of the interest for the first and second years. Those desiring to do so are permitted to repay their indebtedness or settle for the entire amount at any time before the expiration of the 20 years following the purchase. Applicants must, directly or through authorized agents, make a personal inspection of the land they propose to buy. All minerals contained in the property, including gas and petroleum, are reserved by the company.

Purchase of Land Without a Loan

Purchasers of land without a loan are required to enter into occupation within six months from the date of purchase and must undertake the construction of a house costing at least \$350, and a barn costing not less than \$200 and capable of accommodating four horses and four cows. Settlers must



Canadian Pacific Demonstration and Supply Farm, Strathmore, Alta.

tion from the United States to Canada this year has been larger in the percentage of practical farmers than ever before experienced by the Canadian Pacific.

How Land Is Sold to Settlers

The first step in a colonization campaign is to acquaint the prospective farmer with the various conditions under which he can acquire land from the railway or the provincial governments. For this purpose the Canadian Pacific issues detailed pamphlets and bulletins from time to time. The road sells most of its land in accordance with the provisions of four plans: (1) The sale of land for settlement without a loan; (2) the sale of land for settlement with a loan for improvements; (3) the sale of "ready-made" farms; and, (4) the sale of land to veterans of the war. According to the general conditions covering the disposition of land under all of these plans, no land may be bought except by bona fide settlers. Under the first plan as much as two sections, 1,280 acres, may be sold to one purchaser; when a loan is provided not more than 320 acres. An initial payment in

insure their buildings against loss from fire and must sink a suitable well, fence the land, and break and crop a portion of each quarter-section. During the entire period of occupancy each purchaser must undertake to keep at least three milch cows. Instead of cultivating the land, the purchaser may agree to maintain on the property a certain number of horses, cattle, sheep or hogs, which must be his unencumbered property.

Sale of Farm With \$2,000 Loan

The sale of land with a \$2,000 loan for improvements has recently been limited to irrigated lands in parcels not exceeding 320 acres per application. Applicants for lands under this plan must be married men having agricultural experience and must have sufficient capital to enable them to pay the first installment of 10 per cent. of the purchase price, in addition to an amount sufficient to maintain their families for one year after occupying the land. They are also required to own or purchase, free from encumbrances, sufficient horses, cattle and other live-stock, to enable them to develop their

property. Following the acceptance of an application, the company undertakes the erection of a house, a barn, the fencing of the farm and the digging of a well. Not more than \$1,000 may be expended for these improvements, including a charge for supervision of 5 per cent of the amount expended. The amount of the loan is added to the purchase price of the land and is to be repaid in installments extended over 20 years. The character of the house and barn to be erected on the farm may be selected by the applicant from various standard plans provided by the company. A purchaser is required to occupy the land with his family within six months after the completion of improvements and must reside there continuously for five years, during which he must cultivate certain portions of each quarter section. He must also maintain during that time at least three milk cows for each quarter section and must insure the buildings against fire. Under the farm loan scheme, 298 farms have been equipped with buildings up to October, 1917.

Ready-Made Farms

In 1909, the Canadian Pacific inaugurated an improved farm policy. During that year a number of farms were

There will be only a limited number of improved farms available, but land to an almost unlimited extent can be provided under the limited colonization scheme. Under this plan farms must be selected by the intending colonist and then improved by him with assistance from the company in the way of advances of building and fencing material, live stock, implements and seed grain. Both plans provide easy terms of payment for land over long periods, as well as direct financial aid at fair rates of interest if desired in the first year of occupation. Applicants for these lands must be married men, physically fit and of good moral character, who can produce proof of having been an active seaman in the Canadian army or the British army or navy, and who have had experience either as farmers or farm laborers.

In certain districts the company still has land which is sold without requiring the purchaser to settle thereon. When land is sold without settlement conditions, payment is extended over a period of 10 years only.

Improvements Made by Development Branch

In addition to constructing 235 buildings on farm loan lands in 1917, the first year after the adoption of the loan



House, Barn and Well on a "Ready-Made" Farm

equipped with a house and barn, a well and a fence enclosing the property. In addition, 50 acres on each were broken and seeded to crops. In the following year a contingent of British farmers were personally conducted by the company's agents from Great Britain and located on these ready-made farms. Under this arrangement a settler may proceed to earn an income on his farm as soon as he occupies it. The farms are sold on a 20-year-payment basis under the terms of which the price of the improvements is added to the price of the land. At first this type of farm was established only in Alberta, but the policy has been extended to include Manitoba, Saskatchewan and British Columbia.

Farms for Returned Soldiers

The Canadian Pacific also has prepared plans designed to encourage returned soldiers to take up farms. The lands set aside for this purpose are of two kinds, improved farms and "assisted colonization" farms. The former are included in selected colonies with distinctive military names, which have been improved by the erection of a house, a barn and fences, the cultivation of a certain area of land, and the provision of a water supply. Each colony will contain a central control farm in charge of a superintendent, who will supervise the work of all colonists. Central control farms will be used for purposes of demonstration and as supply depots for male live-stock, and for implements to be used by the colonists in common, as follows: One drill, one mower, one binder and one rake for three farms.

farm policy—the development branch did the following work in the interests of settlers:

- 274 miles of fencing erected
- 128 wells drilled, at a maximum depth of 1,000 ft., average 450 ft., many wells the first 100 ft. being 100 ft. deep
- 2,340 acres cleared
- 8,480 acres of virgin soil broken
- 6,000 acres planted to a crop
- 26,500 acres harvested
- 18,000 miles laid out
- 5,800 acres seeded
- 2,000 acres harvested
- 117 houses built
- 117 barns, 1 pigsty, and 1000 chickens, fruit of settlement scheme

On company demonstration farms 11 houses, 14 barns, 12 piggeries, 11 poultry houses and 12 dairies were built, while five wells were drilled and two windmills erected.

In 1916 the development branch of the department erected under its loan policy, 16 houses, eight barns, five gristmills and five chicken houses, put up 17 miles of fencing, sunk 12 wells, constructed one concrete dam and irrigated 500 acres. In addition, the following improvements were undertaken in connection with the farms being prepared for returned soldiers: 170 houses, 100 barns, 2 implement sheds, 190 miles of fencing and 25 wells. The major part of this work was completed in 1916 and the balance in 1917. Arrangements are now being made to install systems on 75 of these farms, which will be supplied with irrigation water. Twenty-five of these systems have been completed.

To encourage the raising of live-stock the Department of Natural Resources, under certain conditions, grants users

of land in the irrigated districts by advancing stock of a value not exceeding \$1,000, on a cash payment of 20 per cent. This loan is made at the discretion of the company's superintendent of agriculture and animal industry and only to settlers who have occupied their land at least one year. So far over 15,000 head of cattle, horses, hogs and sheep have been distributed in this manner.

This policy, together with a continuous campaign of education since 1904 emphasizing the importance of mixed farming, has greatly increased live-stock production in the western provinces. In 1916, the number of cattle in Manitoba and Saskatchewan was twice what it was ten years previously. Contributing to this result was the company's practice of bringing in heifers and selling them at cost as well as granting reduced rates on the transportation of heifers and thoroughbred animals of all kinds. Other factors include the furnishing of pure bred bulls free to the farmers, prize competitions in steer feeding and educational guidance through lectures on animal husbandry in demonstration trains, fairs and farmers' institutes.

For many years the Canadian Pacific has been encouraging the use and cultivation of better grades of seed. It early secured the co-operation of the Dominion and provincial governments, offering to furnish demonstration trains and free seed for the farmers if the governmental agricultural departments would supply lecturers. The Dominion government also established seed fairs throughout the Northwest. Alfalfa and timothy seed, carefully selected by the company's own experts, are sold by the Canadian Pacific on two years' credit without security other than ordinary promissory notes. Seed grain is still frequently supplied to beginners with a crop mortgage as security. The road co-operates as far as possible with government and local organizations to eradicate weed pests.

In line with its policy to extend agricultural education through the medium of exhibits at fairs and conventions and on demonstration trains the Canadian Pacific this year in-

The statistics for Alberta are as follows: Acreage of wheat, 63,391 in 1903; 1,563,700 in 1915; yield of wheat, 1,200-598 bu. in 1903; 51,355,000 bu. in 1915; acreage of oats, 51,929 in 1899; 1,912,000 in 1915; yield of oats, 2,189,441 bu. in 1899; 107,741,000 in 1915.

Live-stock production has likewise shown marked increases in the western provinces. In Manitoba the total number of horses, cattle, sheep and swine increased from 422,000 in 1899 to 886,956 in 1917. The record for Saskatchewan is even more enviable. The number of horses increased from 83,500 in 1901, to 678,965 in 1917; milch cows increased from 56,400 in 1901 to 229,142 in 1917; other cattle from 160,600 to 573,411; sheep from 73,100 to 149,418, and swine from 27,800 to 284,316. Similar results



View of "Ready-Made" Farm Buildings

have been achieved in Alberta, and there are now 590,245 horses, 193,851 milch cows, 721,067 other cattle, 262,675 sheep and 185,074 swine in that province. Since 1914, however, the number of swine in the three prairie provinces has steadily decreased from 1,038,102 to 580,162, in consequence of the heavy export demand. Because of its physical characteristics, agriculture in British Columbia has been confined largely to fruit culture, to dairying and to poultry raising.

The great increase in agricultural production which has taken place in the Canadian provinces naturally has been reflected in increased traffic for the Canadian Pacific. In fact, the motive for conducting so intensive a campaign to induce settlement and stimulate agricultural activity is to secure new business for the road.

Irrigation Tracts

The Canadian Pacific has two large irrigation tracts in Alberta, the land of which it is disposing of to settlers. The Lethbridge tract is the pioneer irrigation undertaking on a large scale in western Canada. It was started in 1900 and was acquired by the Canadian Pacific from the Alberta Railway & Irrigation Company in 1912. It draws an un-failing supply of water from the St. Mary river, which is fed by the snows and glaciers of the Rocky mountains. Canals totaling 115 miles in length serve an area of about 100,000 acres. The tract is well situated with reference to transportation. One railway line connects Lethbridge, Alta., with the international boundary and other lines traverse the center of the district and extend through the westerly portion.

The company's other irrigation tract is the largest individual project of its kind on the American continent. It contains about 3,000,000 acres served by two separate water systems, the oldest of which is in the western part of the block. Water for this section is diverted from the Bow river at a point just inside the eastern limits of the city of Calgary. Main and secondary canals and distributing ditches, totaling 1,600 miles in length, supply water to approximately 220,000 acres. Construction of this system was commenced in 1903 and completed in 1910, and the first water was used in 1907.

The eastern part of the block is served by a great dam at Bassano, Alta., which was begun in 1910 and completed in



Creamery at Demonstration and Supply Farm, Strathmore, Alta.

stalled exhibits at Calgary, Alta.; Brandon, Man.; Regina, Sask.; Toronto, Ont.; Sherbrooke, Que., and Quebec, Que.

Results of Efforts to Develop Agriculture

The statistics of grain production for the western provinces indicate what fruitful results have been achieved through the efforts of the Canadian Pacific and governmental agencies. In Manitoba, the acreage of wheat increased from 260,842 in 1883, to 3,094,573 in 1915 and the yield from 5,686,355 bu. to 62,683,000 bu. The acreage of oats increased from 215,431 to 1,314,846 and the yield from 9,478,964 bu. to 50,695,000 bu. In Saskatchewan the wheat acreage in 1899 was 328,459 and in 1915, 6,838,500, whereas the yield in 1899 was 6,083,508 bu., as compared with 195,168,000 bu. in 1915. In the same province the acreage of oats increased from 83,465 in 1899 to 2,937,000 in 1915, and the yield from 2,518,248 bu. in 1899 to 157,628,600 bu. in 1915.

1914. The dam diverts water from the Bow river into the main canal which is five miles in length and feeds 475 miles of secondary canals and over 2,000 miles of distributing ditches. The system supplies water to about 400,000 acres. Both the eastern and western sections of the block contain more or less equal proportions of irrigable and non irrigable areas. The non irrigated land has a low rainfall but is not arid. The average annual precipitation at Calgary, just west of the block, is 16.4 in., and at Medicine Hat, 30 miles east of the eastern boundary of the block, 10 in. The land, if thoroughly soaked in the fall, holds the water well, producing a crop the following year even in a dry season. The non-irrigated land furnishes excellent range for live stock and as it often lies in the same quarter section with irrigated areas, makes mixed farming profitable. All water legislation is enacted by the Dominion parliament rather than by the provincial legislatures. The water rate for all irrigated land ranges from 50 cents to \$1.25 per acre annually. The actual application of the water to the land is done by the farmer at a cost which rarely exceeds 50 cents additional.

Development of Townsites

The development of new agricultural communities carries with it the creation of cities and towns, where mercantile businesses and industries spring up to serve the wants of the farmers. The Canadian Pacific has endeavored to assist in the location of tradesmen, jobbers and manufacturers in the Canadian West without stimulating the development of city and town life beyond the needs of the rural communities. Before the war the townsites branch of the Department of Natural Resources laid out and opened up as many as 60 to 70 new townsites in a year. Since its inception in 1910, the industrial branch, the province of which is to attract urban settlers to Canada, has located some thousands of new retail businesses, and a large number of wholesale businesses, and manufacturing plants in the western provinces. The branch issues bulletins periodically indicating specifically the opportunities in the various cities and towns on the Canadian Pacific. These bulletins have been instrumental in bringing to the branch an annual average of between 3,000 and 4,000 inquiries, by letter, from prospective settlers. There was a sharp falling off in sales of townsites property in 1915, but there has been a marked revival since then. Sales in 1916 were double those of 1915, and sales in 1917 promise to be twice as large as those of 1916.

Coal and Timber Development

The forestry branch of the Department of Natural Resources stimulates the growth of trees on the prairies—conducting prize competitions to that end—patrols the timber properties of the railroad, takes measures to prevent forest fires, plants trees along the railway lines for windbreaks to replace old wooden snow fences and has charge of ornamental gardening at the railway stations. At Wolseley, Sask., it operates nurseries and at Bull River, B. C., runs the company's lumber mill, from which are obtained ties, poles, piling and other timber suitable for railway construction work.

The coal mines branch operates the company's mines, three of which are in Alberta and one in Saskatchewan. The Canadian Pacific mine at Bankhead, Alta., is the only anthracite mine being worked in the Dominion of Canada. The mines have a capacity of 4,000 tons of screened and washed coal daily.

MINERAL PRODUCTION OF ALASKA IN 1917 OVER \$41,000,000.—In 1917 Alaska produced minerals valued at \$41,760,000. These are the advance figures issued by the United States Geological Survey, Department of the Interior, and are based on estimates made by G. C. Martin. The value of the mineral output of Alaska in 1917, although about \$6,870,000 less than that in 1916, was greater than that in any other year.

Condition at Various Terminals on January 1

THE CONDITIONS AT THE RAILROADS AS INDICATED BY THAT of some of the more important western roads at the time the government took over the road, as indicated by the following summary of reports received in Commissioner McHard of the Interstate Commerce Commission at of January 1 from inspectors assigned to the work for the information of the director, listed as follows:

Pennsylvania Lines at Pittsburgh report no congestion on Conemaugh division, some trouble at Union. It could handle today twice the number of cars if connecting roads could take them, normal movement, 4,000 cars, moved 2,918 up to 1.01 a m. December 31, on hand 12,010 cars, December 31, 2,847 cars, reduction, 1,000 at 11 hours. At 6 a. m., December 31, Pennsylvania was holding the Line West 2,600 cars (an increase from Saturday of 100 cars).

The empty car situation is as follows: Commercial yard cars for Pittsburgh district, none; Conemaugh division, 50 per cent; Monongahela division, 10 per cent.

Pennsylvania Lines at Pittsburgh report Conemaugh yard badly congested; working capacity of yard is 6,000 cars; total cars on hand 6,379, of which 1,744 are load order cars. There were despatched in 24-hour period ending midnight, 30th, eastbound, 773 cars, westbound 913 cars. The westbound movement was 1100 cars below normal. There were received during the same period 1,466 cars. On hand for other Pennsylvania divisions, 1,960 cars; westbound cars on hand, 2,476 which is 5 per cent above normal, 825 of westbound cars were coal.

There were 32 locomotives at the terminal, none of which were O. K. for service. The coaling machine was out of service nine hours on the 30th. Other Pennsylvania divisions were holding 1,870 cars for other yards. The congestion at this point is charged by officers to lack of motive power and inefficient help.

Pittsburgh & Lake Erie advises general condition improved. Five thousand one hundred and nine cars were moved in 24 hours, which is 64 per cent of normal.

Baltimore & Ohio: Has 593 cars of slag on hand. Interchange better than day before. Eastbound freight is accumulating in yards and is being sent over the B & O.

Baltimore & Ohio, Cumberland Division: Brunswick, Cumberland and Keyser, which are the three principal yards on this division are badly congested. At 4 p. m., December 31, Brunswick had approximately 1,200 east-bound loads on hand; Cumberland, with an east-bound working capacity of 700 cars, has on hand 1,041 loads; Keyser, with an east-bound working capacity of 700 cars, has on hand 900 loads, set off between Keyser, Cumberland and Brunswick for points via Brunswick, 1,520 loads, for High Valley and Central of New Jersey railroads via Western Maryland and Cumberland Valley, 268 loads, not including 106 Cumberland Valley loads held at Cumberland and 165 at Keyser; there is also set off on Western Maryland between Hagerstown and Rutherford, 170 loads and on the Cumberland Valley line between the interchange point with the Baltimore & Ohio at Cumber and Shippensburg, 264 loads. The Philadelphia & Reading took from the Cumberland Valley one train and from the Western Maryland two trains, a total of 120 loads on the 31st.

There is set off on line of the Baltimore & Ohio between Connellsville and Cumberland and held at the mine on the Connellsville division, 1,442 loads. Forty-seven of the loads via Cumberland Valley set off east of Cumberland are for government work, 18 of them being copper for Jersey City.

About 800 of the loads set off between Keyser and Brunswick are coal. The congestion on this part of the B & O of loads via Rutherford gateway was caused by Central of New Jersey enlarging against Philadelphia & Reading on all terminal ties except fuel coal, perishable freight and Bethlehem

Steel Company's coal on December 17, and the Lehigh Valley issuing a similar embargo on December 24, and both roads embargoing against everything except live stock and perishable freight on December 28.

Philadelphia: Baltimore & Ohio at East Side from midnight until 7:25 p. m. moved west 126 loads, or five trains. The normal movement west is 18 trains each 24 hours. During the same period Philadelphia & Reading moved east three trains, a total of 58 loads. The total cars at East Side at 5 p. m. were 990. Eastbound loads, 141; west bound loads, 364, 65 of which were hard coal for Wilmington, Baltimore and Washington and west.

Seven Baltimore & Ohio and one U. S. locomotives out of service, frozen up. Fifteen additional Baltimore & Ohio locomotives out of service for repairs; the master mechanic states he will be unable to touch them for at least 15 hours on account of shortage of skilled labor.

Seranton: Erie Railroad. 375 cars moved in 24-hour period ending 5 a. m. 31st. 416 cars coal awaiting movement, due to lack of power, caused by poor housing of engines and zero weather.

Delaware, Lackawanna & Western. Moved 67 trains east and 59 trains west, handling 3,251 loads, 1,072 empties. Nothing held either for power or crews. Movement slow on account of zero weather. Seven crews tied up because of long hours.

Washington, D. C.: At 8.00 a. m., December 31, 1917, the Pennsylvania Railroad had in all yards for unloading 666 cars; was holding out 174 cars account no room; on hand, having been placed for more than 48 hours, 378 cars, of which 165 were for the Government, 143 having been placed in the Navy Yard. It had on hand for movement in Potomac and Benning's Yards, 785 loads and 684 empties, of which 150 were empty coal cars. With respect to the coal situation, there were in the Pennsylvania Avenue Yard 13 cars of bituminous coal and 1 car of anthracite coal, consigned to local retail dealers, received as follows:

12 cars bituminous coal,	December 25, 1917
1 car bituminous coal,	December 26, 1917
1 car anthracite coal,	December 26, 1917

The Baltimore & Ohio, at 8.00 a. m., December 31, had 207 loads placed for unloading, of which 85 were coal; 85 other loads in train yards not placed, account no power; 27 cars held up 48 hours or longer, of which 9 cars were for the government. It had on hand for movement 258 loads

and 300 empties, including 97 empty coal cars which had been on hand more than 24 hours. There was a shortage of power, in both road and switching service. On neither the Pennsylvania nor the Baltimore & Ohio were any cars for Washington proper being held out on line of road.

New York, New Haven & Hartford: On December 28 the New Haven received at interchange points 1997 cars and delivered 1934 cars. Total cars on line for transit movement all directions same date 18,688 cars, of which 9,119 moved. This movement represents what has been done for several days past, namely about 50 per cent.

December 31 at 5 p. m. there was on hand awaiting movement all directions 11,915 cars, of which 6,439 are east and 5,476 westbound. Principal points where cars are being held are Harlem River, Bridgeport, New Haven, Hartford, Waterbury, Maybrook, Providence, Midway. Worst congested points are Waterbury, Harlem River, Maybrook, Hartford and New Haven. Car movement very slow. Of 1,081 engines assigned various divisions, 303 in shop for repairs. Power badly needed; also shortage of material for repairs, as records indicate engines leaving terminals without proper repairs, causing delays en route.

At 7 a. m. 31st, there were no engines ready for service at New Haven, Westfield, Hartford, Springfield, Waterbury, Danbury, Willimantic or Worcester. Will be ready in twelve hours—New Haven 5, Westfield none, Hartford none, Springfield none, Waterbury 2, Danbury 2, Worcester none. Of 60 engines assigned road freight service Hartford division 22 are in shops. Hartford and Springfield short switching and road power, also crews. Hartford short ten road and three switching crews.

Summarizing, the worst conditions reported so far are on the New York, New Haven & Hartford, the Pennsylvania Lines West at Pittsburgh, on the Connellsville and Cumberland Divisions of the Baltimore & Ohio and on the Western Maryland and Cumberland Valley railroads. On the New Haven railroad the principal difficulty appears to be the shortage of power, due to a large number of engines in the shop and shortage of both men and material to make repairs. The congestion at Conway yard at Pittsburgh is due to shortage of power and inefficient help. The congestion on the Western Maryland & Cumberland Valley and in a measure on the Connellsville and Cumberland divisions of the B. & O. is due to embargoes, but we have not yet obtained a check of the condition of power.



Canadian War Photo

Canadian Railway Troops Bolting Rails to Metal Ties in France



A Concrete Roadway System in a Shop Yard

Description of New Concrete Walks Built by the Santa Fe in Store House and Shops at Topeka

By Charles E. Parks

Assistant Editor, The Santa Fe Magazine, Chicago



IN ORDER TO FACILITATE the handling of material and supplies in the shop yards of the Atchison, Topeka & Santa Fe at Topeka, Kan., this company has constructed approximately two and one-half miles of concrete roadways connecting all the principal shop buildings, warehouses, storehouses, lumber yards, car sheds and unloading and storage platforms within the shop enclosure. The Topeka shops of the Santa Fe cover 120 acres of ground and are the largest on the system, containing all the principal repair shops of the company for the repairing and manufacturing of all classes of equipment and also the main storehouses and storage platforms, lumber yards, etc.

Prior to the construction of these concrete roads the trucking and hauling of all storehouse supplies to and from the storehouses and shops and the transporting of material between the different shops was done by teams under contract and by electric trucks over dirt and cinder pathways. Much hauling also was done by push-cars and switch engines. However, all of these methods were costly expedients.

The cinder roads had been built to permit the operation of power-propelled vehicles in order to displace the slow and expensive handling by ordinary hand trucks. However, they did not prove entirely successful as only a small percentage of the traction power of the electric trucks in service could be utilized, even when the roads were in good condition. At times they were impassable for the trucks, resulting in great inconvenience and delay. The hauling by switch engines of material in box cars was necessarily costly, particularly when it was necessary to handle a car three or more times, resulting in heavy switching charges, delay to cars and other expense connected with the intermittent moving and unloading.

Before the construction of concrete roadways was finally authorized an exhaustive study of hauling and trucking conditions was made. This study included a series of tests with an electric truck, the object being to determine the difference in power necessary to start and pull a loaded truck with and without trailers over earth, oiled cinders, wood, metal and concrete roadways.

The Test Conditions

The electric truck used in these tests had a capacity of 4,000 lb. and weighed 2,220 lb. It was equipped with rubber tired wheels, 15½ in. in diameter and a 3-in. tread. The battery of the truck consisted of 24 cells, Edison Type A-6, showing 31 volts at a normal discharge of 45 amperes, or about 1.2 volts per cell.

The trailers referred to in the table as Nos. 1, 3 and 4 weighed 385 lb., trailer No. 2 weighed 401 lb. and differed

from the others in that it had ball bearings on the front wheel pivots and roller bearings in the rear wheels. The diameter of the front wheels of all the trailers was 20 in. with a 2½-in. tread, while the rear wheels were 18 in. in diameter with a 3½-in. tread.

The power used by the truck was indicated by volt and ammeter readings obtained by volt and ammeter placed on the truck. The pull required to move the trailer was determined by placing traction dynamometers between the truck and the different trailers. Before testing, the truck and trailers were each loaded with ten keps of bolts and nuts, making a 2,000-lb. load on each.

Test No. 1 was made with the unloaded truck and the trailer loaded with 2,000 lb. of bolts and nuts on a cinder road. To start the truck required 600 lb. of tractive force, and to keep it moving at a speed of three miles an hour required 250 lb. of tractive force. It was necessary to give some assistance to the truck in starting, the wheels slipped badly and it did not handle the load satisfactorily.

Test No. 2 was made with the unloaded truck and trailer No. 2 loaded with 2,000 lb. of bolts and nuts. This was the roller bearing trailer and it required 500 lb. of tractive force to start the truck from rest and 225 lb. to keep it moving at a speed of three miles an hour. As the truck was empty it did not handle the load satisfactorily.

Test No. 3 was made with the truck loaded with 2,000 lb. of bolts and nuts and trailer No. 1, with a similar load, on a cinder road. This road was level and the cinders oiled, the same conditions prevailing in conducting tests Nos. 1 and 2. The tractive force necessary to start the load from rest was 670 lb. and to keep it moving at a speed of three miles an hour, 250 lb. The truck handled the trailer without slipping but it tended to stall several times after starting, indicating that 4,000 lb. net weight was the maximum load which it could handle on the cinder road.

Test No. 4 was similar to No. 3, with the exception that trailer No. 2 was substituted for trailer No. 1. It required a tractive force of 500 lb. to start the load and 225 lb. to keep it moving, the difference being due to the roller bearings in the trailer.

In test No. 5 trailer No. 1 and 2 were attached to the front truck but it could not move the load on the cinder road.

Test No. 6 was similar to No. 5 with the exception that the truck was loaded with 2,900 lb. of bolts and nuts. However, the load could not be moved, proving that the former conclusion that 4,000 lb. was the maximum load which the truck could handle on a cinder road was correct.

Test No. 7 was conducted on a level concrete road with

the loaded truck, to which was attached the four loaded trailers. The tractive force necessary to start this load from rest was 800 lb. and to keep it moving at a speed of three miles an hour required 250 lb. The 10,000 lb. net weight was moved satisfactorily with about one-half the power used to move 4,000 lb. over the cinder roadway. The ammeter reading in this test was 103 to start and 72 to pull, volts, 22 to start and 26 to pull. In test No. 3 the ammeter readings were 220 to start and 160 to pull; volts 22 to start and 26 to pull.

Test No. 8 was conducted on a ten per cent concrete grade 40 ft. long. Trailer No. 1 was attached to the loaded truck and started up the grade but it stalled when half way up. The ammeter reading was 200 just as the motor stalled, and the volts 12.

In test No. 9 the loaded truck was started up the ten per cent concrete grade alone. It moved up satisfactorily with its 2,000 lb. load. The amper reading was 140; volts 18.

The remaining tests were made with single trailers to determine the pull necessary for handling them. This was determined by pulling them by hand, using a spring bal-

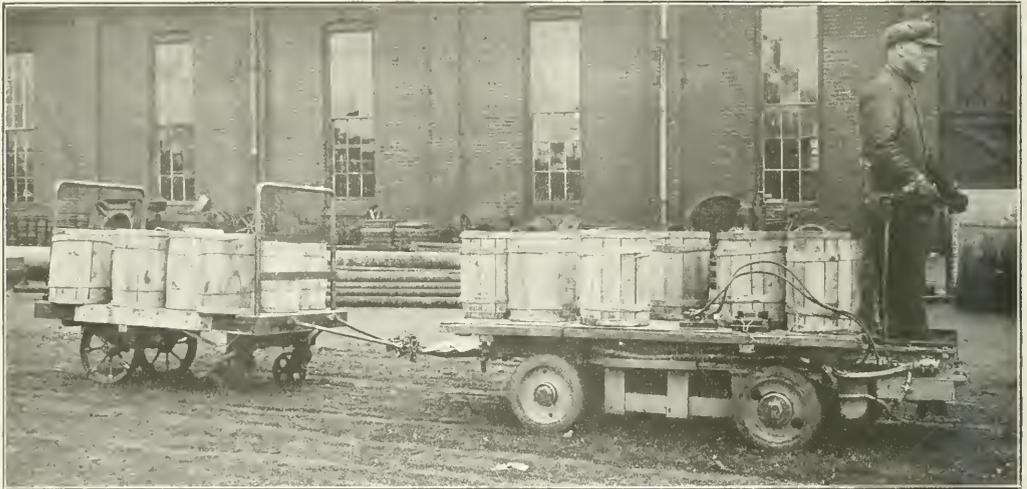
The following table shows the power used by the truck in conducting the various tests.

Test No.	Road	Attached loaded trailer	VOLTS		AMPERES	
			Start	Pull	Start	Pull
3	Cinder level	No. 1	22	26	220	160
4	Cinder level	No. 2	22	26	220	160
7	Concrete level	No. 1, 2, 3, 4	22	26	103	72
8	Concrete 10% grade	No. 1	..	12*	..	200*
9	Concrete 10% grade	None	..	18	..	140

*Readings taken just as motor stalled.

Results

These tests indicated the great advantage of concrete over cinder roads. On the latter the small front pivoted pedestal wheels of the trailers dug into the road, requiring heavy starting effort. This was especially true when the load was turning. Even on tangents the load presses these small wheels a considerable distance into the road so that they tend to slide rather than roll, requiring more power to pull the trailers on cinders than on concrete. This difference is seen by comparing tests No. 3 and 4 with No. 7, where it took less power at the motor and also less pull at the draw-



Dynamometer Test with an Electric Truck on a Cinder Road. Dynamometer on Drawbar and Volt and Ammeter on Truck

ance to register the pull. Trailer No. 1, having common bearings, and trailer No. 2, having roller bearings, were used in the tests which were conducted on concrete, wood and metal roadways. A comparison of the tractive force necessary to start and pull these trailers is shown on the table.

The following table gives a summary of the results obtained in the tests conducted:

SUMMARY OF TRACTIVE FORCE NECESSARY TO START AND PULL TRUCK AND TRAILERS IN THE TESTS DESCRIBED IN THE TEXT

Test No.	Road	Load on truck in lb.	Attached loaded trailers	Tractive force in pounds	
				Start	Pull
1	Cinder	.....	No. 1	600	250
2	Cinder	.....	No. 2	500	225
3	Cinder	2,000	No. 1	600	250
4	Cinder	2,000	No. 2	500	225
5	Cinder	.....	No. 1 & 2	Could not start load	
6	Cinder	2,000	No. 1 & 2	Could not start load	
7	Concrete	2,000	No. 1, 2, 3 & 4	800	250
8	Concrete	2,000	No. 1	Stalled when halfway up	
9	Concrete	2,000	None	Pulled up satisfactorily	
10	Concrete	Hand power	No. 1	90	35
11	Concrete	Hand power	No. 2	60	30
12	Wood	Hand power	No. 1	165	85
13	Wood	Hand power	No. 2	120	60
14	Metal	Hand power	No. 1	95	45
15	Metal	Hand power	No. 2	85	35

bar to move the loaded truck and four loaded trailers on concrete than it did to move the loaded truck and one trailer on the cinder road. This was shown more strikingly when it was observed that it took a steady pull of 225 to 250 lb. to handle one trailer on the cinder road and only 30 to 35 lb. to handle it on the concrete floor. Comparing trailer No. 1, which has common bearings and trailer No. 2, which has roller bearings, the data show that it takes approximately 20 per cent more power to start and pull the former than it does the latter.

The final result of these tests showed that an electric truck could handle only a small percentage of its full tonnage when used on dirt or cinder roads, even when these roads were in good condition, and clearly indicated the great advantage of concrete roads over wood, metal and especially oiled cinders, the truck handling four to five times as large a load at a smaller power output on the concrete roads than on the latter.

Concrete Highways

In view of these conclusions the Santa Fe decided that greater economy would be effected by building a system of

concrete roads on the shop and storehouse premises. Accordingly, 12,979 ft. of these roads were constructed, practically surrounding the yard and connecting all the principal buildings, storage areas and unloading platforms.

These highways vary in width from 5 to 12 ft., 10,705 sq. yd. being of 12 ft. width and 5,490 sq. yd. of 8, 6, 8 and 10 ft. widths, a total of 14,198 sq. yd. of concrete being used. In addition 89 railroad crossings—71 12 ft. wide and

to the flange-way are on the average 14 ft. wide. On the main line crossings there are roads to a single track of 4 ft. by 14 in. by 2 in. in section, the bottom leg resting upon the concrete tie beam and the outer edge against the web of the rail. The ankle bar is bolted to the top by bolts driven through holes drilled in the lower leg. On side track crossings the construction is a width of concrete. After the angle iron for the flange-way has been anchored the concrete is run to a surface even with the top of the rails. Angle irons also are imbedded in the concrete on the sides and termini of the roads at places where the concrete is liable to be injured by constant trucking to and from shop buildings.

Expansion joints are placed every 10 ft. Between these are placed two strips of tarred paper, held in place by steel plates which were removed when the concrete had been placed 10 ft. in advance of the joint. The 12-ft. roads are reinforced with 1/2-in. rods placed along each side and running the entire length of the roads and 1/4-in. bars placed crosswise every 30 ft., or at the end of each expansion joint. The roads 10 ft. or less in width are not reinforced. Standard portland cement meeting the specifications of the American Society of Testing Materials was used in the work, the fine aggregate being clear sharp sand taken from the Kaw



A Converted Ford Truck Hauling Trailers Loaded with Heavy Materials

is less than 12 ft.—were bridged. In connection with the work 300 ft. of new track was laid and 1,027 feet taken up.

In constructing the roadways, the line and grade were first established and the side forms, consisting of 2-in. by 6-in. wooden strips placed in position. As many of these roads took the same course as the cinder roads which had been in use previously, there already existed a firm subgrade which required no tamping. However, this was dressed carefully and 2,400 cu. yd. of excavation outside of the track crossings was removed, the surplus dirt being thrown out and where possible used against the shoulder. The balance was carted away.

The roads are of one-course concrete construction throughout, 6 in. in thickness at the edges, with a slight crown (about 1/2 in.) in the center which varies with the width.



Electric Truck Hauling Six Trailers Loaded with 17,500 lb. of Brass

river near Topeka, and the coarse aggregate consisting of clean crusher-run Garnett stone of 1 1/2-in. maximum size from which all the fine screenings had been removed. In mixing the concrete the time was 1 1/2 min., and the concrete was delivered direct from the mixing machine to the roadway and leveled.

Before the concrete set a common painter's brush was used to give the top of the road a smooth surface, or where rough spots existed, a wooden float was used to smooth it out. The finished roadway was then covered with dirt and water for curing and left covered in this manner for 21 days. The work was done entirely by company forces under the supervision of W. C. Hunt, traveling storekeeper.

These roads have been in service for several months and are giving satisfactory service. They are made use of by electric trucks and trailers, hand trucks, horse-drawn vehicles, automobile trucks and trailers and by pedestrians, and are the principal factor in the economical distribution of materials to the various shops and storage yards.

Electric Trucks

The electric trucks in use are Class A-1, manufactured by the Buda Company, Chicago, while the gasoline trucks are Ford chassis cut down to 40 in. in width and geared as low as possible. For heavy work three-ton White trucks are used.

Electric trucks are much more flexible for the handling of platform storehouse material and car work than the gasoline truck as developed thus far. The former will turn in a



Automobile Truck Carrying 6,000 lb. of Cement

The track crossings are constructed with 12 in. of concrete under the ties upon which is placed a sand cushion. The concrete is then paved with brick to the end of the ties. On account of the small wheels of the trucks and trailers used in hauling material at the shops it was desirable to have a small flangeway between the rails and the roadway in order to lessen as much as possible the jar incident to crossing,

shorter space, can be driven backward or forward more promptly, and can handle trailers into cars and on platforms with much greater ease, but they are not so well adapted for straight hauls of considerable length. The gasoline trucks can haul bolsters and frames, car bolts, driving boxes and similar material from the storage platform to the point of use, from one-half to two miles distant, with greater facility than the electric trucks. The White trucks are very economical in handling heavy material in carload lots and have released for service at these shops alone about three cars a day, which otherwise would have been tied up from three to six days in switching.

In operation the Ford trucks are the most economical, particularly with reference to first cost and upkeep, although the upkeep of the electric truck after two years' operation has been almost negligible. However, the ultimate expense of battery renewals, which can be avoided for a long time with careful handling, is rather heavy.

In its particular field each of the three types of trucks is making a wonderful showing in economic handling on the concrete roadways. No better means has thus far been devised for meeting the needs of the work for which each type is adapted. In addition to this service the concrete highways serve as and are instrumental in securing better fire protection as they permit of the more rapid handling of fire apparatus. In permitting of the maximum use of mechanical means of transportation facilities in the store and shop grounds they are of special interest owing to the present difficulty of securing labor.

In connection with these roads the Santa Fe also has paved a large area between the machine shops, blacksmith shop, power house and oil house over which much trucking is done. Over 6,410 sq. yd. of concrete pavement is installed here and 1,275 sq. yd. under railroad crossings. The construction here is similar to the roads. It gives ideal storage facilities, permitting proper drainage and is independent of weather conditions.

Salt Boxes to Preserve Piles

By Hermann Von Schrenk

Consulting Timber Engineer, St. Louis

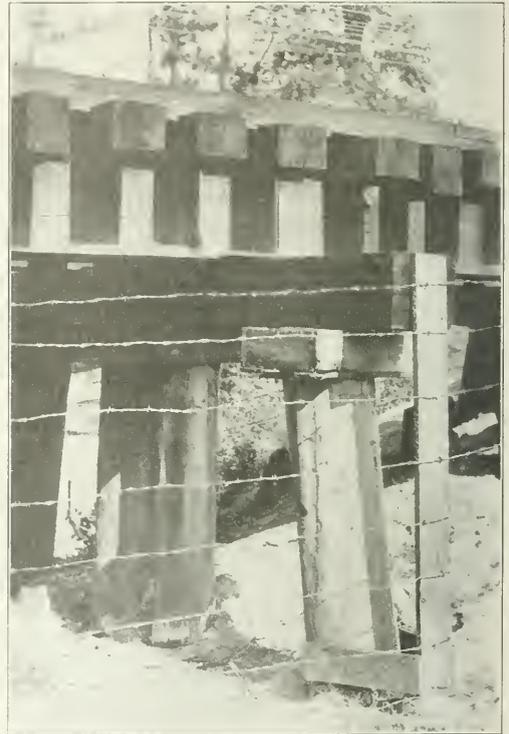
IT MAY NOT BE without interest at this time to describe a simple scheme for increasing considerably the life of untreated wooden piles already in position in bridges. Without question the best method for getting the most service out of piles is to creosote them thoroughly. However, there are a great many bridges with untreated oak and pine piling which, for one reason or another, were driven in an untreated condition. Such piles will decay first of all near the ground line, and if they have any appreciable amount of sap in them, this decay will usually take place with considerable rapidity.

Some years ago the writer's attention was called by C. H. Cartledge, late bridge engineer of the Chicago, Burlington & Quincy, to a simple scheme for increasing the length of life of piles in bridges. This scheme is briefly as follows: A shallow box 3 in. to 4 in. deep is built around the head of the pile, immediately under the cap. The space between the pile and the edge of the box may vary to suit conditions, but it should be 4 in. or 5 in. at least. The bottom of the box should be so constructed that a small space is left between the boards and the pile itself; in other words, a snug fit should be avoided. The box can be built of any rough lumber and need not be particularly solid. After the boxes have been completed they are filled with ordinary rock salt. This can be done most easily by shoveling the rock salt from a push car on top of the bridge, because there

is usually enough space between the bridge ties to make this a simple matter. Every rain storm will dissolve some of this salt, and the more or less concentrated salt solution will run down on the outside of the piles and will be absorbed to a considerable degree by the outer layers of the wood.

It has been known for a great many years that common salt is an antiseptic and prevents decay. Although it is a comparatively weak antiseptic, and, because of its solubility in water, it cannot usually be employed for timber preservation. The scheme above outlined does away with the objection of solubility, because every time that any of the salt is leached out by the water a new supply is added immediately and automatically by the solution flowing from the box.

In 1913 a number of these salt boxes were installed, at the writer's suggestion, by W. S. Hanley, then chief engineer



Piles Protected by Salt Boxes

and now superintendent of the New Orleans Great Northern. The bridges in which these boxes were placed were built of yellow pine piling in 1912, and the salt boxes were fitted in 1913. These boxes have therefore been in position four years.

It is well known that pine piles having a high percentage of sap will decay in a very few years, but a recent inspection of the piles treated with these salt boxes showed that they are in absolutely perfect condition.

It should, of course, be understood that this procedure is applicable only to bridges already built of untreated piling. The writer does not believe one would be warranted in the use of untreated piles in a new bridge with the idea of protecting them by means of these salt boxes, unless it would be impossible to creosote the piles.

Director General of Railroads McAdoo on the Job

"Freight Moving Week" Ordered. Demurrage Rates Increased.
Passenger Service Curtailed. Wage Question

WASHINGTON, D. C., JANUARY 8, 1918.—Next week is "Freight Moving Week," by order of the director general of railroads, W. G. McAdoo, who on Monday issued a general appeal to public officials, shippers, railroad employees and all others concerned to make a special supreme effort to clear up existing accumulations of freight in order to get a new start. The appeal is as follows:

"The movement of fuel, food and other vital necessities is being seriously hampered by the congestion of loaded freight cars at important cities and terminals throughout the country. The congestion is particularly serious in the railroad terminals at the Port of New York. Unless freight is promptly removed by consignees from cars at terminals and from railroad stations, it will be impossible to relieve the present situation. Railroad cars cannot be used for warehouse purposes without grave injury to the American people. Railroad cars must be kept moving and they must be utilized to their maximum capacity if the demands of the people for the necessities of life and of the Army and Navy for essential munitions and supplies are to be met. It is an imperative duty of the hour for every citizen to do his utmost to move freight from cars and from railroad stations immediately upon its arrival.

"Under the new demurrage order just issued, heavy charges for detention of freight cars will go into effect on and after January 21. The whole nation should unite in a supreme effort to clear up the congestion at terminals before the demurrage order goes into effect and to keep it cleared up thereafter.

"I wish to appeal to the people of the United States to observe the week beginning January 14 and ending January 21 as 'Freight Moving Week' and I earnestly request the governors of the various states, the public utilities commissioners, the mayors of cities and towns, the state councils of national defense, the federal and state food and fuel administrators, the chambers of commerce, and other business organizations, business men and shippers generally, trucking companies and all railroad employees concerned, to organize locally and to make a supreme effort during this week to unload freight cars, to remove freight from railroad stations and to clear the decks for a more efficient operation of the railroads of the country.

"An earnest and united pull all along the line will achieve wonders in this direction. We can help ourselves and relieve an immense amount of suffering if we attack the problem vigorously and in the true spirit of co-operation."

He issued the following notice to all railroad officers and employees, with a request that it be posted by all railroads.

"The government of the United States having assumed possession and control of the railroads for the period of the present war with Germany, it becomes more than ever obligatory upon every officer and employee of the railroads to apply himself with unreserved energy and unquestioned loyalty to his work.

"The supreme interests of the nation have compelled the drafting of a great army of our best young men and sending them to the bloody fields of France to fight for the lives and liberties of those who stay at home. The sacrifices we are exacting of these noble American boys call to us who stay at home with an irresistible appeal to support them with our most unselfish labor and effort in the work we must do at home, if our armies are to save America from the serious

danger that confronts us. Upon the railroads rests a grave responsibility for the success of the war. The railroads cannot be efficiently operated without the whole-hearted and loyal support of every one in the service from the highest to the lowest.

"I earnestly appeal to you to apply yourselves with new devotion and energy to your work to keep them running on schedule time and to meet the demands upon the transportation lines, so that our soldiers and sailors may meet for nothing which will enable them to meet the enemy on a grand still and win a glorious victory for united America.

"Every railroad officer and employee is now, as always, in the service of the United States and every officer and employee is just as important a factor in winning the war as the men in uniform who are fighting on the front.

"I am giving careful consideration to the problems of railroad employees, and every effort will be made to deal with these problems justly and fairly and at the earliest possible moment. There should be a new incentive to every one in railroad service while under government direction to acquit himself with honor and credit to himself and to the country."

Mr. McAdoo also announced that he had asked all government departments to set a good example to other shippers by loading and unloading freight promptly.

Reports received by the director general on Monday indicated that some progress had been made in improving freight conditions, but that the worst winter conditions in years had been experienced since the new regime had been inaugurated. The moderation of the weather on Monday brought encouraging reports from railways throughout the east.

Demurrage Rates Increased

The director general of railroads illustrated one of the advantages of a central governmental control of the railroads as distinguished from regulation by the federal government and 48 states when he announced on Sunday a drastic increase in demurrage charges, as an inducement to shippers and consignees to load and unload freight promptly. The railroads have been campaigning for higher demurrage rates for years and after long negotiations had succeeded in securing the permission of the Interstate Commerce Commission and of some, but not all, of the state commissions for an increase from \$1 to a scale ranging from \$2 to \$5 at the time of the congestion last winter, but Mr. McAdoo was able to order an increase to a scale ranging from \$4 to \$10 per day and to cancel the "average" agreement without asking permission from anyone. This order was issued following another order which took off about 400 passenger trains on eastern roads, also without consulting a state commission.

Statement by Mr. McAdoo

Director General McAdoo made public a statement on the demurrage rules, regulations and charges, in which he announced the purpose of his action. The rules are effective January 21, and follow:

"A. 1. Forty-eight hours (two days) free time for loading or unloading of all commodities.

"2. Twenty-four hours (one day) free time for cars held for any other purpose permitted by tariff.

"B. Demurrage charges per car per day or fraction of

a day until car is released, as follows: \$3 for the first day, \$4 for the second day, and for each succeeding additional day the charges to be increased \$1 in excess of that for the preceding day until a maximum charge of \$10 per car per day shall be reached on the eighth day of detention beyond free time, the charge thereafter to be \$10 per car per day or fraction thereof.

"These charges will supersede all those named in existing tariffs applicable to domestic freight, and specifically contemplate the cancellation of all average agreement provisions of existing tariffs.

"No change is authorized hereby to be made in demurrage rules, regulations and charges applying on foreign export freight awaiting ships at export points."

Upon request of the director general the Interstate Commerce Commission has issued an order authorizing the filing of tariffs to accord with this order to become effective January 21 on one day's notice. The railroads must immediately file their tariffs with the appropriate state commissions or other state authorities.

In explaining the necessity for such a demurrage charge, Mr. McAdoo said:

"An imperative necessity exists for releasing freight cars for further service and for relieving terminals, which are now badly congested.

"These unfavorable conditions are injuriously affecting the government's conduct of the war, its aid to the allies and the supplying of fuel, food and necessities for our own people.

"On these accounts I have felt compelled to issue an order providing for heavy increase in demurrage charges unless cars are loaded and unloaded with promptness.

"In making this order I have fully considered the embarrassments of shippers and consignees on account of the scarcity of labor, the inevitable weather, the irregularity of transportation, and the consequent frequent bunching of cars.

"Nevertheless, I am convinced that the total inconvenience and hardship on these accounts will be far smaller than the inconvenience and hardship which our people as a whole are suffering on account of the undue tying up of railroad equipment, and will be very small indeed compared with the menace which the widespread tying up of equipment causes to the health and comfort of the people and the successful conduct of our war operations."

Some question has been raised as to the effectiveness of an increased demurrage rate to reach one of the conspicuous causes of congestion. For several months all government freight has been rushed forward under preference waybills regardless of whether it could be used promptly at its destination. Chairman Hall of the Interstate Commerce Commission testified before the Senate committee that some government contractors had shown an indifference to demurrage charges because they were being paid on the basis of cost plus a percentage.

A Busy Director

W. G. McAdoo and his staff of advisers and assistants have been exceedingly busy during the past week on their big task. They have stayed on the job long after the hour when it becomes necessary to explain one's business to the watchman at the door of the Interstate Commerce Commission building, where the director general and his staff are quartered. Mr. McAdoo usually sees newspaper men between five and six or seven in the evening, usually leaving some conference to do so, and then returns to hear the conclusions reached by his advisers at the conference or plunges into others.

Passenger Service Reduced

While most of the efforts of the railway administration so far have been devoted to speeding up the movement of coal,

with unusually severe weather as a handicap, Mr. McAdoo held conferences on Thursday and Friday with the brotherhood leaders and arranged for a plan for dealing with their demands.

Mr. McAdoo also held conferences with the passenger traffic officers who had been summoned to Washington to discuss the curtailment of passenger traffic and on Saturday approved a plan for a reduction of approximately 20 per cent of the through trains on the eastern railroads and a lengthening of the schedules of others. The traffic men who took part in the conference were: A. B. Smith, passenger traffic manager of the New York, New Haven & Hartford; R. E. Wright, general traffic manager, and J. P. Anderson, passenger traffic manager of the Pennsylvania; L. F. Vosburgh, passenger traffic manager of the New York Central; and W. C. Hope, general passenger agent of the Central of New Jersey. In announcing the reduction in service Mr. McAdoo made an appeal to the public to refrain from unnecessary travel. He said:

"An important change in the passenger train service on the Eastern roads goes into effect Sunday, January 6. I have consented to this change because it is imperatively necessary that passenger travel shall be reduced as much as possible during the present serious emergency which confronts the people in the Eastern section of the country. By elimination of unnecessary passenger train service, much motive power, skilled labor, track and terminal facilities are released for the handling of coal and food and other supplies essential to the life of the people as well as to the successful prosecution of the war. Every patriotic citizen can directly help the Government in clearing up the present unsatisfactory situation on the railroads by refraining from all unnecessary travel at this time.

"The breakdown in passenger service of the various railroads in the East has not made a pleasant impression on the public, but it must be borne in mind that the railroad companies in the East are still seriously congested with an unusual amount of freight traffic, the movement of which is more vital to the country than the movement of passengers, and that the weather conditions for the past two weeks have seriously impeded railroad operations.

"A wholly erroneous impression seems to have been created in some parts of the United States, especially in California, as to the policy of the director general concerning passenger train service to the Pacific Coast. Comparatively few reductions have been made or are in contemplation in passenger train service in California or in the West. No changes have been made or will be made unless they are necessary to enable the Government to deal more effectively with war needs and war problems which are, of course, of paramount importance. Such inconveniences as may result from changes imperatively needed for the prosecution of the war to a swift and victorious conclusion must be, and will be, I am sure, cheerfully endured by the patriotic people of America. Local interests and individual interests must not be permitted to stand in the way of the supreme need of the nation, and the supreme need of the nation is to use all the facilities and resources of the country to win the war."

The plan not only covers the changes in service announced by several individual roads on their own initiative, with some modifications, but also extends to roads which had not taken action. It will gradually be extended to other parts of the country.

By Sunday night over 400 passenger trains on the eastern roads had been discontinued, including 155 on the Pennsylvania, 85 on the New Haven, 60 on the Baltimore & Ohio, 60 on the New York Central and from 5 to 25 on other lines. The number of sleeping and parlor cars was also reduced.

Development of Inland Waterways

The director general also announced his intention of taking up the development of inland waterways. He issued a statement saying:

"I am very much pleased that provision is made in the pending railroad bill for the use of the inland waterways of the United States in connection with the railroad system now under government control. The proper use of these waterways will largely increase the transportation facilities of the country, and if the pending bill is passed giving authority to the President to expend money for the development of transportation facilities on the inland waterways every effort will be made to utilize them to the full extent of their capacity.

Mr. McAdoo received representatives of the International Association of Machinists on Saturday and discussed with them certain increases in wages and threatened strikes on some of the roads. He asked them to withhold their demands until he had further time to develop a wage policy.

Traffic Solicitors

While the doing away of competition between railroads has aroused speculation as to what is to become of the railroad traffic solicitors Mr. McAdoo has told newspaper men that there is no occasion for alarm that any policy of wholesale dismissals will be adopted. While some readjustments will undoubtedly be necessary, he said, the men affected will be given other work to perform. One of the first things done by the Southern Railway under the new regime was to call in its traffic solicitors and assign them to other work; and at a meeting of southwestern lines it was decided to abolish all uptown passenger and freight offices and eliminate passenger and freight solicitors. Mr. McAdoo has preferred to devote his first efforts to moving freight rather than toward effecting economies.

Extent of the Congestion

Mr. McAdoo has also kept the Interstate Commerce Commission unusually busy and Commissioner McChord, who was assigned to collect information as to the extent of the congestion, has submitted daily reports received from inspectors at the principal terminals in eastern territory showing the conditions of the different lines. These reports showed movement below normal in many places, a considerable shortage of power on many roads, shortage of labor and material to repair cars and locomotives, yards filled with cars beyond their working capacity, large numbers of bad order cars, delays in forwarding and receiving cars because of the congestion, shortage of cars at mines, and cars that had been on hand for a long time without being unloaded by the consignee. For example, on the Maryland division of the Pennsylvania on January 3 it was found that

oral provision on the Pennsylvania. Lines indicated serious congestion at Pittsburgh and east the report stated. Shortage of train and switching crews were reported in some cases. Some of the detailed reports giving conditions as of January 1 are given in another column.

Director General McAdoo on January 6 made public the following telegraphic report on general traffic conditions from his assistant, A. H. Smith in New York.

"Accumulation is increasing at points east of Pittsburgh and Buffalo, but this is due to the extreme cold weather. Trainmen and engine men have reported sick in large numbers, which has necessitated curtailment of train service.

"The passenger service is being reduced wherever possible, but as a great many people are returning home after the holidays considerable service is required.

"A shortage of labor at engine house terminals is preventing engines from being turned promptly and getting back into service.

"The tonnage ratings of trains has been reduced on account of cold to expedite transportation of coal and food-stuffs. Embargoes and diversions are being employed wherever necessary and possible.

"A heavy fog through the Pittsburgh district, accompanied by a low temperature, is greatly interfering with switching operations and train movements, which, with the shortage of labor, causes loss of ground there. The labor situation in the Pittsburgh district is acute.

"There is plenty of coal at Hampton Roads, but ships are slow in unloading due to the severe weather and the frozen condition of the coal. Shortage of water at Jersey City is affecting the operation of railroads in that district. Temperature in the coal region is five below zero resulting in water mains freezing and hampering operations. In Indiana and Michigan there is no serious difficulty. There is a heavy accumulation of freight at tidewater ports. Ships are available but labor for unloading them is very scarce as also is labor for coaling."

District Committees Hold Meetings

Members of the six district committees of the former Railroads' War Board, who are to continue in service at least until further orders, held meetings at their various headquarters on January 3 to discuss in detail methods of securing more complete co-ordination of the lines in their districts, such as by common use of terminals, direct routing of freight and curtailment of passenger service, as directed by General Order No. 1. The meeting of the Southeastern roads was held in Washington.

Increased Traffic to Washington

An index of the increased traffic on the railroads and an explanation of some of the delays in train service to Wash-

OPERATING REVENUES PHILADELPHIA, BALTIMORE & WASHINGTON RAILROAD ELEVEN MONTHS ENDED NOVEMBER 30

	1915, 1916 AND 1917		1915		Percent	Comparison with 1916		Percent
	1917	1916	1915	1916		with 1916	1917	
Freight revenue	\$14,840,951	\$12,447,427	\$9,917,476	\$9,917,476	100	\$4,923,475	49.6	
Passenger revenue	1,465,286	9,060,401	7,511,851	7,511,851	100	1,443,435	19.2	
Mail revenue	461,750	463,116	461,750	461,750	100	0	0	0
Express revenue	1,222,845	922,818	792,400	792,400	100	430,445	54.3	
All other revenue	1,108,273	855,323	701,447	701,447	100	406,826	57.9	
Total revenue	\$30,039,655	\$23,289,085	\$19,334,924	\$19,334,924	100	\$10,704,741	55.4	

24 trains were ready to move with no locomotives available. There were also 58 cars of government automobiles in a yard, 50 of them in open top cars, and 120 more cars of automobiles at Glen Rock, all of which had been held for more than 60 days. The Pennsylvania had 1,156 cars for the American Ship Building Company at Hog Island, 667 of them being in the Philadelphia terminals, while there were 472 cars at Hog Island not being unloaded. The gen-

ington, as well as the difficulty in obtaining hotel accommodations, is afforded by a statement just compiled by the Philadelphia, Baltimore & Washington Railroad, showing its revenues for the 11 months ended November 30, 1917, with comparisons for the corresponding period of 1915 and 1916. This is the Pennsylvania's line into Washington which has recently been leased. Comparing 1917 with 1915, passenger revenues increased 66 per cent, freight rev-

enues 50 per cent, express revenues 56 per cent and miscellaneous revenues 57 per cent, while the mail revenues decreased 1.4 per cent. The total revenue shows an increase of 55 per cent as compared with 1915 and of 29 per cent in 1917 as compared with 1916. The decrease in mail revenue stands out in marked contrast with the other increases at a time when the passenger station platforms are so crowded with mail and parcel post that they look almost like freight stations. The government is requiring vastly more service of the railroads; yet under the new space basis of payment which went into effect on November 1, 1916, the railroads are receiving less money for it. The service is so heavy that in many cases it results in causing delays to passenger trains and the mail service itself is greatly delayed. This is particularly noticeable between New York and Washington. The statement of this road's revenues is as follows:

Further Drafts to be Made from Class I

That the operating forces of the railways will probably not be further depleted by the draft to any great extent is indicated in a report to the Secretary of War by Provost Marshal General Crowder announcing that future increments to the National Army can in all probability be met entirely from the first of the five classes into which the registrants are divided. Available figures indicate, the report says, that 1,000,000 qualified men will be found in Class I of the present registration. Class I is composed mainly of single men without dependent relatives and unskilled laborers and those in necessary employments are enrolled in the later classes. General Crowder also urges amendment of the draft law to provide that all men who reach their twenty-first birthday shall be required to register for classification.

Mr. McAdoo has indicated that the various local exemption boards will naturally take into consideration hereafter the requirements of the railroads for men and although railroad employees are not exactly government employees he will not hesitate if necessary to ask the exemption boards to exempt men necessary for railroad service.

The Provost Marshal General has announced that until further orders railroad employees will be classified under the provisions of the regulations governing claims for deferred classification on industrial grounds, and not under the provisions of the regulations governing claims as government employees.

I. C. C. Asks Information on Capital Requirements, Etc.

For the purpose of gaining information to guide the government in its plans for railroad financing, Commissioner Daniels of the Interstate Commerce Commission has sent a questionnaire to the presidents of the railroads, at the direction of Mr. McAdoo, asking them to telegraph immediately the amount of new capital required for this year and for the first six months of the year, and the purposes for which it is needed. They were also asked to furnish details as to the requirements for maturing obligations and for improvements and construction work already contracted for and partly finished, with a statement as to what portion of improvements already started can be stopped now without detriment. An approximate estimate is asked of capital necessary for new construction work and improvements and betterments, including terminals and new equipment, with a statement as to what part of the estimated requirements are not absolutely necessary for the protection of property or maintenance of earnings.

The commission also issued an order to all railroads to submit to the commission under oath by January 25 detailed statements of operating revenues and expenses, income account, profit and loss account and general balance sheet for the year ending June 30, 1917, together with the miles of

road owned and operated on June 30 and the average mileage operated during the year. The regular annual reports of the roads for 1917 are to be filed for the calendar year and this information is required to enable the commission to compute the "standard" return as provided by the administration bill as the basis of compensation to be paid by the government.

The Bureau of Car Service of the Interstate Commerce Commission on January 5 addressed to the railroads and private car lines a form calling for information as to the freight loading equipment actually available for service throughout the country and also that not available, to be submitted by January 25 for the calendar year 1917. Information is asked as to the number of cars of various classes owned, leased, in service, and in operation, and the number of bad order cars classified as to cars not to be repaired, heavy repair cars which will and will not be repaired in 30 days and light repair cars.

General Goethals in Charge of War Department Transportation

An important step in the direction of co-ordinating the transportation requirements of the government in its capacity as a shipper, which had been strongly urged by the railroads for several weeks before the taking over of the roads by the government, was taken on Monday with the announcement by Secretary of War Baker that Major General George W. Goethals, acting quartermaster general, has been appointed also director of War Department transportation and storage. This appointment centralizes functions heretofore exercised by five departmental bureaus independently. General Goethals will supervise transportation of all ordnance, engineering, signal corps, aviation service and coast artillery material, as well as quartermaster supplies and troops. The bureaus which have heretofore placed their orders for railroad transportation independently have been directed to co-ordinate their demands upon the railroads and upon storage facilities through the director of transportation, who in turn will deal with the director general of railroads, the shipping board or any other centralized agency for transportation or storage. The Railroads' War Board in its recommendations on the subject had in mind the appointment of a government traffic director to co-ordinate the transportation of the War and Navy departments and the shipping board and possibly those of the food and fuel administrations.

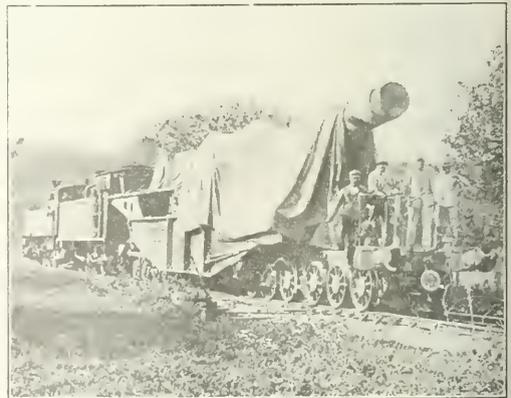


Photo by Central News Photo Service.

A Big French Railway Gun on Its Way to the Front

The Transportation of Perishable Commodities

Type of Bunker, Insulation and Floor Racks Affect Efficiency of Car; Result of Adding Salt to Ice

By Dr. M. E. Pennington

Chief Food Research Laboratory, United States Department of Agriculture, Bureau of Chemistry

THE INVESTIGATION of the transportation of perishables which is now under way in the United States Department of Agriculture has shown that the refrigerator equipment on the various lines differs widely in ability to protect against heat and cold. This variation depends to a certain extent upon the size and character of the load as well as upon the construction of the car. It is my purpose to discuss some of the results of these investigations, comparing the performance of cars of varying types when loaded with varying quantities of the commodity to be

transported. First, however, let me very briefly outline the major differences in the construction of the cars used in these experiments. In the general purpose refrigerator car we find two types of bunker—one known as the "box bunker," illustrated in Fig. 1, in which the ice rests directly against the end and sides of the car—the other, known as the "basket bunker," in which the ice is held in a wire container 2 in. away from walls and bulkhead (Fig. 2). The box bunker usually has an open bulkhead of wood or metal. Sometimes we find a solid wooden partition open at the top and bottom. The basket bunker commonly has a solid wooden bulkhead, open 12 in. at the bottom and 14 in. at the top, and in the new cars this bulkhead is insulated with one inch of insulating material. The new cars also have a rack on the floor, 4 in. in the clear made

of 2 in. by 4 in. lumber and 1 in. by 2 in. cross slats, 1/2 in. apart. These racks are fastened to the sides of the car with hinged bolts and are provided in the middle so that they can be turned up against the walls when the car is cleaned. They are absolutely necessary for the safe carrying of perishable loads. Most of the cars now on the lines are without racks. Some have permanent strips on the floors 1 in. or 1 1/2 in. in height. These strips are practically valueless. The insulation varies from a few layers of paper to 3 in. of some recognized insulator. In some cars the layers of insulation are broken by space—in others the insulation is massed. The cars in the experiments were from approximately 29 ft between bulkheads to approximately 33 ft. All temperatures were taken by means of electrical thermometers inserted when the cars were loaded and the mechanism was such that neither the doors nor the hatches were opened to take records nor was the car modified in any way.

The car factors which determine the size of the load which can be safely carried are insulation, bunkers and floor racks. Each exercises a specific influence as indicated

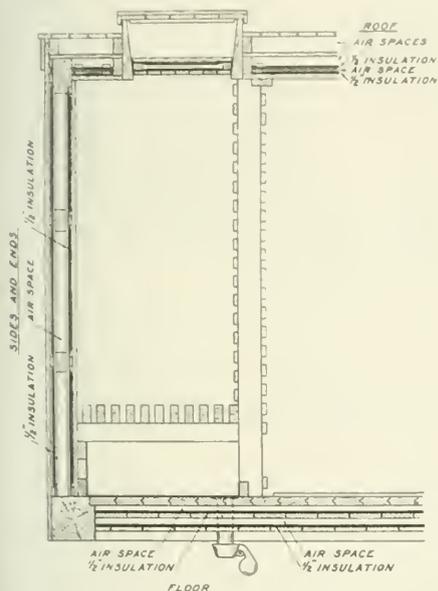


Fig. 1—Box Bunker with Open Bulkhead and Insulation Broken by Air Spaces

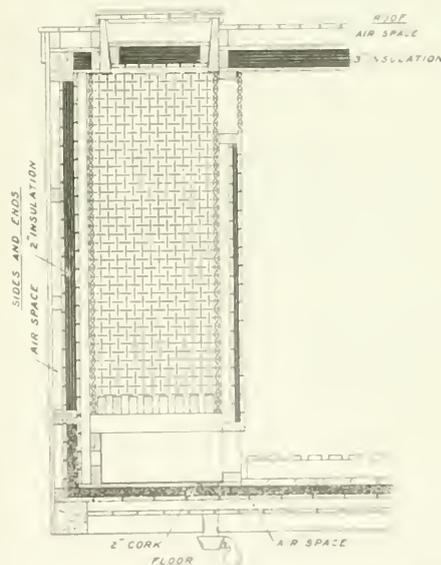


Fig. 2—Basket Bunker with Insulated Bulkhead and Massed Insulation

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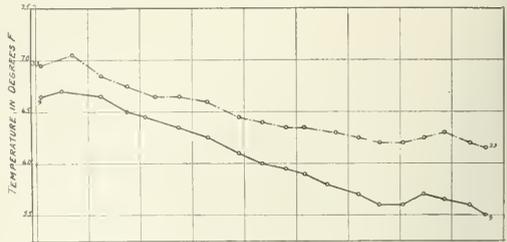
in Chart 1. This shows the results of an experiment conducted with three cars which had been in experimental service for about two months. As shown on the chart, cars A and C were provided with basket bunkers and floor racks; car B had a box bunker and strips on the floor. Cars A and B had 3 in. of insulation on the roof, 2 in. on side walls and

* Figures were presented before the Scientific Section, C. P. A.

ends and 2 in. of cork in the floor. Car C had 1½ in. in the walls and 2 in. in the roof and floor. Each was loaded with 600 cases of eggs consolidated from pickup cars, and each received the same amount of ice accurately weighed into the bunkers. About twelve thermometers were put into each car. For our purposes the temperatures in the cases of eggs on the bottom and top of the load are especially significant, and indicate very plainly the amount of work which the car can do. For example, the temperature of the eggs on the floor of car B, between the doors, was 66.5 deg. F. on arrival; car C, in the same location, was 45.5 deg. F and car A 44.5 deg. F. The packages between the doors on the top of the load—in this case five layers high—showed for car B, 64 deg., for car C, 56.5 deg., and for car A, 55.5 deg. F.

The behavior of the packages on the floor of car B between

Manifestly, car B is not a satisfactory carrier for a heavy load of eggs. Car A, on the other hand, has done its work well, and at first sight car C, having less insulation, appears to be efficient for a load of 600 cases of eggs during hot sum-



Upper Curve (33)—Car C; Lower Curve (9)—Car A

Chart II

mer weather. Further study, however, shows that the packages around the walls of car C came into destination over 6 deg. higher than the corresponding packages in car A (Chart II), though when loaded, they were but 3 deg. apart.

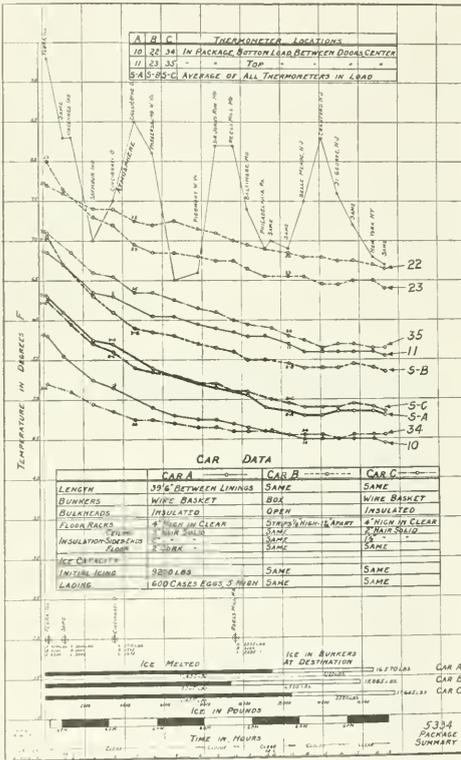


Chart I

the doors is especially noteworthy. They were continuously higher in temperature than the packages on the top of the load, a condition quite contrary to the idea generally held that the coolest place in a refrigerator car is its floor. That is only true when the construction is such that the cold air from the bunkers can travel along the car floor. This experiment, and many others that we have made, show conclusively that a rack 4 in. above the floor is necessary if the goods on the bottom of the load in the two middle quarters of the car are to be refrigerated. It is of interest to note, also, that the insulation in cars A and B is unusually heavy, in fact, more than twice as much as is in most of the refrigerator cars now in service, yet because of the construction of the bunkers in car B and the absence of a rack on the floor, there was practically no refrigeration except near the bulkheads.

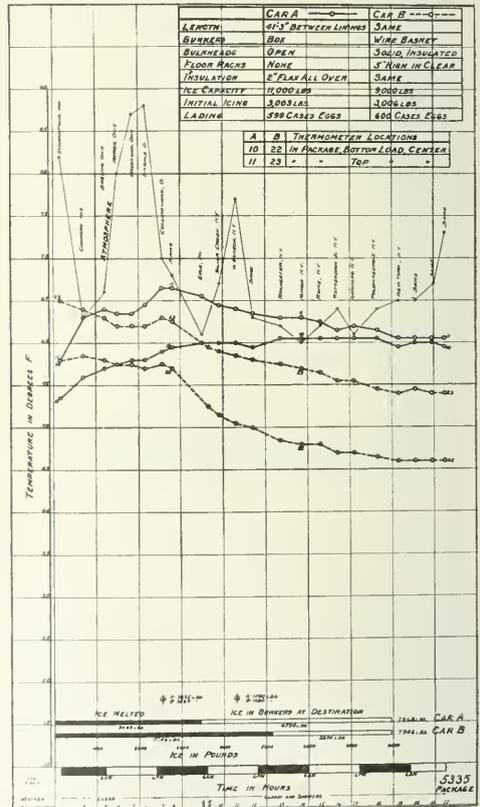


Chart III

Car C used about 1,000 lb. more ice than car A and, on the whole, did less satisfactory work, especially around the walls, where actual deterioration due to heat undoubtedly occurred.

It may be said that in the experiment cited car B, having the box bunker and open bulkhead, was unfairly treated in that the temperature of the entering load was distinctly higher. The facts illustrated in Chart III tend to nullify the significance of such an argument. In this experiment, the cars had 2 in. of insulation throughout, but car A was of the box bunker type, while car B had a basket bunker and its adjuncts. Here the eggs entering car A were cooled to between 50 deg. and 60 deg., while those in car B ranged between 55 deg. and 65 deg. However, car A could not even maintain the initial temperature. At destination the

cars having one foot of insulation. Cars having 1 1/2 in. of insulation, if provided with a 1-ft. box bunker and a floor rack, can carry four layers. If the load is high, we must have 3 in. in the roof and 2 in. in the walls, ends and floors, and good air circulation. With more than five layers of egg cases we have not succeeded in getting good refrigeration.

This is illustrated in Chart VI showing top and bottom layer temperatures in two cars loaded six layers high, totaling 700 cases to the load. Car A is of the box bunker type as was used in Chart I, where with 600 cases at 1 1/2 ft. load work. With 700 cases there was practically no refrigeration except in the bottom layer. The temperature in car B, with the same insulation but having a box bunker and rack even refrigerate the lower layers. The packages on the floor, middle of the car were often warmer than the top of the load, which was only 1 1/2 in. from the ceiling. It cooled more than 5 deg. with the daily rise and fall of the temperature and arrived at destination showing an increase of 7 1/2 deg.

Encouraging results have been obtained in refrigerating heavy loads of fruit in the basket bunker cars by adding salt to the ice in the bunkers. On a long haul across a hot territory salt has been added to the ice at the first three long stations. By that time (the third day) the load was cooled

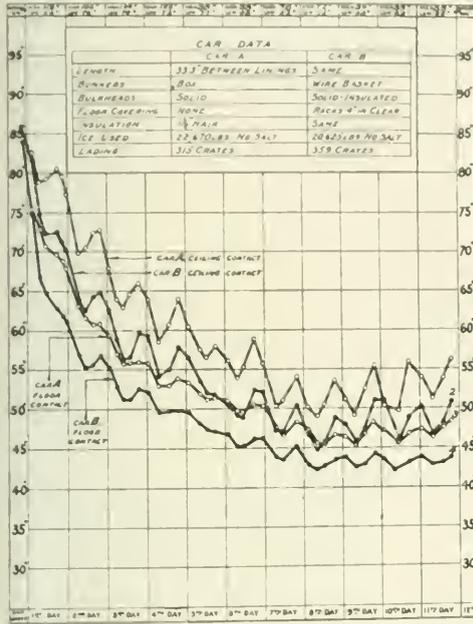


Chart IV

packages in the middle of the car on the floor were nearly 5 deg. warmer than when they entered the car and those in the top layer were over 2 deg. F. higher. Car B, on the contrary, brought in the load from 6 deg. to 14 deg. lower than car A. These two cars were loaded with 600 cases of eggs and, so long as the atmospheric temperatures were above 80 deg. F., refrigeration was of doubtful efficiency. The third and fourth days of the trip were unseasonably cool and also rainy, which compensated for the lack of insulation in the roof and permitted the load in car B to drop below 55 deg. before the end of the fourth day.

The performance of a poorly built car, said to contain 1 1/2 in. of insulation throughout, as compared with a well built car known to have 1 1/2 in. of insulation, is well illustrated in Charts IV and V, showing the temperature in cars in which cantaloupes were hauled for eleven days across a hot territory. The top layer in car A, loaded six wide and four high at the bunkers, was in such bad condition on arrival that claims were filed for damage in transit. Car B, on the other hand, was in good condition, although the load was seven cases wide and four cases high. In car A the combination of a lack of cold air circulation and of insulation proved disastrous, even though the load was light and open in character, and much easier to refrigerate than a load of eggs. In fact, we know that eggs can not be safely loaded more than three layers high in summer weather in

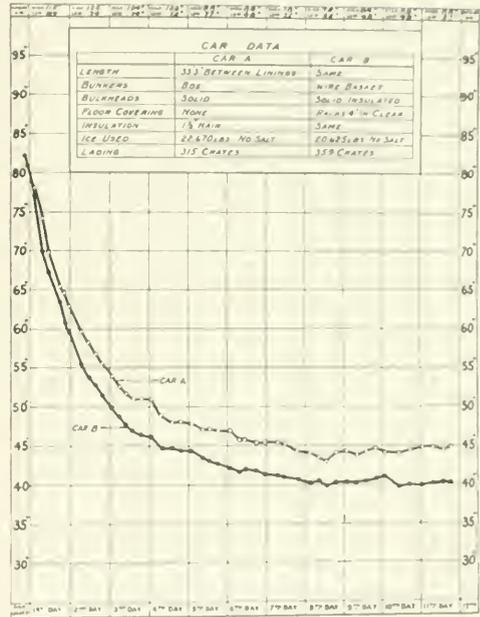


Chart V

and very frequently no more ice was needed, even though the haul continued for five to eight days. The air issuing from the bunkers is far below 32 deg., but the circulation is so rapid that there is no frosting at the bulkhead. The insulated bulkhead also protects the load so that frosting does not occur. Salting ice in a box bunker, open bulkhead, merely freezes the load next to the bulkhead. The packages in the middle of the car are not benefited because of a lack of air circulation.

We have used salt to assist in refrigerating heavy loads of eggs and with some success, but we have not succeeded in refrigerating 700 cases in a car 3 ft. between bulkheads. The records of car A, in Chart VI, bring out this fact.

Three per cent of salt was added after the load had been placed in this car and salt was again put into the bunkers at three icing stations. While the car was not able to handle so heavy a load during the very hot weather prevailing, it nevertheless did rather remarkable work and furnished valuable information on which to develop a more economical and efficient icing system. Car A, which brought the sixth layer of eggs from 85 deg. down to 66.5 deg., used 12,660 lb. of ice and 540 lb. of salt; car B, which did not refrigerate either the top or bottom of the middle part of the load, used 19,755 lb. of ice.

A great many experiments have been made with fruits and eggs, all of which confirm the foregoing; namely, that a suitable use of salt saves ice on a long haul and greatly increases the efficiency of the work done on both short and long hauls.

The experiment recorded in Chart VII adds still further to our knowledge of car construction and car performance when salt is used with the ice. In this case we had short cars, so that by comparison, the 2 in. of insulation became nearly 2.5 in. and the air circulation was more rapid because of lessened distance. Car B was of the usual box type; car A had a box bunker with an insulated bulkhead

cars A and C until the last day of the trip. An analysis of temperatures in different locations shows, further, that the floor of car B paralleled the top layer of car C. Car C did much the best work of the three. Car A, having the rack and the insulated bulkhead, but not the basket bunker, did not succeed in maintaining a sufficiently rapid air circulation to cool the top layer more than 5 deg. The packages on the floor, on the contrary, were exaggeratedly chilled because of the pocketing of the cold air. The conclusion fol-

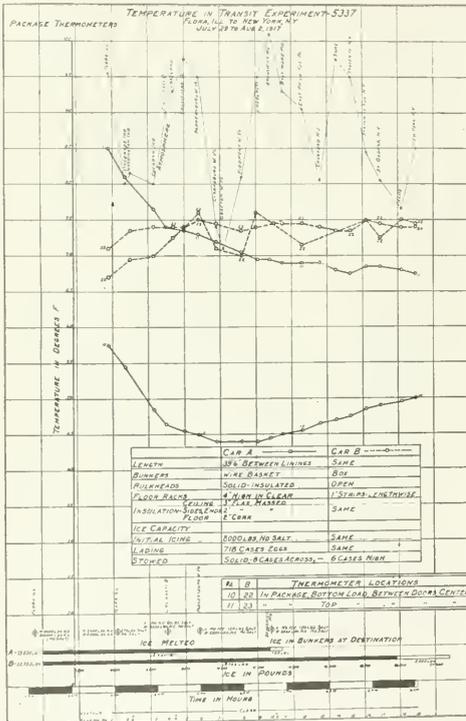


Chart VI

and a floor rack; car C was of the standard basket type. Cars A and C received salt on the initial icing. They were neither iced nor salted in transit on an 88-hour haul. Car B was iced once. All contained from 400 to 500 cases of eggs. The three lower layers were seven cases wide, spaced for air circulation, and the upper layers were eight cases across. The average of all the thermometers in the packages in various parts of car B showed that it was far above

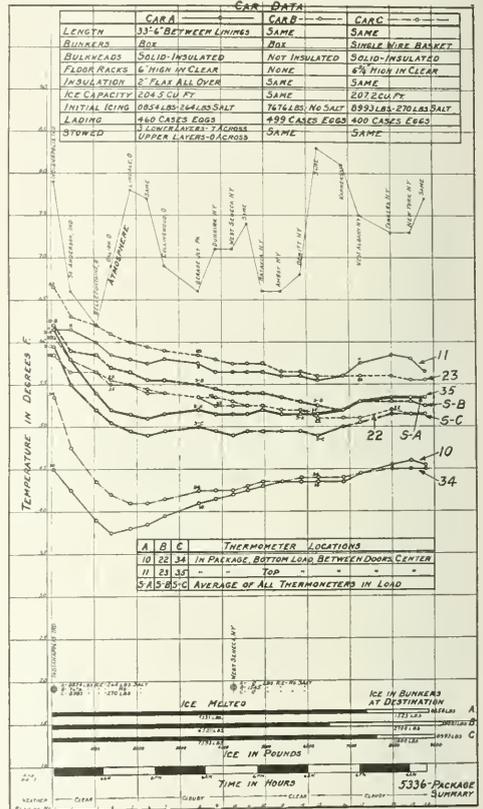


Chart VII

lows that even with an openly stowed load, the car must be provided with a basket bunker, an insulated bulkhead, a floor rack and ample insulation, if our present loads are to be materially increased with safety to the commodity.

Car C of the foregoing experiment was again used with a load of about 600 cases, stowed eight across (Chart VIII.) The ice was salted at the start and 40 lb. was added on the second day. Thermometers in the first, fourth, fifth and sixth layer packages give an instructive picture of the rise in temperature with the height of the load. Without salt the fourth layer would be the stopping point. The fifth layer cases around the walls of the car would suffer if the weather were hot, if salt were not used. With the salt, as this experiment shows, we can load five high with impunity, but not six, because of damage to wall cases. A study of the chart shows that the 40 lb. of salt added at the first icing station was enough to cause a drop in temperature in all except the sixth layer wall packages. Had another charge

during hot weather when loaded more than four layers high.

Cars having 3 in. of insulation in the roof, 2 in. in the side walls and ends and 2 in. of cork in the floor will carry eggs five cases high, but not six.

The box bunker car, regardless of quantity of insulation, does not refrigerate the two middle quarters of the load when it is tightly stowed. Even with an open load the performance is unsatisfactory.

5. The use of salt with the ice in a well insulated basket

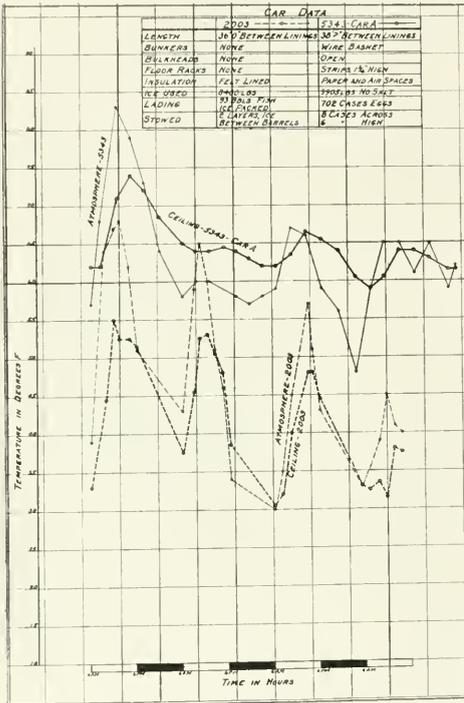


Chart X

bunker car will permit an increase in the load of from 25 to 40 per cent.

6. While each commodity must be studied separately in order to determine the maximum load, the principles of the relation between car efficiency and tonnage of eggs as indicated in this discussion can be applied to perishables in general.

IMPROVEMENTS TO PORT OF DIEPPE IN 1916.—Various improvements to the port of Dieppe, France, were made during 1916. Four steam cranes of American manufacture, of a carrying capacity of 5,000 kilos (11,000 lb.) each, were acquired. Thirteen electric capstans were installed and new railways built around some of the docks. A large shunting station was created at Rouxmesnil, 5 kilometers (3 miles) from Dieppe, and connected with the docks by a railway line. All the docks are now lighted by electricity. The unloading capacity of this port has been increased to 125,000 tons per month. In 1916 1,697 vessels of 929,004 tons entered the port of Dieppe, against 1,428 of 758,279 tons in 1915.—*Commerce Report*.

Priority and Preference Orders

JUDGE ROBERT S. LOVETT, director of priority in transportation, has issued a statement asserting that the "priority" orders issued by him are in no way responsible for the railroad congestion which has been attributed to the indiscriminate use of "preference" orders issued by various government departments. The statement is intended to clear up the confusion caused by the loose use of the word "priority" when the preference orders were meant.

Mr. Lovett's statement was as follows:

"It is being reiterated before committees and in various reports, and repeated from day to day in newspapers, that the present congestion in railroad transportation is due in large measure to numerous and unwise 'priority orders,' and it is well known and is generally published that I am in charge of priorities. The obvious inference, therefore, is that such ill-advised priority orders were issued by me. Nothing could be further from the truth.

"No one knows better than I have known all along that reckless and indiscriminate issue of priority orders would add enormously to the transportation difficulties, and that the greatest caution should be observed in issuing such orders.

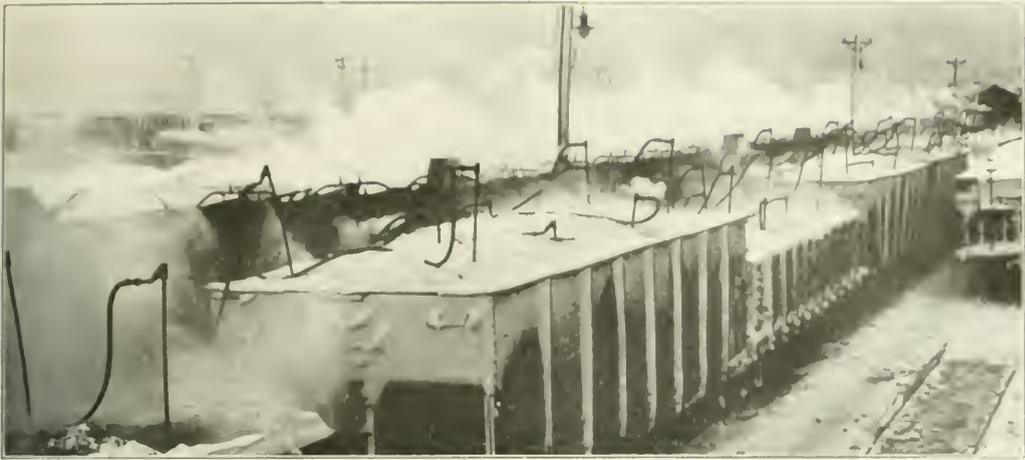
"The result is that since my appointment by the President, in August last, I have issued but five orders awarding priority in transportation, to wit: Order No. 1, issued Aug. 20, directing the movement of coal to the Northwestern States via the lakes; Order No. 2, issued Oct. 27, restricting the use of open-top cars; Order No. 3, issued Nov. 2, giving preference to certain coal shipments from Utah and Wyoming mines; Order No. 4, issued Nov. 29, according priority in the shipment of certain cattle foodstuffs to the drought-stricken sections of Texas and New Mexico; and Order No. 5, issued Dec. 7, according priority to perishable freight, foodstuffs, and certain military supplies, and to coal, coke, and certain war materials.

"No railroad man or other person with knowledge of the facts has claimed or will claim that any of these orders has caused congestion or seriously hampered transportation.

"The fact is that the so-called priority orders, which are more or less responsible for traffic congestion and of which complaint is made, are the result of an agreement made by the railroads themselves and the supply departments of the Army, Navy, and Shipping Board, with which I had nothing whatever to do. This arrangement was embodied in Bulletin No. 22, issued by the so-called 'Railroad War Board' in July last, and is commonly referred to as the 'tag' system. It prescribed a form of placard or tag which, when tacked on a car entitled that car without further orders or instructions to preferred movement to destination. Large quantities of these placards were printed and distributed throughout the United States in the hands of quartermasters' agents, contractors, and others getting material for the government, and naturally one was tacked to every shipment made whether urgent or not.

"Consequently, everything bought was rushed to destination, with the inevitable result that terminals were crowded with materials before they were needed or could be unloaded. No complaint of this system was made or reported to me until late in November, and priority Order No. 5, issued by me December 7, made provision for restricting and regulating the evil.

"However indifferent one may be personally to misrepresentation, yet where the performance of public duty is involved, the facts as they are ought to be stated. Of course, I know the misrepresentation was not intentional, and the unusual circumstances were such as to make it almost unavoidable, but because of the public interest concerned, I think it should be corrected."



Thawing Out Coal at South Amboy, N. J. A Large Part of the Coal Supply for New York City Is Transported from the Mines to Barges at This Point. Copyrighted by the International Film Service, Inc.

Director General McAdoo Speeds Up Coal Movement

The Extremely Cold Weather of the Past Week Has Seriously Complicated the Fuel Problem

THE MOVEMENT OF COAL occupied most of the attention of Director General McAdoo and his advisers during last week. On January 2 coal was moved through the New York tunnels of the Pennsylvania. Mr. McAdoo told newspaper men that he had already found railroading to be a 24-hour job and that after spending long hours at his office he had gone home to dream of pulling a 50-car train of coal with a rope around his waist. He insisted, however, that the coal was delivered on time. After all priority orders had been suspended coal was given the right of way for the time being, even over passenger traffic, with the result that passenger trains in the eastern territory were later than ever, and this resulted in some cases in a delay of milk trains.

A complete statement of the coal needs of the North Atlantic States, particularly New England, was laid before the director general of railroads by the United States Fuel Administration and Fuel Administrator Garfield has impressed upon the railway and shipping authorities the grave necessity for an immediate improvement in transportation conditions in order to relieve the needs of New England. The Fuel Administration furnished full data to the representatives of the director general as to the sources from which New England coal is moving in order that this coal might be hurried to New England along the shortest possible transportation lines.

A distribution schedule covering the North Atlantic states and eastern Ohio has also been worked out. This schedule shows the mining districts from which coal for this consuming territory is being supplied and the transportation lines along which the coal must move from the mines to the distributing centers. This information is expected to enable the railroad lines to take the amount of coal needed as directly as possible from the mines to central distributing points and thence on orders from state fuel administrators to the points of consumption.

Under this schedule the fuel administration seeks to aid the railroads in eliminating the cross-hauling of coal.

Specific coal producing districts in West Virginia and Western Pennsylvania will be set aside to supply the distributing centers in the North Atlantic states.

Fuel Administrator Garfield discussed the transportation condition as affecting the coal supply of New York, Philadelphia, Baltimore and the New England states at various conferences with the Director General.

Speedy movement of coal diverted for the immediate relief of New England was reported to the United States Fuel Administration on January 2. At noon on Monday the Fuel Administration ordered 1,250 cars of coal, tied up behind congestion at Pennsylvania points, to New Jersey tidewater ports; 750 cars of this coal were for New England distribution and 500 for the use of the United States Shipping Board. By noon on Tuesday the first trainload of this coal had reached Jersey terminals and by six o'clock January 2 6 trains, carrying 315 cars of coal, had reached Jersey points.

The Fuel Administration arranged to have the Pennsylvania Railroad carry cars of coal on car floats from Jersey terminal points through New York bay and to coal yards on the Harlem River in New York City. This plan will eliminate some of the difficulties of the transportation of coal by barge from Jersey terminals to New York City. Plans were also made to handle coal by all-rail routes to New England up the west bank of the Hudson river and across the Hudson at the Poughkeepsie bridge.

Fuel Administrator Garfield on January 4 ordered 102 mines in the eastern bituminous fields to furnish 500 additional carloads of coal effective January 8, to be shipped under consignment to J. J. Starrow fuel administrator for New England, each day until further notice. These 500 carloads will be in addition to the usual output of these mines, and the Fuel Administration expects that the order will result in an increased production of 500 cars or 25,000 tons of bituminous coal each day while the order is in force. The order was issued because of the necessity for keeping an adequate supply of bituminous coal flowing to New Eng-

land for the use of industries essential to the conduct of the war.

In co-operation with the fuel administrator, the director general of railroads has undertaken to supply the necessary transportation facilities for making the order effective by issuing an order for the placing of the cars. The Fuel Administration finds that the present volume of shipment to New England by all-rail routes is not adequate, and that the further supply is absolutely necessary for purposes connected with the war emergency.

Four mines on the Cambria & Indiana Railroad are designated in the schedule attached to the order to furnish 26 cars of coal a day. On the New York Central are 23 mines which will have to furnish 74 cars daily. On the Western Maryland there are three mines whose contribution must be 20 cars a day; on the Baltimore & Ohio are 11 mines that will furnish 50 cars a day. On the Pittsburgh, Shawmut & Northern are only three mines that will furnish 10 cars; the Buffalo, Rochester & Pittsburgh serves 25 mines that will furnish 130 cars a day; on the Pennsylvania are 28 mines that will be required to furnish 150 cars a day, and two mines on the Buffalo & Susquehanna will furnish

according to a statement by the Fuel Administration. The delivery of this coal was delayed because of the ice in the Hudson and East rivers. Yonkers was completely frozen in and the floating ice in the lower river was so thick it was necessary to use two tugs to move one float, whereas under normal conditions one tug can tow three or four floats. Coal was being moved through the Pennsylvania Railroad tunnels to the suburbs of New York on Long Island, but only small quantities can be moved to those places, and there can not be any material improvement in transportation until the weather has moderated, the statement says.

Co-operation of government departments relieved a serious coal famine in Boston on January 6, when Secretary of the Navy Daniels promptly met a request from Director General of Railroads McAdoo, to place naval coal at the disposal of the Fuel Administration for the aid of the suffering people. Telegrams from Boston authorities and representations by the Fuel Administration showed clearly that the coal shortage in Boston was an acute emergency. The director general of railroads informed the Secretary of the Navy, who responded by causing the immediate delivery of ten thousand tons of naval coal from colliers in Boston



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Barges Battle Through Harbor Ice to Bring Coal to New York

28 cars a day. Thus, from a total of 102 mines will come, by the order, 500 cars a day. The routing of the cars is to be left to the determination of the director general or to the carrier upon whose lines the mines are located.

On December 31 the Fuel Administration ordered 400 cars of coal from the Western West Virginia coal fields diverted for local distribution in Ohio by way of the Cincinnati, Hamilton & Dayton. This diversion is expected to relieve pressing conditions at Ohio points where weather of unprecedented severity is causing distress.

Three hundred cars of coal in-transit for tidewater at Hampton Roads were ordered diverted for local distribution in North Carolina. Reports to the Fuel Administration showed that weather conditions were impeding the loading of coal for water shipment at Hampton Roads, and the coal bound for that point was ordered to North Carolina.

The Fuel Administration has ordered 700 cars of bituminous coal diverted from the Kanawha district of West Virginia to points in Ohio, Michigan, and Kentucky, to meet the urgent needs of those localities, and to relieve the congestion of eastbound traffic.

Approximately 250,000 tons of anthracite coal consigned to New York City were in the cars at the New Jersey terminals of the railroads leading into that city on January 3,

harbor. This coal is now in the hands of the Fuel Administration for distribution.

The United States Fuel Administration has received assurances from the Emergency Fleet Corporation of the United States Shipping Board that 11 vessels had been assigned for service in carrying coal from tidewater to points in New England. These ships will be utilized at once to relieve the present coal shortage in the New England states and to build up a winter's coal supply in New England. The vessels assigned have an aggregate tonnage of 65,730. Some of the ships were turned over to the fuel administration at Atlantic ports on January 4. Others will be available within the next few days. Some of these ships will be available for only a single voyage, but the shipping board will undertake to replace them if they are withdrawn.

AUTOMOBILE OUTPUT 5,853,000 IN TEN YEARS.—In the past ten years, the American automobile industry has manufactured about 5,853,000 motor vehicles, of which 4,809,000 were made in the past five years. There were registered throughout the country July 1 last 4,200,000 motor cars, indicating the average life of an automobile at just under five years. It is estimated that cars in use now number 4,500,000, of which 400,000 are trucks.

The Basis of Compensation for the Railroads

An Analysis of the Provisions Which Were Suggested
by President Wilson in His Message

By Julius H. Parmelee
Statistician, Bureau of Railway Energy

IMEDIATELY FOLLOWING the President's address to Congress on the railroad situation, last Friday, identical bills were introduced in House (H. R. 8172) and Senate (S. 5885) providing among other things a basis of compensation to railway owners while their properties are under government control. The compensation provisions are contained in sections 1, 2, 3 and 4, while sections 5, 6 and 7 bear indirectly on the financial terms according to which the roads are to be operated. Briefly summarized, the basic compensation provisions are as follows:

1. The "just compensation" guaranteed to each carrier for the use of its property shall be equivalent to the average of its "net railway operating income" for the three years ending June 30, 1917. This is denominated the "standard return."

2. This net operating income may be defined as railway operating revenues less operating expenses, taxes, uncollectible revenues if any, plus or minus the net balance from miscellaneous operations, hire of equipment, and joint facilities.

3. Taxes deductible from operating revenues under the provision just cited shall consist of all state and local taxes actually paid or charged, together with such proportion of federal taxes paid or charged as represents an amount not greater than the federal taxes assessed during the year ended June 30, 1917. This proviso as to federal taxes is designed to hold each road responsible, out of its own corporate income and entirely apart from the income guaranteed by the government, for such war taxes as were levied under the financial legislation of last October, or as may be levied from time to time until government control has terminated.

4. The proposed law guarantees adequate depreciation and maintenance charges. If expenditure of the funds derived from these charges is for any reason deferred, the President may authorize the roads to set up reserve funds on which they may draw at a later period.

5. The use of new capital invested in a carrier's property during the period of government control shall be compensated at an annual rate, determination of which is left to the President. This provision applies to capital whether invested out of carrier's surplus, obtained from the sale of securities, or borrowed direct from the government.

These comprise the direct compensation provisions of the proposed act. Decision as to the amount of the standard return rests with the Interstate Commerce Commission. No road is required to accept the decision of the commission in this matter, but has the option of two courses of action: either to submit its claim to the Court of Claims, or to submit to arbitration by a board of three auditors, whose decision is subject to review by the Court of Claims.

Sections 5 to 7 bear indirectly on the basis of compensation, in that they limit the rate of dividend payable from such compensation to the regular dividend rate of the three-year period to June 30, 1917; give the President power to order additions and improvements, to advance the carriers money at a fair rate of interest, to authorize the issue of securities, which may be purchased by the government on account or for sale in the open market; and finally, appro-

priate \$300,000,000 for carrying out the compensation and other provisions of the act.

This outline of the basis of compensation may be subjected to analysis if any understanding of the real meaning of the compensation provisions is to be reached. In making such an analysis we must consider not only the effect of the compensation provision on the railways as a whole, considered as a single network (but also on the railways individually and on their relative position with respect to all other roads. For example, under the provisions of a standard return all roads receive the same net operating income at the close of the period of government control, although some roads handle considerably more traffic than formerly while other roads may be handling considerably less. It might be argued from this that the scheme of control works to the disadvantage of some roads as compared with others, i. e., that those were doing more work for less return. However, such elements are inherent in any general scheme that must be planned without reference to the particular conditions surrounding the operations of any one company.

How will these compensation provisions, if enacted into law, affect the operations of the railways, and are they reasonably equitable as between individual railways? Reply to this query may be found in the following analysis of the various provisions, in which especial reference is had to their bearing on all the roads and on each road separately.

So far as revenues from and expenses of railway and miscellaneous transportation operations are concerned, the act bears on all roads alike. The item of uncollectible revenues is so small that it may be dismissed as negligible. The proviso as to taxes would affect only lightly roads whose federal tax payments are but slightly increased under the income tax law of October, 1917, while it will put a considerable weight on roads whose taxes will greatly increase. Hire of equipment and joint facility rentals differ from the other items mentioned above as factors in the ascertainment of net operating income, in that they consist almost wholly of inter-railway payments or settlements, whereas the other factors represent dealings with the government or with the general public. Assuming that depreciation rates on equipment are maintained at an adequate level (probably higher than normal, owing to the wear and tear of war traffic) and that repairs are made and are charged (as under normal conditions) to the operating expense accounts, there is little reason to suppose that the inclusion of the hire of equipment provision in the scheme of compensation will be a disadvantage to any road. The only possibility of harm lies in a situation involving the lease of equipment from other than railway companies, or from such railways (i. e., non-operating companies) as may not come under the general provisions of the proposed act. Such a situation might work to the advantage or disadvantage of a carrier, according as it drew respectively a smaller or larger proportion of its equipment in service from the classes of companies named. Another element for harm is represented by charges in per diem rates.

So far as interchange of equipment between roads covered by the scheme of compensation is concerned, guaranteed to the government of the carriers' net operating income will make it of little moment whether the proportional use of

each other's equipment is greater or less than during the normal three-year period utilized as a yardstick. Furthermore, it is of great importance whether hire-of-equipment accounts are actually maintained between the carriers during the period of government control or not, even though for purposes of record it might be considered advisable to do so.

Equipment seems destined to be pooled on a large scale under government control, motive power as well as freight and passenger cars, and inter-company financial relations with regard to equipment contributed to the pool should therefore be of the simplest sort. However, it is absolutely essential that any road using the equipment of another road should maintain it in good order, charging the cost to its own operating expenses, while the owning road should in turn charge to its operating expense account depreciation on that equipment at a rate warranted by the wear and tear on it, regardless of whether the wear and tear occurred while in service at home or on a foreign road.

Joint facility rentals are also inter-railway payments, such as for joint use of tracks. These payments, together with the cost of operating and maintaining joint tracks, terminal facilities, etc., have been adjusted to a reasonably equitable basis in normal times, and it may be assumed that this will represent a fair basis for continuance, regardless of changed conditions of traffic routing or handling.

There are two other rental accounts not included in the scheme of compensation, namely, rents paid and received for lease of road, and miscellaneous rents paid and received. These rental payments and receipts, under the proposed act, are not to be taken into the accounts before arriving at the net operating income which the government guarantees, but shall be financed from income remaining after adjustment under the guarantee. Leased rentals are paid largely to non-operating railway companies, which seem to lie outside the scheme of government compensation. Miscellaneous rents in part represent dealings with non-railway corporations or persons. Hence these two groups of rentals stand in a somewhat different class than the two groups already discussed (hire of equipment and joint facility).

Leaving leased and miscellaneous rentals out of consideration in arriving at net operating income will affect the final result only with such roads as are forced to accept changes in rental rates after June 30, 1917, and during the period of government control. Unfortunately a number of roads are in the position of expecting increased rentals forced on them in the near future, and their guaranteed income will, therefore, be reduced by the amount of the increases. In other words, so long as these rentals are actually a fixed charge (using the word "fixed" in a dual sense, the technical accounting sense and the ordinary sense of "stable"), it makes little difference whether they are accounted for before or after arriving at net operating income; but if they take on more the character of an operating expense in that they shift quickly according to the trend of general prices, they might better be treated as an operating expense and be deducted before reaching the standard return.

There is little question about the other compensation provisions of the act. So much depends on the standards and methods adopted by the President and the Director General of Railroads, that it would be unwise to prophesy how the compensation scheme will work out. For example, much depends on what the President, or rather the person or persons to whom he delegates the task, shall regard as adequate depreciation and maintenance charges, what his attitude will be regarding issues of securities, and the like. However, the President's own emphatic phraseology, set out both in his proclamation and his address to Congress on the railway situation, assures the roads a square deal, and they certainly can neither wish nor expect anything more or less than that.

Lord Shaughnessy Comments on the Canadian Railway Situation

LORD SHAUGHNESSY, president and chairman of the Canadian Pacific, is the author of a most interesting article on the railway situation in Canada which appeared in the annual financial survey of the Toronto Globe. Extracts from this article follow:

After forty months of this great world war, the railway situation in Canada presents a very different face from that of peace times. Canada's trade balance has been converted from a heavy "minus" to a substantial "plus," the exports for eleven months of 1917 exceeding those of a similar period in 1913 by over a billion dollars. The increase in traffic-moving effort has meant not increased profit but increased anxiety for the carriers. The labor shortage is indicated by our own Honor Roll, which shows that up to December 6, 7,021 employers of the Canadian Pacific had enlisted for active service.

The satisfactory features are the efficiency with which the Canadian railways have done their part under such trying circumstances, and the remarkable absence of congestion. With fewer ports and a much less elaborate network of railways than in the United States, Canada has solved its war-export problems with infinitely less confusion. From the beginning of August, 1914, to November 30, 1917, the Canadian railways have handled for the Imperial Government over 6½ million tons of supplies, exclusive of horses and mules, most of which may be considered as supplementary to normal traffic; but so admirably has the movement been timed with the arrival and departure of steamers that not a cent has been earned by the ships as demurrage. * * *

The efficiency and absence of congestion with which our enormous war traffic has been handled might well be taken to heart by our American friends who, if I may venture the suggestion, are looking too hopefully to the centralized effort of an overworked government when they should depend more on the trained enterprise of the individual industrial units that have been so efficiently developed during times of peace. Any form of control that will have the effect of lessening the sense of keenness and responsibility on the part of these units, is sure to be disastrous in its results. If they are not too proud to profit by our experience in Canada, they should solve their traffic problem by placing under government control not the railroads but the shippers, leaving the railroads with their trained operating staffs, untrammelled by political considerations, to find out how to carry the maximum traffic to given ports at a given time, over a given route, and helping these railroads to secure on fair terms the funds for necessary maintenance and equipment.

A government controller of shipments, corresponding to our director of overseas transport, is needed, not a government controller of railroads. It is folly to send out an S. O. S. call for government control or ownership of the railroads themselves, a control which experience has shown to be fatally opposed to economy and efficiency.

The Canadian Railway Association of National Defence, with the unqualified support of the Board of Railway Commissioners, is doing efficiently, economically, and without political interference what might have been done inefficiently and expensively under government control. Our only real handicap is the difficulty of financing the operation of our railways at the old rates, when cost of labor and cost of material keep mounting up. With a reasonable increase of rates corresponding to this increased cost of production, the Canadian railways are well able to face even severer traffic problems than those which they have already so admirably solved.

The Administration Bill for Control of Railroads

Five Hundred Million Appropriation. No Dividend Increases
Without Approval. Income Guaranteed

AN APPROPRIATION from the treasury of \$500,000,000 to be used, together with the surplus earnings of any road in excess of the guaranteed net operating income, to constitute a "revolving fund" for the payment of the guarantee to other roads and to provide terminals, improvements, locomotives or equipment, is provided for in the administration bill introduced in Congress on January 4 to prescribe the terms of the government's control of the railroads in accordance with the President's recommendations. The bill was introduced in the Senate by Senator Smith, acting chairman of the Committee on Interstate Commerce, as S. 3885, and in the House by Representative Sims, chairman of the Committee on Interstate and Foreign Commerce as H. R. 8172, and it was referred to those committees.

The bill authorizes the President to make agreements with the roads and to guarantee compensation based as near as may be on the average net operating income for the three years ending June 30, 1917, which is defined as the standard return, and also provides adjustment by a board appointed by the Interstate Commerce Commission in case of a failure to agree. Under its terms dividends may not be paid in excess of the regular rates paid during the three-year period without the approval of the President.

This guards against the possibility of the government guarantee being treated by any company as a "melon" by distributing the entire amount to the security-holders without the usual appropriations for improvements or surplus and the President is authorized to make, or order a road to make, additions or improvements. Provision is made for a return on new capital invested during the period of government control at a rate to be fixed by the President.

Another important section of the bill authorizes the President to purchase for the United States securities issued by the roads and to sell them whenever in his judgment it is desirable. This is evidently intended to prevent competition of railroad securities with Liberty Bonds and to make it possible to issue securities for refunding or other necessary purposes without regard to the state of the market. The President's approval is required for all such issues.

The net operating income is defined in the bill and the Interstate Commerce Commission is to certify the amount. Federal taxes in excess of taxes assessed during the year ending June 30, 1917, are not to be charged against the revenue in computing the standard return, so that any war excess profits tax or increased income tax will be paid from the net return instead of being charged to operating expenses like other taxes. Any net operating income in excess of the standard is to be the property of the United States to constitute a part of the revolving fund.

Section 9 authorizes the President to extend the federal workmen's compensation law, which now applies to government employees, to apply to railroad employees. Section 12 provides penalties for violations of the law, or any order or regulation issued under its provisions, or for interference with railroad operation.

The lines are drawn for a possible lively contest in Congress between the advocates and opponents of government ownership by a provision in the bill that the plan of government control shall continue in effect not merely for the period of the war but until Congress shall thereafter order otherwise. It is expected that this will be strongly opposed by those who regard the action of the President as unnecessary and unwise, and this includes a large number, especial-

ly on the Republican side, who are expected to make a fight against anything that seems to contemplate a permanent possession of the roads by the government. It has been pointed out, however, that this section need not be considered to have any more significance than the necessary provision for a period of adjustment after the war.

The text of the bill is as follows:

Text of the Administration Bill

A bill to provide for the operation of transportation systems while under federal control, for the just compensation of their owners, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the President, having in a time of war taken over the possession, use, and control (called herein federal control) of certain systems of transportation (called herein carriers), is hereby authorized to agree with and to guarantee to any such carrier that during the period of such federal control it shall receive as its just compensation an income at an annual rate equivalent as nearly as may be to its average net railway operating income for the three years ending June 30, 1917, (called herein standard return); said net railway operating income for the purposes of this act shall, as to carriers making returns to the Interstate Commerce Commission, be computed from such returns, excluding, however, debits and credits arising from the accounts called in the monthly returns leased road rents and miscellaneous rents; *Provided, however,* That no federal taxes in excess of taxes assessed during the year ending June 30, 1917, shall be charged against revenue in computing such standard return. Any net railway operating income in excess of such standard return shall be the property of the United States. The amount of such standard return as accruing during said period of three years shall be determined by the Interstate Commerce Commission, and the certificate of said commission as to the amount of said net railway operating income shall, for the purpose of such agreement and guaranty, be taken as final and conclusive.

During the period of such federal control adequate depreciation and maintenance of the properties of the carriers shall be included as a part of the operating expenses or provided through a reserve fund, in accordance with such principles and rules as shall be determined by the President.

Provision for Failure to Agree on Compensation

Sec. 2. That if no such agreement is made, the President may nevertheless pay or cause to be paid to any carrier while under federal control an amount not exceeding 90 per cent of such standard return, remitting such carrier to its legal rights in the court of claims for any balance claimed; and any amount thereafter found due above the amount paid shall bear interest at the rate of six per centum per annum, and any excess amount paid hereunder shall be recoverable by the United States, with interest at the rate of six per centum per annum.

Sec. 3. That any claim for just compensation not adjusted as provided in section one shall be submitted to a board of three auditors appointed by the Interstate Commerce Commission, members of which and of the official force thereof being eligible for service as such auditors, but without additional compensation therefor. Said auditors shall give a full hearing to such carrier and to the United

States, and shall report to the President the amount due such carrier as just compensation; a sum not exceeding the amount so reported may be agreed upon by the President and such carrier. Failing such an agreement, either the United States or such carrier may file a petition in the court of claims for the purpose of final ascertainment of the amount of such just compensation, and in the proceedings in said court the report of said auditors shall be prima facie evidence of the facts therein stated. The just compensation of any carrier under federal control not making returns to the Interstate Commerce Commission shall be determined in accordance with the provisions of this section.

Sec. 4. That the return of any carrier shall be increased by an amount reckoned at a rate per centum to be fixed by the President upon the cost of any additions and improvements made while under federal control, with the approval of the President, to the property of any carrier and paid for by such carrier from its own capital or surplus, and by an amount equal to the rate accruing to the United States upon any advances made to such carrier for the cost of such additions and improvements as provided in section six hereof.

Sec. 5. That no carrier while under federal control shall, without the prior approval of the President, declare or pay any dividend in excess of its regular rate of dividends during the three years ending June 30, 1917: *Provided, however,* That such carriers as have paid no regular dividends or no dividends during said period may, with the prior approval of the President, pay dividends at such rate as the President may determine.

The Revolving Fund

Sec. 6. That the sum of \$500,000,000 is hereby appropriated, out of the public treasury from any funds not otherwise appropriated, which, together with any funds available from any excess earnings of said carriers, may be used by the President as a revolving fund for the purpose of paying the expenses of the federal control, and any deficit of any carrier below such standard or ascertained return, and to provide terminals, improvements, engines, rolling stock, and other necessary equipment, such terminals, improvements, and equipment to be used and accounted for as the President may direct and to be disposed of as Congress may hereafter by law provide.

The President may also on or in connection with the property of any carrier, make or order any carrier to make any additions and improvements necessary or desirable for war purposes or in the public interest. He may from said revolving fund advance to such carrier all or any part of the expense of such additions and improvements so ordered and constructed by such carrier or by the President, such advances to be charged against such carrier and to bear interest at such rate and be payable on such terms as may be determined by the President, to the end that the United States may be fully reimbursed for any sums so advanced.

Any loss claimed to accrue to any carrier by reason of any such additions or improvements so ordered and constructed may be determined by agreement between the President and such carrier; failing such agreement the amount of such loss shall be ascertained as provided in section three hereof.

From said revolving fund the President may expend such an amount as he may deem necessary or desirable for the purchase, construction, or utilization and operation of boats, barges, tugs, and other transportation facilities on the inland and coastwise waterways, and may in the acquisition, operation, and use of such facilities create or employ such agencies and enter into such contracts and agreements as he shall deem in the public interest.

President May Purchase Securities

Sec. 7. That for the purpose of providing funds requisite for maturing obligations or for other legal and proper

expenditures, or for reorganizing railroads in receivership, carriers may, during the period of federal control, issue such bonds, notes, equipment trust certificates, stock and other forms of securities, secured or unsecured by mortgage, as the President may approve as consistent with the public interest. The President may purchase for the United States all or any part of such securities at prices not exceeding par, and may sell such securities whenever in his judgment it is desirable at prices not less than the cost thereof; any sums available from the revolving fund provided in section six may be used for such purchases.

Sec. 8. That the President may execute any of the powers herein and heretofore granted him with relation to federal control through such agencies as he may determine, and may fix the reasonable compensation for the performance of services in connection therewith, and may utilize the personnel and facilities of the Interstate Commerce Commission and call upon members of such commission, or any of its employees, or employees of any department of the government for such services as he may deem expedient. No such federal official or employee shall receive any additional compensation for such services.

Sec. 9. That the President is hereby authorized while carriers are under federal control to direct that the federal workmen's compensation act of September, 1916, shall be extended so as to apply to carrier employees, on such terms and conditions as will give due consideration to remedies available under state compensation laws or otherwise.

Sec. 10. That nothing herein contained shall be construed as modifying or restricting the powers heretofore conferred upon the President to take possession and assume control of any or all systems of transportation; and the President in addition to the powers conferred by this act, shall have and is hereby given such other and further powers necessary or appropriate to give effect to the powers herein and heretofore conferred.

Sec. 11. That carriers while under federal control shall, in so far as is not inconsistent therewith, or with the provisions of this act, or any other act applicable to such federal control, or with any order of the President, be subject to all laws and liabilities as common carriers; and suits may be brought by and against such carriers and judgments rendered as now provided by law: *Provided, however,* That except with the written assent of the President no attachment shall be levied by mesne process or on execution on or against any of the property used by any such carrier in the performance of its duties as a common carrier.

Sec. 12. That every person or corporation, whether carrier or shipper, or any receiver, trustee, lessee, agent, or person acting for or employed by a carrier or shipper, or other person, who shall knowingly violate or fail to observe any of the provisions of this Act, or shall knowingly interfere with or impede the possession, use, operation, or control of any railroad property, railroad, or transportation system hitherto or hereafter taken over by the President, or shall violate any of the provisions of any order or regulation made in pursuance of this Act, or of any other Act concerning such possession, use, operation, or control, shall be guilty of a misdemeanor, and shall, upon conviction, be punished by a fine of not more than \$5,000, or, if a person, by imprisonment for not more than two years, or both. Each independent transaction constituting a violation of, or a failure to observe, any of the provisions of this act, or any order entered in pursuance hereof, shall constitute a separate offense. For the taking or conversion to his own use or the embezzlement of money or property derived from or used in connection with the possession, use, or operation of said railroads or transportation systems, the criminal statutes of the United States, as well as the criminal statutes of the various states where applicable, shall apply to all officers, agents, and employees engaged in said railroad and transportation service,

while the same is under federal control, to the same extent as to persons employed in the regular service of the United States. Prosecutions for violations of this act or of any order entered hereunder shall be in the district courts of the United States under the direction of the attorney general in accordance with the procedure for the collection and imposing of fines and penalties now existing in said court.

Sec. 15. That the federal control of transportation systems heretofore and heretofore provided for shall continue for and during the period of the war and until Congress shall thereafter order otherwise.

Senate and House Committees

Begin Hearings on Bill

Both the Senate and the House committees having jurisdiction over railroad legislation began their consideration of the bill on Monday, January 7. The House Committee on Interstate Commerce held a short meeting and decided to hold hearings on Tuesday, inviting Director General McAdoo to appear and explain in detail the purpose of the various provisions in the administration bill.

Before the Senate committee, Alfred P. Thom, counsel for the Railway Executives' Advisory Committee, announced it was the position of the railroads that while the provisions of the bill were generally satisfactory, the proposed compensation based on the average net operating income of the three years ending June 30, 1917, would be inadequate, and that it should be based on the earning capacity at the time the roads were taken over or reasonably near that time. He was followed by Julius Kruttschnitt, chairman of the Southern Pacific, who advocated the use of the average for 1916 and 1917.

Amendments to the bill to eliminate the provision for continuing the government possession of the roads until Congress orders otherwise have been introduced by Senators Watson and Gallinger. The former proposes that the plan shall continue for only six months after the proclamation of peace, while the latter proposes that it shall end when the war does.

The Senate Committee on Interstate Commerce on January 2 had completed the first stage of its post mortem on the action of the President in taking over the railroads, after having heard Commissioners Hall, McChord and Aitchison of the Interstate Commerce Commission. On Monday, it resumed its hearing for the purpose of hearing from railway executives, with the President's recommendations before it.

The Republican senators confined their questioning of members of the commission principally to bringing out facts to show that the government itself was chiefly responsible for creating the railroad situation which called forth the President's exercise of his war power, and that he had possessed sufficient powers to deal with the situation without taking over the roads. All of the commissioners assented to the idea that "too much priority," as Mr. McChord expressed it, was largely responsible for the congestion.

After the commissioners had been heard from, Alfred P. Thom, counsel for the Railway Executives' Advisory Committee, urged the importance of a quick settlement of the question of compensation on a basis on which there can be an agreement without the necessity of resorting to the courts, because, he said, if there is any uncertainty there will be great financial distress. Senator Underwood asked what was the object of Congress trying to fix the terms of compensation because the Supreme Court has held that it cannot fix the compensation for the taking of private property. Mr. Thom replied that while that is true, Congress may authorize the President to enter into agreements on a certain basis and establish a tribunal to adjust claims on which there is a failure to agree. The senator also asked if an agreement with the President made by the officers and

directors of a road would be binding on the stockholders. That is a very serious and large question," Mr. Thom replied, "and the only safe way is to leave the stockholders out of the agreement."

No general rule for compensation would be universally applicable. Mr. Thom said, and many have must be dealt with specially as in the case of a cross property or one which in the last six months has greatly increased its value. The railroads wish to avoid as every one has the opportunity of an attitude of obstruction, realizing that every instant must be ready to make sacrifices necessary to the success of the war, but they are confronted with the great question of industrial transaction in history, and there is here a bare national institution in the land that it is not feasible to some extent on railroad securities. In the judgment of the railroads, he said, the basis of compensation should represent the equivalent of the property taken at the time it is taken or is near to that time as is reasonable and should represent what the property was worth in the hands of its owner.

Senator Pomerene remarked that the roads are still subject to regulation as to rates and asked whether the compensation should not be based on what might be considered reasonable earnings.

"The Interstate Commerce Commission has said in its annual report," replied Mr. Thom, "that the body of rates after all these years of regulation, are reasonable and should be so established by Congress for the future. To take advantage of the power of regulation to beat down the value of these properties that have been taken over would be to violate every principle of morality. It would be to say that the rates which have been declared to be reasonable are no longer reasonable in an attempt to reduce the value. Congress attempted something like that once and the Supreme Court in the Monongahela case said it could not be done."

Senator Cummins said that every lawyer would agree that the government must pay just compensation for property taken and he had supposed the railroads had been taken over, but that there was much in the bill as well as in the President's message to lead to some doubt as to whether the government had actually taken the property and was operating it or whether it had not merely exercised a greater degree of control.

"All power to control earning capacity has been taken away," replied Mr. Thom. "If the government manages well enough and the traffic is large enough any earnings in excess of the guarantee go to the government. The very substance of ownership has been taken away."

Mr. Kruttschnitt Testifies

Mr. Kruttschnitt presented statistical evidence to show that the year 1915 was exceptionally unfavorable and should not be included in the average on which to base the guarantee. There were more commercial failures in that year, he said, than in any year since 1860 and 66 per cent of the return earned by the roads on their property investment 4.07, was less than for any year since 1900. If the guarantee should be based on the three year average, all the additional money put into the properties since that time will not be allowed any return. The property now represents between 2,000 and 3,000 more miles and \$1,000,000,000 more money than in 1915. The method proposed by the President, if based on the last two years instead of three, would be satisfactory to most roads and the few special cases could be dealt with separately.

Senator Cummins asked if 1916 and 1917 were not abnormally good years, just as 1915 was abnormally bad. Mr. Kruttschnitt said that as compared with a period of years they were low. The operating income for the three years averaged 5.26 per cent, which was less than the return for 1917, 1918, 1919, 1920, 1907 or 1005 and only slightly over that for 1903. The compensation he said should be

based as nearly as possible on the condition at the time the roads were taken.

Senator Lewis asked whether the same basis of compensation would be fair if the government were to keep the roads permanently.

"Certainly not," replied Mr. Kruttschnitt, "the directors and shareholders would submit to some loss to help win the war, but I am not prepared to say they would accept the same basis permanently."

For the Southern Pacific, he said, the three year average would produce a return of slightly over 5 per cent on the book value.

Mr. Kruttschnitt continued his testimony on Tuesday, describing the remarkable increase in railroad efficiency accomplished by the railroads under the direction of the Railroads' War Board and showing how congestion had been caused by the abuse of government preference orders and by the shortage of locomotives, caused partly by the fact that the government had ordered domestic orders for engines postponed to send engines to France and Russia.

He also told the committee that when the plan of pooling the facilities of the eastern roads was announced, although the plan had not extended to the pooling of freight or of earnings, the attorney general had become aroused by the newspaper reports and had written a letter to the board warning them not to violate the laws. Members of the committee expressed a desire to see the correspondence. "It is in the archives of the War Board, wherever they are now," said Mr. Kruttschnitt.

Before Mr. Kruttschnitt took the stand A. P. Thom, counsel for the Railway Executives' Advisory Committee, made a statement to the committee to correct an impression given by newspaper statements that "the railroads will fight to retain their profits during the period of government control." "We were not appearing," he said, "in any controversial or obstructive attitude. We are not fighting at all, we have determined merely to lay the facts before the committee."

Mr. Kruttschnitt, in reply to a question by Senator Watson, said that all railroads had implicitly obeyed all directions of the War Board. There had been some differences of opinion and some slight argument, but when the War Board insisted its directions were always complied with.

Mr. Kruttschnitt's testimony was based on the statistics included in the report filed by the War Board last week with the Senate Committee, showing an increase in traffic handled of 20 per cent in six months of 1917 as compared with 1916 and of 50 per cent as compared with the corresponding period of 1915.

"Why didn't the railroads adopt these measures of efficiency long ago?" asked Senator Cummins.

"We have been working on them for 15 years," replied Mr. Kruttschnitt, "but some roads had made more progress than others and the efforts of the War Board were largely devoted to trying to bring up the roads at the bottom of the list to the highest standards while spurring the other roads to even greater efforts."

Mr. Kruttschnitt outlined the work of the Commission on Car Service in distributing cars to the points where they were most needed, regardless of ownership, including the sending of over 222,000 empty box cars from the congested roads to the roads which needed them.

"Then didn't you have as complete control of the cars as if there had been a common ownership?" asked Senator La Follette.

"As far as box cars were concerned," replied Mr. Kruttschnitt. "The pooling of coal cars was not attempted until later."

The Railroads' War Board had also submitted to the Fuel Administration a carefully worked out plan for dividing the country into districts to be served with coal from

mines in the district to avoid the cross-hauling of coal, but, he said, the railroads had no authority to put it into effect.

He showed how congestion had been increased by the indiscriminate use of preference orders by the government departments for all government freight regardless of its importance. "On one road it was found that 85 per cent of the freight was covered by preference orders and it was obviously impossible to give everything preference," he said. "Now that Mr. McAdoo is in charge he has followed our suggestion that someone be appointed to co-ordinate the government traffic requirements and has put Edward Chambers of the Food Administration in charge."

"But the government had all the power necessary to correct the difficulty without taking over the railroads," said Senator Kellogg.

"I think so," replied the witness.

The shortage of locomotives, Mr. Kruttschnitt said, was caused in part by the fact that the government had ordered the builders to hold back American orders in order to send their output to France and Russia. Now the Russian orders are being held back and 90 to 100 of the Russian engines have been taken for use here as well as about 100 locomotives built for General Pershing's army which could be spared for a time. Also 165 locomotives had been promised for the eastern roads which had been ordered for the western lines because the western roads' need for them is less urgent.

Senator Watson asked Mr. Kruttschnitt whether he believed the roads would ever go back to their old form of management. Mr. Kruttschnitt replied that their experience during the past eight months had led railroad officers to hope that after the war some of the handicaps under which they had worked because of the laws intended to force competition would be removed. They would have been able to accomplish a great deal more, he said, if they had been allowed to do some of the things prohibited by law. In reply to a question by Senator Watson as to the present status of the railroads Mr. Kruttschnitt read a copy of a telegram he had sent to the three Southern Pacific presidents telling them to follow the usual practices except as otherwise ordered and that there was nothing yet to require the discontinuance of solicitation or the closing of offices and agencies. He said this was the conclusion reached from the President's proclamation and the orders thus far issued by the director general.

Senator Cummins asked what motive the roads now have for controlling expenses. "We have every motive," was the reply. "If we ever lose our grip on expenses it would take years to get it back. That is the hardest kind of work an executive ever undertook." Mr. Kruttschnitt then explained that it was most important that the existing organization should not be demoralized and said that as a matter of pride railroad officers would not want to have the results of their stewardship under government control compare unfavorably with the results before.

"Why should the Southern Pacific have any guarantee from the government? Why should not it be satisfied with a claim for loss by reason of any order of the director general?"

"Our experience in collecting claims from the government for loss has been unfortunate," replied Mr. Kruttschnitt, and he added that the loss of efficiency which might result from a possible demoralization of the organization or from neglect of the property would be greater than any sum of money could pay for.

Commissioner Aitchison Testifies

Clyde B. Aitchison, one of the new members of the Interstate Commerce Commission, testified on January 2. He said all the members of the commission had come to the

conclusion that railway conditions were intolerable. He had concurred in recommending the two alternatives because the first, that the roads be assisted by the government while remaining under private control, naturally suggested itself. But he, at least, felt it was no longer tenable and that it was necessary to eliminate individual interests. He said the commission had intended to express no preference in stating first the alternative of allowing the roads to effect their own unification. He did not wish to criticize the work done by the Railroads War Board, but it did not seem to him that their resolutions were being translated into action and he did not see how they could be. Many of the resolutions, he thought, were taken by the roads as recommendations rather than as positive orders.

Mr. Aitchison put into the record statistics of railway earnings and expenses, etc., for 1916, and for nine months of 1917, showing a reduction of operating income of \$50,000,000 for the roads as a whole, although the loss was entirely on the eastern roads. Senator Cummins asked if it would be safe to take that as a basis for estimating the results for the year.

"You are asking me, in effect, to decide the 15 per cent case," replied Commissioner Aitchison. He also pointed out to the Senator that while the figures showed increases in maintenance expenditures, the carriers claimed that less work was being obtained for the money and that there was a great deal of deferred maintenance.

Senator Cummins asked the commissioner to file a statement showing the principal figures arrived at by the Bureau of Valuation in its first reports.

"As these are not representative roads, they would not give us any idea of what the other roads would show, would they?" asked Senator Kellogg.

"No," answered Mr. Aitchison, "and it would require legislation to make the findings of the commission prima facie evidence in condemnation proceedings."

"But the railroads have been taken over now and there is some obligation on the part of the government to pay for their use," said Senator Kellogg.

"That is my recollection of the constitution," replied the witness.

Senator Kellogg asked the witness whether he believed that the government could operate the roads more efficiently than private enterprise and whether he believed in government ownership. "I think government ownership is now inevitable," Mr. Aitchison replied, "and that is the consensus of opinion of the state commissioners with whom I have talked. Whether I regard it as desirable or not is a different question."

Mr. Aitchison declared that in his opinion a repeal of the restrictive laws would not have been sufficient to make the railroads operate as a unit and he cited the fact that while the Southern Railway was advertising in Washington papers asking people not to travel, the Southern Pacific was advertising in the same papers asking them to go to California by the way of New Orleans. Asked whether the railroads had diverted freight to less congested lines, Mr. Aitchison mentioned the use of the Western Maryland as an auxiliary line of the Baltimore & Ohio, "but," he said, "how long it would continue to carry empties for the B. & O., I couldn't say."

Senator E. D. Smith of South Carolina, the ranking member of the Committee on Interstate Commerce, has been selected by the Senate steering committee for election as chairman of the committee to succeed the late Senator Newlands, and Senator Ollie James of Kentucky to succeed him is a member of the committee.

George P. Anderson, of the Interstate Commerce Commission, testified before the House committee on Tuesday, in place of Mr. McAdoo, who will probably testify after the railway executives have appeared. He explained in detail

the provisions of the transportation bill, which he had taken an active part in drafting. He said that the provisions that increased taxes shall not be charged against the persons in computing the interest. Income would reduce the proceeds by about \$90,000,000, the amount of the increased cost of the railroad this year.

The Schenectady Ticket Office

By F. J. Lyon

THE FACILITIES of Schenectady, with 5000 employees, which we derive approximately \$47,000,000 of income annually. To handle the amount of business I have working with me three clerks, two clerks on duty and one night. Each man has his own ticket desk, safe and cash drawer containing a \$100 bank and a separate compartment is provided in the safe to lock up the same when not in use.

The ticket sales are taken care of during the day at one window, and the Pullman reservations, with general information and telephones at the second window, the day clerk alternating at these windows.

The local ticket case is built in beneath the window counter, extending to the right and left, and over each ticket is shown its destination and price. The two interline cases are directly behind the ticket window, one case being used for tickets with printed destinations which are alphabetically arranged, the price appearing over each ticket, the other case for blank destination tickets, which is alphabetically arranged as to terminal roads.

Four sheets are provided with space for three tours which covers the business handled for 24 hours. All local tickets have agents' stubs attached, thus making a complete stub system, and each tour is made up from the stubs the ticket clerk has when retiring from the ticket window. The three tours are balanced against the daily report books which are closed out at 12 o'clock noon each day, all local ticket numbers being called from the case. The interline is made up from the agents' stubs.

All tariffs are filed in binders labeled "Local" and "Interline" and kept handy to the ticket window, and all circulars, etc., received from the general offices are placed on the desk for one month until everyone becomes familiar with their contents, and at the end of that time are filed in files labeled to show the class of information they contain. When circulars or supplements to tariffs are received suspending the sale of rail water fares, we face the top ticket in the case in and endorse across the back "Off sale."

For the convenience of making mileage exchanges, we have prepared a list showing all the stations on the main line and a list showing the fares to the principal cities.

Some of our "Business Getters" are to be courteous to everyone; call our patrons by name as they appear at the window, if possible; make suggestions to the uninformed traveler, keep dodgers advertising excursions prominently displayed, watch local papers for information as to people visiting and leaving the city. While we do not have much time to call on them personally, we are usually able to get in touch with them by telephone or letter and quote them fares and make suggestions as to good travel service. When application is made for a foreign road time table, we ask if they are planning a trip and invite them into the office. Then we get out maps showing the country through which it would be possible for them to travel, describe such of the interesting points as we are familiar with, give them descriptive literature which would be of interest, quote the ticket and Pullman fares and try not let them escape any easier than the insurance agent does his prospective buyers.

Scientific Marketing and Transportation*

By T. C. Powell,

Vice-President, Southern Railway System, Cincinnati, Ohio.

THERE IS NO DOUBT in my mind that this country is suffering today more because of high prices than from any single cause. The high cost of living is no longer a jest! But these conditions have not been brought about by an actual shortage of food, but by a poor marketing system, and the failure of the marketing system has permitted manipulation of prices.

On October 19, the papers contained a despatch from New York stating that the Chicago packers were said to own millions of eggs in cold storage, for which there was no demand, and that wholesalers were said to be facing a loss of millions of dollars unless the Government fixed a price arbitrarily which would insure a profit. Is it probable that those consumers who had been paying 60 and 70 cents a dozen, and had been told that the price might go to \$1 a dozen, or higher, felt any sympathy?

With electricity, gasoline and steam at our command; with every device for handling commodities on land and water, we see peaches rotting on the trees in Maryland and apples on the trees in New York. We hear of a potato crop more generous than ever before in the history of the country; so generous that it is not being harvested; yet potatoes are higher than in 1915. With a shortage in some localities, we hear of food being thrown overboard and lost, and of milk being poured into the gutters, both for the purpose of keeping up the prices!

What are the real causes of the present inefficient system of marketing food products?

- (a) Lack of uniformity in packing and grading.
- (b) Dishonest packing.
- (c) Failure to plan highways so as to open up the producing and consuming territory for winter and bad weather. Summer roads are not enough and too much money is spent on roads which are not farm highways.
- (d) Failure to lay out the routes of the electric traction line so as to open up the country which cannot be reached by steam railroads.
- (e) Lack of coordination among the different forms of transportation.
- (f) Failure to appreciate that it is more important, and leads to more comfort, to market what is produced, rather than to excite a desire for what is scarce.

Co-ordination of Transportation Agencies

And yet we have more miles of good highways than ever before, and in addition to the motor trucks available for use on those highways, we have the electric traction line, the steam railroad, and the river steamers. Why is it not possible to combine these facilities into a co-ordinating piece of transportation machinery?

So far as river improvement is concerned, the army engineers have reported on those plans which are feasible and those which are not. Let us drop the ones that cannot be undertaken with a fair chance of profit, and concentrate on those which will justify the expenditure.

One such is the Ohio, from Pittsburgh to Cairo. Had the system of locks and dams recommended by the United States engineers been prosecuted vigorously and simultaneously by Congress, and slack water provided throughout the year, so that coal fleets might be operated at all seasons, the communities in Ohio would not have felt forced to confiscate coal during the last month. Such confiscation is a dangerous doctrine. It is opposed to all precedents of law and order, and the situation becomes one of "First come, first served, and the devil take the hindmost." It would certainly be far better permanently to improve the marketing facilities!

Decline of River Transportation

When first built into the Northwest, the railroads broke down the monopoly of the river steamboats. It used to be said of some of the boats on the upper Mississippi, before the advent of the railroads, that they were compelled to tow an extra barge to hold the money taken in by the purser! And if this was an exaggeration, it could truly be said, that many and many a boat paid her first cost out of the profits of one trip, and if it took more than three trips to do so, there was thought to be something the matter with the captain!

Notwithstanding this lead, river transportation has declined in this country because the organization has not kept pace with the demands of commerce. Each boat has been handled as a separate transaction and as if the public demanded to know the name of the boat, the name of the captain and other details of no interest whatever.

The steamboat companies should erect warehouses for the reception and delivery of freight, in locations convenient to the public, just as the railroads have done; and having taken charge of the freight, the river boat companies should despatch it to destination on a regular schedule, giving insured bill of lading and taking full responsibility for the safe delivery.

In other words, they should provide facilities for marketing the transportation they have to sell. When this is done, the river steamboats and the steam railroads will supplement each other.

As you doubtless know, the Government is now trying to demonstrate the practicality of river service by turning over to private parties and corporations the floating equipment of the War Department to haul barges of coal, ore and other commodities on some of the western rivers.

Reasons Interurban Electric Lines Fail

The interurban electric lines in this country have been failures in many cases because the projectors in frequent instances have tried to compete with the steam railroads, and the promoters have found that their support sometimes came from those who were merely antagonistic to the railroads, and whose judgment was, therefore, biased. Few interurbans have been intelligently located so as to open up new territory, and as a consequence, have simply shared in the traffic already existing, with only its normal increase.

Years ago a writer in England said that it would be far better to cover the country with a network of railroads capable of handling traffic and persons at moderate speed, rather than to spend all the money on a few high speed and expensive lines, which could serve only a few communities while the rest of the country remained inaccessible.

Why not plan the electric traction lines as adjuncts to the steam roads, and build them *into* the country instead of on the borders, and then again supplement these with highways, so that every farm and village will have access to the commercial centers in winter as well as summer?

Motor Truck Lines in Transportation Plan

It is proposed, in a bill which has been submitted to Congress, to give the Post Office Department power to establish a special motor truck collection system which will develop a direct delivery of foodstuffs to the consumer. This is what is termed "community marketing," which has been in vogue along the lines of the Southern Railway system for several years. The agents of the Southern Railway system development service collect the data, publish a "For Sale" bulletin, and encourage the use of any facility—parcel post, express, or freight train, and even advocate driving across country, if this seems the best plan in certain cases. I do not mean to do away with the broker or middleman. Within certain limits and under proper regulations, I recog-

*Abstract of an address before the Traffic Club of New York, on October 30.

imize the value of the middleman in establishing markets and providing part of the machinery of distribution, but the problem of scientific marketing goes beyond the scope of the intermediate handler.

I want to impress you with the magnitude of this problem, which includes a scheme of transportation so complete that from the factory, the farm and the fisherman's net, there shall be an unbroken channel to the ultimate consumer, and to do that I would require that every dollar of public money devoted to the improvement of our rivers and our highways, should be spent only in accordance with well conceived and closely co-ordinated plans.

An English Journalist's Views of the English Railway System*

WHEN war broke out it soon became clear that the transport of troops and munitions would involve the treasury in a huge liability to the companies, and it was therefore arranged that all the systems should be operated by one committee of managers. This control was afterwards extended to the tubes and the underground railroads of London, and a scheme for unifying control of surface cars on the streets of all the cities, some of them owned by companies and others by municipalities, is now under consideration.

Railroads in the United Kingdom are capitalized approximately at six billion dollars, and if so large an amount of government paper were added during the war to other government loans there might be a tendency to sell which would embarrass our sinking fund provision. . . . The shareholders have had no reason to complain; the only grievance arises in the case of certain companies that, like the Great Central, have long routes, recently opened up, the value of which will only develop as years go on. . . . Competing express trains were eliminated. Even long distance travelers have had to stand for hours in corridors. High speeds were relaxed. Hundreds of engines were exported to France and even Egypt (to connect up with Palestine). Passenger travel had to be cut down. Our standard fare is two cents a mile, third class, and this was raised to three cents. But all over the country we had cheaper week-end tickets and thousands of excursion trains at holiday seasons to race meetings, to football and cricket matches and to pleasure resorts. All these concessions have been cancelled. Only 100 pounds of baggage may now be carried by travelers, unless they are about to embark on the ocean, and even then they have to pay excess on weight above 100 pounds.

Before the war the net revenue of British railroads available for dividends of all kinds was, in round figures, £50,000,000. The companies paid very low wages. About 100,000 out of the 600,000 employees received under £1 a week, and while many of these were porters, who made good on tips, the record was not wholly creditable to our industrial reputation. The practice of the companies was to recruit their workers in the villages, where agricultural labor earned only, say, 16 to 18 shillings a week, and this reservoir of cheap man-power depressed wage rates throughout the entire transport system. When war broke out labor rose to a premium and wage increases have been granted which, up to a few weeks ago, must have involved the companies—that is the state, which guarantees the companies—in an annual charge of £25,000,000, or half the available fund for dividends. These increases are partly in the shape of war bonuses, but it is easier to concede a war bonus than to bring it to an end. And the boon to labor, however costly, may

be regarded as permanent. And it is said by Government further wage concessions, involving greater inflation, are now certain.

The effect must be either more opportunity travel for the public after the war or a great outflow of railroad capital. Moreover, when the time comes for reconstructing a damaged civilization immense masses of railroad stock must be renewed. All manner of repair have been postponed. Hundreds on hundreds of miles of track have been shipped off to France and elsewhere. All this will have to be put right.

But some at least of the gains of the socialist have been actually sacrificed by state control. Wages may be higher but hours are very long. The substitution of women for men at booking offices, and as ticket collector and train conductors is not precisely what the labor union would have asked for. But we shall never go back to private management. For so small a country as ours there was obviously no room, except for one railroad system. Yet no such monopoly could come about, except under state limitation of profits.

Some Train-Order Technicalities

By W. E. Watts

THE TRAIN ORDER BLANKS in use on most railroads are too small. This was mentioned by a recent writer in the *Railway Age*. Some roads have given careful thought to this matter and have provided a blank upon which that need be asked for. Others still continue to use the old size prescribed by the standard code many years ago. There should be at least three lines for the address, covering the whole width of the blank, five lines would be preferable. The prefix "C. & E." should be printed at the beginning of each line, instead of leaving the operators to write it in.

The space for the body of the order should be the same size on both Form 19 and Form 31. A short line should be printed in the bottom of this space for the initials of the signature of the person by whom the order is signed. Allow five lines for signatures on Form 31. The word "Complete" might be printed in the place provided for that purpose, leaving a blank space for the time. The word is, of course, of no effect until the time is added. A place should be provided for the name of the person receiving the order. Quite often one operator takes an order, and a different one delivers it. There could be no question as to the handling if this information were shown. The space for the body of the order should be at least six inches up and down; the word is fairly satisfactory already, but it would be better if a little wider.

Printed schedule blanks should be approved and encouraged. Names of stations should be printed, with space opposite each station for the "time" in figures only. Words, duplicated in figures, are confusing. A separate blank for each direction should be provided, as eastward and westward; northward and southward; the initial terminal in each direction being at the top of the blank, with following stations in order. Such printed schedules may be quite conveniently used for putting late trains on "waits," or for running extra, under old example 3, Form G, with right over certain other trains. If the train falls behind those figures a new string of waits can be put out for an entire district in a very few minutes; or, better still, such train may be given an order to "run late on order No. . . ." specifying, for example, from A to G, if desired. They are an especially desirable form of order for putting several delayed trains on one schedule when they are lunched. In such a case each train may be run late separately on that order if occasion requires.

When both forms 19 and 31 are used two colors are, of course, desired. Preferably, yellow should be used for 31 and

*From an article in the *New York Tribune* by P. W. Wilson, of the *London Daily News*.

green or white for 19. If only one of these forms is used yellow should be the color. Carbon impressions show up on yellow much better than on white or green. Yellow orders are easier read by engineers at night than either of the other two colors, and do not smut up so easily.

The use of typewriters should be authorized for copying train orders, but the machines ought to have larger type than the ordinary pic. A record ribbon is much better than copying ribbon; for the hard copy made by a copying ribbon has a tendency to "run" if it should get wet. Typewriters have been authorized and used on some railways for several years, and are liked on account of the orders being so much more legible than ordinary handwriting.

The quality of paper provided should allow of making eleven to thirteen copies with a stylus writing over a fly sheet. The paper used for train order blanks seems to have deteriorated somewhat during the past year or two, perhaps owing to the war. The best quality of double-sided train order carbons should be supplied. A brand formerly on the market, known as "Carter's" was as good as any the writer has come across. Price-cutting purchasing agents seem to give very little attention to such details. A good carbon is absolutely necessary for making more than three copies of an order. Thick carbons are practically useless for more than 5 copies. Operators frequently need to make from 10 to 15, or even 15, copies at one writing.

Good agate-pointed styluses should also be provided. Agate is much better than steel. Indelible pencils should not be used. Hard copy "runs" the same as with the copying-ribbon of the typewriter. Old specifications required paper capable of making seven copies with a No. 4 Faber pencil. This grade of pencil is too hard for practical train order use, as it tears the paper quite easily unless used with blunt point. The "Smith" steel stylus is next best to a good agate stylus.

Clearance Cards.—More space should be provided in the blanks for showing the numbers of the train orders delivered. The space generally allowed is insufficient. Trains are frequently cleared with as many as 15 or 20 train orders, including slow orders, annulments, etc., and operators have to write all over the blank, wherever they can find room. Clearance cards might well be printed on manifold paper, a little thicker than train order manifold, but thinner than the stock most generally used now. If used with double-sided carbons and a stylus the writing would show up much better than now.

Conservation of Material*

By J. P. Murphy,

General Storekeeper, New York Central, Cleveland, O.

AS CITIZENS and railroad men we have faced during the past few months what seemed to be, for the moment, insurmountable obstacles; yet means have been found whereby the difficulties, to a great extent, have been worked out. The conditions with which we are daily contending have, to a greater or less extent, affected our individual lives and we are beginning to feel that we not only must conserve our energy, apply it with the greatest efficiency in our daily occupation, but we must conserve in other directions. We are urged by our government that it behooves us to save, that our country and our freedom depend upon our effort in this direction and the support of our men in the field.

We are reclaiming eatables by converting the portions that are not used at one meal into some form appealing to the appetite at another meal. We are not preparing as large a portion for each individual as we formerly did, thus insuring to a greater extent against waste.

The food commission has wisely taken steps to discourage

the hoarding of supplies, prohibiting the storage of large quantities of sugar, canned goods, etc. The housewife favors this plan because she knows if she opens a hundred pound bag of sugar before the hired girl that it will be used much more freely than if there is a small quantity available. She knows if those preparing the dinner have access to a large quantity of potatoes, the tendency will be to use the fresh ones instead of reworking those left over after the last meal. The housewife is giving more personal attention to these things than she ever did before.

Many of our railroads saw fit, recently, to contract for large quantities of material; taking advantage of market conditions, and to a great degree, regulating delivery. In some instances our railroads have large quantities of material on hand. Some materials are exceptionally difficult to obtain. Prices have jumped from 60 cents each to \$3.00, and from 4 cents per pound to 10 and 12 cents. Items of stationery, which frequently do not receive due credit, such as pencils, inks, etc., have jumped 200, 300 and 400 per cent.

The tendency is, as we all know, where large quantities of material are available, to use the new article in preference to anything else. Conservation in the use of such available material is not a general matter. It is an individual proposition. We must realize that this material piled up on our railroads has an equivalent in dollars and cents; that it deteriorates while going through the reclamation period; that while it is sent on its way to the scrap dock other dollars and cents are put in its place.

The value of unapplied material on most railroads has doubled and trebled during the last two or three years and a large percentage of this amount or increase is due to increased prices. The same man-power that two or three years ago was using a pound of nuts that cost two cents is using, in the same manner today, a pound of the same article costing from four to six cents. This same principle applies to other items representing dollars instead of cents.

As the housewife has taken to the education of the members of her family and her assistants, so must the man in charge of the shop apply these same principles to the work he has in hand. Why should we conserve the use of sugar in our households and then go out to our work and permit the open keg of nuts, the monkey wrenches and thousand-and-one other items we have control over, to be wasted?

A striking object lesson which recently came to the writer's notice, is worth relating. In a railroad office employing 25 clerks, five or six of whom are stenographers or typists, the chief clerk was told at about four o'clock one afternoon to stop work, clear off the desks and ask each clerk to empty his waste basket on his desk and straighten out the contents so that the chief clerk might look them over. One of the crumpled bunches of papers taken from one of the baskets contained six new sheets of carbon paper and six sheets of onion skin with about two lines written by the typewriter across the sheet. Apparently, it was found by the stenographer that one of the carbons had been inverted when placing the sheets in the typewriter and instead of removing the carbon and correcting it, the entire bunch was taken from the machine and thrown into the waste basket. While six sheets of carbon paper and six sheets of onion skin may seem a trivial matter, it is typical of the detail waste that is continually going on, particularly in railroad service, where the material is bought and paid for by the other fellow.

While we are occupied with our personal contributions to the government, physically, mentally and financially, we may have been distracted from consideration of our vocation. We may have seen fit to forego the customary woollens for the coming winter in order to contribute more liberally to the Liberty Loan. Are we applying like principles to the properties entrusted to us, or are we permitting the company's material, representing dollars and cents, to go to waste?

*Abstract of a paper presented before the Central Railway Club.



General News



Employment of the Alaskan Engineering Commission, which is constructing a railroad in Alaska, subscribed for \$120,000 of the second Liberty Loan.

The Northern Pacific and the Northern Express Company have granted an increase of 10 per cent in the pay of all unorganized employees, effective January 1. This advance makes the present pay the same in the aggregate as was paid during 1917, but the money will now be paid monthly instead of partly by bonus at the end of each six months.

The Clayton Law, which (Section 10) requires competitive bids on certain classes of purchases made by railroads, and which was to have come into effect on Tuesday of this week, has in effect been suspended in this feature by a joint resolution of both houses of Congress which declares the provision inoperative for one year longer.

At Toronto, Ont., December 28, Justice Riddell, acting on the request of the general superintendent of the road, exempted from the draft 116 firemen and trammies of the Canadian Pacific. Local draft boards had refused exemption on behalf of the railroad; it was stated that the Ontario division was short 250 trammies.

The Chicago & Eastern Illinois has granted a 20-day working month and an advance of \$10 a month to its 424 telegraphers, effective January 1. The Chicago & North Western has granted a 13 per cent advance in pay to approximately 2,100 station agents, operators and workmen, effective December 1. Revised rates applying to these men were made effective January 1.

The Comptroller of the Currency in his call for a report of the condition of banks at the close of business on December 31, in addition to the usual information, asks for an itemized statement of the deposits carried by all railroads, street or electric railways and steamboat companies. This will furnish information to the government railroad administration in its plan for railroad financing.

Ten thousand soldiers are being sent into the woods of the Northwest as the Spruce Production Division of the Signal Corps. Their duties are to get out spruce and fir for airplane stock. These men are volunteering from Western National army camps and from civil life and from other services to counteract the trouble caused by I. W. W. agitation in Western lumber camps.

The Canadian Railway War Board has stationed an agent at the Niagara frontier to supervise the movement of coal and other traffic; with authority to send cars by the best route regardless of the original billing. The aim is to make sure of using all railroads to their full capacity. The traffic by ferry between Windsor and Detroit is to be pooled, with a view to saving fuel. The Board will call for the backing of the Canadian government in its efforts to get cars back from the United States, the excess on this side of the line being now about 22,000 cars.

The Shepherdsville Collision

The State Railroad Commission of Kentucky has announced that an investigation of the rear collision of passenger trains at Shepherdsville, Ky., on the Louisville & Nashville, December 20, killing 47 persons, will be begun at Louisville this week.

The Bullitt county grand jury has indicted three officers of the railroad company on charges connected with their responsibility for this collision, as developed in a hearing lasting five days. These officers are E. M. Starks, general manager; W. F. Sheridan, division superintendent, and F. J. Fishback, master of trains. These three, and the railroad company are indicted for "creating

and maintaining a common nuisance." A witness, Mr. Williamson, the superintendent of the station, is accused of being guilty of involuntary manslaughter. He is facing a charge of "serious neglect and willful negligence." As to the "serious neglect" charge, the jury will not agree, and a verdict is inconceivable.

Fifty Coaches Destroyed

At a fire in the garage of the Eastern & Middle of Warren, Mass., on Sunday last 50 passenger coaches were burned, with 40 recent cars and four small street cars destroyed, together with the North Station coach plant, the estimated loss at \$300,000.

High-Power Locomotive Headlight Law

The Interstate Commerce Commission has promulgated the effective date for the application of high-power locomotive headlights (rules 20 and 31) from January 1, 1918 to July 1, 1918. As these rules now state existing locomotives are to be equipped with headlights to meet the requirements of the Interstate Commerce Commission the first time they need repairs, the shops for general or heavy repairs after July 1, 1918 and all locomotives constructed after that date shall be so equipped. All locomotives must be equipped before July 1, 1920.

Buy Thrift Stamps with Liberty Bond Interest

"Apply the interest from your Liberty Bonds to the purchase of Government Thrift stamps." This suggestion has been advanced by President William Sprague to all officers and employees of the Southern Pacific's Pacific System. The suggestion came in the form of a circular which is to be widely distributed. Announcement is made that the Company will offer the security of its own vaults to all employees who desire to protect their Liberty Bonds and will collect in their behalf the interest as it accrues and either remit same or invest it in Government savings stamps as the owner desires.

New York City Subways

The Broadway subway Manhattan, New York City, is now in partial operation from Vesey street northward to Fort-street road street, about three miles. This line, operated by the New York Municipal Railway Corporation, controlled by the Brooklyn Rapid Transit Company, will when finished extend from the Battery northerly through Church street, Vesey street, Broadway and Seventh avenue to Fifty-ninth street, thence eastward under Fifty-ninth street and the East river to a connection with new rapid transit lines in Queens borough. On the south, the line is to be extended eastwardly under the East river to Brooklyn.

North Western Employees Asked to Increase Efficiency Under Government Control

R. H. Aishton, president of the Chicago & North Western, has sent circulars to every officer and employee of the Chicago & North Western containing a copy of the proclamation of the President assuming control of the transportation system of the country and copies of telegrams exchanged between Messrs. Aishton and McAdoo. In commenting on the appointment of Mr. McAdoo as the new head of the American railroad system, Mr. Aishton has this to say:

"Intelligent and redoubtable efforts to every employee and officer of this company is requested to make this efficiency in the movement of traffic about the lines tributary to the message from the director general of railroads and also in

line with the suggestions for increased efficiency that have been pointed out to the employees and officers of this company from time to time, and particularly since the declaration of war. All employees and officers are earnestly solicited to make recommendations to their superior officers for increased efficiency and economy in handling traffic, and where necessary such recommendations will be transmitted for the general manager's consideration. All concerned are especially requested to see that there is no failure to continue this company's policy of courtesy and efficiency in their dealings with patrons and the public in general."

Massacre of Passengers in Sonora

Press despatches of January 2 report that the regular south-bound passenger train of the Southern Pacific was stopped by Yaqui Indians at a point 32 miles south of Empalme, Sonora, and from 20 to 30 passengers killed, some of the passengers being from Tucson, Ariz. The conductor and the express messenger were also killed. There was on the train a military escort of about 75 soldiers, but these were greatly outnumbered. The Indians had stopped the train by tearing up the track. After looting the baggage and express cars, the Indians rode away.

Railway Regiments' Tobacco Fund

During the week ending Tuesday noon, January 8, the following contributions to the Railway Regiments' Tobacco Fund have been received:

- Robert H. Blackall, Pittsburgh, Pa., \$10 a month for 12 months.
 - Bridgeford Machine Tool Company, Rochester, N. Y., \$10 a month for 12 months.
 - Railroad Water & Coal Handling Company, Chicago, \$5 a month for 12 months.
 - Standard Safety Nut Corporation, New York, \$25 to cover 6 months.
- Preparations are now being made to forward the second shipment of tobacco about January 15.

Machinery in the Mail Room

The Southern Pacific has installed an 8-ft. revolving sorting table in its mail room at 65 Market street, San Francisco, Cal. Priority orders, war tax regulations, war board circulars and other matters incident to the increased activity of the railroads have swelled the volume of mail to such an extent that the installation of the sorting table was considered necessary. The table revolves three times a minute and when sheets of mail matter are to be assembled into sets, as in the case of tariff sheets, etc., clerks gather around it and assemble the sheets as they pass. An average of 30,000 pieces of mail matter are assembled in this way daily.

Railway Revenues and Expenses for October

The net operating income of the railways of the United States for October, 1917, was less than October, 1916, by \$64 per mile, or 12.8 per cent, according to the monthly bulletin of the Bureau of Railway Economics.

Total operating revenues, \$380,951,970, exceeded those for October, 1916, by \$42,285,740. Operating expenses, \$259,017,248, were greater by \$48,721,407. Net operating revenue, \$121,934,722, decreased \$6,435,657. Taxes \$21,910,588 increased by \$8,011,910. Net operating income was \$99,926,889, which is a decrease of \$14,504,608.

If spread over the mileage represented, operating revenues averaged \$1,648 per mile, an increase over October, 1916, of 12.3 per cent; operating expenses per mile, \$1,121, were greater by 23.0 per cent; net operating revenue per mile, \$527, shows a decrease of 5.2 per cent; while net operating income per mile, \$432, decreased 12.8 per cent. Taxes per mile rose 57.4 per cent. This summary covers 231,183 miles of operated line, or about 50 per cent of the steam railway mileage of the United States.

For the Eastern railways, operating revenues per mile were greater than those for October, 1916, by 13.9 per cent; operating expenses rose 25.5 per cent; net operating revenue decreased 10.0 per cent; taxes increased 35.1 per cent; operating income per mile decreased 15.8 per cent.

For the railways of the Southern District, operating revenues

REVENUES AND EXPENSES OF STEAM ROADS—OCTOBER, 1917.	UNITED STATES		EASTERN DISTRICT		SOUTHERN DISTRICT		WESTERN DISTRICT	
	Per mile of line—		Per mile of line—		Per mile of line—		Per mile of line—	
	1917	1916	1917	1916	1917	1916	1917	1916
Total operating revenues.....	\$380,951,970	\$1,648	\$380,951,970	\$1,648	\$117,559,879	\$1,320	\$157,082,664	\$1,117
Freight.....	270,297,894	1,064	270,297,894	1,064	117,559,879	1,320	112,072,425	867
Passenger.....	77,098,370	292	77,098,370	292	32,315,273	289	32,195,273	289
Mail.....	4,656,960	17	4,656,960	17	1,882,501	17	2,029,506	20
Express.....	9,199,117	35	9,199,117	35	4,304,555	32	3,756,647	29
All other.....	19,779,629	74	19,779,629	74	10,709,449	73	7,428,813	54
Total operating expenses.....	259,017,248	1,121	259,017,248	1,121	133,303,442	1,091	195,136,745	1,320
Maintenance of way and structures.....	40,323,705	154	40,323,705	154	17,899,366	154	35,990,040	186
Maintenance of equipment.....	63,722,822	239	63,722,822	239	30,829,000	239	10,118,976	236
Traffic.....	5,684,159	21	5,684,159	21	2,362,794	21	2,280,344	18
General.....	5,355,270	20	5,355,270	20	6,719,883	20	3,383,960	20
All other.....	2,066,770	8	2,066,770	8	1,335,069	8	750,011	6
Net operating revenue.....	121,934,722	527	121,934,722	527	43,594,653	739	59,358,898	459
Taxes.....	21,910,588	95	21,910,588	95	7,404,377	125	11,206,276	87
Uncollectible revenues.....	97,245	0	97,245	0	1	0	54,569	50
Operating income.....	99,926,889	432	99,926,889	432	36,185,725	613	48,097,953	372
Operating ratio—per cent—								
1917.....	67.06		67.06		66.68		66.68	
1916.....	62.10		62.10		62.63		62.63	
Average mileage represented—	231,183		231,183		42,862		129,339	
1916.....	230,840		230,840		42,678		129,052	

d Decrease. * Less than one dollar.

per mile exceeded those for October 1916. In 1910 per cent operating expenses rose 26.7 per cent, net operating revenue increased 1 per cent, taxes increased 68.8 per cent. Operating income per mile decreased 1.6 per cent.

For the Western railways, operating revenues per mile exceeded those for October 1916 by 8.7 per cent, operating expenses rose 18.6 per cent, net operating revenue decreased 4.5 per cent, taxes increased 73.1 per cent. Operating income per mile decreased 1.35 per cent.

The 10 months of the calendar year 1917 (compared with the corresponding period of the preceding year) show changes per mile of line as follows: Operating revenues increased 11.8 per cent, operating expenses increased 19.2 per cent, net operating revenue decreased 2.3 per cent, taxes increased 23.3 per cent, while operating income decreased 7.4 per cent.

Operating income per mile decreased 15.7 per cent in the East, increased 11.1 per cent in the South, and decreased 1.4 per cent in the West.

October net operating income per mile was 12.8 per cent less in 1917 than in 1916, 5.1 per cent less than in 1915, 2.9 per cent greater than in 1914, and 5.8 per cent greater than in 1913.

American Short Line Railroad Association

The Short Line Railroad Association of the South has recently changed its name to the American Short Line Railroad Association and amended its articles of organization so as to admit members from any part of the United States. There was such a demand for membership in the association that it was decided to extend its scope. The association will have the same officers as before: President, Bird M. Robinson; vice-president, B. S. Barker; secretary, T. F. Whittelsey (Washington, D. C.) and the following officers have been added to the staff of its Washington office, 709 Union Trust Building, S. S. Ashbaugh, general counsel, and M. M. Ashbaugh, assistant secretary.

Corrections for Statistical Number

Despite all the efforts of the editors of the *Railway Age* to make the annual statistical number absolutely accurate, two errors were made which were not found until it was too late for correction.

On page 65 in the article entitled "Freight Car Orders in 1917 Reach Low Level" the figures given in the first three lines were incorrect and did not agree with the figures given elsewhere in the issue and particularly in tables I, III and A of the article in question. The totals in these tables were the correct ones.

A total of 979 miles of new railroad was completed in the United States during 1917. This mileage was incorrectly reported in the opening paragraph of the article on Construction Activities During the Year on page 51. The figures in the table are correct.

National Safety Council

The Steam Railroad Section of the National Safety Council now has 83 members, representing 117,056 miles of railroads. Chairman Harry J. Bell has issued a circular calling on all members to co-operate in the safety work.

"Send to Frank A. Wightman, chairman, Springfield, Mo., at least one photograph and description from which a bulletin may be worked up. Or, better still, get up a bulletin all ready to print and send it to him. Criticisms about the bulletin service of the Section should be sent to Mr. Wightman. Send to George L. Wright (C. St. P., M. & O.) St. Paul, Minn., suggestions as to subjects which it is desired to have discussed at the next annual meeting. Members are reminded of their duty to answer questionnaires. To secure the full benefit of this service there must be a general response, so that at least a majority opinion will be given in the analysis which is prepared by the secretary from answers received. Members are asked to send to R. S. Jarnagin (N. Y. C.) New York City, all information concerning safety at grade crossings and in connection with dangers to trespassers. Whenever a bill is introduced in a legislature or a law passed, or any decision is issued by a state railroad commission, Mr. Jarnagin should have the benefit of the information promptly."

Electric Roads Economize

Electric roads, it is estimated, will save \$100,000,000 annually in operating costs over the same number of conventional roads. The United States Bureau of Commerce, which has made detailed study of the subject, says: "The conversion of roads to the electric type is being carried out by the conversion of first-class lines. James A. Allen, director of the American Electric Railway Association's War Board at Washington, estimated the roads that will be converted in 1917 will be a net saving next year. The production of steel in this country is at least adequate to produce 100,000 cars. Yet the country is short of at least 50,000,000 tons of iron products. The price was so high we can produce that in not by producing iron by-products. The street railways of this country are now usually consuming about 16,000,000 tons of coal and they are being asked to save 100 million. The total (see rules adopted by the street railway companies in the city of Washington) and which will result in saving much coal. These measures include the 'kip' or 'stepped stop,' every other car omitting every other stop, distribution of car mileage, reduction of heating in the cars, a gradual elimination of the dual hours of employees in large shops and stores, and the operation of two traction systems by means of one power plant. Resolutions were adopted requesting the Public Service Commission to take action looking to the carrying out of these changes, especially the staggering of hours of labor in industrial plants, the employees of which are patron of electric railroads. Under the present arrangement of operating many of these lines it is in most cases impossible for the companies to furnish a reasonably adequate service during 'rush hours'."

Switch Indicators as Safeguards

The Interstate Commerce Commission's report on the collision at Larnard, Va., October 21 (*Railway Age*, December 29, page 1171), shows the most prominent element in the cause of the collision to have been the failure of the men in charge of Train No. 16 to wait on the side track after getting the signal to go out to the main line, for the space of two minutes as required by the rule. If they had waited they would have seen or heard the train approaching on the main track and the collision would have been avoided.

In the investigation, W. J. Eck, signal engineer of the road was questioned about the use of indicators at crossings, and his views summarized as follows:

"He considered that the rule requiring a train to wait two minutes after the switch was opened before going out on the main line provided ample protection under all operating conditions, as at all crossing-point switches or signals are located within 500 ft. of the point of the switch, and, if a passing train be approximately 5,000 ft. long, the results in the case of the passing train being out over 5,500 ft. from the signal in any case. He considered such a rule safe for the use of switch indicators, for the reasons that the switch indicator is a small, delicate instrument, liable to get out of order and subject to neglect by the maintainer; it is installed where only the train brakeman, who is usually the most experienced man in the crew, observes it, and there is no practical method of checking the observation of an indicator; whereas every body on the train can check compliance with the two-minute rule, furthermore, in case expense, indicators are ordinarily installed to show red or blue as the block is occupied. Although a train may have passed the switch protected, and that introduces an element of uncertainty in the minds of trainmen as to the position of the block. Mr. Eck said that there was no rule in effect on the Southern railway requiring a train after stopping in a block to proceed under control of a member of the train crew through the block, although several instructions have been issued to that effect."

The inspector, evidently, does not fully accept Mr. Eck's claim that a train may not more than 550 ft. beyond the block signal, a distance of two minutes is sufficient, for he says that "under many operating conditions on the two-minute period prescribed by the rule it is probable that a train may require protection for a two-minute interval, as a passing train, particularly in the absence of a signal, may enter a block after stopping or slowing down to proceed under control through the remainder of the block, and in order to prevent a train from entering a block under any circumstances, the train crew must be instructed to stop at the block signal and the rule should be made to read as follows:"

Sproule on Government Control

In a recent public statement William Sproule, president of the Southern Pacific Company, made the following comments on government control of railroads:

"The President's proclamation, taking control of the railroads, states the method and purpose as clearly as it can be done, in my estimation. There can be no question that the highest motives actuate the President. Let us not forget that the center of the target at which the nation is aiming is war. If we will keep our minds fixed upon that as the center we will have a better measure of what is taking place. This is well stated in Section 80 of the 'Selective Service Regulations' issued by the Secretary of War, to govern the selection and organization of the army. This section says in part:

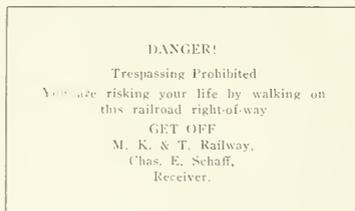
"Two things are to be accompanied to raise armies, to maintain industries and agriculture. . . . It is self-evident that the problem is not absolutely to prevent interference with industry, for that is impossible; it is to reduce interference to a minimum. A balance must be struck and maintained between the military and industrial needs of the nation. . . . The success of the nation's military operations is the dominant object, to which the conservation of certain industries is related as one means to that end. . . . The military necessity, being paramount, the task is to foster all necessary industries equally, to the maximum, consistent with the military necessities."

"This quotation omits portions of the section not material to the moment, but the observation quoted will remain true throughout the period of the war. Hence the public can rely upon it that in the operation of the railroads interference with the normal business of the country will be kept to the lowest point consistent with the purposes of the government in the winning of the war. The fact is that in emergency the government can do, without any question, things in the public interest that it would be unlawful for private ownership to attempt. As to the financial aspects, the financing suggested for the roads needing it leads inevitably to the Secretary of the Treasury, such financing must be done under his auspices and approval, which can be accomplished directly when it is the Secretary of the Treasury himself who has his hand upon the operation and conduct of the railroad systems of the country.

"The Railroads' War Board has given an impulse to unity of aim and purpose on the part of the railroads which is hard to overestimate. Reliance can be placed upon the continuing desire of the railroads to do their part toward the winning of the war, whatever may be the duration of this deplorable struggle for human rights so ardently championed by the President, behind whom we all stand."

"Safety First" on the M. K. & T.

The Missouri, Kansas & Texas distributes a leaflet 4 in. by 6 in. to foremen and others, to be handled to trespassers. These notices are made as small and as attractive as possible, so that foreman can carry them in their pockets and hand them out as occasion demands. The warning reads:



The M. K. & T. is distributing to new employees in the locomotive and car department a booklet, bound in paper covers, entitled "Ten Seconds for Safety." It contains fifteen National Safety Council bulletins cut down to 8 in. by 9 in. These bulletins contain illustrations of injuries and their results, and speak better than words.

Traffic News

The Pere Marquette, the Baltimore & Ohio and the Southern now run a daily train between Detroit, Mich., and Jacksonville, Fla.

The Intercolonial is now running passenger trains regularly to and from Quebec over the new bridge across the St. Lawrence river.

E. N. Hurley, chairman of the Federal Shipping Board, has been appointed chairman of the War Port Board at New York City, succeeding Secretary McAdoo.

Dr. H. A. Garfield, fuel administrator, announced on Monday of this week that henceforth no coal may be exported from the United States, except to Canada, until a license has been obtained. It is the intention to allow none exported except for purposes connected with the winning of the war.

William J. Jackson, receiver of the Chicago & Eastern Illinois, has been named by the Illinois railway presidents to advise the United States Fuel Administration in matters of fuel transportation and diversion in Illinois. This nomination was made at the request of the Fuel Administration, which, since it has been given power of diverting coal for domestic purposes, feels the need of the advice of an expert railroad operating officer.

At Huntingdon, Pa., January 7, the county fuel administrator seized for local needs 12 cars of bituminous coal, destined to New England and standing on the tracks of the Huntingdon & Broad Top Mountain Railroad. This road is now holding more than 1,000 cars of coal consigned to Philadelphia, to New England cities and other eastern destinations, which the Pennsylvania Railroad is unable to take.

Army Motors Detroit to Seaboard

As the result of the recent successful trial run of motor trucks, with freight, the quartermaster's department has decided to start similar trains from Detroit for the Atlantic seaboard every day for six weeks, beginning January 10.

The 46 motor trucks which were started from Buffalo, N. Y., by the War Department, on January 1, for New York City, 440 miles, made the journey in a little less than eight days. Severe weather prevailed throughout nearly the whole of the journey, the temperature being below zero a good deal of the time. This convoy was in charge of Captain J. K. DeLoach and 101 men.

Coal Production

According to the weekly report of the Geological Survey, a preliminary estimate places the estimated production of bituminous coal at 42,050,000 tons, the lowest recorded for months since April, 1917. On this basis the entire 1917 production should be approximately 544,142,000 tons, representing an increase over 1916 of 8.3 per cent. Anthracite shipments were reported as 29,228 cars. Reports from almost every district indicate some improvement over the extraordinary depression of the week of December 15. For the country as a whole, losses during the week ended December 22 due to all causes amounted to 31.9 per cent of the full time capacity. Improvement was reported in car supply, losses due to that factor declining from 30.8 to 24.8 per cent. Losses attributed to labor shortage and to mine disability returned to normal.

Zone System of Handling Embargoes

A zone system of handling embargoes will be introduced on January 21 for the purpose of simplifying for all concerned the problem of routing freight to conform with existing traffic restrictions. Heretofore each railroad has issued any necessary embargoes and has notified connecting lines; and these in turn have notified their connections, and so on until all lines have been advised. Under the new plan about 20 embargo zones will be established in the country in each of which one of the present sub-

committees of the Commission on Car Service will act as an embargo committee. New embargoes must be issued only once every 24 hours and each modification of an embargo must include a full statement of the original order. Each rail will notify its immediate connections as heretofore, and the embargo committee will advise other roads in the same case sending notice also to the Commission on Car Service at Washington and to each embargo committee. In this manner practically all carriers to the country will receive simultaneous information concerning each restriction from day to day.

Freight by Motor-Truck

Three of motor trucks are carrying freight between Boston, New York, Philadelphia, Washington and Baltimore. Two trains each 20 feet long, containing approximately 12 tons, were hauled on motor trucks from Chester to Reading, Pa. Five tons of supplies for the Red Cross were hauled from Philadelphia to Boston on express 320 miles in less than two days. Large quantities of yarn and textile material have been hauled from Philadelphia to New York and reshipped to New England points. A fleet of 22 motor trucks has been running on daily schedule between Philadelphia and New York since July 1, making trips also to Washington, Baltimore, Wilmington, Hartford, New Haven, Springfield, Providence, Harrisburg, Reading, Bethlehem, Trenton and other cities. Single motor-truck loads of freight recently have been insured for \$50,000. Recently 14,000 pounds of mottled leather were carried from Philadelphia to New York for export and 18 trucks carried 90 tons of musical instrument records to New York in a single day. Motion picture films are carried regularly between New York and Philadelphia. — *S. F. and L. Railway Bulletin*.

Lake Vessels on the Ocean

During the last few months a strange procession has been moving through the Great Lakes to the Sea.

The twenty-five locks of the Welland Canal can admit boats of 3,500 tons with 250 feet length and 44 feet beam. Thirty ships not exceeding these dimensions have already passed out to sea, while sixteen more have been cut in sections and so transported through the canal, to be assembled at Montreal. The larger passenger steamers must remain with the fresh water fleet, since their great width precludes the passage of the locks, even in sections. This process of cutting boats in two costs about as much as new construction, but effects a great saving in time and in materials. The process may be completed in about 100 days, one-third the time required to build a new boat. During the winter months, when lake navigation is closed, the use of this tonnage on the Atlantic is so much dear gain. Before spring, new construction on the Great Lakes will have replaced the loss. — *American Express Company's Travel Bulletin*.

Sending Box Cars West

A. H. Smith, assistant director of railroads, on Monday of this week ordered all roads to make special efforts to deliver box cars to lines west of Chicago and St. Louis, the cars being needed there to move grain from country stations to primary elevators. The grain waiting at New York now for shipment to Europe amounts to between five and six millions of bushels, and Mr. Smith calls for the embargo of shipments in box cars eastward except three classes of freight: (a) foodstuffs for human consumption; (b) export shipments approved by the New York committee; (c) government freight covered by section 3 of priority No. 5. The grain actually on hand at New York terminals at the date of the report was located, as follows:

Railroads	Bushels in Elevators or in Boats	Cars on Hand	Cars in Transit
N. Y. Central	1,898,180	27	42
Lehigh Valley	704,000	61	455
Pennsylvania	35,973	0	9
Erie	423,059	65	29
Lackawanna	1,500,000	180	448
Totals	4,561,218	333	983

Stimulation of Water Transportation

The government's stimulating measure of last month to stimulate water transportation has produced disappointingly little result. The water plant in existing form that provides for 170,000 tons of cargo water and 100,000 tons of freight water remains. The government's transportation program that began with the creation of the National Commission on Waterways, which has been several weeks in what has been called to all parties for country. "The great purpose of reducing the national loss so far known. Packet and large cargo coast or inland water tonnage provided and traffic should be handled to the extent.

There seems to be little or nothing to report except from the Mississippi river and its tributaries. Some progress has been noted from Atlantic to Pacific. All some good from coastwise shipping by the P&O line from New York to St. Louis and other points, notably from Kansas City to St. Louis and to Texas to Kansas City, and of all these enterprises, except the last, appear to have been in fact experiments. The government committee which did not succeed. Some activity is reported by city governments and their allies by voluntary associations toward the establishment of docks and loading and unloading facilities at a number of points. St. Louis, Allen, Deseret, Missouri, St. Paul, Minneapolis, Peoria and La Salle, Illinois, for example, must \$5,000 and committee are at work at present at Atlantic, Cook Island, Quincy, Canton, Hannibal and Keokuk. The United States Shipping Board has undertaken the construction of 35 steel barges for use on the Mississippi river, three to be 300 ft. long and 90 ft. draft.

Reductions in Passenger Service

The Boston & Maine will discontinue a large number of passenger trains on Sunday, January 20. The poster announcing these changes is a sheet 20 in. by 15 in. and it contains 150 or more items. Some of these cuts affect only one or two suspensions, and many refer to trains running only on Sunday; but the discontinuance of the main train running at least six days in the week number 75 or more.

The Long Island Railroad has taken out 13 passenger trains and has taken off all parlor cars.

The New York Central has taken off through passenger trains No. 29 and No. 80 between New York and Buffalo.

In Montreal it is announced that all of the lines have agreed to discontinue Sunday passenger trains to New York to Boston and to Portland, Me.

The Grand Trunk has discontinued its passenger train leaving Chicago for Buffalo at 12:10 p. m. and the train leaving Buffalo for Chicago at 11:30 p. m.

Among the 85 trains taken off by the New York, New Haven & Hartford at the beginning of this week were the Bay State Limited between New York and Boston, the new train to and from Pittsburgh over the Hell Gate bridge, and the State of Maine Express.

The Railroad Commission of Louisiana, in orders recently issued, has authorized the Texas & Pacific to discontinue three trains between Addis and Terras, 62 miles; two trains between Alexandria and Shreveport, 132 miles; two trains between Melville and Crowley, 57 miles; two trains between Eunice and Melville, 84 miles, and two trains between Addis and New Orleans, 89 miles. In an order issued on December 19, 1917, the commission imposed a penalty of \$400 on the Texas & Pacific for discontinuing certain trains on November 22 without its consent.

The Lehigh Valley has taken off trains which will reduce the passenger train mileage of the road about 75,000 miles a month, and expects to save 7,500 tons of coal a month. The most important trains taken off are Nos. 3 and 15 westward, and 2 and 12 eastward, both night trains. To other through trains, one in each direction will henceforth be run only over that portion of the line east of Wilkes-Barre. There will be left in service two through trains each way, the Black Diamond in the daytime and the Lehigh Limited at night. The rearrangement of local trains has been carried out in connection with a careful study of the possibilities of pooled railroads, the Central & New Jersey in Pennsylvania, and the New York Central in central New York, so as to give the public the best arrangements with the Texas trains.

Commission and Court News

State Commissions

In the case of Green Brothers Lumber Company versus the Vicksburg, Shreveport & Pacific, recently decided by the Railroad Commission of Louisiana, it was held that when circumstances entirely beyond the control of a shipper prevent him from shipping his finished product within the time required to benefit by rates stipulated in transit arrangements, he shall not be required to pay full tariff rates. In the petition it was stated that from June 2, 1915, to August 10, 1915, 70 cars of logs were shipped into the Green Brothers mill over the V., S. & P. on which full tariff rates were paid. These logs were to be made into lumber and the lumber reshipped over the same road within 12 months, after which the petitioner was entitled to a refund of \$378. On account of the acute car shortage, embargoes and an exceedingly depressed condition of the lumber market caused by the European war it was not possible to ship out the lumber within the allotted 12 months' time. The commission declare the petitioner entitled to a refund equivalent to what was paid above the rate specified in the stop-over arrangement, in so far as intrastate shipments were involved; in other words, the time-limit is held unreasonable.—Green Brothers Lumber Co. v. V., S. & P. Decided December 18, 1917.

Court News

Unloading Oil Tank Cars

A tank car was unloaded by removing a tap on a pipe in the bottom and connecting a pipe, and then opening a valve from the top of the tank. When the tap was removed the flow of oil from the tank could be controlled by means of the valve. When the tap was removed at destination the valve was open when it should have been closed and oil was wasted before the pipe could be connected or the valve closed. The Texas Court of Appeals holds that the tank having been filled by the plaintiff shipper before starting, the railroad was not liable for the loss of oil, and judgment for the plaintiff was reversed.—Houston & T. C. v. Oriental Oil Co. (Tex.), 198 S. W., 601. Decided November 1, 1917.

Hours of Service Act

A train crew was released from duty at a division terminal for an hour and a half while refrigerator cars were being iced, but the release was not absolute, and the men were required to hold themselves in readiness to respond to a call, if needed. The Circuit Court of Appeals, Ninth Circuit, holds that the release did not break the continuity of the service. It also holds that the fact that rainfalls a few days previous had softened the track so that trains were subjected to delay did not excuse excessive hours of service; this was not an unavoidable accident, nor could it be excused, under the law, as an "act of God."—United States v. Southern Pacific, 245 Fed., 722. Decided October 22, 1917.

Grant of Right of Way

An owner made an absolute and unqualified sale of a tract of land to a railroad without reserving a roadway reserved in a former deed of an adjoining tract. In an action by the owner against the railroad for the obstruction of the road way it appeared that the second tract of land was bought for the purpose of double-tracking the railroad. Owing to landslides, it was necessary to make a difference in the grade of the two tracks. This difference in grade made the crossing practically impassable. Thereafter the company constructed another roadway for the plaintiff, several hundred feet longer, which the plaintiff claimed was not safe and practicable. The Kentucky Court of Appeals holds that there could be no implied reservation of the existing roadway in the second deed, but only of a way that was absolutely necessary to give the plaintiff an outlet to the public road, in view of the rule that a grant is taken more strongly against the grantor, and that, if he intends to reserve any right over the

land granted, it is his duty to reserve it expressly in the grant; and that the roadway substituted by the railroad was as safe and practicable as the circumstances would permit.—McGurn v. Louisville & Nashville (Ky.), 198 S. W., 222. Decided November 23, 1917.

Surrender of Bill of Lading

A manufacturer shipped an automobile to its sales agent under a bill of lading to be surrendered. The sales agent secured the car without surrendering the bill of lading and sold it to an innocent purchaser. In an action by the railroad to recover possession of the automobile the Iowa Supreme Court held that the sales agent could not by such sale transfer good title as against the manufacturer or against the carrier who had paid the value of the car to the manufacturer. The carrier may waive a provision of a bill of lading requiring its surrender before delivery of the property, but the presumption that it did so cannot be indulged.—Chicago, R. I. & P. v. McElhany (Iowa), 165 N. W., 67. Decided November 17, 1917.

Exchange of "Off Line" Service Contracts

In an action by a railroad company against a telegraph company to compel the latter to comply with a contract, dated prior to 1906, for 99 years, for the exchange of services, the question was: Under the laws as they exist today, can a carrier or telegraph company render "off-line" service to the other at a rate other than that published in the regular schedules and different from the rate charged the general public? The Federal District Court for the Northern District of Illinois holds that such a contract, though valid when made, is prohibited by the act of 1906 amending the Commerce Act, and is not authorized by the amendment of 1910.—C. G. W. v. Postal Telegraph-Cable Co., 245 Fed., 592. Decided August 14, 1917.

Crossing Accident—Contributory Negligence

In an action for injuries by a train to the driver of a taxicab at a crossing, where, from the physical facts established, the plaintiff, had he looked and listened, must have observed the approach of a train, the California Court of Appeal held that the fact that he testified that he looked for the train and did not see it until he was on the track did not absolve him of contributory negligence. The mere fact that telegraph poles obscured his vision at one point did not absolve the plaintiff of contributory negligence when for 30 feet immediately before he drove on the track his vision was unobscured, since a traveler must look for a train where such looking would be effective.—Jones v. Southern Pacific (Cal.), 168 Pac., 586. Decided September 14, 1917.

Insufficient Evidence of Negligence

A freight conductor was killed by the explosion of torpedoes put on the track by some unknown person. The evidence showed that the torpedoes were the same kind as those kept by the railroad company in its locked storeroom not far away. The window of the storeroom was not always securely fastened. The key to the storeroom was accessible to the company's employees. In an action for the death, the plaintiff rested her case on the establishment of these facts, it being her theory that it was sufficient for her to show that the torpedoes were thus negligently kept where some thief might have stolen them and set them on the track, where by explosion they killed the employee. The Kansas Supreme Court held that a demurrer to the evidence was properly sustained.—Norman v. Atchison, T. & S. F. (Kan.), 168 Pac., 830. Decided November 10, 1917.

Railroad and Pullman Company Exonerated

A passenger sued for injuries caused by slipping on the sill or threshold of a Pullman car while entering, alleging negligence on the part of the railroad and the Pullman company in allowing the threshold to be uncovered and to become coated with ice. The car was of the latest and most improved type of construction, in perfect repair, and the film of ice, if any, which caused the fall was so imperceptible that it could not be discovered without getting down on the floor and scraping the sill with a knife.

The Utah Supreme Court held that in such an instance the doctrine of *res ipsa loquitur* did not apply. It also held that the railroad and the Pullman company were required to exercise only reasonable care for the safety of a passenger in acquiring a knowledge of the presence of ice on the sill of a car, and if the ice could not be seen by an ordinarily reasonable inspection they were not liable to a passenger who slipped and fell. Judgment for the defendants was affirmed.—*Cornell v. O. S. L. (Utah)*, 98 Pac., 337. Decided November 9, 1917.

Passengers' Baggage—Property of Another

The Oklahoma Supreme Court in an action for damages for the loss of a traveling salesman's sample trunk which had been checked by him in the baggage room and was destroyed by fire therein holds that as the railroad had no knowledge of the relation between the passenger and his employers, the plaintiffs, the owners of the property, it was not liable to the plaintiffs in the absence of gross negligence or willful misconduct. The court stated the well settled general rule to be as follows: The carriage of baggage is a mere incident of the carriage of the owner as a passenger; and where a passenger procures the property of another to be carried as baggage, the carrier, if without knowledge of the true ownership, is a gratuitous bailee thereof, and liable to the owner only for loss or damage caused by gross negligence or willful misconduct. Judgment for the plaintiff was reversed.—*Lusk v. Bloch (Okla.)*, 168 Pac., 430. Decided May 22, 1917. Rehearing denied, November 6, 1917.

Taxation of Land Used for Railroad Purposes

In an action against a local board of commissioners to enjoin the sale for delinquent taxes of a piece of land on which tracks had been laid, the Kansas Supreme Court holds that when property, however acquired or previously held, is incorporated into the right of way or yards of a railroad, or is otherwise devoted to the use and operation of a railroad, it becomes taxable by the tax commission, and cannot be assessed or taxed by local authorities. When tracks were laid over the land in question, and it was used as part of the yards of the railroad, it became the duty of the company's officers to include it in its returns made to the tax commission in the following March. A single failure to make such return would have made the company liable to a penalty of not less than \$1,000 under the Kansas statute. The fact that the land had been assessed by the local authorities the year before, upon a valuation which under the law was to be effective for a two-year period, did not prevent the property from passing within the jurisdiction of the tax commission. The railroad was held entitled to injunction.—*Atchison, T. & S. F. v. Board (Kan.)*, 168 Pac., 687. Decided November 10, 1917.

Intrastate Rate-Fixing Proceeding

Appeal was taken from an order of the Pennsylvania Public Service Commission, holding that the rates for carrying milk and cream into Pittsburgh and its suburban towns were excessive and unreasonable, and fixing new rates. The Pennsylvania Superior Court holds that where a railroad company has filed a new tariff of freight rates and no complaint is made within thirty days against such tariff, the proposed rates become effective rates, and if any shipper thereafter complains to the commission that such rates are unreasonable, the burden of proof is upon him to establish that fact. In such a case the railroad is not required to produce any evidence until the complainant has, *prima facie* at least, offered proof which if unanswered would warrant an order in his favor.

The commission found "that the rates complained of are an increase of practically one hundred per cent." It was held on appeal that this finding was not sustained by an inspection and comparison of the old tariff with the new tariff, and the record did not show that the commission had found facts which would enable the court to determine whether or not the conclusion of the commission was reasonable and lawful. The order of the commission was reversed, and the record remitted to the commission with directions to reconsider the order, and make such further report as would be warranted by the law and the evidence. *B. & O. v. Commission*, 66 Pa. Superior Ct. 403. Decided April 15, 1917.

Equipment and Supplies

Locomotives

THE ALABAMA & GULF & JACKSON is requiring for 25 Mikado locomotives.

THE DELAWARE, LACKAWANNA & PENNSYLVANIA is purchasing for 15 Mikado locomotives.

THE CALUMET & ABERDEEN MINING COMPANY is requiring for one Consolidation locomotive.

THE GULF HAV & WESTERN has ordered 2 Mikado type locomotives from the American Locomotive Company.

ARTHUR MEN CARROLL, Patent Specialist, 11 W. L., who styles himself a manufacturer, agent and tropical rubber specialist dealing in the West Indies, Brazil, French and Dutch Guiana and in Venezuela, writes under date of December 13 at follows:

I am in the market now for two locomotives of per enclosed specification and have been informed that there may be a possibility to get them if not to exact specification, at least very near, among those built for Russian orders and not shipped to destination owing to present conditions in Russia.

SPECIFICATION OF TWO LOCOMOTIVES REQUIRED

- TYPE—4-4-0
- GAUGE—4 ft. 8 1/2 in.
- DRIVING WHEELS—51 in.
- BOILER PRESSURE—160 to 200 lb.
- WEIGHT—30,320 to 42,240 lb.
- CYLINDERS—14 in. by 16 in. by 20 in. by 24 in.
- FIRE-BOXING Capacity preferable.
- TUBES—Brass.
- TYPE OF BUZZER—Link & Die.
- SUPERHEATED with OIL BURNER for FUEL OIL.

State has been met in the south of N. Y. New York and state of N. Y.

Anyway, I want two locomotives more or less of the type specified for early delivery and will be very pleased if you could put me in the way to get them.

With satisfaction to the authorities I have supplanted other foreign manufacturers with goods of American manufacture on the same railroad for which I require these locomotives and consequently have good business relations with them.

By careful handling I have built up a pretty decent trade between them and U. S. Manufacturers and have their assurance of permanent custom *after the war* for at least one of the men which I supply exclusively to them.

I may mention that if these locomotives be obtained and of satisfactory, there is an assurance of at least one repeat order.

ARTHUR A. CAMPBELL.

Freight Cars

THE ILLINOIS CENTRAL is requiring for 25 caboose car bodies frames.

THE UNION PACIFIC has recalled a recently issued inquiry for 200 tank cars.

DIXON & HILFBRUNN, Tulsa, Okla., are requiring for 50 8,000-gal tank cars.

THE PITTSBURGH, ALLEGHENY & MCKEY RAILROAD is asking prices on 10 steel hopper cars.

THE ATLANTIC COAST LINE is in the market for 1,000 48-ton steel underframe vent-liner box cars.

THE BALTIMORE & OHIO has issued inquiries for 1,000 50-ton steel underframe box cars, 1,000 50-ton flat bottom gondola cars and 1,000 50-ton hopper cars.

THE PITTSBURGH & WESTERN RAILROAD COMPANY, 1420 Chestnut Street, Philadelphia, is in the market for 50 special flat bottoming and tank cars, see notice on page 100 over.

ITALIAN GOVERNMENT RAILWAYS.—The order for 9,000 freight cars for the Italian Government, which has been in contemplation since November, is about to be placed. Reports have it that the American Car & Foundry Company and the Standard Steel Car Company will get the major part of the order.

Passenger Cars

THE DULUTH & IRON RANGE, noted in the *Railway Age Gazette* of November 16 as inquiring for 5 passenger cars, has ordered 5 coaches from the Pullman Company.

Miscellaneous

THE UNITED STATES GOVERNMENT has ordered a large number of gasoline motor cars for the use of the army on track work in France.

THE UNION STOCKYARDS COMPANY, Omaha, Neb., has placed an order with the Roberts & Schaefer Company for a 150-ton automatic electric coaling plant for South Omaha, Neb.

THE NEW SOUTH WALES GOVERNMENT RAILWAYS, Sydney, Australia, have ordered from the Roberts & Schaefer Company the entire machinery for an automatic electric locomotive plant.

THE LOUISVILLE & NASHVILLE has placed an order with the Roberts & Schaefer Company for coal-handling machinery for a coaling plant at Nashville, Tenn., and a 400-ton concrete coaling plant at Guthrie, Ky.

THE HOCKING VALLEY has ordered from the Roberts & Schaefer Company a complete installation of Robertson cinder equipment for a 300-ton concrete coaling plant which Roberts & Schaefer is now building at Nelsonville, Ohio.

THE BESSEMER & LAKE ERIE has placed an order with the Roberts & Schaefer Company for the equipment of a coaling plant of 400-ton capacity using four RandS measuring coal loaders, electrically operated, at North Bessemer, Pa.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS has ordered from the Roberts & Schaefer Company two 300-ton capacity frame-constructed coaling plants, for installation at Nashville, Tenn., and at Chattanooga, each to be equipped with two RandS measuring coal loaders.

THE PENNSYLVANIA RAILROAD has given a contract to the Roberts & Schaefer Company, Chicago, for the design and construction of a 300-ton reinforced concrete, automatic, electric, locomotive coaling plant and a gravity sand plant for installation at West Brownsville Junction, Pa.; a 200-ton concrete, automatic, electric coaling plant and a gravity sand plant at Blairsville, Pa.; and a 100-ton automatic electric coaling plant which is now being built at Rochester, N. Y.

Signaling

THE WASHINGTON, BALTIMORE & ANNAPOLIS is installing two blocks of automatic signals, one at Shipleys and the other at Ardmore, Maryland, with three-color light signals having a range of from 1,500 to 2,000 ft., under bright sunlight conditions. The material is furnished by the Union Switch & Signal Company.

THE RICHMOND (VA.) TERMINAL COMPANY will install an electro-pneumatic interlocking plant at the Richmond Terminal. The 51-lever frame will include 22 switch levers and 15 signal levers. The 32 track circuits within the locking limits will be equipped with two-position, Model 15 A. C. vac type relays. The Union Switch & Signal Company has the contract for this work.

NEW ROLLING STOCK FOR CHILEAN RAILWAY.—By proclamation dated September 26, 1917, the President of Chile has set aside for the use of the Arica-La Paz Railway the sum of 1,200,000 pesos (\$440,000). This fund is to be employed in the purchase of 100 steel freight cars of 25-ton capacity, and 3 Mallet locomotives. Persons interested in this matter may secure further detailed information from the Ministry of Railways, Santiago, Chile.—*Commerce Report.*

Supply Trade News

Shelby S. Roberts announces the dissolution of the firm of Berry & Roberts and his continuance of the business in the general practice of civil engineering, with office in the Transportation building, Chicago.

P. W. Page, formerly representative for the B. F. Goodrich Rubber Company, Akron, Ohio, in western Massachusetts and southern Vermont and more recently an ensign in the United States Navy, was drowned recently off the coast of England when his seaplane became unmanageable and plunged into the sea.

Peter Leidenger, western sales manager of The Dayton Manufacturing Company, Dayton, Ohio, died suddenly of pneumonia at the Buckingham Hotel, St. Louis, Mo., on December 28. Mr. Leidenger was born at Ironton, Ohio, in 1862, and had been with the Dayton Manufacturing Company for the past 30 years.

Russell T. Gray, formerly advertising manager of the Haynes Automobile Company and more recently secretary of the Shuman Advertising Company, Chicago, has opened an office in the First National Bank building, Chicago, as an advertising engineer. Among his clients are the Chicago Malleable Castings Company and the Interstate Iron & Steel Company, both of Chicago.

D. Gleisen has been appointed manager of the industrial bearings division of the Hyatt Roller Bearing Company, Newark, N. J. Mr. Gleisen is a mechanical engineer, a graduate of Stevens Institute, and has been connected with the Hyatt Roller Bearing Company for the past six years. He was formerly assistant manager of the Hyatt Company in charge of the bushings sales.

Ralph C. Davison, for the past six years associated with the American Mason Safety Tread Company, New York, in a selling and engineering capacity, has resigned his position and directorship with the above company to engage in a broader and more active field with the American Abrasive Metals Company, makers of Feralun Safety Treads and Anti-Slip surfaces. Mr. Davison, through his connection with the Concrete Association of America, has a large acquaintance among architects and contractors. He was also at one time an associate editor of the *Railroad Gazette*.

Frank W. Hall has been appointed commercial manager of the Sprague Electric Works of the General Electric Company. With the exception of a short period, Mr. Hall has been connected with the Sprague Works continuously for 22 years in various engineering and sales capacities, and for the three years prior to his present appointment occupied the position of sales manager. **D. C. Durland**, former executive head of the Sprague Electric Works, has resigned to accept the presidency of the Mitchell Motors Company, Inc.

Charles V. Eades, who recently resigned as sales manager and engineer of the asphalt product department of the Standard Asphalt & Rubber Company, Chicago, announces the establishment of the Mineral Rubber Products Company, with offices at 280 Madison avenue, New York City. The company will handle materials and will contract for floors, waterproofing, insulation, expansion specialties, protective coatings, etc., as well as represent other well-known manufacturers. One of the special products which this company has put on the market is a moisture-proof concrete block, designed by Mr. Eades.

LESS HEAT IN SWISS TRAINS.—As a fuel-saving measure passenger coaches on the Swiss Federal Railways will not be heated to the usual standard this winter, reports Consul Lewis W. Haskell, of Geneva. The use of traveling rugs, to offset this lack of heat, is suggested.

Financial and Construction

ATLANTA, TOLUCA & SANTA FE.—Attachments to the charter of four subsidiaries of the Atlanta, Toluca & Santa Fe have been filed in the secretary of state's office at Austin, Tex. The Cane Belt has increased its capital stock from \$100,000 to \$800,000. The South Plains & Santa Fe has increased its capital stock from \$50,000 to \$7,000,000. The Paulville & Santa Fe has increased its capital stock from \$904,800 to \$3,500,000 and the Pecos & North Texas has increased its capital stock from \$710,000 to \$3,500,000.

DENVER & RIO GRANDE.—The United States Circuit Court of Appeals has affirmed the decision of the Lower Court against the Denver & Rio Grande in the suit brought on behalf of the bondholders of the former Western Pacific by the Equitable Trust company. The amount involved is \$32,272,274, which with interest accrued brings the total judgment up above \$38,000,000.

Horace Payne, counsel for the Director General of Railroads, had a conference at Washington on January 8 with representatives of the Denver & Rio Grande, Western Pacific and Missouri Pacific railways with regard to the financial situation of those roads. At its conclusion Mr. Payne said:

"The Equitable Trust Company has obtained a judgment in New York and another in Denver based on that in New York, for about \$38,000,000 against the roads. Attachments had been levied on approximately \$2,000,000 of cash in New York and Chicago. It was feared that an interruption in the operation of the roads would result because of a failure to meet payrolls and other pressing obligations. Counsel representing these interests had been here and I invited them all to come here together today for this conference. Counsel representing the Equitable Trust Company indicated they were willing to release enough of the funds levied upon them to give the roads a sufficient working capital, but wanted a lien upon about \$3,000,000 of free assets in the treasury of the company in Denver, consisting of Liberty bonds and other assets, and also expressed the desire that the interest maturing January 1, partly paid, be fully paid, and that the interest on bonds and interest maturing February 1 should be paid. They insisted that money advanced for improvements, or, indeed, any substantial sums of money if not secured by the free assets should be secured by receivers' certificates or other arrangements ahead of the bonds except the underlying issue.

"It was plain that this could be done only by a receivership. After much discussion, the parties indicated a willingness to come together on some arrangement, the effect of which would probably be to make an immediate application for a receiver unnecessary, but failing in this, a receivership would be arranged for and application made to the Director-General for his consent to the appointment of a receiver with his approval and his approval of the person to be named as receiver."

MISSOURI PACIFIC.—The Missouri Pacific Railroad Company, a Missouri corporation, has filed a petition with the Illinois Public Utilities Commission asking for authority to purchase the line of the Missouri Pacific Railroad Company, a Delaware corporation, and has asked for a certificate of convenience and necessity to operate the road in Illinois and for permission to extend a lien of first refunding mortgage bonds of the Missouri Pacific Railroad Company, a Missouri corporation over the Delaware corporation.

WESTERN PACIFIC.—See Denver & Rio Grande.

Railway Construction

TAMPA SOUTHERN.—Contracts have been given to E. W. Parker, Tampa, Fla., and to Baxter Morrison, Inverness, to build from Tampa, south to Palmetto. The line is projected further south via Manatee to Sarasota, a total of about 57 miles. D. C. Gillett, president, Tampa; J. E. Willoughby, chief engineer, Wilmington, N. C. (May 4, p. 976)

Railway Officers

Executive, Financial, Legal and Accounting

E. T. Halter has been appointed general manager of the Central Railway with headquarters at Washington, D. C. R. T. Criswell resigned.

J. J. Cogan (former member of the Colorado Midland and the Cripple Creek & Colorado Springs, both of the Colorado Springs Col.) has been dismissed as president.

F. R. Bolles, general manager of the Chicago, Quincy and Ohio, with headquarters at Houghton, Mo., and general manager, vice president and general manager, vice president, over the operating and traffic departments.

G. B. Wall, assistant to president of the Chesapeake & Ohio, with headquarters at Richmond, Va., has been appointed vice-president, and will continue in charge of the real estate, industrial and tax departments and perform such other duties as may be assigned to him.

A. W. Towsley, formerly vice-president and general manager of the Ann Arbor with office at Toledo, Ohio and more recently special representative in the vice-president's office of the Chicago, Rock Island & Pacific at Chicago, Ill., was appointed assistant to the vice-president in charge of construction and will give special attention to transportation matters, effective January 1.

The authority of **George M. Shriver**, chief investment officer of the Baltimore & Ohio in charge of accounting, treasury, loan and relief departments, with headquarters at Baltimore, Md., has been extended over the purchasing department and the authority of **Arthur W. Thompson**, vice-president in charge of traffic and commercial development, with headquarters at Baltimore, has been extended over the operating and engineering departments, effective January 1.

Operating

O. H. McCarty has been appointed superintendent of the Western division of the Western Maryland with office at Cumberland, Md.

W. E. Miller, has been appointed general manager of the Colorado Midland and the Cripple Creek & Colorado Springs, with office at Colorado Springs, Colo., succeeding J. J. Cogan, promoted.

D. E. Wilcox, trainmaster of the Denver & Rio Grande, Colorado lines, at Pueblo, Colo., has been appointed assistant superintendent of the Green river division with headquarters at Helper, Utah, effective January 1.

J. A. Campbell, supervisor of bridges and structures in the Northern Pacific, with office at Tacoma, Wash., has been appointed trainmaster of the Talenta division with headquarters at Taconia, vice **C. W. Fee**, who has returned to general service.

F. S. Gibbons, who has been employed in the same position and on the staff of the vice-president of construction and was general manager of the Illinois Central at Chicago, Ill., was promoted assistant to the general manager with same headquarters effective January 1. Mr. Gibbons entered the service of the Illinois Central 20 years ago and has been continuously employed since that time at various operating assignments on the road. He has been in the present office of the vice-president of operation and the general manager of the Illinois Central since 1916.

R. C. Ten Eyck, superintendent of the Denver & Rio Grande Utah lines, with headquarters at Helper, Utah, has been transferred in the same capacity to the Florida, Denver, Colorado lines, with headquarters at Avonmore, Pa., succeeding B. T. McGraw, who has been transferred to the same capacity to the Erie Railroad with office at Reading, Pa., succeeding W. J. Miller, resigned. J. L. Brown, superintendent of the Colorado lines with headquarters at Washington, D. C., has been transferred to the same capacity to the Ohio

and Second district, First division with headquarters at Pueblo, succeeding D. E. Wilcox, promoted. James Flynn, assistant superintendent of the Second division, Colorado lines, with headquarters at Salida, Colo., has been appointed trainmaster at Walsenburg, succeeding Mr. Brown.

Traffic

C. W. Meador has been appointed assistant general freight agent of the Arizona Eastern, with headquarters at Tucson, Ariz.

W. F. Conner, southwestern passenger agent of the Wabash at Dallas, Tex., has been relieved at his own request, after 42 years of active service.

F. A. Markley, commercial freight agent of the Baltimore & Ohio at Buffalo, N. Y., has been transferred to Pittsburgh, Pa., for special duties. The office at Buffalo has been abolished.

N. W. Hoke, commercial agent of the New York Central at Baltimore, Md., has been appointed general agent of the Michigan Central at Detroit, Mich., succeeding S. W. Secor, resigned.

E. L. Gamble, general agent of the traffic and transportation departments of the Western Pacific with headquarters at Stockton, Cal., has also been appointed to the same position on the Tidewater Southern.

J. A. McCoy, traveling freight agent of the Louisiana & Arkansas, with headquarters at Shreveport, La., has been appointed general agent at Alexandria, La., succeeding H. R. Whiting, who has enlisted in the army.

Laurence Dwen, commercial agent of the Missouri & North Arkansas at Kansas City, Mo., was appointed general agent with the same headquarters, effective December 15. G. C. Murray, commercial agent at Atlanta, Ga., has been transferred to Kansas City in the same capacity to succeed Mr. Dwen.

F. G. Hamblen, traffic manager of the Kansas City & Memphis, with office at Rogers, Ark., having resigned to accept service with the American Red Cross the position of traffic manager has been abolished. All matters pertaining to traffic will in future be handled by R. C. Hobbs, general manager, at Rogers.

H. A. Fidler, general freight agent of the Detroit, Toledo & Ironton at Detroit, Mich., was appointed traffic manager with the same headquarters, effective December 15. His former position as general freight agent has been abolished. C. E. Hockstedler was appointed chief of the traffic bureau with office at Detroit, Mich., effective on the same date.

Engineering and Rolling Stock

J. B. Conerly has been appointed master car builder of the Missouri, Kansas & Texas with headquarters at Denison, Tex., effective January 1.

S. W. Law, electrical signal engineer of the Northern Pacific with headquarters at St. Paul, Minn., has been promoted to assistant signal engineer with the same headquarters, effective January 4.

J. S. Motherwell, master mechanic of the Louisiana & North West, with office at Horner, La., has been appointed master mechanic of the Oklahoma, New Mexico & Pacific, with office at Ardmore, Okla.

T. C. Hanson has been appointed supervisor of signals, of the Northern Pacific with headquarters at St. Paul, Minn., vice E. A. Cuthbertson, who has been transferred as supervisor of signals, to Tacoma, Wash., vice A. H. Barnes resigned.

Thomas J. Cole, master mechanic of the Erie at Meadville, Pa., has been appointed shop superintendent, with headquarters at Meadville; Timothy F. Gorman, general foreman at Brier Hill, Youngstown, Ohio, has been appointed master mechanic of the Meadville division with office at Meadville; Lee R. Laizure, master mechanic with office at Hornell, N. Y., has been appointed shop superintendent at Hornell and Albert J. Davis, general foreman at Hornell, N. Y. has been appointed

master mechanic of the Allegheny and Bradford division, with headquarters at Hornell.

The organization of the maintenance of equipment department of the Bessemer & Lake Erie was sub-divided on January 1 as follows: locomotive department, under the supervision of the engineer of motive power; car department, under the supervision of the master car builder; office, accounting and stores departments, under the supervision of the assistant to the superintendent of motive power; engineering department, under the supervision of the mechanical engineer, and the following appointments have been made: H. D. Webster, engineer of motive power; F. W. Dickinson, as master car builder; C. C. Richardson, assistant to superintendent of motive power; C. L. Tuttle, mechanical engineer; all with headquarters at Greenville, Pa.

Purchasing

N. B. Coggins has been appointed division storekeeper of the Alabama Great Southern with office at Birmingham, Ala., vice D. A. Hickman, resigned to enter service of the United States army.

James E. Garnett, division storekeeper of the Southern Railway at Memphis, Tenn., has been appointed division storekeeper, with office at Sheffield, Ala., vice H. H. Delony, resigned to accept service elsewhere.

F. W. Taylor, whose appointment as purchasing agent of the Southern Pacific, with headquarters at San Francisco, Cal., was announced in these columns, December 14, was born at Campo Bello, New Brunswick, on August 5, 1867. He entered the service of the Union Pacific in December, 1885, as clerk in the store department at Laramie, Wyo., where he remained until July, 1889, when he was transferred in the same capacity to Pocatello, Idaho, with the division store keeper of the Union Pacific, the Oregon Short Line and the Southern Pacific lines east of Sparks, Nev., remaining until January, 1911, when he was appointed general purchasing agent of the Pacific Electric, the Peninsula, Stockholm Electric, the Fresno Traction and the Visalia Electric at Los Angeles, Cal., which position he held until the time of his appointment, as noted above, effective December 1.

Obituary

John T. Long, president of the Ozark Valley Railway, died on January 6, at St. Louis, Mo.

Daniel W. Sanborn, who was general superintendent of the Boston & Maine from February, 1892, to September, 1906, died on January 7, in Somerville, Mass., at the age of 87.

Joseph Hobson, consulting engineer of the Grand Trunk with office at Montreal, Que., died at Hamilton, Ont., on December 19 at the age of 84 years. He was born at Guelph, Ont., in March, 1834, and entered the service of the Grand Trunk as assistant engineer on construction work west of Toronto in March, 1858, and virtually had a continuous record of service with the system from that date until his death. He served as assistant engineer on various lines in Nova Scotia, Ontario and Michigan for several years; from June, 1869, to April, 1870, he was engineer of construction of the Wellington, Grey & Bruce; from that time to November, 1873, he was resident engineer on the International Bridge near Buffalo, N. Y. He then became chief assistant engineer of the Great Western, which position he held until June, 1875, when he was promoted to chief engineer of the same road, now the Great Western division of the Grand Trunk System. On February, 1896, he was made chief engineer of the Grand Trunk System, which position he held until July 4, 1907, when he was appointed consulting engineer. He was also chief engineer and builder of the St. Clair tunnel and the Victoria bridge over the St. Lawrence river.

RIVER SERVICE BETWEEN BOLIVIA AND URUGUAY.—The Belgian-South American Company has established a line of river steamers between the Bolivian river port of Puerto Suarez and the city of Montevideo. The Inca, the first steamer placed on this run by the company, flies the flag of Bolivia.—*Commerce Report.*

EDITORIAL

Railway Age

EDITORIAL

An article on the loading of lumber in open top cars will be found on another page of this issue which merits the attention of all railroad men interested in increasing the efficiency of the transportation system. The present methods of loading lumber result in serious losses on account of the frequent shifting of lading in transit. The expense involved, though very large is widely distributed and for that reason few people realize the magnitude of the waste. Some of the roads which handle a great amount of lumber in open top cars have taken measures to correct these conditions. By bulkheading cars with lumber the shifting and consequent delays in transit have been greatly reduced. That a large saving can be effected by this method is beyond question and the universal adoption of the practice is highly desirable. The majority of lumber shippers will not bulkhead their cars unless they are required to do so, for while bulkheading might prove advantageous to the shipper by insuring earlier delivery, it is more expensive than the standard method of loading. The shippers do not seem to object to the plan on account of the greater amount of lumber which must be used in the bulkhead, but their principal contention has been that the present dunnage allowance is too small to cover the weight of lumber required for the bulkhead and stakes. Since there is no question that the railroads would be benefited by the universal adoption of the practice of bulkheading open top cars loaded with lumber, and slight concessions would be sufficient to overcome the objection of the shippers, it would seem that the logical thing to do to secure the advantages of this method is to modify the M. C. B. loading rules to make the bulkheading of open top cars loaded with lumber mandatory, and to increase the dunnage allowance on cars so loaded to compensate the shippers for the extra expense which this practice involves.

The Future of the Railways

THE future of our railways, has been made more uncertain than ever by the adoption of government control. The utterances of President Wilson regarding their taking over and most of the provisions of the Administration's bill for their control and financing seem to contemplate their return to their present owners at the end of the war. Furthermore, while government control suspends the operation of the Sherman anti-trust law and the anti-pooling law, there has been no proposal made that they be repealed. If they remain on the statute books competition must be resumed as soon as the railways are returned to their owners.

There are, however, several important reasons for doubting whether either the old system of regulation or the old system of management will be revived. While the repeal of the Sherman anti-trust law and the anti-pooling law is not at present being discussed, a revolution apparently has occurred in the attitude of public men and the public generally, toward railroad competition. The sentiment for competition seems suddenly to have given way to a sentiment for "co-ordination" and "co-ordination." Again, Section 13 of the Administration's bill provides that federal control "shall continue for and during the period of the war and until

Congress shall otherwise order otherwise." It is probable that the bill must be passed and that the inevitable continuation of control with the idea that some indirect benefit in railroad ownership as well as management might be desirable after the war, and that the government should hold the properties while they were under reconstruction.

There clearly is a growing belief among both railway men and public men that it is undesirable that either the old system of regulation or the old system of management shall be restored. For many years the railways had been trying to eliminate wasteful competition by pooling, traffic agreements and by mergers. For over thirty years regulation defeated every effort of this kind. The result was that in every territory there were "weak" and "strong" railways operating side by side. The competition in service between the railways in each region was severe and caused many discriminations and wastes. Furthermore, it was impracticable for the regulating authorities to adopt any scale of rates which would be fair and satisfactory to both the "weak" and "strong" roads, or which would not be either regarded by part of the public as too low because it made the poor railways poorer or be regarded by another part of the public as too high because it made the rich railways richer. Probably in the natural course of events combinations between parallel railways would have wiped out the distinction between weak and strong lines; but natural tendencies were constantly defeated by laws to enforce competition.

While most railway men, regulating officers, business men and statesmen would agree that the old system was unsatisfactory, they would disagree widely as to what system should be adopted in its place after the war. Probably a majority of them would say that government ownership and management should be avoided if possible, but many would also say it is at least as likely that government ownership will be adopted as that we shall return to the old system of regulation and management.

Never in its history was this country confronted by an economic and political problem more important than the railway problem as it now presents itself. Few wish to return after the war to the old system, and no one really went to see the adoption of government ownership. In order that we may escape both there must be worked out some plan which will appeal to the public as containing most of the advantages both of the old system of regulation and management and of government ownership and management, while being free from the objections and dangers of both. It is not too much to expect constructive statesmanship in this country to work out and to secure the adoption of some such plan.

The Administration believes that some of the fundamental principles on which the plan that will solve the problem must be based, already are existing. First, it would seem, such a plan must provide in some way for the elimination of unnecessary competition, and this can be best accomplished by the consolidation of the railways along regional lines. Second, such a plan must provide a private ownership with government supervision of rates and returns. Only through private ownership can the political evils and the difficulties of management of government ownership be avoided, but there must be guarantees of its return because experience has indicated that in the absence of such guarantees it will be impossible to set managing bodies to allow pub-

quate net returns. Third, if there are to be government guarantees the government must have a direct voice in the management. This could be given it by empowering it to appoint part of the directors of the regional railroad companies. Fourth, there must be pooling of facilities in so far as such pooling will promote efficiency. The pooling of tracks, terminals, etc., as far as was advantageous, would be secured by reorganizing the railroads along regional lines; and the pooling of equipment as far as was desirable could be secured by the organization of an equipment company, the stock of which should be owned by the regional companies and which should distribute equipment over the lines of all the railroads in proportion to their needs.

Any plan for the reorganization of the railroads which may be offered now will, of course, be subject to important modifications as discussion may disclose its weaknesses from the railroad or the public point of view. It is, however, the duty of railway men, public men and the public to recognize the fact that the railroads are now drifting toward some unknown goal. Unless with wisdom and patriotism they are taken in hand and steered in the direction it is desirable for them to go, they may arrive at some port where few want them to arrive and where it will be destructive of the interests of their owners, their employees and the public for them to arrive.

There has been manifested a deplorable want of constructive statesmanship in the handling of the railway problem in the past. This want has been manifested both by railway officers and by public men. If it continues to be manifested the economic and political consequences will be most serious.

Lord Shaughnessy's Warning

LORD SHAUGHNESSY, chairman and president of the Canadian Pacific, deprecates government control of railroads in the United States. Extracts from a statement recently made public by him were published in the *Railway Age* for January 11, page 128. He says that the people of the United States are "looking too hopefully to the centralized effort of an overworked government when they should depend more on the trained enterprise of the individual industrial units that have been so efficiently developed during times of peace. Any form of control that will lessen the sense of keenness and responsibility on the part of these units is sure to be disastrous in its results."

Government control in the United States is now an established fact. But it is not too late to take to heart Lord Shaughnessy's warning about the danger of excessive centralization. The warning comes from the head of a railway system having the largest mileage, and operating over the largest area, of any system on the North American continent. In view of his long experience in managing such an immense system, he might be expected to speak of the advantages of operating a large mileage as a single system. It is significant that it is to the dangers rather than the advantages of such operation that he directs attention.

The railroads of the United States have twenty times as much mileage as the Canadian Pacific. Therefore, the consequences of excessive centralization of control of management on our railroads would be something like twenty times as serious as the consequence of excessive centralization of control of management on the Canadian Pacific. The central authority can and should indicate the *general* principles on which the railroads are to be managed; it can and should indicate the *general* methods by which these principles are to be carried out; and it can check up the managements of the various large units into which the system is divided and make such changes in their organizations as may be necessary to see that its instructions regarding general principles

and methods are carried out. But the day on which the controlling authority begins to try to do more than this, on that day the managements of all the large units inevitably and necessarily will begin to look to it for detailed instructions and to delay issuing important instructions to their subordinates until they get their instructions from above. When that comes, centralized control will slow down everything instead of speeding up everything; and the increases of efficiency gained by eliminating competition will become small compared with the losses of efficiency caused by impairing the initiative and "lessening the sense of keenness and responsibility on the part of the units."

It should hardly be necessary to say that the foregoing is not intended as a description of what already has occurred on the railroads of the United States. It is intended only as a description of what inevitably will occur under any system of centralized control which does not leave large autonomy and great freedom of action to the managements of the various groups of railroads and of individual railroads.

With reference to the problem that would be presented by consolidation of all the railroads of this country under government ownership, it recently was said elsewhere, before the present government control was adopted:

"The problem of developing and working an organization which would centralize authority enough to co-ordinate all parts of this vast system, and which would at the same time decentralize authority sufficiently to enable each part to cope with local conditions and needs, would be the biggest and hardest industrial problem ever presented to the genius and energy of man. Therefore, even though the best judgment and ability of the country were enlisted and allowed to carry on the business without any political or other vitiating form of interference, it is questionable if the advantages which would be gained by consolidation would not be outweighed by disadvantages arising from the unwieldy magnitude of the undertaking."⁽¹⁾

The problem stated in this quotation is the one Director General McAdoo and his advisers are now actually wrestling with. They are grappling with it under conditions far more favorable to its solution than would exist under government ownership because they actually are doing so—thus far at least—without any political or other "vitiating form of interference," and because some of "the best judgment and ability of the country" are enlisted.

It will be most interesting and instructive to observe what success they will have in securing needed co-ordination of the operation of the railroads while avoiding excessive centralization of direction, with its paralyzing effects.

The Trespassing Evil

THOSE RAILROAD and public service commissioners who, at the Washington convention (see *Railway Age Gazette*, October 19, page 695, and November 2, page 804), voted down the proposal of the Walker committee to have a federal law to punish trespassers on railroad tracks, acted, no doubt, under a sense of public duty: but that discussion and vote marked no progress, and the problem still presses; and the honorable commissioners have a pressing duty, at home, to put forth some vigorous efforts for the enactment of adequate state laws on this subject. One can readily understand the feeling of local pride, or jealousy, or laudable support of States' Rights, which may impel a commissioner to object to federal encroachment on his prerogatives; but such negative action as that at Washington does more harm than good. The crying need is for positive action. State commissioners have a peculiar

(1) Yale Review, January, 1918, article on "Railways in Peace and War," page 371.

and solemn duty in this matter. Most of the legislators who ought to be for themselves and draft suitable statutes to cure the evil are too much engaged in other matters to do anything effective, while the commissioners are, or should be, specially qualified to advise, enlighten, and even push, the legislators. The commissioners are where they can survey the situation throughout the whole country all of the time, and they must be aware of the seriousness of the problem. There is no glory in this work, for the whole public seems to be satisfied to let careless pedestrians go on killing their lives on the tracks at the rate of five thousand a year, but that is all the more reason why a truly devoted public servant should take up the task, other and more spectacular reforms will find promoters easily among people not informed concerning this one.

The commissioners' committee characterizes the conditions as disgraceful; and everybody acquainted with the facts knows that this is true. Only one-fourth of the states have laws designed to suppress trespassing, and those few do not enforce them, at least, they have nothing encouraging to report concerning enforcement. Surveying the country as a whole, the committee says that there is a lack of respect for railroad premises and property, and that this is a deep-seated feeling of many years' standing; and along with this there are people everywhere who seem to believe that anti-trespassing laws have been framed to favor the railroad, rather than to protect careless pedestrians; a belief rooted, no doubt, in the old suspicion that "capital" is always abusing the poor. The final conclusion of the committee's rehearsal of facts is that the outlook is discouraging—which no one can deny.

The cheerful aspect of the situation is that a considerable amount of good work has been done in spite of the discouragements. Many of the larger railroads keep up a vigorous fight, in spite of municipal indifference. With any sort of co-operation on the part of sheriffs and police these railroad activities would soon show tangible results. If the railroads continue to aid and instruct, and enrich, the farmers as they have been doing for the past few years, it may be that after a while people will begin to credit railway officers now and then with a modicum of public spirit. The New York Central by its vigorous prosecutions of tramps a year or two ago, reduced the annual average number of accidents to trespassers 19 per cent. Other roads in the more thickly settled parts of the country have also done good work. It is real work, however; costly and difficult. The Central's officers spent a prodigious amount of time, energy and patience in arousing the local magistrates. The lethargy or ignorance of these officers is one of the greatest obstacles everywhere. New York State, at last, has simplified its law so that the punishment of trespassers will be greatly facilitated; and the Central may be expected to do still greater things. Depending, as we have to, on railroad enterprise instead of state enterprise, it may be said that the Central now has before it the task of extending to the six other states traversed by its lines the profitable gospel of safety which it has been spreading in New York.

The Walker committee made one recommendation that was ignored by the convention; that the campaign of publicity, designed to convince thoughtless persons of the dangers of trespassing, be continued. That is good as far as it goes, but the publicity that will be most likely to count is that which can be engineered by well-informed public service commissioners, addressing themselves to the men who are primarily responsible—the legislators. The committee said that commissioners should "lose no opportunity to point out" the merits of anti-trespassing laws; and it is among legislators that the most useful opportunities can be found. This is a progressive movement which, unlike many others just now, need not be seriously retarded because of the pressure of war-time problems.

The Freight Car Situation

THE condition of existing freight cars is one of the most serious and threatening the railroad. During 1916 and the early months of 1917, the roads succeeded in making a material improvement in the condition of their older cars. There has been little change in the situation since April, 1917, however. The improvement of cars is done at a cost which has increased probably 50 per cent, or more, to 60 per cent of the total, although the roads have been making great efforts to keep cars in service in condition.

This failure to reduce the percentage of cars under repair to several causes. The attention of car owners and the management handled per loaded car have both increased greatly during the past two years. The expenses of the repairs secured from equipment manufacturers have gone up faster than usual and more than the ordinary amount of repairs are needed to keep this equipment in good condition.

The repairing of cars is made unusually difficult under present conditions. Few new freight cars have been received during the past two years, and all the old equipment which the roads owned has been put into service even though it is of obsolete construction and under modern operating conditions requires frequent overhauling. Furthermore the percentage of foreign cars which the roads have been handling has increased, thus making it necessary for the car repairers to do a larger share of their work on cars with whose construction they are not familiar. As might be expected under these conditions, the number of foreign haul order cars in recent months has been much greater than for the corresponding month of the previous year, the increase in some cases is as great as 20 per cent.

The only way to meet the demand for cars is to keep the available equipment in serviceable condition. This is no easy task. There is a very strong temptation to put by the minor defects when cars are on the repair track in order to increase the number of cars turned out. Inspectors and inspectors, who are best qualified to judge the situation, agree that the general condition of cars at this time is far below the average. The condition of cars which have been off the home road for some time is, in many cases, extremely bad.

With labor and material both hard to get it is believed that the foreman in charge of the shops should get more attention to the repairing of foreign cars. The cars on the home road are given preference, and too often the foreign car receives just enough repairs to get it into service on the line of some distant road. After it has made a few hundred miles it is again ready for the repair track.

In routing cars under operating conditions, probably one regard that ever before will be paid to maintenance. This will result in a greater percentage of foreign cars on all roads. Unless these cars are handled promptly when they need repairs, the number of haul orders is bound to increase. Consideration of profit or loss should no longer enter into the question of making repairs. The immediate matter is keeping the car in service. Whenever satisfactory repairs can be made, with material on hand, it should be supplied, even though it is not standard to the car. That is possible in nearly every case to repair cars without calling on the owner to furnish material or down to the nearest workshop which required 12, 30 or 40 cars and several months from the owners or only 11.

Roads that are following the practice of shifting repairs to foreign cars should realize that such a procedure will inevitably result in rapid deterioration of equipment. The surest way to keep the cost of maintenance down is to make light repairs as soon as they are needed. If this is not done,

the car is certain to require an abnormally large amount of work when it is shopped.

A reduction in the percentage of bad order cars cannot be secured by any system that attempts to shift the burden to some other road. Two things are needed to improve the car situation. First, a disregard of the petty considerations that delay repairs to foreign cars, and second, good, thorough repairing applied as soon as the car develops defects. The object of the repair track foreman should not be merely to get the cars back into service, but to put them in condition to handle traffic and stay off the repair track.

New Books

Seasoning of Wood. By Joseph B. Wagner. 274 pages, illustrated, 6 in. by 9 in. Bound in cloth. Published by D. Van Nostrand Co., 25 Park Place, New York. Price, \$3.

The book considers seasoning both in air and in kilns. The first two-fifths of it is devoted to a general treatment of the subject of timber, including two brief chapters on general characteristics and some 70 pages in cataloguing the various species. Wood destroying insects, which work on wood in the air, either in the tree or in the structure, are also given some space. In the treatment of seasoning, proper attention is devoted to the relation of the properties of wood, moisture, content, the influence of evaporation or manner of drying and to a discussion of the advantages of seasoning.

The construction, arrangement and operation of kilns of various kinds and various devices and forms of apparatus used in kiln drying are given detailed treatment.

Business Law for Engineers. By C. Frank Allen, formerly professor of railroad engineering, Massachusetts Institute of Technology. 6 in. by 9 in., 457 pages. Bound in cloth. Published by McGraw-Hill Book Company, Inc., 230 West Thirty-ninth St., New York. Price, \$3.

The book is divided into two parts, one entitled "Elements of Law for Engineers" and the second called "Contract Letting." The first part may be compared favorably with the familiar texts on commercial law, designed for the use of the layman, except that the material is arranged in this case for the special benefit of the engineer rather than the business man. Otherwise the arrangement is much the same with chapters covering the familiar subjects of torts, equity, real property, agency, etc. As illustrating the supplementary material for engineers the chapter on real property covers the acquirement of land for engineering projects, eminent domain, the law of land surveying, etc. There are also two chapters of special significance to engineers and railway men, namely, "Railroads" and "Engineer's Relations with Others."

The first of these touches on the legal phases of railway location, maintenance and operation and deals briefly with the legal status of the common carrier. The up-to-date character of the book is indicated by the fact that mention is made of the Adamson law. The second part of this book covers the same general ground as previous texts on engineering and construction contracts. The subject is treated largely through the presentation of specimen forms for all phases of contracts, such forms including the uniform general contract of the American Railway Engineering Association, and the Standard Form of the American Institute of Architects. As the author states in his preface, the book is not intended to make every man his own lawyer, but it will be a valuable addition to the library of any engineer.

Letters to the Editor

A Correction

WASHINGTON, D. C.

TO THE EDITOR:

May I call your attention to two typographical errors in the article appearing in your current number from my pen entitled, "The Basis of Compensation for the Railways"?

The last sentence in the last paragraph on page 127, as printed, read "Another element for harm is represented by charges in per diem rates." The word "charges" should have been "changes." I was referring to the fact that changes in per diem rates during the three-year test period or at any future time during the period of government control would tend to throw out the relation of road with road in the scheme of government compensation.

The other error appears at the top of page 128, in the first sentence reading "Furthermore, it is of great importance whether hire-of-equipment accounts are actually maintained between the carriers during the period of government control or not, even though for purposes of record it might be considered advisable to do so." The word "not" is left out of the sentence after the word "is." The sentence should have read, "Furthermore, it is *not* of great importance," etc. My thought there was that the keeping of hire of equipment accounts between the carriers would, under government control, be largely a matter of policy and expediency rather than of necessity.

JULIUS H. PARMELEE.

The Problem of Depreciation

UNIVERSITY OF CHICAGO.

TO THE EDITOR:

G. C. Hand's article on depreciation in your issue of December 7 is ingenious, but I fear it makes more for confusion than for clearness on the fundamental issues involved. His argument is deductive and his conclusion is contained in his assumptions as to the meaning of value. When Mr. Hand takes up the *a priori* logic which is the favorite weapon of the closet theorist, he must remember that the structure is no stronger than its foundation assumptions and that his foundation is itself unsupported. He also gives the theorist a chance to turn the tables on the practical man by remarking that his logic does not touch the practical needs of the case. This chance is too good to be missed; so let me say, as a specialist in *a priori* closet theory, that the final logic of this case is pragmatic, not *a priori*, and that the system that will work and be equitable cannot be deduced from definitions of terms.

Mr. Hand assumes that "depreciation is the subsidence of value," that: "The value of a railroad is the present worth of the . . . net revenue . . . funded at the prevailing rate of commercial profit," and that: "Value is unique." These three propositions contain his entire case against physical valuation and against the calculation of depreciation accrued but not matured. The answer is: If value is unique, and means what Mr. Hand proposes, then "valuations" for accounting and regulation are not and cannot be, strictly speaking, value, but something else. Hence we get nowhere by first assuming that they ought to be value and then criticising them because they are not. If valuations for accounting, regulation, condemnation, etc., are all "values," then value is not unique.

Each in turn is in a sense responsible for the whole value of the going concern. It follows that the sum of the parts thus calculated would be many times greater than the whole. This goes to show that regulation cannot be based on the actual values of the parts of the property of a company any more than on the actual value (as Mr. Hand uses the term) of the whole taken together. For this service Mr. Hand deserves the thanks of those interested in clear thinking on these matters.

To sum up: the basis of regulation and the basis of accounting are not "value" in the commercial sense, as he assumes, and his main thesis falls with this assumption on which it is based. If such questions as these could have been thrashed out earlier and a reasonably simple outcome arrived at, the present valuation of railways might have been made less expensive. The whole problem of "fair value," however, can never be simple.

J. M. CLERK,
Associate Professor of Economics.

Curses and Courtesy

CHICAGO.

TO THE EDITOR:

Ever since the inception of the "courtesy movement" on railroads, the periodicals of the country have been replete with articles on that subject, each one, perforce, meritorious because it constitutes an agitation toward a worthy end, if for no other reason. One and all of those that have come under my perusal have discoursed on the soft spoken word for the public, leaving the inference that the mask of courtesy may be donned or doffed at will.

With all due respect to the compelling power of the conscious mind and its facility for facing trying environment, we must award the palm to the subconscious mind for power of impulse—which actuates by far the most of our activities. Auto-suggestion, by means of conscious courteous effort, has a certain power, but the effort must be perfunctory as a general thing, if it springs from the will rather than from impulse.

A discussion of impulse carries us into the subject of heredity and its strongest ally or, mayhap, its strongest enemy, environment. We may run the entire gamut of human character and find all the tones of temperament due to heredity; tones that come with our entrance upon life's stage and for whose presence we are not responsible. Reflection reveals to us that these proclivities assert themselves most unexpectedly and our task is to align and sometimes repress them. It is not necessary to descend far down the classification of organisms until we come to those which are absolutely helpless before their inborn tendencies; their reflex actions are always and inexorably the same under a given set of circumstances and this is true no matter how painful is each experience. We are told by scientists, and we know *a fortiori* of its truth, that the continued existence and progress of any organism depend upon its power of adaptability toward its environment. Further, we see that man embodies the highest type of adaptability found in any organism. His power to act upon and set the scenery of his environment places him upon a pedestal far above the beasts of the field and the fowls of the air over which he was given dominion. Then, as the apostle Paul says, "Let us acquit ourselves like men."

We are born into the narrow room of heredity, but adaptability is the key that unlocks the door and permits an exit into a world of character progress.

But what has all this to do with the acquirement of a courteous manner, you may ask. Just this. Our powers of adaptability must be bent upon setting the stage for a continuous performance, a consistent environment, an aura of

gentility. A courtesy to the public is not the beginning of such an environment, it is more truly the end; for as surely as law is law, so sure is it true that the beginnings of our courtesy must be among ourselves. Can a justifiable rebuke, degenerated into a tirade of curses administered by a superintendent, for instance, to an engineer, be so dissolved that the superintendent can turn in the same hour and give an address before a commercial club with a courtesy and gentility which is convincing in its sincerity? Not often. The man who fell into the slough of curses is the selfsame man who speaks in the club room.

We railroad men, in practically every department of the business, must plead guilty to all too much of this brand of conduct. The conductor curses the engineer and fireman, is cursed in return, then turns to his ticket collecting and puts on a courteous attitude as "prescribed by the rules."

The agent curses at the way-freight crew for knocking an empty car "off spot" and in the same breath turns to sell a lengthy coupon ticket to a prospective purchaser, who from the window has heard his altercation with the train crew. How incongruous it must sound then to hear the agent dilate upon his road's being "the only way" or as providing the best of everything. Yet another scene: The train dispatcher's office, a snow blockade, trains hours late; numerous ones of the public stray into the office to inquire about relatives or friends on snowbound trains which have no diner attached and no way to warm the cars; the dispatcher's ability and patience are strained to the breaking point; enter a trainmaster, or an assistant superintendent and, seeing what he deems to be poor judgment being exercised in some detail of despatching, breaks forth into a stream of sarcasm, abuse and curses, within hearing or beyond—it is little difference—of the inquiring public. Do the words of such a man inspire the inquirers with confidence in him, respect for his business or satisfaction for the safety of the snowbound passengers? Plainly now, can a man be a Doctor Jekyll and Mr. Hyde and make a success of both? Man's inability to serve two masters was asserted by a wise teacher 1917 years ago. Have we not yet learned its import? He also said, "Woe unto you, vipers, hypocrites, for you cleanse the outside of the cup, but the inside is filled with all uncleanness." Let's all think of that when we turn from our notorious, mutual cursing and endeavor to put on our courtesy mask for public inspection.

NEMESIS.

Not a Consolation Prize in This Case!

NEW YORK CITY.

TO THE EDITOR:

May I say a word in commendation of the lowered price for the upper berth?

Years before the price was lowered I learned to use the upper berth because, for a girl traveling alone, it seemed a distinct advantage to be up and out of the way, and safe for the night. And now—well, I take peculiar pleasure in getting the thing I prefer at the preferable price!

S. D. W.

TUNNEL TO BE BUILT UNDER JAPANESE STRAIT.—The Japan Chronicle reports that influential citizens of Fukuoka, Kiushu, have undertaken a plan for the establishment of a company with \$7,228,250 capital for the purpose of making a railway tunnel under the Mōgi Straits. The tunnel will start at Shimonoseki and end at Dairi, Fukuoka Prefecture, and it will be connected with the railway trunk line of Kiushu. The total length is put at 17,700 feet, of which 4,000 feet will be beneath the sea. Five years will be required to complete the whole project.



Director General McAdoo with the Members of His Advisory Board and Staff.

Running the Railroads Under the New Regime

Freight Moving Week. Status of the I. C. C. and the State Commissions. Wage Question. Mail Service

By HENRY H. HARRIS

THE PRINCIPAL WORK of the railway administration during the past week in the direction of improving transportation conditions was that directed from New York by A. H. Smith, Mr. McAdoo's assistant in charge of transportation on the eastern lines, who also came to Washington on Thursday and spent several hours in conference, reporting on conditions at the congested New York terminals and on the efforts to increase the movement of coal.

Freight Movement Week, officially designated by Director-General McAdoo, started on Monday throughout the country with many different agencies co-operating in an effort to make it a success, but bad climatic conditions threatening to seriously interfere with the work.

Reports from the middle west on Monday night were to the effect that the storm which has paralyzed that section for several days had begun to break, but there was no indication that even the normal movements of cars could begin for several days. Both snow and cold were interfering with the movement of traffic as far east as Pittsburgh. The snow did not reach beyond that point, but cold weather was being experienced east as far as the Atlantic seaboard. Reports from New York, however, said that the temperature was moderat-

ing, and it was thought that trains could be speeded up considerably early in the week.

Under the direction of the director-general, very effective plans were being used throughout the middle western section where snow drifts were interfering with train movements, and the roads were cleared railway employees were working the greatest possible speed to get their trains to their destinations. The general order that went out from the director-general was that every possible means should be used to return road conditions to their normal state as quickly as possible.

Despite the snow and cold it was believed that a great deal of good would be accomplished during freight clearance week. Virtually every business organization and mayor in the United States indicated his desire to co-operate with the director-general in clearing up the situation, promising particularly to endeavor to keep new freight on the rails during the shipments now on hand ready for distribution. Various governmental agencies outside of the director-general's office also are lending a helping hand. The Fuel and Fuel Administrations have sent out urgent pleas through all these agencies to keep new shipments off the road this week. So far they have been the responsive to the director-general's wide-spread appeal for co-operation, that it was felt much of the congestion could be relieved if the weather moderated to any extent during the course of the week.

Thousands of telegrams have been received at the office of the director-general from mayors of cities, business organ-

* Henry H. Harris, editor, A. H. Smith, president, N. Y. & C. Co. (the largest operating carrier of the country); Heriberto Walters, assistant, Atlantic Coast Line; Director-General W. G. McAdoo, standing; Hove H. Baker, assistant Chicago, Burlington & Quincy; Edward C. Collins, vice-president, Atlantic, Tri-State & Santa Fe; Walker D. Harris, chairman, Atlantic Coast Line & Santa Fe; John Martin Payne, legal adviser; and Oscar S. Price, secretary to the director-general.

izations, state governors and other leaders, promising full support for freight moving week. On the first day of next week the new increased demurrage rates will go into effect, and the clearance movement preceding is expected to save many thousands of dollars to shippers as well as assist the railroads in handling their big load.

To A. H. Smith, his assistant in charge of eastern lines, and R. I. Aishton, president of the Chicago & North Western, Director General McAdoo telegraphed on Sunday:

"I am very much distressed at the inconvenience and suffering the blizzard has brought to the people in the West and central West. The paralysis of railroad service is inevitable, but I should like you to use every possible means to overcome the situation and restore railroad service at the earliest possible moment."

Mr. Aishton's report read:

"Every means within our power is being used to restore normal railroad service, and particularly in the movement of coal. The greatest difficulty was experienced in Chicago and in a radius of about 250 miles, with Chicago as its center, where the severity of the storm of Friday last, following the very heavy snow and strong wind the previous Sunday, created a condition that has not been equalled in the history of this territory for over twenty years.

"All employees stuck to their tasks of keeping transportation moving as long as it was humanly possible to do so. Every available man was employed in the moving of snow, and very good progress was made yesterday and last night.

"Through passenger service and coal movement was resumed to a limited extent last night. Suburban service in the Chicago district was resumed with nearly normal operations in Chicago this morning. The greatest efforts are being directed to resume normal movement of coal. Very good success was obtained last night in placing coal in Chicago territory. Every man that can be spared from any other class of work is being used to remove snow from tracks in yards so that all transportation may be resumed at the earliest possible hour. You may feel assured nothing is being left undone by officers and employees to restore full normal transportation."

A. H. Smith telegraphed Director-General McAdoo on Monday as follows:

"Between Pittsburgh, Buffalo, Chicago and St. Louis there has been practically no freight movement for 24 hours. Practically the only passenger movements have been those incident to getting stalled passenger trains into terminals.

"Snow has drifted very heavily, packing in cars on side tracks and in yards, and it will take considerable time and much effort to get them loose. Temperature this morning at Pittsburgh and Buffalo still zero with extremely high winds. West of there weather has moderated. It has likewise moderated in New York and at other points east.

"The very low temperature with snow and high winds has produced a combination which is said to be worse than anything in the history of the railroads in the central west.

"Little freight, if any freight eastbound from Chicago and St. Louis today on account of conditions in yards. Efforts are being made to place coal to relieve fuel situation in central western cities. Everything being done with the help and power available to restore service at the earliest possible moment.

"In answer to your telegram you may be assured of the utmost efforts in this direction on the part of all concerned.

"Believe we should devote our attention to keeping people warm, moving food and coaling ships in the harbor, even if manufacturing industries close down for a few days until the effect of this storm can be cleared away and working room afforded.

"There are 118 ships in the harbor this morning awaiting coaling and 21 bunkered last 24 hours."

Later, Mr. McAdoo gave out the following statement:

"The director-general is in receipt of advice from A. H. Smith, assistant to the director-general at New York, that the weather conditions, which are more severe than experienced in 50 years, have crippled railroad transportation to such an extent that it is imperative to give preference at New York and vicinity to certain vitally essential commodities. He recommends that this order of preference be:

"First—Coal for domestic use and vital public utilities.

"Second—Food.

"Third—Coal for bunkering the ships now in New York harbor which are loaded for our armies abroad and for the Allies.

"The director-general has approved the recommendation with the expectation that the plan will be temporary only; that improving weather conditions will soon obviate its necessity, and that it will not materially affect industrial activity.

"This appears to be the shortest cut to a restoration of normal conditions. It is hoped, therefore, that everybody will co-operate by submitting as cheerfully as possible to the temporary inconveniences the plan may occasion, in order that it may be made in the highest degree effective and that prompt relief may be brought about."

Mr. McAdoo has announced that he expects to appoint other assistants in charge of various districts, just as Mr. Smith is in charge of transportation on the eastern roads. B. F. Bush, president of the Missouri Pacific, has been advising him on conditions at St. Louis. Mr. McAdoo has announced, however, that he will *not* appoint state directors of transportation.

Acting on a report from Hale Holden, assigned to make a special study of freight conditions in the District of Columbia, Mr. McAdoo sent a letter to A. W. Thompson, vice-president of the Washington Terminal Company, requesting him to arrange for the common use of the rail facilities in the district, in which he said:

"I inclose copy of letter which I have today written to Louis Brownlow relating to the local freight congestion in the district. It is of importance that these facilities be kept in efficient operation, and while the present situation appears to exist chiefly because consignees are unable or do not take away their freight as rapidly as should be, there are doubtless measures which can be taken to increase capacity by the railroads.

"I therefore request that you undertake at once to arrange for the common use of the rail facilities in the district, as far as may be wise, to increase efficiency in the use of them and see to it that sufficient switching power is maintained here at all times. The forces at the freight houses and in the administration of the facilities generally should be kept at all times adequate to serve the public and generally measures should be taken from time to time as necessary to keep the service abreast with the requirements of the public here. I shall be glad if you will report to me on the subject from time to time."

In another letter to one of the district commissioners Mr. McAdoo approved of a plan for a pooling of the use of drayage and trucking facilities in the district recommended by Mr. Holden, and pointed out that the main cause of the local congestion has been the delay on the part of consignees in removing freight from freight houses and team tracks.

On Tuesday Mr. McAdoo announced that he had relieved A. W. Thompson, vice-president of the Baltimore & Ohio, from his duties as vice-president of the Washington Terminal Company, in order that he might devote his attention to his own road, and appointed in his place G. R. Loyall, assistant vice-president of the Southern, whose office is in Washington and who is therefore in a better position to give attention to the local situation.

The Navy Department on request of Director General McAdoo sent a battleship to Baltimore to break the ice in

the harbor and to open the channel. Myvia was received in the afternoon that the harbor had been opened and the battleship was proceeding down the bay with 18 loaded ships and barges which it released at Baltimore. There was three feet thick snow on ice in the Baltimore harbor.

Thus far Mr. McAdoo has not reached a conclusion as to whether the express companies should be taken over by the Government. He has asked the Interstate Commerce Commission and his advisers for an opinion on the subject but has felt that an immediate decision was not necessary because of his jurisdiction over the trains in which express cars are carried. A delegation of officers of the principal express companies called on Mr. McAdoo on January 10 and it is understood practically asked him to take over their business, which is to a very large extent intertwined with that of the railroads.

The Interstate Commerce Commission

While there has been much discussion of the effect on the Interstate Commerce Commission of the President's

various parts of his program, Commissioner Daniels is making information on which to make up a budget of railroad improvements and equipment. The Bureau of Civil Service is taking a census of the number and availability of the freight car equipment. Commissioner Anderson is receiving from the principal railroad men statements which will provide the terms for the operation of Government-owned, but leased lines for a week experiment in the Seaside and Haverhill communities, and Commissioner Harlan has been in New York helping to reform the Erie system there.

Mr. McAdoo and the members of the Interstate Commerce Commission (including the Commissioner in Charge of the American Railway Association) are busy, as the function of the railroad transportation of the former railroad. War boards, which paid a building of its own, have been taken over under the direction of Har Holden, president of the Chicago, Burlington & Quincy.

The Interstate Commerce Commission on Saturday cleared the way for railroads to haul freight over the coast-



Photo from Transportation File 1012

Reasons Enough Why This Train Arrived Late at Chicago

action in taking over the railroads and placing them under the direction of Mr. McAdoo, and it has become entirely evident that the Commission has lost much of its supreme authority because that of the director general of railroads has been made paramount, the Commission has by no means been side-tracked.

Its office building in Washington has now become the headquarters of the U. S. A. R. R., and to all outward appearances it is a busier place than ever before. While the rate problems with which the commissioners and their subordinates formerly wrestled have been diminished both in number and in importance, a large number of new tasks have been imposed upon the commission by the director general in accordance with his announced intention of making use of his organization to the full. Commissioner McChord is securing information regarding transportation problems in

routes and establish new receiving or delivery points by issuing an order allowing the necessary tariff changes to be made on one day's notice, and allowing relief from the provisions of the long and short haul laws in the case of new rates made to open new routes.

The State Commissions Just After the Cyclone Passed

At this important period in the history of transportation the railroads find themselves to some extent at a point of sympathy with, if not from, the state railway commissions which are concerned as to the effect of the new regime on their status.

The President's proclamation provides that it shall not be put so far as said director shall from time to time exercise his authority in regard to the operation of the railroads in transportation shall remain subject to the authority of the

and orders of regulating commissions of the various states in which said systems or any part thereof shall be situated. But any orders, general or special, hereafter made by said director shall have paramount authority and shall be obeyed as such."

Charles E. Elmquist, secretary of the Special War Committee of the National Association of Railway and Utilities Commissioners, has addressed to the state commissions a bulletin on the subject of Government operation of railroads. After quoting the above and other extracts from the President's proclamation and message, he says (italics his): "Examination of the foregoing makes it appear that the railroads were taken over as a war measure, should be operated as a war measure, and that none of the functions exercised by the Interstate Commerce Commission or state commissions or common law or statutory rights of shippers and passengers, should be curtailed unless it is necessary to do so as a war measure. Exigencies of war should not require the director general to set aside statutes or orders of state or federal commissions, or to abolish the wise practice of submitting all rate questions to regulating tribunals, with the right of the public to be heard. *The right of the director general to supersede by an order the constitutional rights heretofore exercised by the states is a debatable question. Instead of considering the distinction between state and federal authority at this moment of extreme peril to the Nation, we regard it as important to establish a fair, just and workable basis of co-operation between the state and federal governments, so that all regulating officials and employees may work together in the common cause of helping the country win the war. Team work should be the watchword.* For the purpose of establishing a correct understanding between the states and the government the Hon. Clyde B. Aitchison has been designated as the person to confer with Mr. Charles E. Elmquist, secretary of your Special War Committee, and it is expected that a working basis may soon be reached. It is to be expected that questions for discussion will frequently arise and the Interstate Commerce Commission felt that this plan establishes a helpful point of contact between the states, federal government and the director general. Your committee will give much thought to these matters and invites suggestions from the commissions. *It is to be expected that the railroads will ask the director to interfere with pending actions before, or orders made by, the commissions.* It will be of service to the states if the special War Committee is furnished with copies of orders that are issued by the states, which affect revenues, labor or material, and also a statement of pending formal cases, and what is involved in them. *The state commissions should retain jurisdiction over all matters conferred by statute until otherwise ordered by the director or court, at which time appropriate action may be taken.* The exercise of these functions, however, should have due regard to the conditions imposed by the war. *The underlying purpose should be to help the government operate the railroads in such a way as to make them a vigorous auxiliary of our war machinery.* This can be done by helping to curtail unnecessary and luxurious passenger service, save fuel and motive power, eliminate circuitous routing, police the yards and terminals for the purpose of expediting delivery by the carriers and prompt release of equipment, encourage heavy loading and prevent the bunching of cars, use conservatism in treating demands for improved station facilities and reduction of grade crossings and other improvements which cost money and absorb labor and material, constantly remind the public that we are in a state of war and that normal service can not be expected, and be careful to find out if the carriers, their employees and agents are freely and unreservedly responding to the unusual demands for service which are brought on by the war.

"Your committee takes pleasure in announcing that the President in his proclamation honored our request that the

state commissions be recognized and shippers be given the right to sue railroads in local courts. The legal effect of that part of the proclamation is a moot question.

"I am sending to your office one copy of the administration bill introduced in Congress. Examine this carefully and decide if amendments are necessary to preserve the useful powers of the Interstate Commerce Commission to regulate interstate commerce and complete the valuation of railroad property, and secure the right of the states to regulate intrastate rates and service, and of the shipper to be heard upon questions affecting charges for transporting persons or property, and to sue railroad companies for damages to person or property, in local courts. Send your recommendations to your Congressional delegation and furnish me with a copy. It will also be well to have special attention given to the existing status of state commissions and the right of the director general to set aside state statutes or orders made by commissioners."

This bulletin expresses a commendable desire to co-operate, and if it displays a keen interest in the preservation of the constitutional rights of state commissions it may be well to recall that the President has not yet recommended any guarantee to state commissions.

Wages

Mr. McAdoo has already begun to hear from the classes of employees other than the members of the brotherhoods who want their wages increased. On January 9 S. E. Heberling, president of the Switchmen's Union of North America, which is a rival of the Brotherhood of Railroad Trainmen and the Order of Railway Conductors in its efforts to represent yard employees, called on Mr. McAdoo to discuss demands already presented to the roads which have contracts with the switchmen's organization. The organization of the maintenance of way employees has asked the United States Board of Mediation and Conciliation to call the attention of the director general to their interests. A movement has also been started among train dispatchers to bring their claims for increased wages before Mr. McAdoo. How great strength this movement represents has not been made clear, but copies of a petition have been circulated among the dispatchers of different roads with a request to them to sign it and forward it to the director general. The petition contains a review of the working conditions of dispatchers and asks for one day off per week, or in lieu thereof double time for Sundays and holidays; a monthly salary of \$235 for chief dispatchers, \$225 for assistant chief dispatchers, and \$215 for trick dispatchers, to be made effective as of January 1, 1918; also foreign line and Pullman transportation. The Order of Railway Telegraphers has been following its usual plan of presenting demands separately to individual railroads, but its president, H. B. Perham, has been in Washington recently.

Burleson Finds Mail Trains Late

Comes now A. S. Burleson, Postmaster General, to take a last crack at the "inefficiency" of the railway mail service while the cracking is still good, because hereafter cabinet courtesy, if not the well known admiration of the Postmaster General for government management, will probably preclude such statements as the one he has just issued in answer to many criticisms of delay in the mail service.

"During the month of November," says the Postmaster General, "mail trains failed to make scheduled connections 86,712 times. One of the important trains, carrying mail from Washington, Baltimore, Philadelphia and points west, failed 70 per cent of the time during the last four months; and the principal train between New York and Chicago failed 71 times in its Southwest connection during three months, and 57 times in its Northwest connection.

"Delay in the transmission of mail," says the Postmaster General, "is due to congestion of the railroad system. Re-

part, so daily operations of the railway mail service, the postoffice and city delivery show that the mail, though presented in greater volume than before in the history of the country, is being handled more expeditiously by the postal employe than in previous years. That there has been a delay in some instances is a matter of public knowledge not dispelled by the department.

The Postmaster General, however, unlike most people who have to experience delays or shortages these days, does not make any complaint on the score of increased expense. He says:

There is no indication of whereby more liberal, lawful expenditure of money in any branch of the service under the control of the department the delivery of mail could be facilitated. The Post Office Department is no more responsible for delay in the delivery of a letter than it is for the delay in the delivery of coal and sugar, and were additional sum expended much in excess of the surplus of the past ten years the mail could in no wise be expedited.

Reports show that notwithstanding an increase of more than 25 per cent in first-class matter and approximately 40 per cent in parcel post there was a marked improvement in the service during 1917 as compared with that of other years.

The reports of the holiday season show that the only point where congestion occurred in a post office was in Washington, and this congestion was due to failure by the railroads to furnish sufficient cars, the mail through this office having increased at least 10 times the normal amount by reason of the city being the gateway to army cantonments and mobilization camps.

The Postmaster General takes his critics to task on complaints that he has saved from \$5,000,000 to \$9,000,000 for the government, believing that this curtailment has injured the service. Mr. Burleson contends that the service has been bettered, not hindered, and challenges any one to show where "by the restoration of a system of prodigality of expenditure" the delivery of mail could have been made more prompt.

These are some of the things he says. Some of the things he does not say are that most of the \$5,000,000 to \$9,000,000 he has saved has been saved at the expense of the railroads, by reducing their pay for carrying the mails. "Poor pay, poor preacher." Either of the sums named would have bought a few mail cars.

The 25 to 40 per cent in raise in mail service finds no response in the bulletins on railway revenues published by the Interstate Commerce Commission. For the 10 months ending October 21, published in the commission's latest report, while total railway operating revenues per mile increased 11.8 per cent as compared with the corresponding period of 1916, and freight revenues increased 10.7 per cent, passenger revenue 15.1 per cent, and express revenues 12.5 per cent, the revenues received for transporting the mails show a decrease of 1.7 per cent.

Purchasing Departments Undisturbed

There is no apparent intention on the part of the government railway administration, for the present at least, to interfere with the functions of the railroad purchasing departments. Mr. McAdoo and his staff are concentrating most of their attention upon the immediate pressing problem of moving the freight and clearing up congestion and until he has it to at the railroads will continue to purchase their own supplies on the usual way, just as they continue to operate their lines. The administration bill provides for an appropriation of \$500,000,000 to be used with any excess earnings above the guarantees, in the purchase of engines, rolling stock and other necessary equipment and for terminal improvements. Probably orders placed with this money would be expedited under the direct supervision of the government, but so far as rail matters are concerned the railroad officers

will follow their usual course, as provided in the following paragraph from the President's proclamation:

"Said directors also shall have the widest approval upon them to long and to now exist, to be shown otherwise through the boards of directors, managers, officers and employees of said systems of transportation. They and subject to the usual director shall have full power to close by general or special orders other than provided, the business of necessary business, except and conditions, they require transportation to their said enterprises, the operation thereof to the usual and ordinary course of the business of normal carriers, at the business of such respective companies."

(See also item in early correspondence entitled "Railroad Men, Railroads United for New Business" - Editor.)

Train Accidents in December

THE FOLLOWING TABLE SETS FORTH the total number of train accidents that occurred on the railways of the United States in the month of December, 1917.

Date	Railroad	Place	Casualties		Killed	Injured
			Passenger	Freight		
76	At. & G. S.	Ill.	0	1	1	1
	Ill.	Washburna	0	1	1	4
	Ill.	W.	0	1	1	1
8	St. Louis & S. F.	W. Va.	0	1	1	2
30	Nashville, C. & S. I.	D. C.	0	1	1	1
16	Del. & Hudson	Calif.	0	1	1	1
17	T. & N. Nashville	Pa.	0	1	1	1
20	N. Y., N. H. & Ill.	N. H.	0	1	1	1
22	Central N. J.	N. J.	0	1	1	1
24	Canada P.	Quebec, M.	0	1	1	1
25	Balt. & Ohio	N. Va.	0	1	1	1

Date	Railroad	Place	Casualties		Killed	Injured
			Passenger	Freight		
1	Wabash	Ill.	0	1	1	1
2	Ill. Central	Ill.	0	1	1	1
3	Pennsylvania	Pa.	0	1	1	1
6	Norfolk S.	Pa.	0	1	1	1
6	Miss. Central	Miss.	0	1	1	1
8	Cles & O.	Ill.	0	1	1	1
17	Duluth & I. R.	Ill.	0	1	1	1
18	Deer & R. G.	Ill.	0	1	1	1
21	G. S. & Ill.	Ill.	0	1	1	1
28	N. Y., N. H. & Ill.	N. H.	0	1	1	1
30	St. Louis & S. F.	W. Va.	0	1	1	1
30	W. Maryland	Pa.	0	1	1	1

The trains in collision at Bolivar, Ark., on the Erie with northbound passenger No. 2 and northbound freight No. 6580, the passenger running into the rear of the freight. The fireman of the passenger train was killed and the origineman injured. The collision was due to disregard of block signal by train No. 2, and the train is charged. No 6580 are charged with neglect of flag protection.

The trains in collision at Shippensburg, Pa., at 11:47 a. m., on the one were eastbound passenger No. 48 and a switching engine moving westward, pulling a freight train. Both trains were on the westbound track, the eastbound track having been closed by a derailment. Both locomotives were wrecked and their conductors were killed. A caboose next to the switching engine was carried up together with the bodies of two trainmen who were in it, and were killed. The forward car of the passenger train was crushed and the forward man was killed. One other employee was killed and two were injured.

The trains in collision near Warsaw, Ky., on the morning of the 17th, one was a passenger train and the other a freight train. The passenger train was No. 154 and the freight train was No. 1744. The freight

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had been brought to a stop and the passenger was running at low speed. There was a blinding snow storm at the time. One engineman and one fireman were injured.

The trains in collision near Weleetka, Okla., on the night of the eighth were through freight. Both locomotives were wrecked and three employees were killed.

The trains in collision at Dickson, Tenn., on the tenth were a through freight of the main line and a local freight of Centreville branch. Two employees were fatally injured.

The trains in collision at Cobleskill, N. Y., on the 16th were eastbound freight No. 864, running into the rear of No. 791. Two engines and 11 loaded cars were wrecked. The engineman on No. 864 was killed. Train 864 ran into the passing siding already occupied by the preceding train at excessive speed, and No. 791 was not properly protected.

The trains in collision at Shepherdsville, Ky., on the evening of the 20th were southbound passenger No. 41, a local train, and southbound passenger No. 7, a through express. The express ran into the rear of the local, wrecking the two rear cars and killing 45 passengers and two trainmen. About 40 passengers were injured. There appear to have been neither space-interval nor time-interval regulations, but the engineman of the express disregarded a train-order signal, the observance of which would have given him sufficient space within which to stop his train before striking No. 41. This collision was reported in our issues of December 28 (p. 1185), January 4 (p. 88) and January 11 (p. 137).

The trains in collision near New Haven, Conn., on the 22d were a northbound passenger and a switching engine, the collision occurring within yard limits. The fireman of the passenger train was killed and three other employees were injured. The baggage car was overturned.

The trains in collision at Ludlow, N. J., on the 23rd were westbound through freights. One trainman was killed and two others were injured. The engineman of the second train fell asleep and awoke too late to stop before running into the other train. He had been on duty 6³/₄ hours.

The trains in collision at Keough, Me., on the 24th were an eastbound freight and a following locomotive without a train. The empty engine ran over a misplaced switch and into the rear of the freight, wrecking the caboose. The conductor and a trackman, in the caboose, were killed.

The trains in collision on the Baltimore & Ohio at North Vernon, Ind., on the 29th of December, were eastbound passenger No. 2 and westbound passenger No. 23, second section. Eight persons were killed; one passenger, the engineman, fireman and baggageman of the westbound train, and the engineman, fireman, baggageman and one brakeman of the eastbound. About 20 persons were injured. The eastbound train had run past distant and home automatic block signals set against it. This collision was reported in the *Railway Age* of January 4.

The train derailed at Edwardsville, Ill., on the 2d was westbound passenger No. 3. No serious injuries to persons were reported. The derailment was due to the failure of an arch bar of one truck of the tender. A broken part fell to the ground and tore out a frog.

The train derailed near Granger, Ill., on the 2nd was a westbound special passenger carrying soldiers returning from a two-day holiday at Chicago. Two of the 13 cars of the train were overturned, and 25 passengers and one employee were injured. The derailment was caused by the failure of a brake rod connection on one of the trucks of the tender which fell to the track and caught in a switch.

The train derailed near Corry, Pa., on the morning of the 3rd, at about 2 o'clock, was a southbound passenger. The engine was overturned and the engineman and fireman were fatally scalded. The derailment was caused by a defective brake rigging which fell to the ground and caught in a plank crossing.

The train derailed at Butts, Va., on the night of the 6th was southbound freight No. 65. The engine was derailed at a misplaced switch, and, with four cars, was overturned and wrecked. The fireman was killed and two other trainmen were injured. The switch had been tampered with.

The train derailed near Camp Shelby, Miss., on the 6th was a westbound passenger. The fireman and three passengers were injured, the fireman fatally. The cause of the derailment was not determined; supposed to be defective truck.

The train derailed on the Chesapeake & Ohio at Sharon, Ky., on the night of the 8th was eastbound passenger No. 24. Both of the two engines drawing the train were overturned and fell against the caboose of a freight train standing on a side track. One trainman in the caboose, and three other employees were killed, and three employees and one mail clerk were injured. The leading engine had been thrown off the track by ice at a street crossing about three miles back, and had run on the ties the whole distance to a switch, near the standing freight train, where the engines headed across the side track.

The train derailed near Tower, Minn., on the 17th was a local passenger. Three coaches fell down a bank and were overturned. Fifty-four passengers and 2 trainmen were injured.

The train derailed near Dale's Station, Utah, on the 21st, about 5 a. m., was a westbound freight. The train became uncontrollable on a steep descending grade and was thrown off the track at a curve. One trainman was killed and three others were injured, one of them fatally.

The train derailed near Valdosta, Ga., on the 24th was southbound passenger train No. 95. The locomotive and tender remained on the rails, the four coaches being derailed but not turning over. Three passengers and one porter were slightly bruised. The derailment was caused by a piped rail breaking under the train.

The train derailed near Roxbury, Conn., on the 25th was a southbound passenger. Twelve passengers were injured. The cause of the derailment was a broken rail.

The train derailed at Ludlow, Ky., on the 26th was a northbound freight. The train became uncontrollable on a steep descending grade near Erlanger, seven miles from Ludlow and ran at high speed to a switch in Ludlow yard, where the engine and 25 cars were ditched.

The train derailed near Security, Md., on the 30th was a westbound freight, No. 914. The train became uncontrollable on a steep descending grade near Edgemont and ran at a high speed to Security, about 10 miles. Several cars were thrown off the track at a curve near Cavetown.

The train involved in the accident near Derry, Pa., on the 3rd was eastbound passenger No. 32. While passing, at full speed, a freight train, standing on the adjacent main track, a freight car projected so as to foul the side of the passenger train, and many coach windows were broken. Twenty-six passengers and one employee were injured.

Electric Car Accidents.—Six serious accidents to electric cars were reported in the newspapers as occurring in the United States in the month of December; the worst one, a runaway at Pittsburgh, Pa., on the 24th, causing the death of 20 passengers and the injury of about four times as many. This accident was reported in our issue of December 28, page 1189. At Houston, Tex., on the 15th, a locomotive ran into a street car, killing three persons and injuring five. Other accidents—causing one death and a number of injuries each—occurred at Weehawken, N. J., on the 14th; Baltimore, Md., on the 19th; Fair Hope, Ohio, on the 26th, and Vandalia, N. Y., on the 26th.

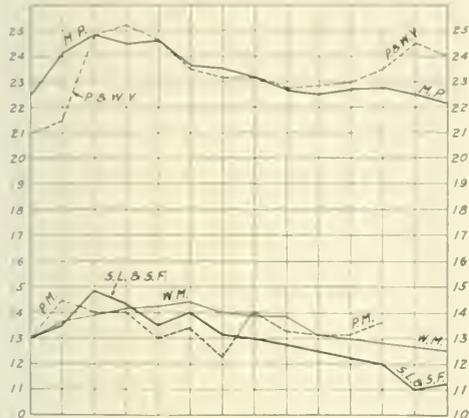
Canada.—In a collision on the Canadian Pacific, near Tilsonburg, Ont., on the 17th, one employee was killed, and in another on the Grand Trunk at Stoney Creek, Ont., on the 18th, two were killed and three were injured.

How Will the Railroad Securities Be Affected?

Progress of the Country Can No Longer Be Counted Upon as a Favorable Factor in Railroad Stock Values

ON THE THURSDAY MORNING after the announcement of the President in regard to the government operation of railways and guarantee of net income, there was a quite sharp rise on the New York Stock Exchange in the price of most of the so-called standard railroad stocks. By the following Saturday a reaction had set in in many railroad stock prices.

Of all the many things that are reflected in price changes



Closing Prices Dec. 26 to Jan. 11 of Missouri Pacific, Pittsburgh & West Virginia, Pere Marquette, Western Maryland and St. Louis-San Francisco

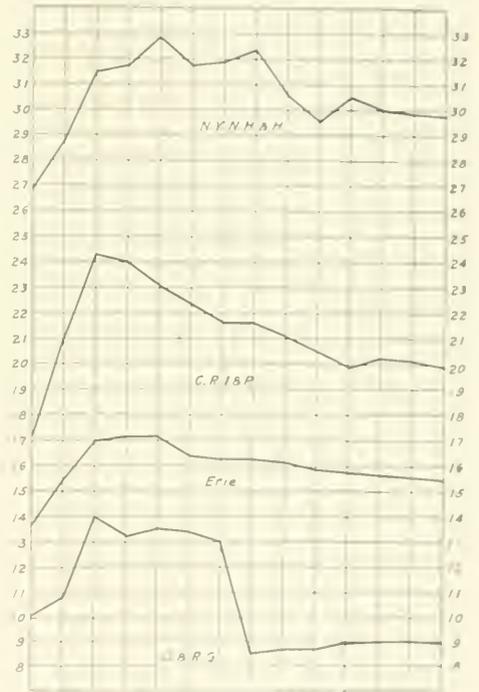
on the stock exchange it is possible to distinguish two principal groups: one group has to do with nerves, the other with brains or judgment. The sudden upward trend of prices on Thursday and its continuation in some cases on Friday may be principally attributed to those causes in the group that has to do with nerves. It reflected the sudden cessation of nervous dread which had been cumulative in the past few days and weeks. The charts show the closing price of each of 20 railroad stocks on each stock exchange day from Wednesday, December 26, the day before the President's proclamation, to Friday, January 11. The course of prices, after the first sudden rise of Friday, may in general be said to reflect the judgment of the market, modified, of course, by specific supply and demand conditions.

After the relief due to the removal of uncertainties had worn off a little, one of the first things that struck an investor in railroad stocks when he studied the administration's bill was that whereas nearly all investment in stocks and the great bulk of investment in bonds has been predicated upon the assumption that gross business will steadily increase at an average annual rate of about 8 per cent, and that a considerable part of the increase in gross will go one way or the other to enhance the return on the investment or the equity behind it, now suddenly that whole attitude of mind has to be changed. Not only is there no hope for an increased return on the investment and no longer can progress and growth of the country be a factor to count upon, but even the best that we have done before is not taken as a standard for the future—it is averaged down by the inclusion of 1915.

There are only a few American railroad stocks that are

properly classed as investments, the difference being a greater or less extent speculative, and yet all investors just as surely owe the railroad management the obligation to disclose to the conservative investor. To the speculative investor and to the stock of recently organized companies the administration's plan is not a bad thing. The charts showing the prices of Missouri Pacific, Pittsburgh & West Virginia, Pere Marquette, Western Maryland, and St. Louis-San Francisco show this in quite a striking way. These roads have all been through reorganization. All of them have had their debts written off, very considerable losses charged out to security holders, and the par value of the outstanding securities at least three out of five is much lower than the actual cash investment in the properties.

It is, of course, impossible accurately to figure out just what "other income," "fixed charge" and "rentals" will be

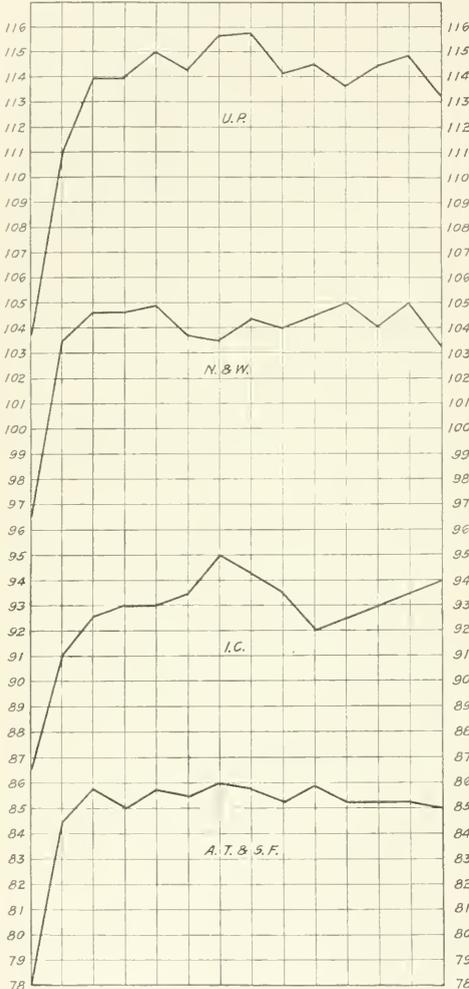


Closing Prices Dec. 26 to Jan. 11 of New York, New Haven & Hartford, Chicago, Rock Island & Pacific, Erie and Denver & Rio Grande

in the next two or three years, but based on the actual figures for the last year (either based on calendar year, or better available) it would appear that the Missouri Pacific road charges, rentals, etc., would be between one and two million dollars. The sum which the directors will have under the "standard return" plan will be \$14,445,111. There is here a little margin, but the reorganization plan was predicated on the assumption that the new stockholders who had paid

a heavy assessment would in the near future begin to receive some dividends; without the President's specific permission they cannot now receive dividends.

The Pittsburgh & West Virginia will receive only \$298,704 under the government guarantee, but its stockholders were former bondholders and the par value of the stock is less than the actual cash investment in the property.



Closing Prices Dec. 26 to Jan. 11 of the Union Pacific, Norfolk & Western, Illinois Central and Atchison, Topeka & Santa Fe

The Western Maryland will receive \$3,090,247; its fixed charges are between two and three million and its cumulative dividend requirements \$1,260,000.

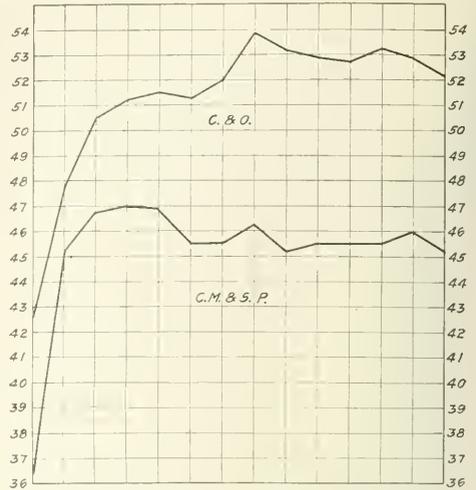
The Pere Marquette will receive \$3,750,963, while its fixed charges are over one and a half million and its cumulative dividend requirements nearly \$1,200,000.

The St. Louis-San Francisco will receive \$13,453,378, while its fixed charges are over fourteen million dollars.

All of these roads will have some "other income" to add

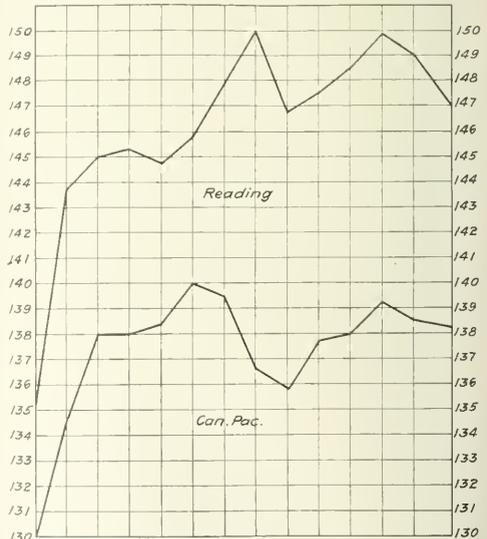
to the government's guarantee, but even this will not leave them anything like an adequate margin.

Turning now to the railroads that have had fairly good



Closing Prices Dec. 26 to Jan. 11 of the Chesapeake & Ohio and the Chicago, Milwaukee & St. Paul

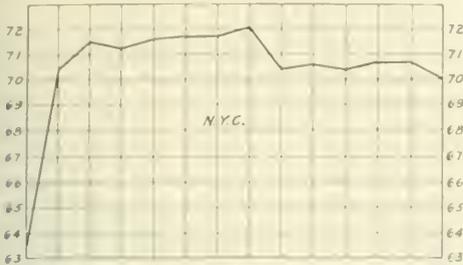
earnings in the past three years, but about which there had been considerable doubt and uncertainty. In this class are the Chicago, Milwaukee & St. Paul, New York Central, New York, New Haven & Hartford, and Chicago, Rock Island &



Closing Prices Dec. 26 to Jan. 11 of Reading and Canadian Pacific

Pacific. At first thought it would seem that the government's plan would be of great market value to these companies' stocks. The stocks had been selling down and down because of the fear that the future would not be as good to them as

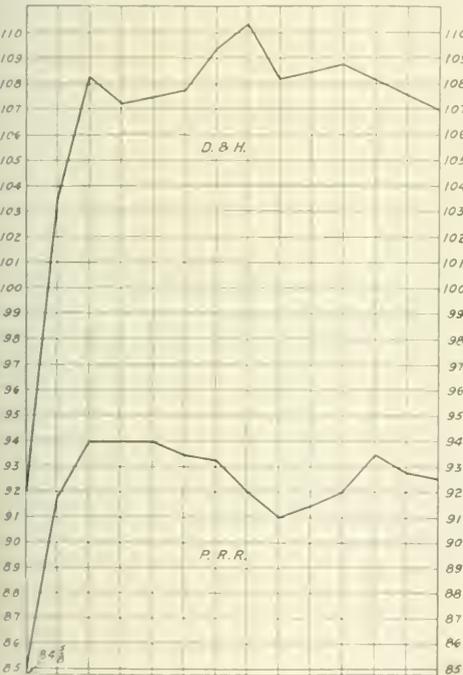
the past had been. Now they are to be guaranteed on the basis of the past. It is quite evident from the chart that the stock markets took this point of view, at least on Thursday. But further consideration proved to be not so optimistic, especially in the case of the Rock Island and the New Haven.



Closing Prices Dec. 26 to Jan. 11 of New York Central

The Rock Island will receive \$15,074,252; its fixed charges, after deducting other income, will be apparently nearly \$14,000,000.

The Chicago, Milwaukee & St. Paul will receive \$27,848,808 and its fixed charges, after deducting other in-



Closing Prices Dec. 26 to Jan. 11 of Delaware & Hudson and Pennsylvania

come will be between fourteen and fifteen million dollars, leaving between twelve and thirteen million dollars for dividends and surplus, while 7 per cent on the preferred and 4 on the common will call for nearly \$13,000,000.

The New York Central is in a quite different situation. It will receive \$55,972,807, with net fixed charges, etc., amount-

ing to a little over one-third of a half million, leaving in the neighborhood of thirty-eight million dollars, with dividend requirements at the present rate of double less than twelve and a half million dollars.

The Chesapeake & Ohio presents an interesting financial case. It will receive \$17,280,000 and will have left after paying fixed charges, etc., something over five million dollars. It has only recently resumed paying dividends and without special permission could not apparently increase the 3 per cent rate but the market took a decidedly favorable view of it.

The Delaware & Hudson stands in a class by itself. It will receive \$7,257,294 and will have left after deducting increased income from the coal mining department, nearly \$4,000,000, while it is 1 per cent dividend requirements will for a little over \$2,800,000. The Delaware & Hudson had the largest rise in price on any of the charts. The fact was, however, that the stock was selling at considerable discount price due to a 1 per cent and long drawn out road work in the stock market, accompanied by rumors of a reorganization in fact.

Turning now to what may be properly considered high class investment stocks. We have the Union Pacific, which will receive \$8,267,203 with net charges of \$1,000,000 and dividend requirements of 8 per cent on the common and 4 on the preferred, or a little over \$4,700,000, leaving a surplus of nearly fifteen million.

The Norfolk & Western will receive \$9,918,800 and have left over \$19,000,000, with dividend requirements of about \$8,000,000.

The Illinois Central will receive \$16,249,000 and have left between eleven and twelve million dollars, with dividend requirements of about \$6,500,000.

The Atchafalaya & Santa Fe will receive \$4,000,406 and have left over \$3,100,000, with dividend requirements of only a little over \$1,000,000.

The stocks of these roads had a large rise and fairly well maintained their new levels, but apparently there is uncertainty as to just how the surplus above the "standard return" not required for dividends will be dealt with. If Congress and the Interstate Commerce Commission merely live up to the commission's theories of the distribution between capital expenditures and expenses this surplus can be invested as new capital and the standard return will be increased by an amount equal to interest thereon. If this interpretation is placed on the law there will be certainly a chance for roads like the Santa Fe, Norfolk & Western and Illinois Central to appreciate in value and for a steadily increasing equity back of the stocks. The same is true of the Pennsylvania, although, because of the combination of the Pennsylvania Company with the lines east, an accurate forecast cannot be made of how great the surplus would be above the standard return.

Canadian Pacific, which was not affected by the President's proclamation, except through its ownership of Soo stock, had as great a rise as many stocks that were directly affected. The explanation of this is probably a technical one. J. P. Morgan & Co. have presumably been liquidating a heavy sale of securities which included a very large block of Canadian Pacific in anticipation of paying off a British loan which matures at about this time. There had therefore been heavy selling pressure on Canadian Pacific and when the pressure ceased as it did before December 26, an excess rally was needed for a considerable rise.

It would appear that if the government passes and interprets the new law so as to make it less of a hardship on the new reorganized roads and plays fairly and squarely with roads like the Santa Fe and Illinois Central, there is a real chance that the standard American railroad stock will again become acceptable to investors for the first time in more than a decade.

Tests of Manganese Steel Rails

THE SERVICE which has been secured from manganese steel rails on seven railroads is given in a report prepared by M. H. Wickhorst, engineer of tests of the rail committee of the American Railway Engineering Association, Chicago, and published in bulletin No. 199 of that association. These seven roads submitted reports to the committee giving in considerable detail the curvature and grades and the approximate density of traffic to which the test rails were subjected. Two of the seven reports submitted to the committee are abstracted below with the conclusions based on the seven reports.

Tests on Lackawanna

In the fall of 1912, 500 tons of 101-lb. rolled manganese rail was secured, for use on some of the sharp curves of the eastbound track of the Delaware, Lackawanna & Western on a 1½ cent grade down the Pocono mountain. After the manganese rail had been in service for about two years, the low rail on some of the sharpest curves showed signs of flowing. This flowing was not by the formation of a lip, as is usually the case with Bessemer or open-hearth rail, but the head of the low rail dished slightly and the entire head seemed to move both ways from the center. With a view of getting the full life out of this rail, we decided to remove the low rail from the curves in question and lay it on the high side of other curves, laying frictionless rail on the low side.

For convenient study, the results of the several tests showing the abrasion of the high rail per million tons of traffic are given below:

HIGH RAILS		Sq. in. abrasion per million tons
Curve	Kind	
6°	Beth. O.-H.	.0230
6°	Lack. Bess. F. T.	.0283
6°	Lack. O.-H. Spec. Prem.	.0274
6°	Beth. O.-H. Spec. Prem.	.0260
6°	Ill. Manganese	.0035
6°	Ill. Manganese	.0035
6°	Lack. O.-H. Spec. Prem.	.0222
6°	Ill. Manganese	.0034
6°	Lack. Bess.	.0718
7°	Lack. O.-H.	.0583
7°	Passaic Manganese	.0115
7°	Beth. O.-H.	.0275

Tests on Pennsylvania

In April, 1912, about 41 tons (0.27 track miles) of 100-lb. P. S. Manard rails were laid in the eastward freight track on the Horseshoe curve, and open-hearth rail was laid simultaneously, adjoining it, for comparison. The Manard rail cost \$94 per ton. In September, 1912, the open-hearth was replaced with new open-hearth, this latter rail remaining in track until January 7, 1913. The open-hearth rail was again renewed on June 20, 1913, and both open-hearth and Manard were removed October 15, 1913, the life of the Manard being 17½ months, or four times that of the open-hearth.

The figures below give the average abrasion of each kind of rail:

Date of measurement	Manard		Open-Hearth	
	Square inches	Per cent of head abraded	Square inches	Per cent of head abraded
October, 1912	0.08	1.9	0.52	12.4
February, 1913	0.47	11.2	1.25	29.8
June, 1913	0.63	15.0	2.11	50.1
October, 1913	0.81	19.2	3.11	74.0

There were three failures of the Manard rail out of a total of 84 rails laid, two consisting of transverse fractures through the head and about two-thirds of the web and one by split head.

On January 26, 1914, about 0.27 track miles of Manard rail was laid in the eastward freight track on the Horseshoe curve in comparison with ordinary open-hearth rail. It was removed November 9, 1915, the abrasion being as follows:

Abrasion	Manard	Open-Hearth
Total area sq. in.	0.74	4.13
Per year of service	0.42	2.35
Per ten million tons of traffic	0.07	0.41

On the Middle division, in 1914, 0.40 track miles of Manard rail was laid, as follows:

Date	Miles	Track	Location	Curve
Jan. 14	0.16	Ewd. Pass.	W. of Barree	6°
Jan. 26	0.19	Ewd. Pass. & Frt.	E. of Tyrone Forge	6°
May 1	0.05	Ewd. Pass. & Frt.	W. of Shoenerger	6°

This rail is still in track and the stretches west of Barree and east of Tyrone Forge now show wear as follows:

Location	Deg. of curve	Per cent of head abraded	Service to date	Life of ordinary rail
Barree	6°	8.44	33 mo.	14 mo.
Tyrone Forge	6°	10.39	33 mo.	18 mo.

Of the 0.94 track miles of Manard rail in track there have been 40 failures, of which 28 were transverse fractures through the head and a portion of the web, 6 were split head and 6 split web. In no case was the rail broken through. Forty failures in 0.94 track miles in average life of 3½ years amounts to 1,216 failures per year per 100 miles of track, as compared with an average of 27 failures for all rail on the Pennsylvania on the same basis.

A comparison of failures per 100 track miles of Manard rail with those of ordinary open-hearth, 1913 100-lb. P. S. rails shows the following:

	Failures per 100 track miles				Position in ingot			
	Head	Web	Base	Broken	A	B	L/3	*Total
Manard	639	639	..	2977	2127	1488	74	4255
Ordinary O.-H.	31	27	2	28	23	16	12	88

*Failures in lower positions divided by 3 to show approximate number in each position.

The annual cost per ton of open-hearth rail at \$30, lasting one year, is \$28, and Manard at \$94, lasting four years, is \$27. It would therefore be economical to use Manard rail on sharp curves under heavy traffic where ordinary open-hearth rail lasts one year or less, but not elsewhere. In this comparison failures are not taken into account. If they are considered, the cost of the Manard rail per ton per year would be increased about \$3, and with such a failure rate it would be economical only at locations where ordinary open-hearth wears out in 8 months.

Conclusions

The following are probably the conclusions that may be drawn from the various tests:

1. Manganese steel rails abrade much slower than Bessemer or open-hearth steel rails on sharp curves. On curves of 8 or 9 deg. the abrasion of the high rail per million tons of traffic, may be taken very roughly as follows: Manganese, 0.004 sq. in.; open-hearth, 0.012 sq. in.; Bessemer, 0.20 sq. in. In other words, the abrasion of open-hearth rails is about three times that of the manganese rails, and the abrasion of the Bessemer rails is about five times. The results, however, vary considerably and are probably dependent upon the nature of the rolling equipment as well as the tonnage. We also have no information as to relation between the abrasion and degree of curvature.

2. Manganese steel rails become distorted by spreading and drooping of the head more easily than open-hearth rails, and apparently, also, than Bessemer rails, explained presumably by the low elastic limit of manganese steel.

3. The failures or breakages of manganese rail were extremely high and seemed to consist mostly of transverse cracks in the head, starting from the surface, resulting finally in pieces of the head breaking out. The manufacturers explain these failures as due to faulty manipulation in the early manufacture of manganese rails, which has since been remedied. Immediately after rolling, while still very hot, it is necessary to quench the rails in water, which operation was not at first handled in an entirely satisfactory manner.

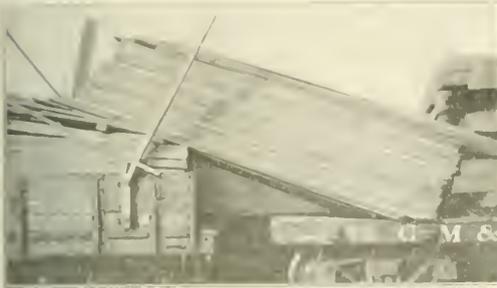
Methods of Loading Lumber in Open Top Cars

Failure to Prevent Shifting of Lading Results in a
Serious Waste of Equipment and Labor

THE UNPRECEDENTED MEASURE, restricting the use of open cars which have been taken by Judge Lovett, director of priority, show the importance of securing the maximum service from this class of equipment. The tonnage of coal that will have to be moved this winter will break all records and the demand for cars will be greater than

was met either by supply or by new cars produced continuously between the falling and last years' hauls. It is important, therefore, that the shipping of lumber be done in accordance with the maximum service from this class of equipment. This can be done in only one way, and that is by the use of a better method.

It will be noted that the rules governing the loading of lumber in open cars are based on two assumptions that friction will be sufficient to prevent lateral shifting of the load. The selection of heavy rubber-pneum tires for the reason of the length of train in recent years has increased the weight



Good Judgment or Good Luck in Making Up the Train

of the supply. Gondola cars will, therefore, be urgently needed for carrying coal. On the back haul to the coal mining regions gondolas are used for many commodities, one of the most important being lumber. It is the purpose of this article to show how greater service can be secured from open



Damaged Equipment Contributes to the High Cost of Transporting Lumber

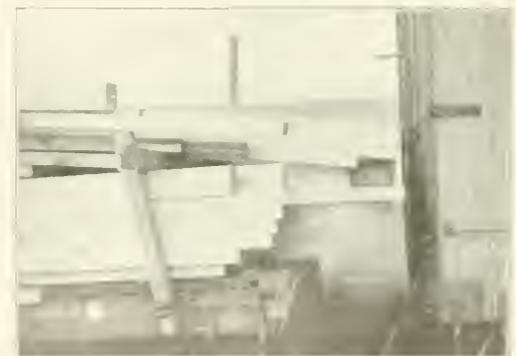


The Transfer Track Is a Busy Place

cars by better methods of loading lumber, soon transported in that class of equipment.

The loading rules of the M. C. B. Association, in brief, provide that lumber loaded in open top cars must not extend beyond the end sill of the car unless protected by an idler, nor within 6 in. of the brake wheel. If the load extends beyond the side of the car, stakes must be provided to hold the lading at the side. The number and size of the stakes depend on the height of the car side, the height of the load, the number of piles making up the load, and the method of loading. The tops of opposite stakes must be fastened together with boards or with wire. Lumber of equal thick-

ness must either be stacked in long, single piles continuously between the falling and last years' hauls. It is important, therefore, that the shipping of lumber be done in accordance with the maximum service from this class of equipment. This can be done in only one way, and that is by the use of a better method.



A Load That Will Probably Check Short at Its Destination

ness must either be stacked in long, single piles continuously between the falling and last years' hauls. It is important, therefore, that the shipping of lumber be done in accordance with the maximum service from this class of equipment. This can be done in only one way, and that is by the use of a better method.

ing lumber in open top cars can be gained by examining the illustrations which accompany this article. All the photographs of shifted loads which are shown were taken at one yard in a single week.

The Illinois Central a short time ago conducted a special investigation in order to determine the loss of service from cars due to the reshaping of loads which had shifted in transit. During a period of three months this road handled 7,926 cars loaded with dressed lumber. The total car days' delay on these shipments amounted to 17,778, an average

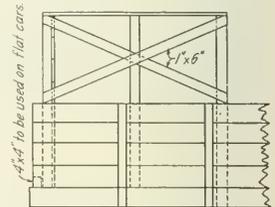
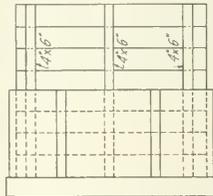
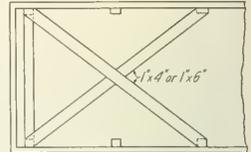
dressed, which causes trouble by shifting. Open cars are used to handle probably 25 per cent of the dressed lumber shipped, or 26,000,000 tons. Assuming an average load of 50 tons per car this amounts to 520,000 carloads. As each shipment would require under normal conditions about 18 days from origin to destination, the average number of open cars used in the lumber traffic is 25,600. If an average saving of two days per trip could be secured by bulkheading the cars the number required to handle the traffic could be reduced to 22,800, thus effecting a saving of 2,800 cars.

In addition to the saving in equipment there would be fur-



Bulkheads on Lumber Cars Keep the Load Where It Belongs

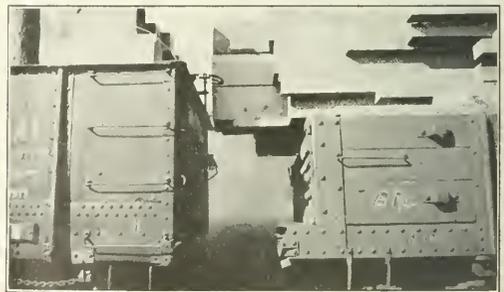
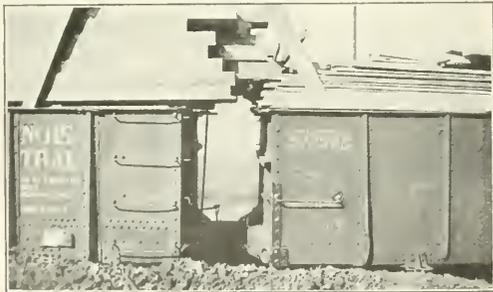
of 2.24 days per car. Had it been possible for the Illinois Central to avoid the delays to cars loaded with dressed lumber during the three months referred to above, the road would have had 194 more cars available for service. It is estimated that it would have secured increased revenues amounting to about \$85,000. In addition to this there would have been a considerable saving due to the elimination of the expense of switching cars and adjusting loads, and claims for damage to lading. The cost of switching was probably about 50 cents a car and the cost of reshaping the load considerably greater. In the month of May alone the cost of transferring and reshaping loads of lumber at Memphis amounted to



Type of Bulkhead Used on the Illinois Central

ther economies due to the reduction of charges for switching and reshaping of loads and also to the elimination of claims for damage to lading.

While the Illinois Central was investigating the delays due to the shifting of loads, a special messenger accompanied one shipment of 50 cars of lumber from a single company.



Shifting Is Not Confined to the Smaller Sizes of Lumber

\$39,308. Probably one half of this expense was chargeable to loads on open cars.

While accurate data concerning the amount of dressed lumber shipped in open cars on the railroads of this country are not available, an estimate of the saving of cars that would be effected if the practice of bulkheading was generally adopted will show the importance of the subject. The total lumber traffic of the country in the year 1917 was probably about 160,000,000 tons. Of this amount about 65 per cent or 104,000,000 tons consisted of lumber wholly or partly

Of these 50 cars 22 were delayed three or four days on account of the necessity of reshaping the load. The railroad had experimented with bulkheads placed in the ends of the cars to keep the lumber in place and had found the results of this practice very satisfactory. It was so evident in this case that the delay was due to improper loading that the company from which the shipment in question was received was persuaded to bulkhead their cars. They have continued to follow this practice and delivery of shipments from this company are now made without the delay formerly experi-

enced. Trains of 30 cars have been brought to their destination without having a single car removed or undetracked for re-lashing.

The method of bulkheading which has been in use on the Illinois Central for loads on gondolas or flat cars is shown in the illustration. The end is made up of three upright posts 4 in. by 4 in., to which are fastened 2 in. by 1 1/2 in. boards. The corner post is fastened to the third side post by diagonal strips of 1 in. by 6 in. lumber and similar bracing connects the tops of the posts. In case the bulkhead is used on flat cars a 4 in. by 4 in. timber is placed crosswise at the end of the car to hold the lower end of the posts in place.

That shippers are willing to cooperate with the railroads in this matter of bulkheading cars is shown by the fact that one large producer of lumber has adopted the practice while the Southern Pine Association has urged its members to consider the advisability of bulkheading their shipments. The

value and if additional damage is repaired the allowance provided in the tariff should be increased.

It seems probable that both the shipping and the railroad would benefit by the adoption of the practice of bulkheading open cars loaded with lumber. The savings that would be realized over under-packed conditions would justify the practice. At the present time no shippers shipping wood goods are afforded an opportunity for securing more effective protection of the car supplies.

Tests of Slag Concrete

A series of tests for the purpose of comparing slag, gravel and stone in the concrete aggregate for concrete is being carried on by the Portland Cement Laboratory, Portland, Pa. It being the intention to cover

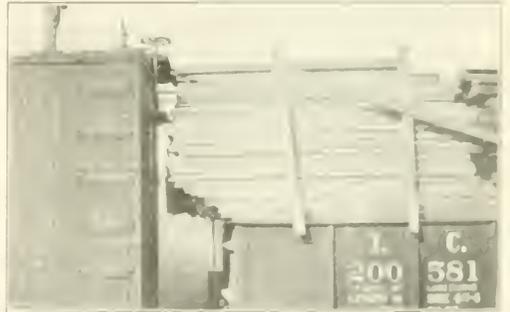


Typical Examples of Shifted Loads

main obstacle to the adoption of the practice is the fact that the shippers object to using so much lumber to secure the load unless the roads make a corresponding increase in the damage allowance. The present rules of the three principal freight classifications provide that an allowance not to exceed 500 lb. will be made for temporary stakes, dunnage or supports when required to protect and make secure for shipment

the tests over a period of five years. All the tests made up to the end of the first six months have now been made public and while these are by no means conclusive they indicate the trend of the results.

The tests were undertaken to secure information relative to (1) a comparison of the crushing strengths of air-cured blast furnace slag, crushed stone and gravel when used as



Loads of Lumber Going Out "Over the Top"

property on flat or gondola cars upon which carload rates are applied. It has been urged by the shippers that the practice of bulkheading be made mandatory and the damage allowance increased to 1,000 or 1,500 lb. The carriers claim that the lumber used in bulkheading has some commercial value and that the shippers should be able to sell it to the consignee. The shippers on the other hand contend that the lumber used for securing loads has no market

value and that if additional damage is repaired the allowance provided in the tariff should be increased. (2) Determination of the gradation of the material as received together with other physical characteristics. (3) A determination of the percentage of water in the material as received. (4) The effect of surface area ratios, based on the modulus of concrete up to the age of five years. (5) The tensile strength and durability of

concrete made of high magnesia low lime slag and low magnesia high lime slag.

The cement used in the tests is Alpha portland, from Manheim, West Va., selected by lot from a list of several standard brands. The fine aggregate is sand from the Ohio river, while the coarse aggregates cover nine varieties of slag gathered from plants in various parts of the country, two kinds of gravel, two kinds of limestone, a trap rock and a crushed granite.

The proportions were determined by establishing the leanest mixture which would produce a dense concrete when using the coarse aggregate having the highest percentage of voids, and then using this mixture for all the materials. This led to the use of proportions of one part cement, two parts sand and four parts of the coarse aggregate.

The specimens were made in steel molds to produce cylinders 8 in. in diameter by 16 in. high. A quantity of material sufficient to make 10 cylinders was mixed at one time. Water was added as needed until a "quaking consistency" was obtained, so that the same consistency was secured in each case, regardless of the amount of water used. For this reason, it was not possible to use a mechanical mixer. The specimens were kept in the molds for 48 hrs. and were then stored in damp sand for 35 days. At the end of this time, all specimens were removed and stored in air. Four short pieces of reinforcing steel were embedded in each of two cylinders from every batch for the determination of corrosive tendencies. The results of the compression tests on the cylinders at the ages of 14 days, 30 days, 60 days and 180 days are shown in the table.

RESULTS OF COMPRESSION TESTS ON 8-IN. BY 16-IN. CYLINDERS.

Character of Coarse Aggregate Used,	Compressive Strength in Pounds Per Square Inch.					
	14 days		30 days		60 days	
Max. Min.	Max. Min.	Max. Min.	Max. Min.	Max. Min.	Max. Min.	
Gravel	2093	1792	1921	2608	2040	2294
Lime Stone	1840	1720	1758	2442	1950	2174
Trap Rock	2109	2026	2063	2454	2330	2386
Granite	2208	1980	2122	2334	2230	2292
Slag No. 1	2594	2380	2484	3127	2999	3075
Slag No. 2	1998	1897	1941	2770	2343	2525

Note.—The tests for each age covered the same number of specimens. For each age there were six gravel cylinders, six of lime stone, three of trap rock, three of granite, three of slag No. 1 and three of slag No. 2. Nine varieties of slag were used, of which slag No. 1 gave the greatest strength and slag No. 2 the lowest.

Average Net Operating Income for Years 1915, 1916 and 1917

THE ACCOMPANYING TABLES, showing the net operating income and property investment of railroads operating 86 per cent of the railroad mileage of the country, for the years 1915, 1916 and 1917, were introduced in evidence before the Senate Committee on Interstate Commerce last week by Frank Trumbull, chairman of the Railway Executives' Advisory Committee, and are here reproduced for the purpose of showing the amount and percentage of the guarantee proposed to be paid to the roads by the government while the properties are under its control during the war.

The average net operating income for the three years is proposed as the "standard return" to be used as the basis for agreements to be made by the roads with the President. For special cases where an agreement cannot be reached on this basis the bill now pending in Congress provides a method of adjudication by a board of auditors to be appointed by the Interstate Commerce Commission or by the Court of Claims. The net operating income as stated in the table is computed as that term is used in the Interstate Commerce

SOUTHERN DISTRICT
NET OPERATING INCOME AND RATE OF RETURN ON INVESTMENT FOR THE YEARS ENDED JUNE 30, 1915, 1916 AND 1917; ALSO THREE-YEAR AVERAGE (Net Operating Income = Operating Revenues Less Operating Expenses, Taxes and Net Balances of Equipment, Joint Facilities and Miscellaneous Items)

Road	Net Operating Income June 30,			Property Investment as of June 30,			Rate of Return - Per Cent			Road
	1917	1916	1915	1917	1916	1915	1917	1916	1915		Three-Year Average 1915-1917
Alabama & West Gulf	662,837	645,855	645,855	65,665,132	65,665,132	65,665,132	9.95	9.84	9.84	9.88
Alabama & West Point	481,419	521,937	521,937	4,521,379	4,521,379	4,521,379	10.67	11.54	11.54	10.92
Atlanta, Birmingham & Atlantic	1,668,139	1,597,441	1,597,441	38,487,000	38,487,000	38,487,000	4.34	4.15	4.15	4.28
Atlantic Coast	2,760,311	1,258,075	1,258,075	10,415,419	10,415,419	10,415,419	26.49	12.07	12.07	19.28
Carolina, Chickasha & Ohio	1,816,741	2,031,625	2,031,625	70,263,597	70,263,597	70,263,597	2.59	2.90	2.90	2.74
Central of Georgia	4,277,124	5,274,322	5,274,322	8,497,001	8,497,001	8,497,001	50.11	62.10	62.10	55.74
Charleston & Western Carolina	4,604,714	14,269,899	14,269,899	238,866,890	238,866,890	238,866,890	1.93	6.02	6.02	4.62
Chesapeake & Ohio	3,379,550	4,537,737	4,537,737	9,101,861	9,101,861	9,101,861	36.81	50.08	50.08	43.45
Chesapeake & Potomac	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	100.00	100.00	100.00	100.00
Florida East Coast	758,482	9,076,791	9,076,791	1,949,181	1,949,181	1,949,181	38.99	465.82	465.82	156.43
Georgia B. & Lessee Organization	307,000	1,245,047	1,245,047	882,985	882,985	882,985	34.78	141.01	141.01	88.90
Georgia & Ship Island	507,556	620,219	620,219	740,458	740,458	740,458	68.42	83.76	83.76	76.09
Ill. & M. & St. Louis	4,029,239	4,629,822	4,629,822	15,945,641	15,945,641	15,945,641	25.27	29.03	29.03	27.15
Ill. & M. & St. Louis	5,070,500	22,134,556	22,134,556	11,904,940	11,904,940	11,904,940	42.59	193.50	193.50	131.50
Louisville, Henderson & St. Louis	139,893	308,209	308,209	179,239	179,239	179,239	78.07	172.59	172.59	155.25
Memphis, Chattanooga & St. Louis	1,316,350	4,497,202	4,497,202	1,645,831	1,645,831	1,645,831	80.05	273.39	273.39	184.45
Memphis & Northern	1,005,721	24,101,201	24,101,201	16,084,820	16,084,820	16,084,820	62.54	149.26	149.26	105.90
Norfolk & Western	885,232	24,250,079	24,250,079	1,178,171	1,178,171	1,178,171	75.24	205.50	205.50	140.42
Norfolk Southern	908,721	1,445,079	1,445,079	1,332,186	1,332,186	1,332,186	67.86	108.47	108.47	88.17
Potomac, Fredericktown & Pascoe	87,848	1,508,846	1,508,846	1,237,911	1,237,911	1,237,911	70.26	122.68	122.68	96.47
Seaboard Air Line	3,184,000	7,132,139	7,132,139	5,233,472	5,233,472	5,233,472	60.75	136.23	136.23	95.37
Seaboard & Atlantic	3,184,000	7,132,139	7,132,139	5,233,472	5,233,472	5,233,472	60.75	136.23	136.23	95.37
Virginia Central	312,621	4,238,913	4,238,913	3,322,502	3,322,502	3,322,502	94.39	127.57	127.57	110.98
Washington Southern	354,577	731,088	731,088	527,566	527,566	527,566	67.31	138.58	138.58	102.95
Western B. of Alabama	133,442	310,385	310,385	179,607	179,607	179,607	74.35	172.49	172.49	153.42
Yazoo & Mississippi Valley	1,825,004	5,018,139	5,018,139	9,882,048	9,882,048	9,882,048	18.37	51.00	51.00	34.78
Total	32,893,119	138,077,860	138,077,860	114,770,489	114,770,489	114,770,489	28.91	33.07	33.07	31.00

*Estimate. *Property investment of Georgia Railroad not available. Figures shown include only net expenditures for betterments to leased property. Rate of return not computed and figures omitted from total.

WESTERN DISTRICT
 NET OPERATING INCOME AND RATIO PER CENT ON EXPENDITURE FOR THE YEARS ENDED JUNE 30, 1915, 1916 AND 1917, AND YEAR AVERAGE
 (Net Operating Income = Operating Revenues Less Operating Expenses, Taxes and Net Balances of Equipment, Property, Transportation, Maintenance and Other)

Road	Net Operating Income June 31			Year Average			Property Investment as of June 30			Rate of Return - Per Cent			Road
	1917	1916	1915	1917	1916	1915	1917	1916	1915	1917	1916	1915	
Arkansas & New Mexico	1,372.14	845.14	629.40	\$100,000	\$4,563,613	\$4,515,354	44,506,828	44,506,828	10.03	6.75	5.23	4.78	Arkansas & New Mexico
Atlantic States & New York	11,276.17	43,120.50	31,920.50	48,388,654	64,638,336	66,010,420	668,196,867	668,196,867	7.02	6.12	6.24	6.24	Atlantic States & New York
Chicago & North Western	3,747.97	3,137,596	2,781,051	1,829,731	7,642,937	4,355,837	4,871,379	4,871,379	26.54	20.21	11.17	11.17	Chicago & North Western
Chicago & St. Louis	1,058.84	1,332,784	1,337,526	2,761,433	121,870,574	121,870,569	131,670,373	131,670,373	34.11	34.81	34.60	34.60	Chicago & St. Louis
Chicago, Burlington & Quincy	8,107.81	84,105.01	18,414,280	18,000,493	12,814,542	17,758,915	371,315,040	371,315,040	64.77	54.85	54.85	54.85	Chicago, Burlington & Quincy
Chicago & Great Lakes	4,878.31	4,313,031	33,107,915	18,000,043	18,700,043	18,700,043	564,200,931	564,200,931	81.11	74.81	74.81	74.81	Chicago & Great Lakes
Chicago, Milwaukee & St. Paul	3,316.41	18,174,411	18,174,411	17,849,726	348,044,412	350,437,818	362,310,743	362,310,743	47.71	47.71	47.71	47.71	Chicago, Milwaukee & St. Paul
Chicago, St. Paul, Minneapolis & Northern Pacific	3,356.47	3,217,544	44,014	44,014	6,261,478	6,261,478	362,310,743	362,310,743	84.79	84.79	84.79	84.79	Chicago, St. Paul, Minneapolis & Northern Pacific
Chicago, Rock Island & St. Louis	4,476.75	1,218,171	605,873	709,438	17,319,008	17,844,544	17,878,594	17,878,594	74.31	67.79	67.79	67.79	Chicago, Rock Island & St. Louis
Chicago, Rock Island & Pacific	4,476.75	1,218,171	605,873	13,076,074	13,076,074	13,076,074	13,076,074	13,076,074	54.68	47.75	47.75	47.75	Chicago, Rock Island & Pacific
Chicago, St. Paul, Minneapolis & Northern Pacific	1,108.60	4,371,641	4,371,641	2,501,497	81,841,818	81,841,818	81,841,818	81,841,818	61.25	61.25	61.25	61.25	Chicago, St. Paul, Minneapolis & Northern Pacific
Chicago & Eastern Illinois	3,371.84	4,145,757	4,145,757	4,145,757	6,454,488	6,454,488	15,011,424	15,011,424	60.71	60.71	60.71	60.71	Chicago & Eastern Illinois
Cripple Creek & Colorado Springs	976.03	377,303	377,303	431,254	3,580,473	3,580,473	10,540,019	10,540,019	54.77	54.77	54.77	54.77	Cripple Creek & Colorado Springs
Denver & North Platte	2,838.54	1,115,774	1,115,774	4,665,444	14,869,344	14,869,344	14,869,344	14,869,344	74.11	74.11	74.11	74.11	Denver & North Platte
Denver & South Platte	2,838.54	1,115,774	1,115,774	2,838,540	10,540,019	10,540,019	10,540,019	10,540,019	54.77	54.77	54.77	54.77	Denver & South Platte
Delaware, Maryland & Delaware	1,620.73	712,778	712,778	326,054	346,790	346,790	48,187,082	48,187,082	14.51	14.51	14.51	14.51	Delaware, Maryland & Delaware
Delaware, Maryland & Pennsylvania	636.14	1,365,632	1,028,536	1,094,156	1,849,241	1,849,241	18,081,357	18,081,357	26.01	26.01	26.01	26.01	Delaware, Maryland & Pennsylvania
Fort Worth & Denver City	252.22	10,889	20,851	20,851	1,044,388	1,044,388	6,081,675	6,081,675	0.21	0.21	0.21	0.21	Fort Worth & Denver City
Great Northern	3,192.45	29,242,518	31,832,947	19,438,780	39,048,381	412,208,612	432,900,817	432,900,817	4.77	4.77	4.77	4.77	Great Northern
Great Northern & Pacific	4,720.34	4,145,757	10,323.00	17,465	31,958	31,958	21,918,473	21,918,473	0.16	0.16	0.16	0.16	Great Northern & Pacific
Illinois & Michigan	4,673.31	4,467,981	5,864,594	1,467,444	2,342,231	2,342,231	4,324,124	4,324,124	33.11	33.11	33.11	33.11	Illinois & Michigan
Illinois & St. Louis	1,186.11	4,032,106	3,792,937	4,678,845	8,418,845	8,418,845	12,028,434	12,028,434	54.11	54.11	54.11	54.11	Illinois & St. Louis
Illinois, St. Louis & Chicago	842.71	4,913,074	4,111,170	1,800,644	2,419,497	2,419,497	10,949,645	10,949,645	16.11	16.11	16.11	16.11	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	361.70	411,371	422,261	1,177,488	444,605	444,605	17,420,313	17,420,313	6.31	6.31	6.31	6.31	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,205.14	70,049	173,144	149,021	1,490,326	1,490,326	4,480,336	4,480,336	3.11	3.11	3.11	3.11	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61	13.61	13.61	13.61	Illinois, St. Louis & Chicago
Illinois, St. Louis & Chicago	1,441.75	1,752,844	1,861,629	1,561,941	10,445,311	10,445,311	33,641,971	33,641,971	13.61				

Commission monthly report forms and not according to the modified definition given in the bill, which excludes miscellaneous rents. The tables were prepared before the bill

Table 1. REVENUE ON AVERAGE PER OPERATING MILE IN THE THREE YEARS ENDING 1917, C. M. S. AND THE GREAT BRITAIN PROPERTY INVESTMENT

District	Average property investment three years	Average net operating income three years	Rate of return %
Eastern District	\$6 795 499 304	\$455 407 441	6.82
Southern District	1 334 340 518	109 791 470	8.20
Western District	7 800 087 314	401 072 993	5.14
All Roads	15 929 926 136	966 271 884	6.12

PROPERTY INVESTMENT AS OF JUNE 30, 1917

District	Property Investment June 30, 1917	Average net operating income three years	Rate of return %
Eastern District	\$6 530 771 871	\$455 407 441	7.10
Southern District	2 041 334 704	109 791 470	5.38
Western District	7 936 340 088	401 072 993	5.06
All Roads	16 508 446 663	966 271 884	5.84

ESTIMATED PROPERTY INVESTMENT, AS OF DECEMBER 31, 1917

District	Estimated property investment December 31, 1917	Average net operating income three years	Rate of return %
Eastern District	\$7 075 000 000	\$455 407 441	6.45
Southern District	2 095 000 000	109 791 470	5.24
Western District	8 041 000 000	401 072 993	5.00
All Roads	17 211 000 000	966 271 884	5.60

MILEAGE REPRESENTED

30 978.37 of a total of 64 730 miles in the Eastern District or approximately 47.9 per cent	to the Eastern District or approximately 91.3 per cent
33 883.11 " " " 50 300 " " " " " "	" " " " " "
140 249.00 " " " 142 730 " " " " " "	" " " " " "
881 925.04 " " " 236 000 " " " " " "	" " " " " "

was introduced, but the variation for any road is negligible because the total effect of this item for all the roads is less than \$5,000,000.

Freight Operations for October

REVENUE AND MILES OF FREIGHT TRANSPORTED in the full month of the London Railway & Overseas Company for 1917 are compared with October, 1916, according to the monthly report of freight operations compiled by the Bureau of Railway Economics. Freight operations for 1917 received 1.4 per cent, but miles decreased 1.6 per cent, and locomotive miles decreased 1.2 per cent, the increase for freight having increased from 1.9 to 0.7, and the decrease per ton from 2.4 to 1.7. The average miles per locomotive per day decreased 1.8 per cent from 7.75 to 7.6, and the average miles per car per day decreased 7.1 per cent from 18.1 to 16.9. The decrease in miles per car per day is observed in eastern, western and southern territory. The revenue in miles per freight locomotive down an increase of 4.3 per cent and per freight car of 1.9 per cent. The percentage of locomotive in shop or awaiting shop decreased from 14.4 to 13.1 and the percentage of freight car from 5.4 to 5.6.

The combined figures for the seven months April to October show an increase of 12.6 per cent in revenue ton miles, or from 74,811,000,000 to 84,110,000,000. Tons per train increased from 6.6 to 6.74, or 2.1 per cent, the tons per loaded car from 24.8 to 27.1, or 9.1 per cent, and the average mileage per locomotive per day from 69.1 to 68.8. The average mileage per car per day increased from 27.5 to 27.7 and the percentage of empty car rater from 30 to 30.5. The revenue ton miles per freight locomotive increased from 6,907,519 to 7,674,871, or 11.1 per cent and per freight car from 916.2 to 1,078,844, or 17 per cent.

The Railways of Great Britain After the War

The Problem of Employees' Wages; The Need for Reconstruction; Possibility of Nationalization

AMONG THE PROBLEMS that will present themselves for settlement at the end of the war, not the least is the future of those industries of which the Government has taken control—railways, shipping, canals, mines, etc. Each of these subjects will present a series of difficulties, but it is safe to say that none more than that associated with railways. The propagandists of nationalization will, no doubt, be much in evidence with appeals to the state to retain control of all these utilities, but it is hardly likely that any change from pre-war conditions will be seriously considered, except in connection with railways and canals. We associate the two because they are so closely related that whatever is decided in the case of one will, almost certainly, apply equally to the other.

Railways, however, present a series of exceptional problems which may be enumerated as follows: (a) How to meet the higher wages now being paid to the staff; (b) reconstruction, i. e., the restoration of the property to pre-war conditions; (c) the increased cost of labor and material for the upkeep and operation of the railways; (d) the success which has attended the operation of the railways since they passed under the control of the state at the outbreak of war; (e) that many directors, shareholders and officers have become tired of the constant appeals of traders and railway servants for concessions, and would, therefore, be glad enough to see the railways taken over by the state; and (f) the need of reform in British railway methods, in order to

cope with the commercial efforts that will be made after the war is over.

Some of these points are so obvious that we need not comment upon them, other than for enlightenment. One can, however, be disposed of in a few words. It is that which relates to the operation of the railways since the war broke out. The war success which has attended the operation of the railways since August 4, 1914, is the movement of naval and military men, material and stores to the front; the care and supply of military materiel; the production of locomotive, rolling stock and track for the service; and in keeping the railway service at all times completely unimpeded, and, indeed, more efficient than ever. It is this success which has made the belief that the railways are of greater value now to the state. Thus, our own railwaymen, to take the case. All the railway law under the control of the Railway Laborers' Committee, which are based on the state, and in accordance with the recommendations of the R. L. C., they are being paid comparatively the same percentage increase as those that they received in 1914. It is not surprising that the government has been unable to find any industry that has increased its output so much as the railwaymen.

There is a great deal of opinion, however, that would be expressed by the Government with the Railway Executive Committee, and, indeed, by the state, and which, naturally, comes to a conclusion. In the Railway Executive Committee, and the railwaymen, to take the case, they are being paid the same

*From The Engineer, London, November 30, 1917.

cessful operation of the railways during the war is to give praise where it is not due. But in any case the present control cannot be continued indefinitely. The Act of 1871 sanctions it only when "emergency has arisen," and the Secretary of State's warrant for possession has to be renewed every week. Nor, fortunately, can the railways pass into the possession of the state without the sanction of Parliament. Many hold the mistaken view that the Gladstone Act of 1844 gives the Government power to take over the railways. All that that act sanctioned was the purchase of any railway thereafter authorized. Railways made or authorized prior to that session were excluded, and whilst the terms of purchase were laid down in the act they were only definite in the case of those companies whose "clear annual profits divisible upon the subscribed and paid-up capital stock of the said railway, upon the average of the three then last preceding years, shall equal or exceed the rate of ten pounds for every hundred pounds of such paid-up capital stock." Those companies which have paid less than 10 per cent—which means all of them—may take their claim to arbitration. Finally, it is distinctly laid down in section 4 of the act that Parliament must again consider this question, as the necessary funds must first be provided. On the abstract principle of government ownership, there has been no change in public opinion; on the contrary, the high authorities who inquired quite recently into the future of the Canadian railways, said "Our personal belief is strong that, in normal circumstances, railway enterprise is a matter best left in private hands, subject to proper regulation by the Government. Were we asked to advise in the case of the railways of the United Kingdom or the United States, which have been constructed by private companies, with money found by private investors, we should give effect to this belief." It must not be forgotten also that practically every witness in any way associated with commerce who appeared before the Royal Commission of 1913-14, presided over by Lord Loreburn, which inquired into the relations between the railways and the state, was emphatically opposed to the state ownership of railways.

Where the idea has gained ground is in the labor party and, without doubting the sincerity of that party's opinions, it is fair to assume that the success which has attained its applications for increased pay has suggested that, with the state instead of private companies to deal with, the condition of labor would be better. The Railway Review—the organ of the National Union of Railwaymen—said in its issue of November 16: "If it is not intended to work the British railway system in the future as a single entity in the possession of the state, it will be the business of the National Union of Railwaymen to declare that railway workers object to the railways and railway owners returning to the pre-war status. A return to pre-war conditions of railway control and management will not be to the advantage of railway workers and will be detrimental to the national welfare."

Unfortunately, it is no longer a question as to whether or not the country would be the better by state ownership. The war has brought other conditions to bear on the subject, and it is now the question whether the companies could revert to their former conditions. A few brief remarks will soon put our readers in a position to judge as to this possibility. The main point to remember is that in the year 1913 the railway companies had a net income, including the balance brought forward and a small appropriation—£28,000—from reserve, of £53,268,000. After paying the interest on loans and debenture stock, miscellaneous other first charges and appropriations to reserve, there were paid £17,239,000 in interest on guaranteed and preference stocks and £17,705,000 on ordinary stock, leaving £1,159,000 to be carried forward. As roughly two millions of this sum belonged to the Irish railways which, in this matter, are outside the question, it may be taken that the divisible

profits of British railways, under pre-war conditions, were thirty-five million pounds.

If, and when, the railways revert to private ownership, one question to consider—if not already disposed of—is the payment of the increase in wages. In August last it was stated that this increase cost twenty-five millions a year. The five shillings a week since granted to the enginemmen by the Committee on Production, and the same amount given by the government to the other men, will bring it up to thirty-three millions, a sum which, alone, would swallow up all the profits. But that is not all. There is the higher cost of material. How much it will be we cannot even estimate, but allowing for an increase of 5s. per ton in coal alone, three-and-a-half million pounds a year would be required to meet the increase. Again, to cope with the increased trade that may reasonably be hoped for, considerable capital expenditure will be necessary. If the credit of the railways be impaired, where is the high rate of interest—supposing the money could be borrowed—to come from?

It is very easy to talk about raising the rates and fares to meet the increased expenditure. To raise fares would, considering the services rendered, be quite justifiable, and would appear to be called for. But to raise rates is to cripple trade, which has other burdens sufficiently heavy to bear. British railway rates are, on the whole, higher than those elsewhere. The necessarily short haul and the numerous companies—each of whom is entitled, in the case of traffic passing over its line, to charge as though the traffic initiated on its line—are partly responsible for this fact, but the main reason is the senseless competition of former, but yet comparatively recent, days. No increase in the existing rates could be obtained without a struggle. Some rates could be raised to the maximum, but even they would certainly be challenged before the Railway and Canal Commission. The government might promise legislation, as at the railway strike of 1911, for an all-round advance, but the experience gained on that occasion would prevent such a step being taken. When it is remembered that the bill sanctioning what is now known as the 4 per cent increase, was determinedly opposed by the government's own supporters, and that it was only secured by Mr. Asquith saying that the government could not go back on its word, it is safe to say that the chances of the railways passing into the hands of the state is more likely than an increase in rates.

The whole problem is amongst the most difficult conceivable, and it is further complicated by the possible addition to the thirty-three million pounds for wages by another large sum as a consequence of the demand for an eight-hour day. It must not be assumed that because this demand was much in evidence in August, that it relates to enginemmen alone; the National Union wants eight hours for its 350,000 or so members. Then there are the questions of arrears of maintenance and renewal of track, locomotives, rolling stock, etc.; the rehabilitation of the workshops to their normal condition for railway work; the return or replacement of locomotives, wagons and track sent overseas; the re-employment of railway servants who have been crippled; the reopening of stations and branch lines now temporarily closed, which, although not earning a profit, could not be kept shut without laying the railway company open to a charge of withdrawing facilities; the future of privately owned wagons, etc. The government has, therefore, done wisely in calling in the aid of authorities in the different spheres to advise them on these problems. These gentlemen, as we understand Sir Albert Stanley's answer in the House on the 14th inst., do not constitute a formal committee. The different aspects of the whole question are each to be considered by the two or three experts on that particular subject. The result of their labors is, Sir Albert added, to come before the House before any final arrangements are made.

Senate and House Committee Railroad Hearings

Roads Ask Standard Rate of Return Computed on Basis of Property When Taken. Want Time Limit

WASHINGTON, D. C.

BOTH THE HOUSE AND SENATE committees on Interstate Commerce devoted all of last week and part of this week to hearings on the administration bill prescribing the conditions governing the government's control of the rail roads during the war.

A majority of the members of both committees who indicated their attitude by their questions evinced a desire to treat the roads fairly. Many of them, however, showed a reluctance to accept the reasoning of the railroad witnesses that the compensation should be based on the year 1917, or the average of 1917 and 1916, as representing the earning capacity of the roads at the time they were taken, rather than the average of the three years 1915, 1916 and 1917, which is reduced by the inclusion of such an unfavorable year as 1915. Many of the committee members seemed inclined to feel that 1916 and 1917 were abnormally good years, at least sufficiently so to offset one lean year, and that the three-year average represented both the ups and downs of the fortunes of war.

Senator Cummins, in his usual suave manner, appeared the most hostile to the plan proposed by the President and asked most of his questions for the purpose of tearing down the arguments made by the witnesses. He was clearly opposed to guaranteeing the average net operating income and indicated a preference for what he might consider a "reasonable" return on a "fair" valuation of the property, or on the market value of the securities. While the railroad men stated the net operating income in comparison with the property investment, he insisted on having it compared with the capitalization and even made some efforts to drag in an inference from the tentative valuations made by the Bureau of Valuation of the properties of six small roads.

Many of both senators and representatives appeared to agree with the contention of the railroads that Section 13 of the bill should be amended to provide a definite time limit for the continuation of government control after the war instead of leaving it in effect until Congress shall order otherwise.

The railroad witnesses had pointed out that the property investment at the time of the taking over of the roads was about \$240,000,000 greater than on June 30, 1917, and much greater than that of the plant which had produced the three-year average of net operating income. They also expressed the opinion that most roads would be able to reach a speedy agreement on whatever basis is selected, and that only a comparatively few roads in special circumstances would have to take their claims to court. Whenever the proposed guarantee was suggested as a possible basis of compensation in the event of government ownership, however, they promptly insisted that what might be considered a fair rental basis in war time would not be a satisfactory measure of the purchase price.

Commissioner Anderson Before Senate Committee

The Senate committee heard railroad witnesses first. The opening testimony of Julius Kruttschnitt, chairman of the Southern Pacific, was reported last week. The House committee began by hearing George W. Anderson, of the Interstate Commerce Commission, who was the principal author of the bill, and who explained in detail the purpose of its various provisions. On Friday, Mr. Anderson repeated his testimony before the Senate committee and Mr. Kruttschnitt and Alfred P. Thern, counsel for the Railway Executives'

Advisory Committee, transferred their testimony to the House committee.

Mr. Anderson said that the average net operating income of the three years ending June 30, 1917, had been selected as representing a fair and practical basis of compensation for the majority of the roads, taking everything into consideration, and that a method had been provided for negotiating special cases. He said the average of a five-year period had been considered and discarded because it was regarded as being too low to give a fair return on the fair value of the securities. He had considered the plan of tying compensation on the market value of the securities, but found that it led into a blind alley and dropped it.

Asked by a representative if the plan proposed would not lead to a rise in the market quotations of bonds, Mr. Anderson said he certainly hoped so. When he qualified as a member of the Interstate Commerce Commission recently he had been obliged to dispose of his holdings of railroad securities, and had taken a loss of about 50 per cent and he thought something ought to be done to put the market price somewhere near the real worth of the securities. Estimating from the actual figures of Class 1 roads, Mr. Anderson placed the three-year average of net railway operating income at \$955,000,000 for all carriers, including switching and terminal companies, and excluding the Pullman company, express companies and private car lines. This is 5.31 per cent on an average investment of \$16,873,832,797. The percentage for the three years he gave as 4.14 for 1915, 5.84 for 1916 and 5.91 for 1917. The property investment for 1917 was estimated at \$17,250,000,000. From the \$955,000,000 estimated guarantee, he said, would be deducted the war taxes, estimated by the railroads as between \$50,000,000 and \$90,000,000, because it was felt that the railroad security owners should bear their share of the war taxes instead of charging them to expenses. He opposed placing any definite time limit on the period of government control, saying that a period of readjustment would be necessary, but that Congress could not bind future Congresses, and that although he was not an advocate of government ownership, certainly the former status ought never to be re-established.

Asked by members of the committee whether he considered the book value a fair measure of the cost of railroad property, he said that it must be treated with caution, but could be used safely for purposes of comparison. For some roads it probably represented an understatement and for others an overstatement of the actual value.

He referred to the proposed guarantee as a rental which must be paid on the basis of the actual earnings in spite of the lack of an firmity as between different roads, but said he proposed to submit an amendment to prevent paying a premium to a road that has increased its net operating income by "skimming" its property by investment requirements and depreciation allowances and to prevent penalizing a road that has made a major investment. He also said that the bill was amended to provide for a reasonable reserve, so long as it does not penalize property in connection with a road's earnings.

Several senators agreed vigorously with Mr. Anderson on the points raised by Senator L.

"The government ought to be in the way of the industry when it makes the contract," Senator Killgore insisted, but Mr. Anderson could not agree with him.

"If you think that that we must government ownership we ought to determine if we can raise and pay it in the 1917 bond

Senator Underwood. "If we don't, we should set a definite period. Some of these railroads will have their compensation fixed in the courts and if a court construes the taking as for an indefinite period it may fix the compensation on that basis."

Mr. Anderson asked if he thought a court would fix a higher rate of compensation in one case than in the other. "As Section 13 is drawn now," replied Senator Underwood, "it is an absolutely indefinite taking of property and a railroad could enter suit for the value of its property, and the court would probably fix the compensation on that basis, but if a definite period were specified the court would probably hold that the rental value would be just compensation."

Both Senator Underwood and Senator Townsend contended that the provision "until Congress shall thereafter order otherwise" in Section 13 means nothing more than is implied in every bill and leaves the period of government control entirely indefinite.

"The purpose of this plan is to get better railroad service, is it not?" asked Senator Watson.

"That and to stabilize market conditions," said Mr. Anderson.

"Will Section 13 enable us to get any better service?"

"I can't say that it will have any effect either way in that respect," replied Mr. Anderson. "The only thing I claim for Section 13 is that it offers less opportunity for difficulty and danger than any other plan." He added that he had yet to hear any railroad lawyer say he wanted government control to be terminated immediately after the war and that to set any definite time after the end of the war would be to "hold a stop watch on Congress." He said that railroad men agree that legislation will be necessary after the war to deal with the new conditions which will have been created by the government's possession of the roads, such as the financial readjustment, the changed status as to competition, the results of pooling traffic during the war, the effect on the traffic department organization, and the disposition of government rolling stock.

Senator Cummins thought there ought to be a time limit but for another reason, that the President should not be allowed to retain after the war such great powers over the commerce of the country as he will have during the war, and that when peace is restored the question of what shall be done with the railroads should be turned over to some proper tribunal.

"Congress might not be able to agree on a plan for ten years," he said.

In reply to a question by Senator Pomerene Mr. Anderson said he thought Congress would be better able to decide what ought to be done two years from now than it is today.

Senator Cummins said that the bill provides for paying to the railroad owners not only the amount of their dividends and interest but also any surplus they had earned during the last three years, and provides for the payment of a return on any of that surplus that may be invested in the property. "The Interstate Commerce Commission has been on both sides of that question and is now on neither side," he said, "but why have you attempted to settle it in the bill that the railroads may collect rates to pay a return on invested surplus?"

"I was not of the opinion that the bill would prejudice that question in any way," replied the commissioner. "If I thought it would I would never stand for it."

Senator Cummins suggested that the guaranteed return might be reduced by any excess over "adequate" dividends and interest and the surplus devoted to improvements with a provision that rates should not be based on that investment. He promised to draft a proposed amendment along that line.

Mr. Anderson's testimony was concluded on Monday but he said he wished to redraft the bill in some particulars and may be recalled later. The President is understood to have

let it be known that he desires early action on the bill but it is predicted that a long contest is to be expected.

Mr. Kruttschnitt Before Senate Committee

"The railroad officers of the United States have made up their minds to be good soldiers whatever happens and to support the President's policies as to the management of the railroads to the best of their ability," declared Julius Kruttschnitt, chairman of the Southern Pacific Company, before the Senate committee.

Senator Smith had asked the witness if, assuming that the present organizations of the roads may be maintained, government control will not result better in meeting the exigencies of the situation than private control.

"We have felt that the railroads could have done a great deal more under their own organization," replied Mr. Kruttschnitt, "if they had had greater support and assistance from the government, but we realize as a practical matter that there was certain assistance that probably couldn't have been given to the roads under private ownership. Therefore, we have no criticism to make and we accept what has been done because it was the opinion of the Commander-in-Chief that it was necessary and we will work as loyally under government control as in the past. We feel that the President must have had good reasons for what he did and we intend to support his policies to the best of our ability.

"Personally, I think what has been done was done for the best and we propose to do our level best to make the existing conditions successful. I have exhorted our officers to work as hard under the new conditions as they did for the shareholders, and I haven't the slightest doubt that they will do it."

Small Roads Handling Increased Business

Alton C. Dustin, of Cleveland, president of the Portsmouth & Western Railroad, who described himself as "not a practical railroad man, but a lawyer who in an unguarded moment financed a railroad," testified to call the attention of the committee to the effect of the compensation provisions of the bill as applied to small roads that are now handling an increased business. His road in the year ending June 30, 1915, had earned net \$53,000; in 1916, \$62,000, and in 1917, \$147,000, an average of \$87,000, but in the calendar year 1917 it had earned \$244,000. The road is in receiver's hands and cannot borrow money, but it is now meeting an important demand for freight service, and is using the increased earnings to put the road in shape to handle the business. Under the three-year average guarantee it would receive only \$87,000, while it would have to wait for years to get through the Court of Claims money that it needs now to keep in operation. Mr. Dustin suggested an amendment to authorize the President in special cases to authorize additional compensation not exceeding the current net operating income.

Three-Year Average Unfair to Eastern Roads

George M. Shriver, vice-president of the Baltimore & Ohio, testified on behalf of the eastern railroads to show how the average net operating income for the three years ending June 30, 1917, was reduced by the inclusion of the year 1915. In 1915, he said, the net operating income produced a return on the property investment, for the 38 eastern roads, of 4.34 per cent. In 1916 the return was 6.53 per cent and in 1917, 5.71 per cent, making the three-year average 5.54 per cent. However, the investment in property had meanwhile been increased so that, based on the investment on June 30, 1917, the three-year average of net operating income produced a return of only 5.41 per cent, and based on the investment as of December 31, 1917, a return of only 5.33 per cent, which was less than the net operating income of the eastern railroads in 1913, which was 5.36 per cent, to which the Interstate Commerce Commission said in the 5 per cent case was "smaller

than is demanded in the interest both of the public and of the railroads.

The average property investment for the three years for the 48 eastern railroads was \$6,250,411,492. On June 30 it was \$7,116,424,440 and on December 31 it was estimated at \$7,226,000,000, approximately \$110,000,000 having been added during the last six months.

Nation seven was the first really good year for the eastern railroads had since 1910, said Mr. Shriver, whereas 1915 was, with one exception, 1914, the worst year the eastern

other year and the railroads are well being compensated based on what they actually did earn at the time the property was taken over.

Mr. Trumbull on Three-Year Average

Frank Trumbull, chairman of the Railway Unemployment Advisory Commission, testified before the Senate committee on January 10, insisting that the average net operating income for the three years ending June 30, 1917, is reduced by the inclusion of the 1914 year and 1915. He argued that there existing capacity of the lines their operating were taking care. He pointed to 1916 when the government had only the roads, it had increased the net income at the same time as the year. He also pointed out that the three-year average would be not possible to read) that 1917 had sweeping their investments and whose earnings capacity will be through the whole part of the period than at the time they were taken by the government.

To illustrate the point Mr. Trumbull presented a slide showing the income and property investment by roads and companies operating 80 percent of the railroads of the country in 1915 the net operating income of those roads was \$100,000,000.



Eliza Crossing the Ice

roads had had in the last 18 years. The net operating income in that year was less for the eastern roads than it was for 1906, 1907, 1909, 1910, 1911, 1912 or 1913, notwithstanding an increase in the investment of over \$1,700,000,000."

When Senator Cummins questioned the accuracy of the book value of the railroads, Mr. Shriver explained that the book value was used only as a basis for purposes of comparison to show the relative rate of return on that basis in the different years, and to show how the average was reduced by the inclusion of the year 1915. He said the railroads were not asking a definite rate of return, but only a compensation based on their earning capacity at the time the properties were taken over.

"In other words," said Senator Underwood, "you ask to have as a basis for the compensation to be adjusted by agreement with the President the same basis you would expect to receive if you were obliged to go into the courts and sue for compensation."

"Why should not the government pay the same rate of return on all properties?" asked Senator Cummins.

"It would be a good thing for the railroads if that were done," replied Mr. Shriver, "but a dollar invested in one place is often more profitable than a dollar invested in an-



Parents Have a Way of Worrying About Such Things

\$7,740,400 per cent on the property investment. In 1914 it was \$95,579,917, or 5.75 per cent. In 1917 it was \$480,788,002, or 5.75 per cent, whereas the average for the three years was \$800,214,880, or 5.24 per cent.

In other years the three-year average was \$114,000,000 less than the net operating income for 1917 and \$88,000,000 less than for 1915, while the net for 1915 was \$200,000,000 less than the average.

Mr. Trumbull presented his statement by saying, "We are not here in an obstructive attitude, but we think we would be wiser by our duty to the interest of these roads

and to you if we did not present the facts as they appear to us."

Senator Poindexter asked: "What is the attitude of your committee toward permanent government operation or ownership?"

"We have not taken any attitude on that," was the reply.

"What is the general opinion in railroad circles?"

"I think as a whole the railroad officers think it would be an undesirable step for the country to take," said Mr. Trumbull.

"What about the interest of the owners of the roads?" asked Senator Poindexter.

"That would depend on the price they would get," replied the witness. "Many of them would be glad to sell to anybody if they could get their price."

Explaining the statistics, Mr. Trumbull pointed out the inequality in the effect of the three-year average on different roads. "For example," he said, "the three-year average for the Chicago & Eastern Illinois, which is in receivers' hands, would be \$3,000,000 less than the net for 1917, for the Atlantic Coast Line it would be \$2,500,000 less, for the Chesapeake & Ohio \$2,300,000 less, for the Illinois Central \$5,300,000 less, for the Atchison, Topeka & Santa Fe \$6,600,000 less, for the Missouri, Kansas & Texas, which is in receivers' hands, \$800,000 less. A most glaring example is presented by the International & Great Northern, which is also in receivers' hands; the three-year average would cut the 1917 earnings in two. Many roads, such as those which have recently been reorganized and those which are in receivership and are yet to be reorganized, would be underpaid by the three-year average."

"The action of the government in taking over the railroads was made inevitable in 1910, when Congress passed the law giving the Interstate Commerce Commission power to suspend any increase in rates," said Mr. Trumbull. "At that time the railroad managers lost their control of their earnings and were rendered unable to increase their rates to meet increased expenses, as any other kind of business does. No one could run a business successfully under such conditions. When that law was passed it became inevitable that some time the government would have to guarantee them." He explained that he was giving his personal views.

Government Regulation Has Broken Down

"Are you in favor of government ownership?" asked Senator Townsend.

"No, we should preserve the benefits of private initiative with possibly some form of government guarantee and some plan by which the government would share in the profits."

Section 13 of the bill, he said, seems to leave the railroad problem in the air indefinitely, and the period of government control should be limited to some definite time after the expiration of the war.

"I believe that before the period of government control expires we will be able to work out some better scheme than we have had in the past. Later on we will want to consider some permanent relation between the government and the railroads."

"Then you think that government regulation of private ownership had broken down," said Senator LaFollette.

"I think the system of regulation had broken down," replied Mr. Trumbull.

Additional Investments Should Be Considered

In discussing the terms of the bill, Mr. Trumbull said that the railroad plant taken over by the government on December 31 was not the same plant that had earned the average net operating income of the three years 1915-1917. It represented \$240,000,000 more on December 31 than

on June 30 and \$934,000,000 more than on June 30, 1915.

"We feel that this bill should make provision, no matter what years are selected, for allowing a return on the additional plant which was turned over to the government. The average net operating income for the three years represents only 5.04 per cent on the investment as of December 31."

The bill should also provide for an adequate tribunal to deal with the questions presented by the roads in special circumstances, he said, such as certain roads that had a deficit for the three years, and that are wondering what their guarantee will be. It is important that Congress shall establish a standard to serve as a basis for agreements with as many roads as possible, but there will be certain roads that will have to resort to a separate adjudication.

Alfred P. Thom Testifies

Alfred P. Thom, counsel for the Railway Executives' Advisory Committee, made a preliminary statement before the House committee, saying that the railways realize fully that the President has been actuated by a purpose to do justice in what he has recommended, and that nothing they shall do or say should be interpreted as an indication of an obstructive attitude or critical spirit. "We believe," he said, "that the principle which the President has recommended as the basis for compensation is the correct principle, and that it recognizes that the rental which the government should pay should represent the equivalent of the value of the use which the owners of the railroad property were able to make of it at the time of the taking by the government—in other words, its earning capacity."

In order to represent the earning capacity of the plant whose use has been taken, Mr. Thom said the compensation should be related as closely as possible to the earnings on the date when the roads were taken.

"In England," he said, "they took the year before the war, undeterred by the fact that that was the best year in the history of the English roads. Our view is that to take the last year would be to go back far enough from the time of the actual taking, and that two years would certainly be enough, but that if you go back three years, to 1915, the result is inadequate, both because that year was an abnormal one and because the plant as it existed on December 31 represented a much greater investment than that of June 30, 1915."

Congress should fix a time limit for the expiration of the period of government control of the railroads after the war, in order to provide for any necessary readjustment, and should authorize the President to terminate the plan sooner, Mr. Thom contended.

Section 13 of the law should be determined before the compensation is determined, he said, because just compensation for a temporary taking would be very different from the compensation for a permanent taking. "I regard Section 13 as meaning government ownership," he said, "and that question should be decided on its merits. If the government is to buy the railroads it should pay the full value of their property, not the mere value of their use."

"Under Section 13 as it stands," he said, "all you've got to do, if you think you've got a good bargain and want to keep these properties after the war, is to do nothing."

"Can't you trust the patriotism of future Congresses?" asked Chairman Sims.

"You would rather rely on the patriotism of the present Congress, would you not?" asked another member of the committee.

"Yes."

"In other words, you prefer to fix the terms of the bargain now."

"We appeal to Congress to fix the tenure," said Mr. Thom. "No one rents a house and leaves the term of the lease to

the will of the tenant, and you should at least be as definite in dealing with one-seventh of the property in the United States. Congress can fix a limit and provide that the President may terminate the contract before that time."

1915 An Abnormally Bad Year

Julius Kruttschnitt, chairman of the Southern Pacific, testified on January 11 before the House Committee that the three-year average was reduced by the inclusion of the abnormally bad year of 1915, and that the average of 1916 and 1917 would be fairer. He denied that the earnings in those years could be considered abnormally high. To show that 1915 was abnormal he showed that in the fall of that year over 40,000 miles of railroad, or one-sixth of the total railway mileage of the country, were in the hands of receivers.

"Would it not be more fair to take a period of years when more normal conditions prevailed instead of war years?" asked Representative Parker.

"That depends on the time when you take the properties," replied Mr. Kruttschnitt. "If you had taken them in peace times then the return in peace times should be considered, but you should pay the owners the return they were getting at the time you took them."

Mr. Kruttschnitt also emphasized the importance of keeping the railroad organizations intact, with the idea that the properties will be greatly impaired if anything is done to impair the spirit of emulation between different roads, which he said had been largely responsible for the degree of efficiency they have obtained. While no one should be retained in a position where he cannot perform useful service, he said, he thought that the popular idea as to the possibilities of economics as a result of unification is considerably exaggerated, and he understood that present practices are to be continued except as the director general shall order otherwise.

In reply to questions by Representative Esch, Mr. Kruttschnitt said that if wages are increased during the war it will be extremely difficult to reduce them afterward, and he assumed that the government "will use its influence with the Interstate Commerce Commission to raise rates so as to make the people who use the railroads pay the government guarantee, instead of making all the people pay it by taxation."

"It would leave the roads bankrupt," said Mr. Thom, "if wages should be increased without reference to the earnings."

Railway Employees in Government Service

R. M. Little, chairman of the United States Employees' Compensation Commission, told the House committee that his board had already taken over the railway employees into the government service, by passing a resolution that they are federal employees, but Glen E. Plumb, counsel for the railway brotherhoods, informed the committee that if Congress desired to extend the provisions of the federal workmen's compensation act to the railway employees it would be safer to do so by legislation than to take Mr. Little's word for it. The bill provides for extending the act to cover railway employees, but the War Department has ruled that they are not federal employees.

L. E. Wetting, statistician for the western railroads, testified before the House Committee on Monday, basing his statement principally on the statistics prepared by the Bureau of Railway Economics which had been used by Mr. Trumbull before the Senate Committee.

He was followed by Bird M. Kolinson, President of the American Short Line Railroad Association, and other representatives of the short lines, who explained how the bill would affect the smaller railroads, many of whom had deficits in place of a net operating income for the three years ending June 30, 1917. The short line representatives

also appeared before the Senate Committee on Monday. John Bertin Payne, Director General, made his final advisory statement before the House Committee, that those short lines would not be taken over by the government because they were not essential. Thus, Mr. Robinson would have had "virtual assurance" of roads left out. All the roads had already received notice that they had been taken over. Commissioner Anderson proposed to draft an amendment to safeguard the interests of the short lines.

Following a meeting of railway executives in New York on Sunday the Railway Economics' Advisory Committee forwarded to Washington a resolution urging an amendment of the administration bill to provide that government control shall terminate one year after the close of the war or earlier in the discretion of the President.

A Question of Authority

Representative Lenroot, of Wisconsin, in a speech to the House on Monday, attacked the right of the President to assert in his proclamation or to delegate to the director general of railroads power to set aside orders of the state and interstate commissions and to regulate stations. He said he was merely opposing the method taken and that if the President desired to exert such power he should obtain specific authority from Congress.

"This is a declaration upon the part of the President," Mr. Lenroot said, "that during the time the railroads of the United States shall be in his possession in behalf of the government all statutes of the United States, all orders of the Interstate Commerce Commission, and all statutes in the various states and orders of state commissions relating to railroads may be suspended by him, acting through the director general whom he has appointed. I confidently assert that no such power has been delegated to him and none can exist unless expressly delegated by Congress. If this power does exist the Interstate Commerce Commission may be deprived of all its functions by the director general except the drawing of their salaries.

"There is no language in this act from which any implication can be drawn that the President is given power to set aside or suspend any existing statutes relating to railroads. I think I am safe in asserting that when this act was passed no member of Congress ever dreamed that under it a power to set aside the laws enacted by Congress would be asserted. While there are certain statutes affecting railroads that will not affect them while in possession of the government, it is not because of any power of the President to suspend them, but only because under the now existing conditions they are no longer applicable.

"It may be claimed that the power to employ the resources of the government to carry on the war carries with it the power to suspend the statutes of the United States if he shall deem it necessary to carry on the war. No such power can be implied from the language used."

It has also been argued that the words "existing statutes and orders" in the proclamation have in effect only such orders as had already been issued and would not in effect give further orders except with the approval of the director general.

Walter F. Talbot, governor of New Jersey and president of the Council of States in Taxation, has sent a telegram to the Vice President, saying: "I respectfully draw your attention to the fact that any governmental action in any branch of railroad control does not interfere with existing contracts of carriage of individual states and local units of trust as on railroads, property or interests, at the present time. This, in many states, constitutes a large portion of state revenues, and to amend in any form would greatly interfere with the state governments and local units of trust as on railroads, property or interests, at the present time. This, in many states, constitutes a large portion of state revenues, and to amend in any form would greatly interfere with the state governments and local units of trust as on railroads, property or interests, at the present time."

Solidification as a Factor in Railway Valuation

A Method Is Suggested for Determining the Appreciation in the Roadbed Due to Seasoning

By H. M. Taylor

Chief Engineer, Ferrocarriles del Norte de Cuba (Cuba Northern Railways Co.), Moron, Cuba.

IN THE *Railway Age Gazette* of October 5 (page 599). Director Prouty of the Valuation Board states that appreciation by solidification cannot be determined. I regard the article of the Director as highly fair as a whole, but disagree with him in this statement. Anything worth knowing can be determined if it is approached with an open mind and patience enough to get at the facts. There are railway systems which have been engaged in railway construction for half a century that know very closely how much more it costs to maintain new track than it does to maintain seasoned track. Unfortunately, our railways and our public have not yet arrived at the position where the Director could accept the statements of these railways, however certain he might be of their correctness, because the public would not regard such information as impartial.

This matter was brought home to me a number of years ago by reading an estimate of the cost of a line, published by one of our most important Western systems in which the officer making the estimate used the phrase "hardening down" and gave a sum that surprised me as the cost. I had had no such experience as the man mentioned, but had been on construction a considerable part of my life and most of the balance of the time I had been engaged on maintenance. The term struck me as good, expressing a condition which I had observed and which had caused me some uneasy nights as well as anxious days. As I was shortly afterward placed in charge of the construction of an important line for the National of Mexico, where another and far more experienced engineer had made the estimate, I looked for his allowance for "Hardening down" and did not find it.

This work was the standard gaging of the National line from Corpus Christi, Texas, via Laredo and the construction of a new line from a place we afterward named Gonzalez to Mexico City. The whole distance was 1,000 miles and the new line was 196 miles long. My work was the building of this new line.

We had been operating the narrow gage line since 1888. I had been with the company since 1890. Our track, though narrow gage, was good; our men remained in the service and there had been few changes among our officers in a number of years. Our vice-president and general manager was E. N. Brown, afterward president, an experienced engineer and a careful, close figuring operating officer, who made us think and plan carefully.

Our standard of maintenance was high, and details of the cost to maintain a given number of kilometers in a given district had been well determined. Sections from Saltillo to San Miguel Allende were 15 kilometers (9.315 miles) long. Six men and a foreman comprised the gang required to maintain and better the line for that distance and they did it. The line from San Miguel to Mexico City, with lighter rail and inferior road bed material, had sections of 12 kilometers (7.45 miles), with the same number of men. This latter line was nearly 20 per cent curved, had 1, 2, 3.85 and 4 per cent grades and crossed a summit a little over 10,000 ft. in elevation and this was the cause of the new line. Our survey gave us a 1 per cent grade south bound and 1.5 per cent north bound, shortened the line about 40

miles and crossed a summit 1,000 ft. lower than the old line. All of us had staked our reputations on what we could do with the standard gage line, the amounts we could save in the fuel bill, in wages and in maintenance as compared with the old line. My report was we would save nothing on maintenance and it was not popularly received.

The line was placed in operation in October, 1903. The track was in good line and surface, and well raised with good slopes from the ends of the ties to insure drainage. We started with twenty-one 15-kilometer sections, with two supervisors, and one road master and one foreman with 8 men to each section. The foremen were all picked men, known to me. The labor was unusually good, even for Mexico, where the most faithful track labor I have yet worked is to be had. The supervisors and the road master were capable. Within one month after we turned the road over to operation with 70-lb. rail, 8 ft. ties spaced 22 in. on centers, E. 40 locomotives and 80,000-lb. capacity cars, the track condition became alarming. Several derailments occurred, and the sand and "tepetate," or volcanic burned clay ballast, which we had put down to cover about 100 kilometers of gumbo, had become insufficient. The one man to 1.164 miles of line could not maintain it, neither could 8 men instead of 6 men to the section. In December we increased the forces to 12 men to the section and put on one extra gang to get out more "tepetate" ballast and put it in. A second extra gang of 40 men with a foreman and an assistant were put on with a regular work train in January, 1904, and continued throughout the year.

January 1, 1905, one of the extra gangs was taken off and in April of the same year the other gang came off for financial reasons. After we had gotten by the fiscal year on July 1, one of the gangs was put back on under the better foreman. This gang was increased to 60 men and they stayed on until April, 1906, when the gang was taken off, and the section gangs reduced to 8 men, for financial reasons. This held until the end of 1906.

In January, 1907, two extra gangs of 20 men and foremen were put on to clear cuts and widen certain of the large fills and lift them back to grade where the settlement had been sufficient to affect the tonnage rating of the engines. Ballasting with broken stone was well under way. This work was charged to betterments and had nothing to do with "Hardening down," the cost of which was still charged to operating expenses. These men continued on the hardening throughout that year, and again in 1908 throughout the year, cleaning slopes, increasing them in many cases, widening fills, and bringing them up to grade ahead of ballasting. This was charged to operating.

Finally in May, 1909, with the track fully ballasted and after 5½ years of operation, the gangs got down to the old standard of the narrow gage line, 1 foreman and 6 men to the section, with no extra gangs. None of these men were engaged at any time in work on stations, on water tanks, wells, etc., for the line started with all stone culverts, stone and steel bridges, steel tanks, and stone stations. Repairs to these, which were almost nothing, were confined largely to additional bridges and painting, and were properly distributed in the accounting. E. 46 locomotives and 100,000

16 cars had been added. The rail had been changed to 85 lb. and the number of ties had been increased to 2,000 per kilometer or 30 to a 33 ft. or 10 meter rail. Due to consolidation with the Mexican Central and the diversion of much tonnage to the lighter grade line, the tonnage had doubled. The passenger trains remained the same as in 1904.

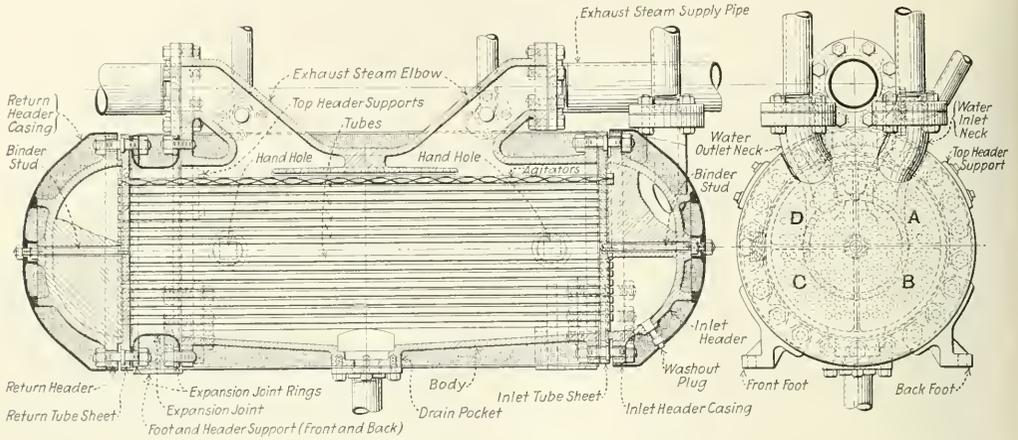
In my estimation all the men employed beyond these 6 men and the foreman between 1900 and 1909 were a proper charge to the cost of property, or "Hardening down." It takes more men to maintain stone ballasted track than seasoned well drained, hardened earth track. I was not with the line from March, 1904, to June, 1907, but was with the same system and kept notes and watch on this piece of line.

For easy calculation suppose the labor received for this period \$1 per day. The cost which should be added would be:

In 1904			
40 extra labor men	70 days @ \$1	700.00	\$800.00
4 men	70 days @ \$1	280.00	\$1,080.00
1 foreman	70 days @ \$1	70.00	\$1,150.00
80 extra labor men	70 days @ \$1	5,600.00	\$6,750.00
40 extra labor men	70 days @ \$1	2,800.00	\$9,550.00
1 foreman	70 days @ \$1	70.00	\$9,620.00
1 foreman	70 days @ \$1	70.00	\$9,690.00
1 foreman	70 days @ \$1	70.00	\$9,760.00
1 foreman	70 days @ \$1	70.00	\$9,830.00
1 foreman	70 days @ \$1	70.00	\$9,900.00
1 foreman	70 days @ \$1	70.00	\$9,970.00
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1 foreman	70 days @ \$1	70.00	\$10,180.00
1 foreman	70 days @ \$1	70.00	\$10,250.00
1 foreman	70 days @ \$1	70.00	\$10,320.00
1 foreman	70 days @ \$1	70.00	\$10,390.00
1 foreman	70 days @ \$1	70.00	\$10,460.00
1 foreman	70 days @ \$1	70.00	\$10,530.00
1 foreman	70 days @ \$1	70.00	\$10,600.00
1 foreman	70 days @ \$1	70.00	\$10,670.00
1 foreman	70 days @ \$1	70.00	\$10,740.00
1 foreman	70 days @ \$1	70.00	\$10,810.00
1 foreman	70 days @ \$1	70.00	\$10,880.00
1 foreman	70 days @ \$1	70.00	\$10,950.00
1 foreman	70 days @ \$1	70.00	\$11,020.00
1 foreman	70 days @ \$1	70.00	\$11,090.00
1 foreman	70 days @ \$1	70.00	\$11,160.00
1 foreman	70 days @ \$1	70.00	\$11,230.00
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1 foreman	70 days @ \$1	70.00	\$24,530.00
1 foreman	70 days @ \$1	70.00	\$24,600.00

near the cylinders in order to reduce the length of passages between the cylinders and the heater. In the particular case illustrated, it is located directly in front of the cylinders.

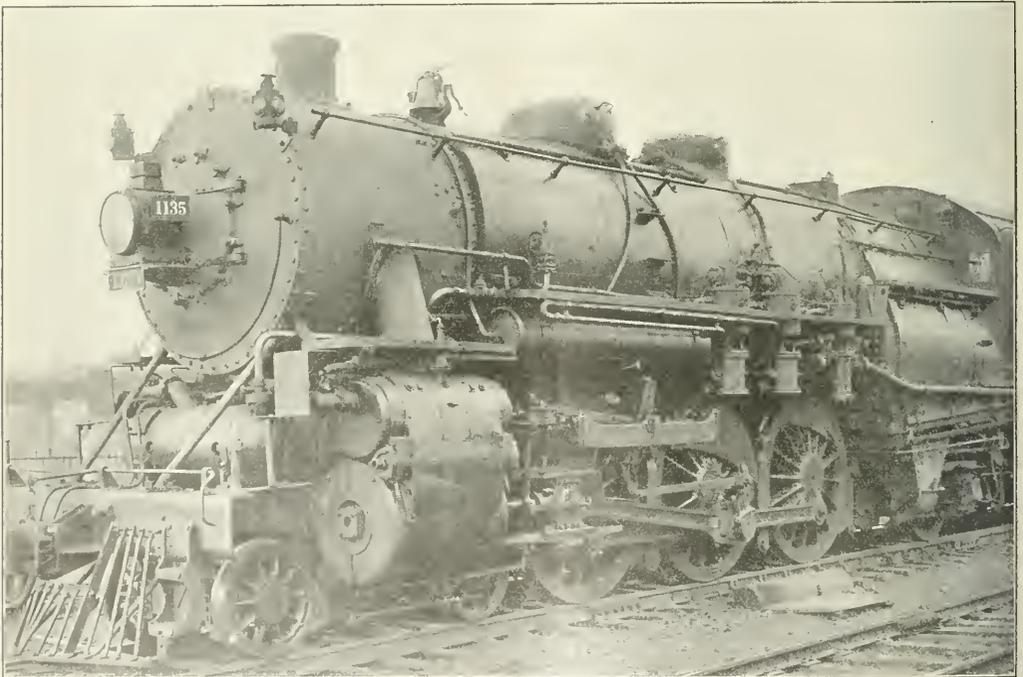
water heating equipment applied to a locomotive well illustrates the system. The pump draws the water from the tank through a 3½-in. suction pipe and delivers it to the heater



Section Through the Locomotive Feedwater Heater

Pipes extend from each steam chest to the inlet connections of the heater. With this system the injector is replaced by an entirely new water pump, which was developed for this

through a 2-in. pipe. From the heater the water passes through a 2-in. pipe with a check valve to the boiler check. A ¾-in. connection is made in the pump discharge pipe for



Application of Feedwater Heater and Steam Pump to a Locomotive

particular work by the Westinghouse Air Brake Company. It may be located on either side of the locomotive, being applied similar to the application of an air compressor.

The diagrammatic view of the arrangement of the feed-

the squirt hose, thus providing cold water for that purpose. The pump takes steam from the cab turret and the speed of the pump is regulated by a valve at that point. The exhaust steam from the pump passes into the heater to

give up its waste heat to the feed water. The exhaust steam condensed in the heater passes through an opening in the bottom of the heater to a drain pipe that carries it to a point near the ash pan where it is drained to the track.

The pump was modeled after a Westinghouse compressor. The steam end is that used on a standard 9½ in. compressor. The water cylinder is 6½ in. in diameter and is double acting. When running at 80 strokes a minute the pump will deliver 6500 gals. an hour. There are ten valves, five suction and five discharge, located in the chambers on each side of the pump. Each set of five valves is included in a valve deck which may be easily removed. Tests made with this pump have shown that 50 lb. of water and over are pumped per pound of steam used for operating the pump.

A sectional view of the heater is shown among the illustrations. As indicated by the notations, the exhaust steam from the steam chest is admitted at the top, allowed to circulate around the tubes which contain the feed water, and passes out through the drain at the bottom. The water from the pump passes through the heater four times before it is delivered to the boiler. This is accomplished by means of walls in the headers at the ends of the heater. The header at the right has three chambers formed by a wall extending horizontally across the header at the center and a vertical wall extending up from this wall. The header at the left has one vertical wall dividing it into two parts. The water enters the header at the right in the upper right hand

position. It passes through the lower chamber of it to the header at the left. From there it comes through the tubes marked *B*, then back through the tubes marked *C*, to the header at the left, then through tubes marked *D* to the water outlet. By thus passing the water through the heater four times an equivalent length of pipe of 14 ft. is obtained from which the water will almost boil.

One of the most important features of this heater is the jacketing contained in most of the tubes of the heater. These are closed in the top row of tubes in the heater illustrated. They consist of a thin brass, corrugated and spiraled strip of metal and each functions to so surround the water as it passes through the tubes that every portion of it will come in contact with the hot tubes and absorb all the heat possible from the exhaust steam on the outside of the tubes. This jacketing also serves to keep the tubes clean and free from scale. The higher the velocity of the cold water passing through the tubes the more violent the agitation and the greater the amount of heat absorbed by the water.

Two types of heater bodies are being used, one iron pipe and the other steel plate. When a cast iron body is used the difference in expansion of brass and iron is taken up by a copper expansion joint forming one end of the body. When steel plate is used the difference is taken up by a flexible form of joint formed at other end of the body where it connects to the tube sheet.



Photo from Central News Service

A More Elaborate French Munitions Depot for Storing the Larger Shells



Photo from Central News Service

The Germans Make Efficient Use of the Light Railway in Transporting Wounded



General News



A walkout of 1,500 shopmen from the shops of the Atlantic Coast Line at Waycross, Ga., was reported on January 8, the grievance being that a non-union pipefitter had been employed; but the matter was settled the next day.

The long bridge over Albemarle Sound, on the Norfolk & Southern, was badly damaged by ice in the storm of January 11 for a length of about 1,000 ft., and the operation of trains had to be suspended to allow the bridge to be repaired.

The governor of Pennsylvania has received an offer from a committee of business men and public officers of Susquehanna, Lackawanna and Luzerne counties, to give to the state for a state highway, the right of way which has been abandoned by the Delaware, Lackawanna & Western Railroad from Clark's Summit to Milford, 33 miles.

A grievance of enginemen on the New York, New Haven & Hartford is reported as having been settled by arbitrators under the Federal law: and the decision was filed in the United States District Court at New York City on January 15. The controversy was submitted to the arbitrators on October 30 last. It is said that in the main the railroad company is sustained.

The freight house and office building of the Union Pacific at Fifteenth and Nicholas Streets, Omaha, Neb., was destroyed by fire on December 28, together with 9 loaded cars. Ten other cars with contents were damaged. The fire is believed to have originated from a small stove used by water service men for thawing out frozen pipes. The total damage to the building and cars is estimated at \$50,000.

A fine of \$1,000 was imposed, in the county court at Jersey City, N. J., on Monday of this week, on the Lehigh Valley Railroad Company because of its responsibility for the death of a policeman at the fire which resulted from the great explosion at "Black Tom," New York harbor, July 30, 1916, in the yards of the Lehigh Valley. The indictment against the railroad company was for the crime of manslaughter.

Differences between the Chicago & Alton and its telegraphers were settled through the mediation of G. W. W. Hangar, of the United States Board of Mediation and Conciliation on January 11. Under the terms of the agreement the telegraphers will receive overtime pay for Sunday work, a reduction of the working day by one hour, giving them an eight hour day, and an increase of about \$9.75 a month. About 400 men are affected by the settlement which is the first made since Secretary McAdoo was appointed director general of railroads.

The coal carried off by mobs of men, women and children who raided the railroad yards in Philadelphia during the first week of January, when thousands of people were suffering from the cold weather, is said to have amounted to several hundred tons; and the retail dealers, whose coal was taken from the cars, are preparing to sue the city for the amount of their losses. It is said that the tracks of the Pennsylvania Railroad, along Washington Avenue, were visited by crowds of a thousand persons at one time, and whole carloads were carried off. The police made few arrests and most of those who were taken to the courts were leniently dealt with.

Disturbance of state revenue from railroad taxes, as a possible undesirable result of Federal control of railroads, is the subject of a telegram which Governor Walter E. Edge, of New Jersey, has written to the leaders of Congress and to the governors of a number of states. Governor Edge is president of the Congress of States on Taxation, which recently held a conference at Atlanta, Ga., and his efforts to arouse interest in this subject are addressed to governors and other state

officers who took part in the conference. The state of New Jersey collects from the railroads in taxes about \$8,000,000 annually, the largest single source of revenue in the state. The governor deems it wise to present the matter to Congress without delay, and before any action is taken, with special regard to the interests of those states where the railroad taxes are based on the receipts from traffic.

A Government Traffic Director

H. M. Adams, vice-president and traffic manager of the Missouri Pacific, has been appointed Director of Inland Transportation of the War Department to supervise all Government traffic, under Major-General George W. Goethals, acting Quartermaster General. Mr. Adams will have his office in Washington.

Western Railway Club Meeting

The January meeting of the Western Railway Club, will be held at the Hotel Sherman, Chicago, on January 22. A. R. Ayres, superintendent of motive power of the New York, Chicago & St. Louis, will present a paper on Organization Maintenance and P. S. Eustis, passenger traffic manager of the Chicago, Burlington & Quincy, will speak informally on The Passenger Traffic Problem Today.

Mr. Willard Resigns from Industries Board

Daniel Willard, president of the Baltimore & Ohio, has resigned as chairman of the War Industries Board; and it is understood that the resignation will be accepted as soon as a successor is found. Mr. Willard gave as his reason that the railroad required his entire attention. He has had the step under consideration some time. He was confronted with the alternative of resigning the presidency of the Baltimore & Ohio if he remained as chairman of the War Industries Board.

Fuel Administration Officers

Appointed to Co-operate with Railroads

In compliance with a request from Director General of Railroads McAdoo, United States Fuel Administrator H. A. Garfield has designated Fuel Administration officers to co-operate with the railroads in clearing up emergency traffic congestion. G. N. Snider, of the Fuel Administration, is to act with the Pennsylvania and the Philadelphia & Reading. The Commissioner of the Tidewater Coal Exchange at Norfolk, Va., is to co-operate with the railroads at Hampton Roads in clearing up congestion at that point. Another representative has been located at New York City. These designated officers of the Fuel Administration will have authority to divert shipments of coal from the original consignee whenever an emergency renders such action necessary to relieve traffic conditions.

Progress in Valuation Work

In a statement prepared by H. C. Phillips, general secretary of the Presidents' Conference Committee for the Federal Valuation of the Railroads, dated December 31, 1917, information is presented to the effect that the government has spent about \$9,000,000 and the carriers \$16,600,000 on the valuation work from the passage of the valuation act on March 1, 1913, to June 30, 1917. The government roadway and track parties have covered over 150,000 miles of main lines up to January 1, 1918. Tentative valuations up to the present time have been served on six carriers with a total mileage of 2,120 miles. The field and track inspection is now complete on 153 roads with a total mileage of 61,333

F, Fort Arthur, Tex. Most recent reports make the number of officers of the El Paso & Southwestern who have received commissions, two; the number of employees who have received commissions, 10; the number who have enlisted or who have been drafted in the army, 185; and those in the navy, 26; making a total now with the colors of 223.

The Baltimore & Ohio reports the following additions to its list of employees who have received commissions: J. G. Stevenson, bridge inspector, captain quartermaster's department, Camp Merritt, N. J.; W. B. Blanchford, machinist, captain, regular army; H. R. Holljes, inspector, first lieutenant Marine corps, France; E. J. Clopton, chairman, lieutenant field artillery; A. N. Peters, chief dispatcher, lieutenant, railway regiment; A. M. Dinsmore, brakeman, second lieutenant, machine gun corps, Fort Riley, Kan.; C. R. Preston, inspector, second lieutenant in infantry, Camp Lee, Va.; J. J. Chisolm, inspector, second lieutenant assistant paymaster in the navy; J. M. Beverly, brakeman, second lieutenant in the navy.

The statistics of enlistments in the army for the Tennessee Central were inadvertently omitted from the article in the *Railway Age* of January 4. The number of employees of this road, however, who entered government service was included in the grand total of railway men under arms therein mentioned. Two Tennessee Central employees received commissions, i. e., C. H. Fitzgerald, yardmaster, a majorship, and F. J. Ready, Jr., secretary and chief clerk in the legal department, a first lieutenant in the aviation section of the signal corps. Seventy-one other employees either volunteered or were drafted.

Gratitude for Tobacco Funds

Brigadier-General W. W. Atterbury, Director General of Transportation, American Expeditionary Forces in France, has congratulated the employees of the Pennsylvania Railroad upon the liberality with which they have contributed to the fund for supplying tobacco to their former comrades, now in the field. In a letter to J. C. Johnson, Superintendent of Telegraph of the Pennsylvania Railroad, he says:—

"I was very much gratified to learn that the Pennsylvania Railroad employees had contributed a fund of \$35,000 for the purchase of tobacco for Pennsylvania Railroad boys serving with the American Expeditionary Forces. As to the best method of sending the tobacco. I shall want from the general manager's office a list of the employees, upon receipt of which we will make the necessary arrangements and advise how to forward the tobacco.

"I want to congratulate the employees of the Pennsylvania Railroad who are doing their bit at home to help us here in France, for the splendid way they have responded in this very laudable undertaking. American tobacco is very scarce over here and is in great demand, and I know that all of our employees with the American Expeditionary Forces will be very glad to receive such a substantial reminder from their friends and fellow-workers at home.

"Needless to say, we are very busy, for the job they have given us is going to tax all our energy and ingenuity. However, that is what we are here for."

Contributors to the Railway Regiments' Tobacco Fund will be interested in a letter from Fred A. Preston, secretary and treasurer of the P. & M. Company, Chicago, now a captain in the regular army in France. He was in a hospital for a month with the measles, and after he came out he wrote a letter to Fred A. Poor, president of the P. & M. Company, in which he said:

"I had occasion while at the hospital to see what sending tobacco to the soldiers means. There were sixty privates with the measles quarantined in a separate building and they were the most cheerless lot of men I ever saw, with no clothes of their own and nothing to smoke. They were actually sick, not from measles but from pure lonesomeness. After they had been there six days the Y. M. C. A. brought around about 500 bags of Bull Durham and the whole character of the place changed in a flash. I have never seen anything which gave so much pleasure and those boys were well in an hour, and left the hospital the next day!

"There is nothing so welcome as Bull Durham with plenty of papers and matches. The latter are especially scarce. Send the tobacco in the large size bags. Before long I shall have

the chance to see some of the soldiers who are receiving your tobacco. I will write you what they say; but I know now what it will be."

Contributions to the Railway Regiments' Tobacco Fund for the week ending Tuesday noon, January 15, are:

Detroit Graphite Company, Detroit, Mich., \$3 a month for 12 months.

Mt. Vernon Bridge Company, Mt. Vernon, Ohio, \$10 a month for 12 months.

Record Snow Storms Paralyze

Transportation in Central West

Two of the severest snow storms in history have swept over the Central West within a week paralyzing transportation for from 24 to 48 hours each time. The first storm was accompanied by a snow fall of nearly 15 i. hes, which constitutes a record for Chicago and tributary territory, and was confined largely to a zone within about 100 miles of that city. It started west of the Mississippi river late in the evening of Saturday, January 5, and at Chicago the velocity of the wind was about 55 miles an hour. The railroads were forced to annul most of the passenger trains scheduled to leave Chicago on Sunday, and all incoming trains were late.

Hardly were the rails and yards cleared of snow when a second storm passed over the same section of the country. It began Friday evening, the 11th. The snow fall was not so heavy, a maximum of about eight inches and in many localities not exceeding three inches, but the gale was as bad or worse, and of longer duration. Passenger trains throughout the storm area were stalled, and passengers were forced to billet in warehouses, country stations and small rural hotels. The less fortunate had to remain in their trains, in some cases after the car-heating facilities gave out. Many important trains could not be moved for from 24 to 48 hours. Some which left Chicago Friday evening were recalled when it became apparent that they could not proceed, but the return trip in some instances took all day Saturday and Sunday.

Thousands of men were hired and others were drafted from all railroad departments, which could spare men, to clear the tracks. The Chicago, Burlington & Quincy employed all its freight handlers, freight clerks, and draftsmen to shovel on January 14. Other roads took similar measures. Because of the difficulty of obtaining men for this work some Chicago roads paid as high as \$1 an hour for common labor. Rotary snow plows were put at work, but, as long as the storm lasted, these progressed with difficulty. On Sunday morning, January 13, a plow and a locomotive were derailed near Corliss, Wis., on the Chicago-Milwaukee line of the Chicago, Milwaukee & St. Paul.

Practically no trains were run on the 12th and 13th, but passenger service was resumed on something approaching normal schedules on January 14. Chicago suburban trains, which attempted to fight the storm Friday night, were stalled in snow drifts, forcing commuters to spend the night in the cars except when rescued by farmers who broke through the drifts with sleighs and bobsleds. Chicago offices, stores and factories were operated with depleted forces on January 12 because of the failure of all suburban trains, electric interurbans and street railways.

The first break in Chicago's isolation from the east came when the Twentieth Century Limited on the New York Central arrived at 10 a. m., Sunday, a little over 24 hours late. The New York-Chicago Limited of the Baltimore & Ohio, due at 9 a. m. on Sunday the 13th, did not arrive until 1:30 p. m. on Monday. The Manhattan Limited and the Mercantile Express of the Pennsylvania, due in Chicago on Saturday afternoon arrived Monday. These trains were held at Mansfield, Ohio.

No freight service, except the movement of coal and perishables, was attempted until Monday, January 14. The Illinois Central delivered coal at team tracks in Chicago on Sunday, although hardly a wheel of a passenger train moved. A small amount of milk in cans reached the city over the Chicago & North Western Monday morning, the first to come in over that road since Friday. Milk deliveries in the city on the 14th were confined to families with babies, and even some of those had to do without. Coal movements were greatly impeded everywhere. The Illinois State Fuel Administration has com-

Traffic News

The Navy Department has taken two steamers of the Central Vermont Railway, which have been lying at New London unused, for the past three years—the Narragansett and the Manhattan.

The Traffic Club of Jacksonville, Fla., held its annual meeting on January 5. John C. Burrowes, superintendent of the Pullman Company, was elected president for the ensuing year.

In Philadelphia, this week, eight large freight stations of the Pennsylvania Railroad have been kept open until 10 o'clock in the evening, with the hope that consignees would be able to more rapidly clear away the accumulation of freight.

James A. Farrell, president of the United States Steel Corporation, who was recently appointed assistant to A. H. Smith, assistant director-general of the railroads, has appointed a committee of eight traffic managers of steel companies to gather information and submit reports to Mr. Smith.

The United States Food Administration's recent instructions that shippers must load to safe carrying capacity have produced results on the Southern Pacific. A shipper at Hubbard, Ore., on November 15, loaded 104,500 lb. of potatoes into a Southern Pacific 40-ft. box car. At 60 pounds to the bushel this means 1742 bushels. The car was loaded nine sacks high, and was delivered at Colma, Cal., on November 22, without complaint as to the condition of its contents.

The special committee of the National Industrial Traffic League, recently appointed, with Guy M. Freer, president of the league, as chairman, has gone to Washington to give Director General McAdoo the viewpoint of shippers at large concerning the important measures he has taken since assuming control of the railroads, including particularly the new demurrage rates, the routing of freight without reference to company lines, etc. The committee will also ask for a league representative on Mr. McAdoo's advisory board.

Railroads in the territory of the Western Passenger Association have discontinued the delivery of railroad, sleeping-car and parlor-car tickets either by railroad employees or by paid messengers. Similar action was taken some time ago by railroads in the territory of the Central Passenger Association. Member lines of the Western Passenger Association have also agreed to discontinue free telegraph and telephone service in connection with sleeping-car reservations, subject to the concurrence of the Southwestern and Transcontinental Passenger Associations. According to this arrangement, if it becomes effective, no sleeping-car or parlor-car reservations for passengers on foreign lines or at other points on the same line will be made by telegraph or telephone except at the expense of the passenger. This rule will not apply to reservations on sleeping-cars or parlor-cars which pass through the station where passengers call for space, but merely applies when passengers desire to reserve berths or parlor-car chairs on a train with which they intend to connect.

Illinois Manufacturers Protest

Increased Demurrage Charges

The traffic committee of the Illinois Manufacturers' Association has passed a resolution declaring that any change, through government control, or agitation by the carriers in connection with trap and ferry cars, increase in carload minimum weights, storage, track storage, or other matters, without consultation and agreement with shippers, is ill advised and inconsistent with the spirit of co-operation. "These subjects have been handled through negotiation between the carriers and shippers with very satisfactory results, and we respectfully suggest that such relations continue." A telegram was sent to W. G. McAdoo, director-general of railroads, criticising his order making radical changes in demurrage charges and eliminating the average agreement.

It said: "We are in entire accord and sympathy with you in your efforts to facilitate prompt movement, but . . . we can demonstrate that the enforcement of your order will not accomplish the results desired. . . . We therefore respectfully request opportunity to be heard prior to the taking effect of the order January 21."

To managers of Chicago railroads a message was sent deploring the abolishing of commercial railroad freight offices long established out of necessity. Such a radical change, it is declared, deprives the shipping and traveling public of the only prompt means of obtaining necessary information which is absolutely essential.

Curtailement of Passenger Train Service

The New York Central made further extensive reductions in passenger train service on Monday of this week, particularly in suburban trains to and from New York City.

The Chicago, Milwaukee & St. Paul, to conserve coal, has issued orders cancelling 54 passenger trains.

The Cleveland, Cincinnati, Chicago & St. Louis has discontinued its night trains between Chicago and Louisville.

The Louisville & Nashville has taken off a number of Sunday trains.

South American Traffic

Steamship lines to South America and to Trans-pacific ports report more passenger traffic than last year. The rapid development of new trade enterprises under the stimulus of war conditions has created a volume of commercial travel heretofore unknown. New trade relations now established mean new freight, and permanent benefit to the carriers of both freight and passengers. The new United States and Pacific Line, plying between New York and the west coast of South America, through the Panama Canal, announces the departure of the first of its four new steamers the last of January.—*American Express Co.'s Travel Bulletin.*

Discontinuance of Solicitation of Traffic

Reductions of the forces of city passenger and freight agents have been under consideration during the past three weeks by many railroads at many cities; and action has already been taken in a number of cases, including the complete closing of some offices; but there seems to be no very well-defined policy, and each road apparently finds itself compelled to consider numerous local obstacles. The Baltimore & Ohio has closed its office at 196 Washington street, Boston, and the New England passenger agent has been sent to Philadelphia. Among the 30 railroad offices on the principal business streets of Boston, a considerable number reduced their staffs on or about January 1; but it is said that some of the roads have reconsidered the matter and may not withdraw so many men as at first was intended. From Toronto, Ont., it is reported that the Chicago, Milwaukee & St. Paul, the Minneapolis, St. Paul & Sault Ste. Marie, and the Pennsylvania have closed their offices. The passenger and freight agent of the Missouri Pacific at Nashville, Tenn., has called in his traveling agents. The Chesapeake & Ohio, the Erie and the Southern have signified their intention of close their offices in Philadelphia. The Georgia Railroad has closed its office in Macon. A number of offices have been closed in Atlanta, Ga. At Chicago mercantile interests protested against the closing of city freight offices.

Railroads in the territory west of Chicago have practically discontinued the solicitation of freight traffic, but their soliciting forces have been utilized in other ways. The Missouri Pacific recalled approximately 200 freight solicitors and put them at work in the operating department. On most of the larger roads the solicitors are employed to expedite the movement of freight and to keep shippers advised as to how and by what routes freight is being moved. The Texas & Pacific, the Southern, the St. Louis Southwestern, the International & Great Northern and the Missouri, Oklahoma & Gulf have closed their offices at Chicago. The Chicago, St. Paul, Minneapolis & Omaha has closed its agency at Kansas City, and the Baltimore & Ohio closed its office at Buffalo, N. Y.

held insufficient to contradict the written admissions in the contract. Judgment for the plaintiffs was reversed and judgment entered for the railroad.—*Illinois Central v. Rogers* (Miss.), 76 So. 686. Decided November 19, 1917.

Computation of C. L. Charges—Storage and Demurrage

Action was brought against a shipper to recover for freight, demurrage and storage on a stone-working lathe and equipment shipped from Columbia, Me., to St. Cloud, Minn., which the consignee refused to receive, but not on account of any fault of the carriers. The freight charges were lawful, and on 24,000 lb. the minimum c. l. rate. The actual weight of the goods was 17,000 lb., and the question was raised whether the goods shipped reasonably amounted to a carload. The Maine Supreme Court justified the carload rate; and also held that the terminal carrier did not act imprudently in taking the lathe and equipment to a warehouse at an additional freight charge, although it might have unloaded it on its right of way; but its action, after it knew that the shipper was unlikely to give any orders for the disposition of the shipment, in keeping the goods on the car at a demurrage charge of \$1 a day for 86 days was held unreasonable and unnecessary, and it should have unloaded the freight and released the car after a demurrage charge of not over 26 days.—*Northern Pacific v. Pleasant River Granite Co. (Me.)*, 102 Atl. 298. Decided November 24, 1917.

Free Passes to Employees—

After Termination of Service

A railroad sent its agent to Union Springs, Ala., and there employed several persons to work for it on its lines in North Carolina and Tennessee. Their contracts included free transportation to their place of work and free transportation to their homes in Alabama every two weeks. The latter was never furnished, but the men continued at work until their job was finished in North Carolina and they were transported to Johnston City to work. At this point they declined to work any further and were discharged. They then demanded their free transportation to their homes, which was refused and they brought suit. The railroad's defense was that it was not permitted, under the law, to contract to furnish free transportation; that it could only furnish transportation to such persons as were in its employ, and that, at all events, after the plaintiffs were discharged, it was unlawful for the railroad to furnish such transportation. The Tennessee Supreme Court held that the plaintiffs not being servants of the railroad at the time the free transportation was refused at Johnston City, the railroad could not furnish it without being liable in the penalty provided in the federal law. There is no exception for such a case in the act itself and the court can make none. The court followed the rulings of the Supreme Court of the United States, which has construed the act very strictly in furtherance of the policy of Congress to root out the practice of furnishing free passes by interstate carriers, except in the cases reserved by the act. Such a contract was therefore held not binding.—*Northern v. Linear* (Tenn.), 198 S. W., 887. Decided November 20, 1917.

United States Supreme Court

Texas Train-Schedule Law Void

The United States Supreme Court, on Monday of this week, in the case of the Missouri, Kansas & Texas, of Texas, against the state of Texas, dismissed a suit by the state to collect penalties for alleged violation of an order of the state railroad commission in failure to adhere to passenger train schedules. The Court held that the order was an interference with interstate commerce.

Interstate Commerce Commission Sustained

The Supreme Court of the United States has upheld the order of the Interstate Commerce Commission which (after several revisions) merely denied to the Louisville & Nashville authority to continue on certain traffic through Bowling Green to Louisville and to Nashville lower rates than were contemporaneously in effect to Bowling Green. (*Bowling Green Business Men's Association v. Louisville & Nashville*, 24 I. C. C. 228). The railroad assailed the validity of the

order in the federal district court for the Western District of Kentucky. The district court refused to grant a temporary injunction and dismissed the company's bill. This is now affirmed by the Supreme Court. The railroad company had filed a long assignment of errors. The Supreme Court says that "many of the assignments of error are not now insisted upon, none deserves detailed discussion, all are unsound." *L. & N., v. United States*. Decided, January 7, 1918.

Railroads Lose Illinois Passenger Fare Case

The Illinois railroads have lost their fight to set aside the Illinois two-cent fare law. The United States Supreme Court on Monday of this week in a decision by Justice Van Devanter, sustained the decision of Judge Landis of the district court for the northern district of Illinois, which held that the Interstate Commerce Commission had exceeded its authority in its order in the Business Men's League case. The commission ordered the railroads to remove the discrimination against interstate traffic resulting from the higher rate for interstate traffic than the rate charged for intrastate passengers, and it specifically approved the 24-cent interstate rate as being reasonable. The railroads asked an injunction to restrain the enforcement of the two-cent rate in Illinois, but Judge Landis dismissed the proceedings. Both the railroads and the state authorities appealed from the decision, which is now upheld. Another federal court at St. Louis enjoined the railroads from violating the commission's decision and during the litigation the higher rates have been charged, rebate coupons being given to the passengers. The court sustained the contention of the state authorities that the order of the Interstate Commerce Commission was not sufficiently definite and precise to be enforced as against a state law.

Assumption of Risk Under

Federal Employers' Liability Act

A freight train was being made up in a yard, and an experienced conductor, while between cars contrary to the rules, and assisting in an effort to adjust a faulty coupler, was killed. The coupler was at the south end of a string of cars standing on a grade; another string moving down from the north hit the standing cars and drove them against the deceased and across a space of twenty feet. Suing under the federal Employers' Liability Act the administratrix maintained that the brakeman in control negligently permitted the moving cars to strike with too great violence; also that the company negligently failed to promulgate and enforce adequate rules to safeguard the deceased while at work; and some evidence tended to support both claims. The Circuit Court of Appeals, Second Circuit, affirmed a judgment for the defendant after the trial court had denied motion for new trial based solely on its refusal to give the charge specially requested by the plaintiff (218 Fed. 367). The requested charge was that "the risk the employee now assumes since the passage of the federal Employers' Liability Act, is the ordinary dangers incident to the employment, which does not now include the assumption of risk incident to the negligence of defendant's officers, agents or employees." Denying the request the court said: "Under the Employers' Liability Act the employee simply assumes the risk of his employment. Section 4 reads, 'Such employee shall not be held to have assumed the risk of his employment in any case where a violation by such common carrier of any statute enacted for the safety of employees contributed to the injury or death of such employee.' I decline to charge as requested, because this is not an action of the kind specified in Section 4."

The Supreme Court of the United States, in affirming judgment for the defendant, said that the request quoted did not accurately state any applicable rule of law and was properly refused. Already the jury had been told that the deceased assumed the ordinary risks of his employment, a statement more favorable than the plaintiff could properly demand. If the negligence of all officers, agents or employees of the company should be excluded in actions under the Employers' Liability Act "it is difficult to see what practical application could be given to the established doctrine concerning assumption of risk." *Boldt v. Pennsylvania*. Decided January 7, 1918.

Equipment and Supplies

Locomotives

THE WESTERN PACIFIC is inquiring for 4 Mikado locomotives.

The **CHICAGO, MILWAUKEE & ST. PAUL** is contemplating the purchase of 50 steam locomotives.

The **DELAWARE, LAKE AND WESTERN** reported in last week's issue as asking prices on 15 Mikado locomotives, has ordered these locomotives from the American Locomotive Company.

THE RHODE ISLAND RAILWAY have ordered 9 mountain type locomotives from the American Locomotive Company. These locomotives will have 22 by 24 in. cylinders, a total weight in working order of 172,000 lb. and will be equipped with superheaters.

THE CHILEAN STATE RAILWAYS recently ordered 20 Mikado locomotives from the American Locomotive Company. These locomotives will have 22 by 28 in. cylinders, a total weight in working order of 195,000 lb. and will be superheated. The purchase of the locomotives has been supervised by Justiniano Sotomayor, vice-general manager and vice-minister of public works of Chile, who is now staying at the Hotel McAlpin, New York.

Freight Cars

EARL PETTY, Eldorado, Kan., is inquiring for 20 sulphuric acid tank cars.

THE ST. LOUIS-SAN FRANCISCO is inquiring for 170 steel underframes.

THE BALTIMORE & OHIO has withdrawn its recent inquiry for 3,000 freight cars.

SAMUEL BAER, Nashville, Tenn., is inquiring for 10 8,000-gal. capacity tank cars.

W. D. JENKINS, New Orleans, La., is inquiring for 10 8,000-gal. capacity tank cars.

THE CANADIAN GOVERNMENT RAILWAYS have issued inquiries for 250 drop bottom gondola cars.

THE WESTERN CONTRACTING COMPANY, Kansas City, Mo., is inquiring for 25 8,000-gal. tank cars.

LOWELL R. GAIDRI, New Orleans, La., is inquiring for 10 50-ton, 8,000- to 10,000-gal. capacity tank cars.

THE REPUBLIC IRON & STEEL COMPANY has ordered 200 coke cars from the Pressell Steel Car Company.

THE EQUALITY REFINING COMPANY, Oklahoma City, Okla., is inquiring for 30 8,000-gal. capacity tank cars.

THE SOUTHERN OIL CHEMISTS, INC., Okla., is inquiring for 25 8,000- to 10,000-gal. capacity tank cars.

THE JAREKI CHEMICAL COMPANY, Cincinnati, Ohio, is inquiring for 6 50-ton, 7,000-gal. capacity tank cars.

THE UNITED STATES NAVY has ordered 60 11' steel underframe box cars from the American Car & Foundry Company.

THE COLUMBIAN NORTHERN has ordered 10 15-ton wooden gondola cars from the American Car & Foundry Company.

THE UNITED STATES WAR DEPARTMENT is about to place orders for quantities of spare parts and accessories for freight cars.

THE BRIDG HILL IRON & COAL COMPANY, Yorktown, Ohio, is inquiring for 10 70-ton gondola, 40 70-ton coal and 125 50-ton general service cars.

Passenger Cars

THE COLUMBIAN NORTHERN has ordered 2 third-class passenger coaches from the American Car & Foundry Company.

Supply Trade News

Peter L. Maher, assistant manager of the Eastern Car Co., 111, 113, 115 Broadway, New York, has resigned his position and has returned to the United States.

The Concrete Mixing & Placing Company has moved its offices from 121 West Madison Street, Chicago, to the First National Bank Building in the same city.

S. D. Winger, formerly associated with the Turner-Lane Locomotive Co. and an industrial exhibitor, has been appointed general manager of the transportation equipment department of the Carnegie Institute, 400 North Pennsylvania Street at Chicago, Ill.

P. C. Gunton has been named general manager of the mechanical department of the Great Northern Railway, 20 E. Mr. Gunton has been in the same department of the Hyatt Company for two years. Just previous to his recent appointment he was manager of the Pittsburg office.

The American Sheet & Tin Plate Company, 100 Broadway, on January 1, had a total of 1,417 steel and tin plate manufacturers in the military service of the United States. In a circular letter to this fact the company printed in its letter heads a sticker made up like a service file containing the name of the company, a star and the figures, 1417.

A. C. Miller, promoter of the Calmar, New York Air Line, part of which was finally absorbed by the Gray & Lister Urban Traction system, of which he was formerly the head and more recently the inventor and promoter of a rail train control device, died on January 4, at Aurora, Ill., aged 66 years. Although of the same name he was not associated with the Miller Train Control Corporation, Danville, Ill.

Recent promotions in the Pottsville Steel Car Company, an organization in the Pittsburgh District, include **J. H. Hackenburg**, purchasing agent, succeeded the late **H. J. Gearhart**. Mr. Hackenburg was formerly the assistant purchasing agent. **H. B. Fisher** and **C. C. Clark** have been assigned assistant purchasing agents of the company. **W. C. Howe** recently in charge of the Allegheny plant, has been promoted to the vice president. **J. C. Ritchey** has been appointed general engineer.

R. A. Van Houten with members of the Southern Manufacturing Company, Chicago, has been appointed vice president and general manager with the same headquarters. **George M. Hogan**, sales agent, has also been appointed assistant secretary and **W. H. Seigmund**, general manager, has been appointed assistant cashier. **E. M. Kerwin**, secretary, treasurer and bookkeeper of a large of industrial order entry service, having been a continuous member of the reference department, has returned to Washington, D. C.

Milton Rupert was recently elected vice-president and assistant treasurer of the D. D. Hiram Company of Washington, Pa., a manufacturing company. Mr. Rupert has been with the Hiram Company since Mar. 5, 1912, holding various positions. In 1913 he was transferred to the general office, being directly in touch with all other divisions and manufacturing operations. During the latter part of this period Mr. Rupert was assistant in purchasing and general business. In his present position Mr. Rupert will have charge of sales and manufacturing operations.

Forl, Bacon & Davis, Pittsburgh, announced the formation of the Ford, Hancock, Lewis Corporation, organized by the merger of producing a general engineering machine and electrical engineering in mechanical parts, which will supply electrical equipment and systems, including such railway equipment, heating, ventilation, lighting, refrigeration and electrical systems. It also may serve the contractors in connection with an engineering work which the corporation has been handling in the West. The corporation's headquarters are at 111 Broadway, New York and it has offices at 1700 Commonwealth Ave., Pittsburgh.

Trade Publications

SMOOTH-ON SPECIALTIES.—A new edition of the instruction book published by the Smooth-On Manufacturing Company, Jersey City, N. J., has recently been issued for free distribution. In addition to information regarding the use of Smooth-On iron cement, the booklet contains a list of the standard sizes of Smooth-On coated corrugated gaskets for flanged pipes of sizes from 2 in. to 26 in.

METHODS OF LOADING RADIATORS AND BOILERS.—The American Radiator Company has issued an excellent booklet, describing and illustrating the standard methods of loading and bracing shipments of radiators and boilers, which have been adopted by this company to reduce the liability of damage to a minimum. The instructions contained in the booklet will be of value to agents who frequently handle such shipments.

HYDRATED LIME.—The Hydrated Lime Bureau of the National Lime Manufacturers' Association, Pittsburgh, Pa., has issued a 24-page pamphlet entitled "Watertight Concrete" which is devoted to the discussion of the properties of hydrated lime in making concrete impermeable to water. The pamphlet contains a large amount of information regarding this material and its uses and is illustrated with photographs of structures in which hydrated lime has been used.

PRESSED STEEL TRUCKS.—The Pressed Steel Truck Company of Pittsburgh, Pa., has recently issued folders describing the Atlas two-wheel and four-wheel trucks. These folders are well illustrated and show in some detail the interesting features of construction and describe the various uses to which these trucks may be put. They are constructed with a one-piece frame, without bolts or rivets. They weigh less than wooden trucks and have greater strength. The axles are supported on flexible hardened steel bearings.

AN EXPORT ORDER AND ALLIED TOPICS.—The Foreign Trade Department of the National Association of Manufacturers has recently issued a very interesting 48-page booklet in which it follows with illustrations of letters, invoices, bills of lading, etc., the progress of an export order for paint to a company in New York from a purchaser in Montevideo from the inquiry for information to the shipment and invoicing of the goods. The accompanying story explains each step in the order, and emphasizes such essentials as courtesy in the correspondence, the securing of proper credit data, the translation of letters into the language of the prospect, and the proper methods of securing shipping permits and orders, insurance, drafts, etc. In addition to that information is given concerning the trade mark laws and the consular requirements of foreign countries. Several pages, finally, are devoted to the facilities of the Foreign Trade Department of the Association. The Department, says the booklet, furnishes special reports on trade prospects to individual manufacturers, lists of foreign business houses, translations, credit reports. It also prepares reports on foreign inquiries for American goods and in trade conditions. The offices of the department are at 30 Church Street, New York. Views are shown of these offices and a map in the form of an insert shows the location of the department's foreign correspondents in all countries of the world.

MORE DESTROYERS THAN THERE ARE NOW IN THE WORLD.—E. G. Grace, president of the Bethlehem Steel Corporation, told the 500 guests of the Allentown, Pa., Chamber of Commerce at its banquet on December 20, that the submarine destroyers which the Bethlehem Shipbuilding Corporation will build for the Government are more than all of the destroyers now in the world. Mr. Grace said he regarded the rapid construction of destroyers as the solution of the submarine menace. Mr. Grace said that of the entire ship construction of the United States, war vessels and merchantmen included, the companies of the Bethlehem Steel Corporation are bearing more than half of the burden. The Bethlehem plants now employ 30,000 men as compared with 9,000 five years ago. Charles M. Schwab, who also spoke, said that the payroll of the Bethlehem plants is now \$100,000,000 a year.—*Iron Age.*

Financial and Construction

Railway Financial News

BALTIMORE & OHIO.—The board of directors at a meeting last Wednesday declared semi-annual dividends of 2 per cent on the preferred stock and 2½ per cent on the common stock.

BOSTON & MAINE.—The Minority Stockholders' Protective Association has sent a protest to President Wilson against the enactment of any legislation under which the disbursement to railroad security holders of compensation for the use of railroad property by the federal government would be left optional with the directorates. The resolution in which the protest is embodied also urges the enactment of legislation to provide specifically for a guarantee of direct compensation payment to security holders during the period of federal control.

CANADIAN NORTHERN.—The \$1,250,000 6 per cent one-year gold notes, originally issued by William A. Read & Co., were paid at maturity, January 10, by the Central Trust Company, New York. During the last year the Canadian Northern has reduced its outstanding obligations by \$6,000,000. The Canadian government now owns practically all of its \$100,000,000 capital stock.

MICHIGAN EAST & WEST.—This road, operating between Manistee, Mich., and Marion, has been placed in the hands of Eugene Ford, receiver.

PENNSYLVANIA RAILROAD.—The railroad lines heretofore operated by the Pennsylvania company, embracing the northwest and central systems of the Pennsylvania Lines West of Pittsburgh, having been taken over by the Pennsylvania Railroad Company, will be operated under the title of the Pennsylvania Railroad Company, Western Lines.

PITTSBURGH & WEST VIRGINIA.—The Pittsburgh Terminal Railroad & Coal Company, a subsidiary of the Pittsburgh & West Virginia recently declared two dividends of 3 per cent each on its \$14,000,000 of stock. All of the stock is owned by the railway company. The first dividend, an initial distribution, was paid December 31, 1917. The second dividend is payable next June. The total cash involved in these two dividends amounts to \$840,000, equivalent to the full 6 per cent on the \$9,000,000 Pittsburgh & West Virginia preferred stock and an additional 1 per cent on the \$30,000,000 common. Since the railway company earns sufficient to pay the full 6 per cent on the preferred this distribution of \$840,000 may be said to apply entirely to the common stock. On this basis it is equivalent to \$2.80 per share on the common.

ST. JOSEPH VALLEY.—H. E. Bucklin, president, has been appointed receiver of this line, which extends from Elkhorn, Ind., to Columbia, 70 miles.

Railway Construction

ILLINOIS CENTRAL.—This company is considering the construction of an inbound freight house at East St. Louis, Ill.

MOBILE & OHIO.—This company proposes to repair and remodel the grain elevator at Mobile, Ala., and the wharf adjacent thereto, involving a total expenditure of about \$125,000. The grain elevator, with a capacity of 250,000 bushels, is to be connected to the wharf by a conveyor having a capacity of 15,000 bushels per hour. This building is 56 ft. wide by 106 ft. long and 130 ft. high to the eaves. The machinery to be installed will be entirely electrically driven and of the latest type. A contract has been given to the R. C. Stone Engineering Company at St. Louis, Mo., for the installation of the machinery, and the remodeling of the building will be done by the railroad company. It is expected to have the elevator in operation within six months.

Railway Officers

Executive, Financial, Legal and Accounting

F. E. Richardson has been appointed auditor of the Tennessee Railway with office at Oxford, Tenn., succeeding **G. G. Boardman**.

W. B. Cronk has been appointed vice president and general manager, of the Caraquez & Gulf Shore with office at Barbours, N. H.

W. Mosby (transportation assistant) of the St. Louis Southwestern with office at St. Louis, Mo., has been appointed assistant to the president with office as of here at St. Louis.

Meade T. Spicer, executive assistant to the Chesapeake & Ohio, has been appointed executive assistant also of the Hocking Valley with office at Richmond, Va., effective January 1.

G. F. Baker, assistant general adjuster of the Chicago, Milwaukee & St. Paul, has been appointed general adjuster with headquarters at Chicago, succeeding **O. D. Aepli**, assigned to other duties, effective January 15.

H. A. Scandrett, who has been appointed assistant director of traffic and commerce counsel of the Union Pacific system with office at Chicago, Ill., as was announced in these columns on

January 4, was born at Farmville, Mo., on April 8, 1876. He graduated from Shattuck Military Academy in 1894 and graduated from the University of Missouri in 1898. In January, 1901, he entered the office of the general claim agent of the Union Pacific at Omaha, Neb., being transferred to Kansas City, Mo., as claim adjuster a few months later. In October, 1901, he was made assistant attorney for Kansas and Missouri and in November 1901, he was appointed assistant general attorney of the Union Pacific and



H. A. Scandrett

was also a member of the firm of Loomis, Blair & Scandrett at Topeka, Kan. From April, 1908, to January 1, 1911, he was first assistant attorney in the above-named states and on the latter date was appointed assistant interstate commerce attorney of the Union Pacific-Southern Pacific system; from May 1, 1912, to January 1, 1913, he was interstate commerce attorney for the Union Pacific-Southern Pacific companies. Since January 1, 1913, he has been interstate commerce attorney for the Union Pacific system, and on January 1 of this year assumed his new duties as assistant director of traffic and commerce counsel, as aforementioned.

Morton C. Bradley has been appointed assistant controller of the Boston & Maine, with office at Boston, Mass., in charge of statistics, valuation and other special accounting and **Earl A. Ryder** has been appointed real estate agent.

M. R. Waite, who was general solicitor to the Cincinnati, Hamilton & Dayton until that road was merged with the Baltimore & Ohio, has been appointed general attorney for the Baltimore & Ohio for the states of Ohio and Indiana with office at Cincinnati, Ohio.

W. H. Sayer, assistant secretary and assistant treasurer of the Lehigh & Hudson River, has been elected secretary and treasurer with office at Warwick, N. Y., vice **John Sayer**

THAYER, 1917 AND 1918 OF ASSISTANT PRESIDENT AND ASSISTANT SECRETARY OF THE RAILWAY AGE.

A. W. Towsley, whose appointment as assistant to the vice-president of operations and construction of the Chesapeake, York Island & Eastern, with office at Chesapeake, Md., was announced in these columns on January 11, and served as assistant, 1917. He graduated from the University of Wisconsin and in the fall of 1878 entered the service of the Chesapeake, Michigan & St. Paul railway, eventually becoming general agent, general superintendent and chief engineer. Since leaving the latter post he has been with the Great Northern as chief train dispatcher and trainmaster, the Norfolk & Western as chief train dispatcher, trainmaster, superintendent of transportation and assistant to the vice-president and general manager, the Atlantic, Toronto & Santa Fe, as assistant to the superintendent and secretary in the superintendency of transportation, the Southern Railway, as superintendent assistant to the superintendent and general manager and assistant to the president, the Chesapeake & York Islands as superintendent and general superintendent, and the Chesapeake & Ohio as general and principal agent. He left the Atlantic, Toronto & Santa Fe in 1917 to accept the position of general agent and general representative, which position he held for one year of his appointment, as noted above. Mr. Towsley will again accept position in transportation matter.

Operating

E. K. Longan has been appointed superintendent of the Southwestern Railway with office at Henrietta, Texas.

J. E. Thayer, has been appointed chief transportation and trainmaster of the Georgia Railway with office at Marietta, Ga.

H. E. Rodenfels has been appointed general agent of the operating and trade departments of the Cincinnati & Ohio with office at Columbus, Ohio.

J. D. Walker has been appointed acting superintendent of transportation of the Colorado & Southern with office at Denver, Colo., succeeding **A. Pardoe**.

J. W. Allen has been appointed acting superintendent of the Puget Sound division of the Northern Pacific, with headquarters at Seattle, Wash., vice **J. J. McCullough**, assigned to other duties.

Charles D. Ward, general agent of the operating department of the Erie, with office at Chicago, has been appointed general agent of New York Terminal division, with office at Jersey City, N. J.

H. D. Earle has been appointed superintendent of the Northern division of the St. Louis-Southwestern with office at Pine Bluff, Ark., succeeding **M. J. Kennedy**, resigned, effective December 13.

J. A. Shepherd has been appointed superintendent of the Green River division of the Denver & Rio Grande, with headquarters at Helper, Utah, succeeding **R. C. Ten Eyck**, transferred, effective January 1.

C. O. Bradshaw, formerly a trainmaster of the Green River, western, was appointed superintendent of the Illinois and the Racine & Southwestern divisions of the Chicago, Milwaukee & St. Paul with headquarters at Sagamon, Ill., succeeding **G. R. Morrison**, assigned to other duties, effective January 1.

W. O. Franklin, who had been general superintendent of the Pennsylvania division of the Reading & Waters, with headquarters at Allentown, Pa., has been already long announced in these columns, and long in the January 25, 1914, at Marietta, Va., and previously in connection with the Mountaineer, Clark's School. His former railway work was with the Chesapeake, York Island & Western, and with the Erie, the Pennsylvania, the New York, Ontario & Western, and the Erie, the Pennsylvania, the New York, Ontario & Western, and the Erie, the Pennsylvania, the New York, Ontario & Western. He was chief superintendent, freight conductor for four years, assistant superintendent, and superintendent for two years and later served in the same capacity of superintendent of the Southern division. He was also superintendent of transportation for the Pennsylvania division, which position he held until his recent appointment as superintendent of the same road, as above noted.

Traffic

J. H. Gregory has been appointed commercial agent of the Chicago, Burlington & Quincy with office at St. Joseph, Mo.

George J. Allen has been appointed commercial agent of the Georgia & Florida and the Augusta Southern, with office at Nashville, Tenn.

E. M. Hess, has been appointed commercial agent of the New York Central, with office at Baltimore, Md., vice **N. D. Hoke** promoted.

C. J. Piper, has been appointed commercial agent of the Canadian Northern, with office at Minneapolis, Minn., vice **J. T. Whitlaw** resigned.

J. W. Brown, traveling freight agent of the Baltimore & Ohio with headquarters at Dayton, Ohio, has been appointed general agent at Camp Sherman, Ohio.

R. R. Williams has been appointed Canadian agent, passenger and freight, of the Buffalo, Rochester & Pittsburgh, with headquarters at Toronto, Ont., vice **P. A. Bolopue**.

W. T. Grier, general traffic manager of the Lehigh Valley, with headquarters at New York, having resigned to enter other business, the position of general traffic manager has been abolished.

H. A. Cochran, general coal freight agent of the Baltimore & Ohio, with office at Baltimore, Md., has been granted a temporary leave of absence in order that he may assist the United States Fuel Administration at Washington.

F. K. Woodruff, manager of mail traffic of the Kansas City Southern, with office at Kansas City, Mo., has been appointed director of development, with the same headquarters, in charge of the industrial, immigration and agricultural departments. The position of manager of mail traffic has been abolished and the duties of that position have been assumed by **F. D. Downie**, general baggage agent, Kansas City, Mo., effective January 1.

Engineering and Rolling Stock

B. J. Peasley has been appointed mechanical superintendent of the St. Louis-Southwestern of Texas with office at Tyler, Tex.

A. H. Hackfield has been appointed master mechanic and roadmaster, of the Southwestern Railway with office at Archer City, Texas.

H. T. Nowell, assistant superintendent of the Billerica (Mass.) shops of the Boston & Maine, has resigned to engage in other business.

Ernest S. Draper, has been appointed engineer of structures of the Boston & Albany, with office at Boston, Mass., vice **A. D. Case**, who has resigned to become structural engineer, in charge of the structural division of the American International Shipbuilding Corporation.

M. F. Smith, division master mechanic on the La Crosse and Wisconsin Valley division of the Chicago, Milwaukee & St. Paul, with office at Milwaukee shops, was promoted to district master mechanic, with the same headquarters; **William Joost**, roundhouse foreman at Milwaukee shops, was promoted to master mechanic of the Milwaukee terminal and the Chicago and Milwaukee division, with office at Milwaukee shops, Wis., effective January 10; **A. J. Klumb**, assistant district master mechanic, with office at Milwaukee shops, has been appointed division master mechanic on the Prairie du Chien and Mineral Point division, with office at Madison, Wis.; **W. H. Hart**, assistant district master mechanic on the Superior division, with office at Green Bay, Wis., was promoted to division master mechanic with the same headquarters; **J. E. Bjorkholm**, traveling engineer, with headquarters at Milwaukee, Wis., was appointed division master mechanic of the Chicago terminal, with office at Chicago, Ill.; **J. H. Phillips**, traveling engineer, was appointed division master mechanic on the Northern division, with office at Horicon, Wis.; **John Turney**, assistant district master mechanic of the Twin City terminals, with office at Minneapolis, Minn., was appointed division master mechanic of the same division; **H. G. Dimmitt**, district master mechanic of the River and Iowa & Minnesota divisions, was

appointed division master mechanic of the same divisions; **P. L. Mullen**, roundhouse foreman at Sioux City, Iowa, was appointed division master mechanic of the Southern Minnesota division, with office at Austin, Minn.; **G. P. Hodges**, general car and locomotive foreman, with headquarters at Mason City, Iowa, was appointed division master mechanic of the Iowa and Dakota division, with the same headquarters; **Joseph Bodenberger**, traveling engineer, with headquarters at Aberdeen, S. D., was appointed division master mechanic of the Hastings and Dakota division, with the same headquarters; **G. P. Kempf**, district master mechanic on the Dubuque division, with office at Dubuque, Iowa, was appointed division master mechanic of the same division; **E. W. Harvey** was appointed division master mechanic of the Illinois and Racine & Southwestern division and the Rochelle & Southern line, with office at Savanna, Ill.; **F. P. Miller**, general car and locomotive foreman at Marion, Iowa, was appointed division master mechanic of the Iowa division, with the same headquarters; **S. J. O'Gar**, general car and locomotive foreman, with headquarters at Ottumwa Junction, Iowa, was appointed division master mechanic of the Kansas City division, with the same headquarters; **G. J. Messer**, general car and locomotive foreman, with headquarters at Minneapolis, Minn., was appointed division master mechanic of the Sioux City and Dakota division, with headquarters at Sioux City, Iowa; **T. S. Manchester**, general foreman, with headquarters at Aberdeen, S. D., was appointed traveling engineer, with the same headquarters, and **Joseph Opia**, general foreman, with headquarters at Austin, Minn., was appointed general inspector, with the same headquarters.

Railway Officers in Military Service

F. G. Robbins, general superintendent of the Erie at Chicago and recently commissioned major in the Engineer Officers Reserve Corps, has been called into active service and has been assigned to Washington, D. C.

James T. Phillips, auditor of disbursements of the Oahu Railway & Land Company, with headquarters at Honolulu, T. H., has been called to active military service with the rank of captain in the quartermaster department, and assigned to duty as assistant to the department quartermaster in Honolulu. Mr. Phillips went to Honolulu in March, 1916, to take charge of the disbursements and store department of the Oahu Railway; he previously had served for about 15 years in the operating and accounting departments of the Rock Island, the Chicago, Burlington & Quincy, the Atchison, Topeka & Santa Fe and the Southern Pacific.

Obituary

M. L. Crowell, formerly treasurer of the Toledo, St. Louis & Western, with office at Toledo, Ohio, died on January 7, at the age of 73.

Archibald J. Wykes, treasurer of the Illinois Central, with headquarters at New York, died on January 14, at his home in Glen Ridge, N. J., at the age of 46. Mr. Wykes entered the service of the Illinois Central in March, 1897, as a clerk in the executive office, at New York. In February, 1913, he was appointed assistant treasurer and the following May was promoted to treasurer.

Lee Howell, general freight agent of the St. Louis and Henderson divisions of the Louisville & Nashville, with headquarters at Evansville, Ind., died recently. He was born on May 18, 1844, and began railway work in 1872, as a contracting agent on the Louisville & Nashville. He subsequently served as general agent at Evansville, Ind., then as division freight agent of the Henderson division and since November 1882 was general freight agent of the same road. From July 1 to December, 1883, in addition to the duties of general freight agent he served as superintendent of the St. Louis division.

THE TOTAL EXPORTS TO U. S. FROM ENGLAND IN 1917 had an aggregate value of \$262,891,937, against \$305,414,269 in 1916, according to a cable from the American Consul General at London under date of January 2.

EDITORIAL

Railway Age

EDITORIAL

The War Savings Stamps have now been on sale for some thing over two months. The admirable campaign of publicity

War Savings Stamps

that has been put behind them and the splendid co-operation from agents of all kinds for their sale have spread their use most extensively. However, the stamps and certificates are not yet

in as general use as they should be in view of the merits of the plan. Anyone who has studied the method of inducing a man to save money by means of these War Savings Stamps or who has bought some of the stamps himself, has been surprised at the remarkably easy plan they present to save money and to be thrifty. The plan has been advertised so extensively that it is not necessary to repeat its essentials here. But it may be worth while to bear in mind that a mere quarter starts an account, mere quarters carry it on, and compound interest at 4 per cent begins, not at the end of a year, or after a certain interest date, but as soon as \$4.12 worth of War Savings Stamps have been exchanged for a \$5 War Savings Certificate. The readers of this paper no doubt understand the value of these Thrift Stamps, but we wonder if they are doing all that they can to bring their value to the attention of the men under them. Railwaymen have taken it upon themselves to leave no stone unturned to serve their country in this war. This time the opportunity in question relates to Thrift Stamps. Railwaymen can do considerable in encouraging their sale and they will certainly agree that thrift among their own men is very desirable. Railwaymen and employers generally can encourage the sale of Thrift Stamps (1) by buying stamps and certificates themselves, (2) by recommending their sale at railway ticket offices and at the pay car, (3) by recommending their sale and availability at stores, (4) by telling their friends and employees how easy it is to obtain stamps and save money by them, and (5) by backing the organization of War Savings societies among their forces. It should not be hard to encourage a man to be patriotic and save money at 4 per cent compound interest. It is merely a matter of readily available supplies of stamps and publicity to explain the plan and its advantages.

Railway officers are unusually fortunate these days in both their enemies and their friends. W. G. Lee, president of

Some Friends and Enemies of Railway Officers

the Brotherhood of Railway Trainmen, announces that railway employees had noticed for months before government control was adopted, that railway officers were permitting unnecessary delays

and congestions of traffic. They were doing this to discredit government regulation, he says, and they unmitigatedly let the situation get beyond their control. W. R. Hearst also has been shadowing the railway officers, and has got something on them. His artistic and veracious newspapers assert that railway officers are "lying down" in order to discredit government control. He advises that the chief malefactors be discharged and that the rest have their "fancy" salaries cut—seemingly forgetting that he once found it profitable to pay one of his editors \$75,000 a year. Lee is one of the four labor brotherhood heads who showed their in-

terest in railway officers and the welfare of the United States by calling a strike on all the railways last spring when the country was right on the verge of war with Germany. Later after we were in the war, the labor union actually caused a strike in Chicago in an attempt to force for terminals there. Calumnies from a man who put above his interest in railroad efficiency and his patriotism in such ways should be very pleasant. As for Hearst, that why discuss anybody so well known and perfectly understood by the American people as Hearst? The President of the United States said recently in a message to Congress, referring to the way the railway officers who had general charge of railroad operation before government control was adopted, that they "performed their difficult duties with patriotism and marked ability," and "did, I believe, everything that it was possible for them to do in the circumstances." The Director General of Railroads has not hesitated to rely on railway officers, high and low for advice and assistance. The public probably will have no great difficulty in deciding whether W. G. Lee and W. R. Hearst, or President Wilson and Secretary McAdoo, are more likely to judge the efficiency and loyalty of railway officers intelligently, disinterestedly and fairly.

Once more the railroads have failed in their effort to defeat a state two-cent passenger fare law on the ground of discrimination against interstate commerce. They have had little difficulty

Illinois Passenger Fare Case

in showing that the two-cent fare decrease, such a discrimination and in the Illinois passenger fare case it was believed that a shrewdly drafted issue had been presented to secure a clear-cut decision, which would be lawfully applicable to other states. The Supreme Court, however, in a decision rendered last week, of which an abstract is published in this issue, holds that the order of the Interstate Commerce Commission or which they had relied on not sufficiently definite in its description of the rates to which it applies to be used to set aside a state law. The commission had held that 24 cents a mile was a reasonable rate for passenger service between Chicago and Missouri and Iowa and that the corresponding maintenance between points in Illinois of lower rates than the interstate rate constituted an illegal discrimination against the interstate commerce. It was held so far as to issue a supplemental order from which the inference might be drawn that its direct purpose was to bring about an advance in the state fares, but the Commission was seemingly restricted by the terms presented to it by the company and possibly it was not so well advised as to Illinois. The court holds that the principle that there is the Shreveport case, that Congress has ample power to prevent railroads from being used in their interstate operations in such a manner as to effect unjustly discrimination, that Congress, not the state, is entitled to prescribe the interstate rate, and that Congress may provide for the abolition of that power through the Interstate Commerce Commission and has done so in the way in question here. It has rejected its former claim, where the Commission not only finds that a dis-

parity in the two classes of rates is resulting in unjust discrimination against interstate commerce but also determines what are reasonable rates for the interstate traffic and then directs the removal of the discrimination, the carrier not only is entitled to put in force the interstate rates found reasonable but is free to remove the forbidden discrimination by bringing the intrastate rates up to the same level." There is no doubt that the Commission intended that its order should fit the above specifications, but the court says, "while the order shows that it is not intended to require or authorize a readjustment of all the intrastate rates, the description of those to which it applies is left indefinite." It therefore concludes that the uncertainty in the order is such as to render it inoperative and of no effect as to the intrastate rates. A similar case instituted by the express companies to set aside an order of the South Dakota commission came to a similar conclusion. The court's various decisions in cases of this kind leave no room for doubt as to the power of the Interstate Commerce Commission to prevent discriminations resulting from low state rates but "straight is the gate and narrow is the way" of the course to be followed in doing so.

The Report on Columns

THE FINAL REPORT of the special committee of the American Society of Civil Engineers on steel columns and struts, which was published recently, harks back to the first Quebec bridge failure, because the discussion of the grave disclosures made in the investigation of this disaster culminated in the organization of this body of American bridge engineers.

The committee carried on its work for nearly eight years and, with the aid of the United States Bureau of Standards, conducted a comprehensive series of tests on columns of various sections.

"To report upon the design, ultimate strength and safe working values" were the instructions given the committee and the report covers admirably all phases of its problem except the first, design. The tests disclosed little upon which to base discrimination between the several forms of sections tested. As regards stresses, on the other hand, the results are positive and, might be considered to be, disappointing or even alarming if they had not been anticipated by the progress reports of the committee and the reports of contemporaneous tests carried on under other auspices.

The unwelcome fact is that the ultimate unit strength of a column is materially less than the drop-of-the-beam yield point as determined by the mill specimen tests of the material used. Of even more concern is it that this condition is more pronounced in columns composed of heavy material—such as would be more commonly used in actual construction—than in the light columns of the test. In other words, the ultimate unit strength of the columns composed of thicker material was materially lower, although this fact was not indicated in a comparison of the ultimate strengths and yield points as determined in the mill tests of the material.

The steel used in the tests was of the ordinary structural grade with a specified ultimate tensile strength of 60,000 lb. per sq. in. and a yield point of 38,000 lb. per sq. in. Studies of the ultimate unit strengths of the columns and of their "Useful Limit Points" (a practical elastic limit) disclosed that the former varied from 38,000 lb. per sq. in. to 32,600 lb. and the latter from 35,000 to 19,000 lb. per sq. in., for columns having a ratio of slenderness of 50 to 85. Based upon these facts the committee "regards it as unwise to assume a higher working stress than 12,000 lb. per sq. in. for columns in which the ordinary grade of structural steel is specified and in which the ratio of slenderness is 80 or less.

As this is materially lower than the American Railway Engineering Association column formula, $16,000 - 70 \frac{1}{r}$

with its maximum value of 14,000 lb. per sq. in., the question as to a substitute formula is answered by the committee with the statement that the wide limits covered by the strength values obtained in the tests (28 per cent) precluded the writing of a rational formula at this time.

This wide variation in strength values deserves serious thought, particularly because the workmanship of the test columns and the care with which they were prepared for testing involved much more refinement than is obtained in usual structural steel practice, while the specifications for the material were more rigid than the usual structural specifications in so far as they concerned an effort to secure material of uniform strength. Although definite as to the limitations of column strength, particularly with columns composed of the thicker material, the report is not conclusive as to the cause of the weakness of this thick material and as to the reason why this fault has not been disclosed by the mill tests. More complete information on these vital matters is extremely desirable.

Make It Solely a War Measure

GOVERNMENT CONTROL of railroad management was adopted as a war measure. If it is to be efficient as a war measure it must be carried out as a war measure.

The sole purpose of war measures should be to win the war as quickly and completely as possible. Many of our people have not awakened to the fact that the United States is engaged in a life-and-death struggle with the greatest military power that ever existed and that there is a strong chance that the United States may lose. These people persist in thinking a great deal more about the effects war measures will have on our affairs at home than about the effects they will have on the battlefields of Europe. Many of them are constantly engaged in trying to frame and use such measures not mainly to defeat Germany, but mainly to work an economic and social revolution in the United States.

This tendency has been strongly manifested by certain politicians and labor leaders in dealing with the question of railroad control. In the hearings before the Senate committee Senator Cummins has hardly asked anything as to how railroad control may be so shaped as to make it most effective in helping win the war. All his questions about the proposed financial guarantees to the railways have been directed toward whittling the guarantees of the stronger lines down as much as possible. Does he think this would help win the war? If so, he has not said so, nor told why he thinks so. He has asked the director general of railroads to furnish him a list of the salaries paid to most of the higher officers of the railways. He evidently wants to see these salaries reduced. Does he think that wholesale reductions in their salaries would cause railway officers to give more loyal, patriotic and energetic support to the government and thereby contribute toward winning the war?

He might answer that the money saved the public by reducing the guarantees of the companies and the salaries of their officers could be usefully employed elsewhere, and that the companies and their officers should be willing to make the sacrifice. But why not use a little common sense about such matters? Railway owners and officers assume exactly the same attitude toward questions of this kind that other people do. They are perfectly willing to make their *proportionate share* of the sacrifices necessary to winning the war. But if the government, as a pretended war measure, arbitrarily reduces their return from their properties and their

ought to be able to reach a solution of the intricate problem before it which will commend itself to all concerned. It has neither the prejudices of the employer nor those of the employee. It ought to be just as much concerned with the interests of the rate-paying public as with those of the wage earning public, and with the condition of one class of railway employees as with that of another.

If it finds that railway wages ought to be so increased that the present rates will not produce sufficient revenue to pay them and the other necessary expenses of transportation, then the rates ought to be increased also. Otherwise the wages will not be paid by those who use the railroads in proportion to their use but by the entire public in the form of taxation, and the railroads will be left in an impossible condition after the government guarantee has expired.

"Lest We Forget."

ALMOST EXACTLY twelve years ago one of the wisest and farthest-seeing Americans that ever lived made a prediction. The prophet was James J. Hill. The prophecy was that continuance of the policy of railroad regulation then being adopted by the state and national governments would bring national disaster.

The policy was continued. The prophecy has been fulfilled. The disaster has come. It has come in the midst of the nation's participation in the greatest of all wars. The government last week ordered the industries of the busiest and most populous part of the United States shut down for five days. It has made each Monday in the same territory an enforced holiday for ten weeks.

Those responsible for the order say it was necessary because the railways could not haul all the coal that the mines could produce and other industries could consume—that this was the only way to relieve the transportation congestion and increase the movement of fuel.

This is but a partial explanation. Last summer the government created a fuel administration and put at its head a college professor, who knows little about fuel and less about administration. The great need of the country as regards fuel was a vast increase in production. No possible amount of conservation would make the supply sufficient. To get the needed increase of production the prompt adoption of large constructive measures was essential. Prices must be so fixed as to encourage the operation of mines which, under ordinary conditions, would be unprofitable. Production must be raised and kept to the very maximum possible during the summer and fall months when transportation conditions were favorable. It was desirable to divide the country into zones as was long ago done in England, so that coal would be consumed near where it was produced, and cross-hauling and waste of transportation be eliminated.

The large constructive measures needed were not adopted. Instead of co-operating with the railways as was necessary, the fuel administration spent its energies in "passing the buck" to them. With a fuel administration which knew anything about the fuel business there would have been a larger amount of coal produced and transported.

The rest of the explanation of the existing situation is that James J. Hill's prediction has been fulfilled. For twelve years the state and national governments have followed a policy of regulation intended to compel unrestricted competition between railroads and to reduce their net return to the lowest basis which the courts would not hold confiscatory. In consequence, while the productive capacity of our industries has been rapidly increasing, the expansion of the facilities of our railways has been rapidly decreasing. The final outcome was clear to every intelligent and sane railroad man or business man. It was as certain that under this policy

the railways in time would become unable to handle all the country's commerce as that the law of gravitation would continue to operate or the sun to rise in the morning and set in the evening. The fulfillment of Mr. Hill's prophecy has been precipitated by the war, but it was bound to come whenever from any cause there came a great increase of industrial activity.

Who have been chiefly responsible for the policy of regulation, which led to such results? Those responsible are Senator La Follette, Senator Cummins and other politicians of the radical class, who have succeeded in getting the states and the nation to adopt and persist in a punitive, repressive policy in dealing with the railways regardless of its effects on the railways, and on commerce and industry.

When the present transportation condition has been predicted, La Follette, Cummins and others of their class have replied that the railways were over-capitalized, and were earning too much, and that predictions of disaster were mere "calamity-howling." And what do they say now, when these predictions are being fulfilled? They say that the railways have "broken down"; blame the managers for the "break-down," and talk about government ownership as the remedy! The government under a new system of war control, and with the patriotic support of railway officers, is trying to retrieve the mistakes of the past; and certain of the radicals in and out of Congress are trying to reduce the compensation the administration proposes to pay the railways, to slash railway officers' salaries and to otherwise emasculate the administration's plan in ways that would undermine its effectiveness as a war measure.

The country is at the parting of the ways in respect to its railroad policy. It must choose whether it will follow in future those responsible for the policy which has paralyzed transportation and industry and who are now advocating government ownership, or those who have opposed the past policy of regulation, who have foreseen and predicted its results and tried to get it reformed and who are now opposing government ownership because they believe it would make conditions still worse, if possible.

Which class of leaders will the public follow in future? The answer to this question may exert as much influence on the economic and political future of the United States as the outcome of the great war.

New Books

Proceedings of the International Railway Fuel Association.

416 pages, illustrated, 6 in. by 9 in. Published by the association, J. G. Crawford, secretary, 702 East Fifty-first street, Chicago, Ill. Price, leather bound, \$1.50, paper bound, \$1.00.

This is the official proceedings of the ninth annual convention of the Railway Fuel Association which was held in Chicago, May 14 to 17, 1917. It contains papers with complete discussions on the following subjects: Powdered Coal; Storage Coal; Locomotive Feedwater Heating; Front Ends, Grates and Ash Pans; Car Shortage and Coal Shortage; Conservation Appeal; Council of National Defense; Fuel Economy in Relation to Reducing the Cost of Kindling Fires in Locomotives; Fuel for Small Furnaces; Graphical Daily Records of Performances of Enginemen and Locomotives; Soot, Tests of Six Grades of Coal from a Franklin County (Illinois) Mine; and Theory, Practice and Results of Fuel Economy. Of particular interest are the papers and discussion on locomotive feedwater heating and the tests made by the University of Illinois for the association, on Illinois coal. This book is a material addition to the information put forth by this progressive association, and contains suggestions which will to a very large extent assist in the conservation of fuel on railways.

The New Pennsylvania Entrance Into Indianapolis

A 41-Mile Line Between Ben Davis and Frankfort Gives a Line to Chicago Over Its Own Rails

A COST OF MORE THAN \$1,500,000 OR OVER \$100,000 per mile, the Pennsylvania Lines are now completing a new railroad in Indiana which will give the system a complete line between Indianapolis and Chicago. The new line is being built by a separate corporation, the Indianapolis & Frankfort Railroad, and is 41 miles in length. It extends north from a connection with the St. Louis division, to Frankfort on the Michigan division. These divisions are both parts of the St. Louis system of the Pennsylvania Lines which, until recently, was the Vandalia Railroad, and which is now a part of the new consolidated company, the Pittsburgh, Cincinnati, Chicago & St. Louis Railroad. The new line is being built under the direct jurisdiction of officers of the St. Louis system. At Lebanon, 27 miles north of Ben Davis, this line crosses the Central Indiana, which is controlled jointly by the Pennsylvania and the Big Four.

On the completion of this road the traffic of the Panhandle between Chicago and Indianapolis and the south, which is now handled over the Logansport and Richmond divisions, from Chicago, through Logansport to Kokomo, Ind., and then over the Lake Erie & Western to Indianapolis, will be diverted to the new route at Logansport, and will go over the Michigan division to Frankfort, and then over the new line to Ben Davis and Indianapolis. While no distance is saved by the new route for passenger traffic, it will be about six miles shorter for most freight movements. The grades are much lower and the traffic facilities will be much improved.

Under the present arrangements the east and west traffic of the Pennsylvania lines through Indianapolis is handled over the Indianapolis and St. Louis divisions. Divisions from Vincennes and Louisville also enter the city from the south and the freight is handled between the different lines by means of the belt line of the Indianapolis Union Railway. These divisions furnish the facilities for the east, west and south traffic. The existing Pennsylvania lines leading to the north of Indianapolis intersect the east and west line at Terre Haute, 72 miles west of the city, and at Richmond, 68 miles east, meeting at Logansport.

The Pennsylvania has seven lines radiating from Logansport. The traffic originating at Indianapolis and on the divisions to the south, a large amount of which is coal from the southern Indiana fields on the Vincennes division, des-

and by the location of certain parts of the line to avoid low speed movements through curves or by the construction of a new line. The latter plan was adopted, an analysis of the situation showed that, with the same tonnage being handled by the Pennsylvania, the advantages gained justified the investment necessary for its construction.

In deciding on a new line opportunity was also taken to improve operating conditions at Indianapolis. The use of the Lake Erie & Western track north from Indianapolis



Relation of the New Line to Other Pennsylvania Lines

required the turning of all passenger trains on a curve at that point. The old arrangement also made it necessary for all of the coal trains to use the tracks of the Indianapolis Belt for about 11 miles and the congestion on this line led to excessive delays. Both of these conditions will be eliminated on the new line.

Surveys for the new line were first made in 1911. The maximum grades of the new line were established at 0.3 per cent northbound and 0.5 per cent southbound as compared

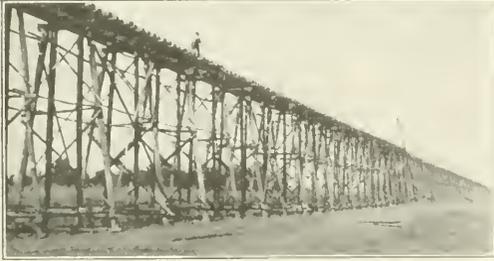


Map of the New Line

with 1 per cent grades in both directions on the old route. There are few curves on the new line and the sharpest are 1 deg. except for one curve at the Ben Davis connection. While for the present only a single track will be built, right-of-way has been provided and the masonry has been built for a double track line.

The new line is also a part of the proposed future im-

provements including a connecting line from Ben Davis to Mooresville on the Vincennes line. By means of this proposed connection the traffic from the Vincennes division for points north of Indianapolis will be diverted from the present route through the city to this new connection, saving about 11 miles in distance and to an extent relieving the yards at Indianapolis and the St. Louis and Vincennes divisions near Indianapolis, where both divisions have ruling grades against the coal movement. The construction of the Indianapolis to Frankfort line provides a 0.3 per cent grade from the St. Louis division connection to Chicago, and a



A Standard Construction Trestle

0.3 per cent line can be had from the coal fields and from Louisville without prohibitive cost.

Grade Crossings Eliminated on New Line

As mentioned previously, the new line is 41 miles in length. Sufficient property was acquired for a double track line, the right-of-way being 100 ft. wide for the entire distance and wider where necessary. The country traversed is mainly flat and for much of the distance the tracks are carried on embankments, making frequent borrow pits necessary.

Passing tracks 4,500 ft. long are provided at intervals of about six miles. These sidings are so located that controlling grades are not encountered in leaving. The grades are separated at all highway crossings on these sidings.

The width of roadway at sub-grade is 24 ft. for single track and all slopes are $1\frac{1}{2}$ to 1. The tracks will be laid with gravel ballast, 85-lb. rail and untreated oak ties. Cast iron pipe is used for small drains up to 48 in. in diameter and reinforced concrete culverts for the larger openings, farm crossings and cattle passes.

There will be no crossings at grade with steam or electric railways, the new line in all cases being carried overhead. Twenty-four highways are carried under the track through subways and two cross overhead. These 26 crossings include most of the main roads so that the highways that cross the line at grade are generally unimportant. Where possible, at points where the line crosses highways near their intersection, marginal roads parallel to the right-of-way enable two crossings to be consolidated into one or allow part of the traffic to avoid crossing entirely.

Lebanon is the only town of any importance reached by the new railroad. Here the line passes through the outskirts of the city and is elevated, all streets being carried under the tracks through subways. A modern station will be provided at the street level and passengers will reach the platform at the track level by subways and stairs. An electric elevator will also be provided for handling milk and baggage. At the track level the layout will be built for double track. The passenger platform will be located between tracks and will extend across two streets and an electric line. The platforms over the bridges have already been built as a part of the bridges.

Property has been acquired near the business center of the city as a site for a local freight house and team tracks. This property will be reached over the Central Indiana tracks and the interchange track between the two railroads. Interchange tracks will be provided here.

In order to lessen the grading on the new line at the crossing over the Cincinnati, Indianapolis & Western it was necessary to depress the main track and a passing siding on that line. The maximum depression was about 6 ft. which necessitated a cut with a total length of 4,000 ft. The lowering of these tracks was done by the Indianapolis & Frankfort contractors.

Water stations will be provided at White Lick (mile 13), Lebanon and Frankfort. At the latter point the water facilities will consist of one 50,000 gal. and one 100,000 gal. tank, connected with a water softening plant.

Embankments Made from Four Borrow Pits

As previously mentioned, the new line is carried on embankments for much of its length, requiring a large amount of borrow. The grading consists of about 2,700,000 cu. yd. of filling and 230,000 cu. yd. of excavation exclusive of borrow pits. While the lighter fills have been made from side borrow, the general plan has been to secure the material from four large borrow pits located at intervals along the line, pit No. 1 being at mile 3, pit No. 2 at mile 9, pit No. 3 at mile 28 and pit No. 4 at mile 33. Between pits 2 and 3 the grading was light and most of the excess filling material was secured by the side borrow.

The heaviest grading on the line was on the first five miles north of Ben Davis. Through this district the line is entirely on embankments that exceed 26 ft. in height in places. The fill necessary in this section aggregates more than 1,700,000 cu. yd. which was all secured from pit No. 1. In the $4\frac{1}{2}$ miles north of this section where light cuts aggregating approximately 2 miles in length were made, several large fills were necessary which were made from material secured from pit No. 2.

Pit No. 1 is the one from which the most dirt was taken. It covers an area of about 75 acres. It is located $1\frac{1}{2}$ miles east of the new line, making the construction of a connecting line necessary. This line was double tracked for the entire distance. To permit the flexible operation of the material trains both north and south of the pit the tracks of the line leading to the pit were spread into a wye at the connection



A Typical Flat Slab Bridge for County Highways

with the new line. A double track crossover was provided just east of the point of convergence on the connection line, this arrangement permitting the trains on either of the connection tracks to reach the new line over either of the wye tracks.

The material in the pit is chiefly clay and existing springs together with the great amount of rain which fell during the season made it necessary to provide an outlet for the water by means of 18-in. tile drains leading to existing drainage ditches east of the pit. The high ground near the center of the pit was utilized for the location of water supply facili-

ties for the shovels and engines, the water being pumped to the tank from a creek in the vicinity.

Two shovels were cut in on opposite sides of the pit, each working toward the high ground in the center. As a shovel progressed with a cut a track was laid close behind it over which it moved back before starting the next cut. After moving back, this track was utilized as a loading track. Working ten hours a day, the two shovels maintained an average output of 3,500 cu. yd. of material per day. The tilting material was moved to the embankments in standard gage equipment the trains consisting of from 12 to 15 12-yd. cars.

The fills were made from trestles, consisting of four pile



Building the Double-Arch Bridge and Approaches at Prairie Creek

vents capped with logs and braced with three lines of girts. The stringers were 10 in. by 16 in. by 28 ft. long which were salvaged after the completion of the fills. Jordan spreaders were used in spreading the material after unloading from the cars.

The other pits were located adjacent to the new line. Standard gage equipment was used at pits 3 and 4 and narrow gage equipment at pit 2. At pit 1, 3 and 4 the grading outfits were brought in by rail, the connecting tracks also being used as construction tracks. At pit 2 it was impossible to secure such a connection and the equipment was brought in over a highway from Clermont, a station on the Big Four, 1 1/2 miles distant. This was done by laying a standard gage track on a road in sections about 800 ft. long over which the shovel was moved. After the passage of the shovel the rails were moved in for the narrow gage engines and cars. The additional equipment for use in the pit was brought in by wagon.

The Bridges

Approximately 68,000 cu. yd. of concrete was used in the construction of the bridges and culverts. At highway crossings two designs were followed. Where the headroom permitted, reinforced arches with spans ranging from 30 to 50 ft. were built, and where the headroom was limited flat slabs of reinforced concrete or I-beams protected with concrete and with center columns were substituted. In cities the flat slabs were built in three spans with the supporting columns at the curb lines. At drainage ditches the bridges consist of 30-ft. deck girder spans and concrete abutments, this design being followed to permit the spans being removed for the passage of dredges as required by law.

Both stone and gravel were used in the concrete and in all reinforced concrete ten per cent by weight of hydrated lime was added to the cement. Abutments and wing walls were painted on the back with one coat of tar paint and the arches and flat tops were covered with Barret, Minwax or Lewis waterproofing. The formation encountered at the bridges was mainly clay which in some cases was soft. The foundation piles were timber, 20 ft. piles being used in most cases, driven from 14 to 18 ft.

With the exception of the labor shortage which has handicapped the contractor throughout the entire work, the construction of the bridges presented no special difficulty. While

in many instances the materials were delivered to the site on flat trucks and along the right-of-way from connections with the railroad, it was necessary at places to use teams and wagons. The construction plant consisted of 1 yd. mixer, two towers and chutes for placing the concrete in the form.

A portable plant was used at Lebanon where several bridges were built within a short distance. This plant consisted of a flat car with a tower and elevator at the forward end and a 30-yd. mixer. A trolley bin with a capacity for 24 cu. ft. of material was placed behind the mixer. The floor of the bin was sloped toward the rear so that the materials might pass by gravity from the bin to the charging hopper. The hoisting engine and the boiler for the mixer were located at the rear end of the car. A locomotive crane hauled the material from the stock pile to the storage bin.

The largest bridge of arch design was built at Sugar Creek. It consists of three 65 ft. elliptical arches. No foundation piles were necessary at this point. Cofferdams of timber sheet piling were used in making the foundation excavation. The water was controlled during the excavation by centrifugal pumps and in order to obviate the possibility of trouble from high water, the work up to the springing line was built as a unit.

The concrete materials were brought in from Frankfort over the new line and unloaded into bins placed beneath the deck of the dumping trestle. The material dropped by chutes from these bins into small push cars which ran on dinky tracks. The cars were pushed to the mixing plant by hand. The plant was located near the center of the bridge and consisted of a mixer, a tower and chutes. The arches were poured in three sections parallel to the track, each section being completed in a continuous run. Expansion joints filled with felt and asphalt were provided between sections.

The centering for the arches, which was jacked on the ground, was supported on falsework made up of timber bents with the necessary bracing and wedges. As mentioned, the arches were built in sections. Two rows of piles were driven about 6 ft. apart for each section, the rows being parallel to the bridge. These piles were capped with



Carrying New Line Over the St. Louis Division of the Big Four

12-in. by 17-in. timbers placed at right angle to the center. With these timbers of oak three bents were built consisting of posts for uprights and 17-in. by 12-in. timbers for cross. These three bents were rigidly braced to each other by means of poles. The second story of the falsework consisted of two rows supported on 12-in. by 12-in. hills laid transversely on the sides of the first story bents. Using these bents as supports the arch forms were held in place by pole braces and by ropes placed between them and the forms in position of which the adjustments were made

and the forms were released after the concrete had set.

This line was incorporated early in 1916 and a contract for its construction was awarded about April 1 of that year. The masonry and grading work is now practically complete and the track laying and the ballasting will soon be finished. It is expected that the line will be turned over

to operation for freight traffic during the present winter.

The studies leading to the construction of the new line and the plans for the work were developed under the direction of F. T. Hatch, chief engineer of the Indianapolis & Frankfort Railroad. The contractor for the work was the Dunn-McCarthy Company of Chicago.

Five Coal-less Days and Ten Heatless Holidays

Fuel Administration Orders Curtailment of Coal Burning and a Suspension of Industries

WASHINGTON, D. C.

WITH THE EXCEPTION of plants engaged on work deemed particularly essential to the prosecution of the war or the production of food, the manufacturing industry of the eastern part of the United States came to a standstill on January 18 for five days as the result of an order issued on January 17 by United States Fuel Administrator Garfield, adding to the series of "meatless" and "wheatless" days with which the country has already become familiar a period of "coalless" days to be followed by nine "heatless" Mondays on which the use of fuel except by consumers classed as absolutely necessary is prohibited. The shutdown became less complete after the first day because the order was followed by a long list of exemptions, many of which did not become known until after the plants to which they applied had complied with the original order.

Advance notice of the order to cease operations was given out on the evening of January 16 and the order itself was signed on January 17, with the full approval of the President and such members of his cabinet as were consulted but without the advice and consent of the Senate, which only a few minutes after the signing of the order had adopted by a vote of 50 to 19 a resolution requesting its postponement for five days.

The order provided that on January 18, 19, 20, 21 and 22 preference and priority in the use of coal should be given only to a designated list of consumers, in which railroads were first named, whose consumption of coal is absolutely necessary; that during those five days no manufacturing industry, with a few exceptions, should be allowed to operate even if it had its coal supply on hand, and that the use of fuel except by consumers classed as absolutely necessary should be prohibited on Monday of each week from January 21 to March 25.

The exemptions made public on January 18 included a list of about 1,000 plants compiled on information furnished by the Secretary of War and the Secretary of the Navy and heads of other government departments, so that concerns supplying materials under contract to the government which are immediately needed and could be delivered without adding to the transportation congestion might not be forced to cease their production. Various special exemptions were also made. The list included the manufacturers of locomotives for the United States government and American railroads and also manufacturers of gas masks, explosives, rifles, pistols, machine guns and small arms ammunition, important forgings, war essentials needed immediately, Liberty Bond paper, chrome green, linseed oil, destroyers, forgings and boilers for destroyers, seamless tubes less than 1½ in. in diameter, condenser tubes for destroyers, aircraft and signal corps products, emergency navy contracts, products for the shipping board, emergency fleet orders and emergency government work. The further special exemptions included manufacturers of uniforms, optical glass and tents and equipment. The exemptions applied, however, only to the

manufacture of the materials specified and not to other products that might be made in the same plants. There were no general exemptions of industry.

The order aroused a storm of protest on the day following its announcement and on the first day of its effect, but after the exemptions had been announced, and the President had endorsed it, there was less opposition.

The Order and the Railroads

Whether the order was primarily intended for the conservation of coal or whether its chief object was to serve as a partial embargo on new freight offerings to the overburdened railroads, has been a point of lively controversy in Washington and particularly in Congress, which devoted most of its sessions to the discussion of the subject on January 17 and 18. Mr. McAdoo was asked the direct question during the testimony before the Senate Committee on Interstate Commerce on Monday, as to whether it was a coal order or a transportation order and replied that it was both. He said he had nothing to do with formulating it but had agreed to it and thought it would be beneficial and that an immense improvement had already resulted.

Interest in the administration railroad control bill was temporarily suspended for a time while Congress joined with the rest of the country in criticising the Fuel Administration's embargo on manufacturing. It soon became apparent, however, that while Fuel Administrator Garfield took full responsibility for the order, the authority of the entire administration was back of him. While the railroad administration at first took the position that its interest in the question was rather incidental, its attitude toward the effect of a virtual embargo on most kinds of new freight for five days, which would enable it to catch up on its coal movement and clear up congested terminals, was plainly one of more than equanimity. Freight Moving Week having turned out inauspiciously, as the result of the unprecedentedly severe weather, which the still unco-ordinated government weather administration had been unable to deal with successfully, a series of days during which coal could not be used for the manufacture of additional demands upon cars and locomotives while the director general was completing his organization, was obviously a source of considerable relief. Mr. McAdoo said he did not care whether it was called an aid to the director general or not, provided its result was beneficial.

Dr. Garfield was somewhat more outspoken in his announcements of his efforts to co-operate with the railroad administration. "The movement of coal in transportation," he said, "must be so directed as to aid the director general of railroads in dealing with the railroad emergency created by the recent blizzard conditions."

While Dr. Garfield also emphasized the desire to keep domestic consumers of coal warm he laid the greatest stress, both in his testimony before the Senate Committee on Man-

ufactures, which called on him to explain the order and in his prepared statements to the public, on the effect it would have on transportation conditions.

In a statement accompanying the order, describing the conditions which he considered made it necessary, Dr. Garfield said:

Statement by Dr. Garfield

"The most urgent thing to be done is to send to the American forces abroad and to the Allies the food and war supplies which they vitally need. War munitions, food, manufactured articles of every description, lie at our Atlantic ports in tons of thousands of tons, while literally hundreds of ships, waiting loaded with war goods for our men and the Allies can not take the seas because their bunkers are empty of coal. The coal to send them on their way is waiting behind the congested freight that has jammed all terminals.

"It is worse than useless to bend our energies to more manufacturing when what we have already manufactured lies at tidewater congesting terminal facilities, jamming the railroad yards and sidetracks for long distances back into the country. No power on earth can move this freight into the war zone where it is needed until we supply the ships with fuel.

"Once the docks are cleared of the valuable freight for which our men and associates in the war now wait in vain, then again our energies and power may be turned to manufacturing, more efficient than ever, so that a steady and uninterrupted stream of vital supplies may be this nation's answer to the Allies' cry for help!

"It has been excess of production, in our war-time speeding up, that has done so much to cause congestion on our railroads; that has filled the freight yards to overflowing; that has cluttered the docks of our Atlantic ports with goods waiting to go abroad. At tidewater the flood of freight has stopped. The ships were unable to complete the journey from our factories to the war-depots behind the firing-line.

"Added to this has been the difficulty of transporting coal for our own domestic needs. On top of these difficulties has come one of the most terribly severe winters we have known in years.

"The wheels were choked and stopped; zero weather and snow-frozen trains; terminals congested; harbors with shipping brought in; rivers and canals impassable—it was useless to continue manufacture and pile confusion on top of confusion.

"A clear line from the manufacturing establishments to the seaboard and beyond; that was the imperative need. It was like soldiers marching to the front. The men in the foremost ranks must have room to move.

"More than a shock was needed to make a way through that congestion at the terminals and on the docks so that the aid so vitally needed by the Allies could get through.

"The incidental effect of this transportation situation on coal production has been disastrous. There is and always has been plenty of fuel but it cannot be moved to those places where it is so badly needed while railroad lines and terminals are choked. Throughout the coal fields scores, even hundreds, of mines are lying idle because of railroad inability to supply the cars to carry away their product. Coal mines cannot operate without cars. Cars cannot be supplied while the railroads are crippled by the present freight congestion, which keeps idle cars lying useless in the freight yards.

In the past week the production of coal has been disastrously reduced. Reports in some cases have shown 90 per cent of the mines in certain fields closed completely for lack of cars.

"This is war. Whatever the cost we must pay it so that in the face of the enemy there can never be the reproach

that we hold back from doing our full share. Iron ships, liners, with no supplies of food for men and food for guns must have fuel and coal to use."

Order Endorsed by President Wilson

President Wilson also issued a statement saying that he had been consulted by Dr. Garfield before the order was issued and fully agreed with him that it was necessary.

"It is absolutely necessary to get the ships away. It is absolutely necessary to relieve the congestion at the port and upon the railroads. It is absolutely necessary to move great quantities of food and it is absolutely necessary that our people should be relieved in their homes, if not where else, and half way measures would not have accomplished the desired end.

"If action such as this had not been taken, we should have limped along from day to day with a slowly improving condition of affairs with regard to the shipment of food and coal, but without such immediate relief it had become absolutely necessary because of the congestion of traffic which have been piling up for the last few months.

In a later statement apparently intended as an answer to those who had advocated cutting off the coal supply of non-essential industries rather than a general temporary curtailment, Dr. Garfield said in part:

"Industry is in an unbalanced condition. We lack many essentials—food, clothing, fuel. We have piled up enormous stores of things not essential to life but very essential to war. We have piled them so high on our docks and in our storehouses that the ships available cannot carry them away as fast as they pile up.

"The food supply is threatened to an even greater degree than the fuel supply. This condition is in large part due to the congestion that at many points holds the loaded cars in its grip.

"To single out industries not engaged to some extent in war manufacture is to select industries which in the aggregate will bring relief only if suspended indefinitely. To require all industries except a comparatively small part to cease for a few days quickly accomplishes the desired result and permanently injures none.

"The order as it stands puts all industry on an equal footing, favoring none and avoiding unfair competition, but this reason alone is not sufficient. This reason, plus the fact that the order will put coal in the empty bunk of the people, will save coal, will aid in breaking up congestion of traffic and in furnishing an adequate supply of coal to the people who need it and to the ships which cannot sail without it—these are sufficient reasons and justify the order."

"Only those industries producing necessary war material that can be promptly delivered are permitted to operate during the suspension period. To permit industries with a coal supply on hand to operate would allow many of the most essential to continue while those of the fuel essential would be compelled to stop.

"Moreover, to allow these fortunate groups to produce a coal pile to continue would result in allowing the production of coal and other war goods to be concentrated in a few hands. The result would be in concentration of coal would be result. To have allowed the application of the order would only have added to the congestion. It is an understanding of industry to see that such would have serious effects to increase the supply of coal and other war essential during the suspension of the application of the order."

A report was published to the effect that the fuel order would be frustrated by coal-brokers from the business general of the country, planning an embargo against the transportation of non-essential material, but it was authoritatively stated that neither of the kind was contemplated by Mr. McAlister. The director strongly emphasized such a step unnecessary because the fuel order would give the railroads a "running

spell, and, while he considered Dr. Garfield's order in the light of a necessary surgical operation, he thought its results would be beneficial in the end. He hoped that with an improvement in weather conditions such as was reported east of the Allegheny mountains on Friday, the more effective use of freight cars resulting from the increased demurrage charges, which Mr. McAdoo believes will increase freight car efficiency 25 per cent, and with the assistance afforded by the delivery of 700 additional locomotives to the eastern roads, the roads will be enabled to handle all the freight offered without embargoes, while essential freight will be given preference. Mr. McAdoo has made it plain that he does not intend to cut off non-essentials unless the necessity for it should become more apparent than it has so far.

Mr. McAdoo sent the following telegram on January 18 to the presidents of all railways in eastern and southern territories:

"In view of the order of the Fuel Administrator for a five-day cessation of industrial activity in this territory for the purpose of accumulating and distributing an ample fuel supply, I urge and direct that every possible effort be made by the railroads to move coal and to co-operate to the limit with the Fuel Administration for the accomplishment of the desired end.

"I hope that the officers and employees of the railroads will do their part so effectively that there may be no further occasion for interruption of the industrial and normal activities of the nation."

On Saturday the fuel administrator, at the request of A. H. Smith, assistant director general of railroads, made arrangements looking to the pooling of facilities for bunkering ships at the port of New York. The assistant director general, in a telegram to the fuel administrator, set forth that some piers which were supplied with coal had no barges to transport the coal to vessels in the stream, and that other piers having no coal were well supplied with barges. After a consultation with Chairman Hurley, of the United States Shipping Board, the fuel administrator advised the assistant director general that a personal representative of the Shipping Board would be sent at once to New York to take charge of the proposed pooling arrangement. J. W. Searles, personal representative of Fuel Administrator Garfield at New York, was directed to extend his full co-operation in perfecting the plan.

General compliance and almost complete co-operation in the enforcement of the fuel administration regulation curtailing industrial use of fuel were reported to the United States Fuel Administration on Saturday. Railroad officials reported generally improved transportation conditions in the eastern part of the country. The reports indicated that the way was rapidly being cleared for the movement of coal for the bunkering of the ships now held up at Atlantic ports and for keeping the country warm. Improvement was also noted in the central west, despite the continued zero weather, which has been impeding railroad operations.

Reports from the Baltimore & Ohio showed a car supply of 1805 cars available for coal mines in West Virginia. This was an increase of 400 over the number available the day before. On the first day the restrictive regulation was effective the Baltimore & Ohio moved 1100 loaded coal cars consigned in accordance with the order out of the West Virginia coal fields. This was the best movement of coal that this railroad company has shown in that district in 60 days.

From Philadelphia it was reported that rail conditions generally on the lines operating between Altoona and Philadelphia, which have been badly congested, were much improved.

Reports direct to the fuel administration showed that coal in transit consigned to or already arrived at tidewater

points for the bunkering of ships destined to the American forces in Europe and to the nations associated with the United States in the war were more than sufficient to bunker the ships now in port and supplies sufficient to insure the prompt bunkering of vessels for some time to come were en route. Upwards of 300,000 tons of coal was in cars for bunkering and is on the way to South Atlantic ports. Approximately 150,000 tons is in cars en route for northern Atlantic ports. With the improved rail conditions this coal should rapidly fill the requirements of the vessels now awaiting bunkers.

At the request of the United States Fuel Administrator, the director general of railroads placed an embargo on the use of open-top coal cars for the shipment of products other than fuel.

The fuel administration was notified that 3,000 cars of coal were moving on one railroad to the east; 1,000 was consigned to tide-water for bunkering ships and 2,000 was on the way to domestic consumers.

On Sunday reports from the mine fields indicated that snow and zero weather were interfering with railroad movement of coal, but that empty coal cars were moving promptly back to the mines. Weather conditions in the middle west, particularly, were reported as interfering with general railroad operation. Deep snow and as low as 20 degrees below zero in some parts of the country combined to make train movements difficult.

The improvement in the weather did not continue, however, and on Monday Dr. Garfield announced that while more fuel had been made available for domestic consumers and bunker coal was moving to tidewater in sufficient volume to supply transatlantic shipping, the third aim to be accomplished, the clearing of railroad congestion, had not yet been attained because of adverse weather conditions.

The Pennsylvania Railroad declined to accept any general freight for shipment and other roads placed local embargoes but Mr. McAdoo declined to order a general embargo.

Disappointed with the results of the five days' suspension of industry, Fuel Administrator Garfield has recommended to Director General McAdoo that an embargo be placed for a few days on general freight except fuel and food. Mr. McAdoo was not inclined to favor it and a committee has been appointed consisting of Howard Elliott and A. G. Gutheim, representing the railway administration, to work with two representatives of the fuel administration in developing a plan for eliminating the cross hauling of coal by restricting the shipments to the zones of production.

The geological survey reports that the 1917 production of bituminous coal was 544,000,000 tons, or an increase of 8.3 per cent over 1916.

On Tuesday the total number of ships coaled at the New York harbor was 24, and all of the most important ships had been supplied and were sent on their way. The number of ships waiting on Wednesday morning to be coaled was 80; not all of these, however, were scheduled to sail at once.

W. B. Pollock, marine superintendent for the railroads' committee at New York, said on Tuesday that the loading of 353 empty lighters had been seriously hampered at the loading points by the desertion of large numbers of laborers, practically all of whom are Italians and Poles. On Tuesday, when a light snow was falling nearly all day, 1,060 men refused to work on the ship bunkering barges. In addition hundreds of men quit work for the day, at least, at the docks in New Jersey.

The men engaged in bunkering steamers could earn \$200 a month by working full time. But they are paid on the hourly basis, and they lie off whenever the weather is bad. The pay is 55 cents an hour for day work, 80 cents an hour for night work, and \$1.05 an hour on Sundays.



W. G. McAdoo



C. H. Markham



R. H. Ashton

McAdoo Appoints Three Regional Directors

Railway Wage Commission to Investigate Labor Questions.
Weather Interferes with Transportation

THE DIRECTOR GENERAL OF RAILROADS, W. G. McAdoo, on January 18, issued General Order No. 4 announcing that for purposes of operation the railroads of the United States will be classified as Eastern, Southern and Western Railroads, defined as follows:

Eastern Railroads.—The railroads in that portion of the United States north of the Ohio and Potomac rivers and east of Lake Michigan and the Indiana-Illinois state line; also those railroads in Illinois extending into that state from points east of the Indiana-Illinois state line; also the Chesapeake & Ohio, the Norfolk & Western and the Virginian railways.

Southern Railroads.—All railroads in that portion of the United States south of the Ohio and Potomac rivers and east of the Mississippi river, except the Chesapeake & Ohio, Norfolk & Western and the Virginian railways; and also those railroads in Illinois and Indiana extending into those states from points south of the Ohio river.

Western Railroads.—All railroads not included in the above definitions and, broadly speaking, all railroads in the territory west of Lake Michigan and of the Indiana-Illinois state line to the Ohio river and west of the Mississippi river from the Ohio river to the gulf of Mexico, excepting those railroads in Illinois included in Eastern Territory, and those railroads in Illinois and Indiana included in Southern Territory, as above stated.

A. H. Smith, president of the New York Central, is appointed regional director, with office at New York, in charge of the operation of Eastern railroads.

C. H. Markham, president of the Illinois Central, is appointed regional director, with office at Atlanta, in charge of the operation of Southern railroads.

R. H. Ashton, president of the Chicago & North Western, is appointed regional director, with office at Chicago, in charge of the operation of Western railroads.

Orders issued by the gentlemen named in their capacity as regional directors will be issued by authority of the director general and will be respected accordingly.

Railroad Wage Commission Appointed

Director General of Railroads McAdoo has announced the appointment of a Railroad Wage Commission to make a general investigation of the subject of railroad wages in the United States. The director general named as members of

the commission Franklin K. Lane, Secretary of the Interior, Charles C. McChord, member of the Interstate Commerce Commission, J. Harry Covington, chief justice of the supreme court of the district of Columbia, and William R. Willcox of New York. The members of this commission are all men who have had experience in dealing with problems like that referred to it.

The commission held its first meeting at Washington on January 21 and organized by electing Secretary Lane as chairman. W. A. Ryan was appointed secretary of the commission. It was decided to appoint a board of four examiners and a statistical board of three members. Public hearings will be held at Washington and it was stated that some results could be expected in about 60 days.

Secretary Lane was for eight years a member of the Interstate Commerce Commission, and was also the chairman of the board, consisting of himself, the Secretary of Labor, Daniel Willard and Samuel Gompers, which brought about the wage agreement between the railroads and the four railroad brotherhoods last year pending the adjudication of the Adamson law.

Commissioner McChord was formerly chairman of the Kentucky Railroad Commission. During his eight years of service as a member of the Interstate Commerce Commission he has been largely concerned with those regulatory laws which directly affect railroad employers, and during 1916 had charge of the investigation of car shortage problems.

Judge Covington, prior to his appointment as a federal judge in 1914, was a member of Congress, serving on the Committee on Interstate and Foreign Commerce, the committee which considers all railway legislation in the House of Representatives. He was the President's personal representative last summer on a mission to the Pacific Coast states in connection with labor trouble existing there.

Mr. Willcox was chairman of the Republican National Committee last summer. After receiving the new appointment. After having his postmaster of New York City, he was appointed by Governor Hughes chairman of the New York Public Service Commission for the Fuel Director and served upon that body for six years.

The commission has been appointed with a view to determining the cause for the increased charges of labor upon the railroads, including not only the train service, but also the ferry, passenger service, steamships and the other classes.

many of which had presented demands to individual railroads. It will begin its work at once, and will report to the director general, giving its recommendations in general terms as to changes that should be made. Upon this report the director general will make a decision.

In dealing with such a complex problem as railroad wages, the powers of the commission must be very broad if it is to report a satisfactory result. It is therefore authorized to make a general investigation of the whole field of railroad labor—the compensation of persons in the service of the railroads, the relation of railroad wages to wages in other industries, the conditions in different parts of the country, the special emergency respecting wages which exists at this time owing to war conditions and the high cost of living, and the relation between different classes of railroad labor.

The creation of this commission is the culmination of a large number of complaints and demands of employees which have been pending before the railroad managers for some time past. These complaints and demands were brought to the attention of the director general shortly after the assumption of the operation of the railroads by the government. They came in all forms, from various classes of railroad labor organizations and from various groups of unorganized employees of the railroads.

President Wilson sent the following letter to each member of the commission:

"May I not assure you of my appreciation of your acceptance of the invitation extended to you by the director general of railroads to serve as a member of the important commission he has appointed to inquire into the question of wages of railroad employees in the United States?"

"This is one of the most important problems of the moment and is worthy of the unselfish and disinterested service you have so patriotically undertaken to render."

In the case of the brotherhoods an agreement was reached at a recent conference between their representatives and Mr. McAdoo that whatever decision was made would become effective as of January 1, 1918.

Shippers Confer with Director General

A special committee of the National Industrial Traffic League called on Mr. McAdoo on January 17 to offer their co-operation and to discuss the relations between shippers and the railroad administration. They made a suggestion that a representative of the shipping public be appointed to the director general's Advisory Board, but Mr. McAdoo told them that the board represented the entire public. They also suggested a change in the new scale of demurrage rates which went into effect on January 21, proposing instead of the progressive scale ranging from \$3 to \$10 a rate of \$5 for the first few days and \$10 thereafter, to obviate the difficulties caused when cars on which demurrage has accrued are switched without reference to the number of days they have been detained. The shipper or consignee would naturally prefer to have the most expensive car moved first but it is difficult to handle the cars in that order. The National Industrial Traffic League proposed a similar change last year after the scale of \$1, \$2, \$3, \$4 and \$5 had been in effect for a time and the railroads agreed to substitute the flat rate of \$2 for the first three days, increasing to \$5 thereafter. The shippers also objected to the abolition of the average agreement and the bunching rule. The suggestions were referred to Edward Chambers, Mr. McAdoo's traffic advisor.

State Commissions Reassured

The authority of state railroad commissioners is not impaired by the federal control of the railroads, Mr. McAdoo told a delegation of representatives of state commissions at a conference in Washington on January 16. The delegation was headed by E. C. Niles, of New Hampshire, presi-

dent of the National Association of Railway and Utilities Commissioners, and they expressed to Mr. McAdoo their fears that it might be the intention to nullify their authority, as the President's proclamation declared that the railroads shall remain subject to all *existing* statutes and orders. They also said that in some instances railroads had already refused to obey their orders; but they were assured that unless and until the director general chose to exercise his paramount authority their status remained unchanged. Mr. McAdoo advised them, however, not to impose requirements involving capital expenditure except in cases of absolute necessity and the commissioners promised their co-operation in every way.

Cars Wanted for Corn Loading

Representative Medill McCormick of Illinois has placed before Mr. McAdoo a letter from Food Administrator Hoover on the need for sending box cars west for loading with corn. It was stated that the country elevators are filled and that corn is rotting in the fields because so many cars of western roads are in the east. Mr. McCormick suggested the appointment of an experienced railroad executive to devote his attention to the corn movement. Mr. Hoover's letter said in part:

"It does not appear to me that the movement of this most critical and essential foodstuff necessarily conflicts with the movement of coal. Grain moves in box cars and coal in open top cars. I am informed that a large number of box cars are daily loaded with pianos, furniture, graphophones, beer, whisky, etc., which are not so essential at the moment as grains. It is estimated that the eastern roads have anywhere from 20,000 to 40,000 box cars belonging to the grain roads and unless these can be returned and put into their proper employment there is little solution of the problem."

New Locomotives Ordered Diverted to Eastern Lines

For the purpose of increasing the supply of locomotives on the eastern roads, many of which are conspicuously short of power, Mr. McAdoo has ordered the locomotive builders to deliver all locomotives turned out in January, February and March, on orders from the railroads, about 700 in all, to be turned over to specified eastern lines, regardless of the road that ordered them. About 150 are to be delivered in January, about 250 in February and 250 in March.

Mr. McAdoo has been in conference with officers of the locomotive companies in the effort to secure early delivery of engines which have been ordered and in making arrangements for obtaining the use of locomotives ordered by the Russian government. As one of the great sources of difficulty has been the shortage of labor for repairing locomotives, efforts have been made to transfer men from the western and southern lines to the eastern lines.

Blizzards Interfere with Freight Moving Week

Weather conditions throughout the eastern district have continued to interfere with the efforts of the railway managers and the director general to clear up congestion. The efforts to make last week a general freight moving week were rendered almost fruitless by the continuance of blizzards in the middle west and below zero weather in the east, and while the five-day shut-down of manufacturing plants resulted in some improvement and certainly prevented congestion from increasing as it otherwise might have done, its results were far less than had been expected. On Monday night Mr. McAdoo received the following report from A. H. Smith:

"Very severe weather over entire Eastern District. 9 below in New England. 31 below in Pennsylvania. 20 below in Northern New York State, and snowing and blowing. 15 below Ohio. 5 below West Virginia.

"There was severe shortage of labor at engine terminals

and many men failed to report to work. Many of those who did report went home on account of severity of the weather, interfering with train operations and slowing up things very much.

There is much ice in the yards which is interfering with switching. So far as possible we are getting labor to pick it out.

At 10:30 o'clock this morning weather clearing and moderating and situation is improving.

We are concentrating on getting empty to the mines and movement of coal out, also movement of food-stuffs east of Chicago, which must be kept up.

"Anthracite producing regions still affected by the freezing, and improvement can only come with higher temperatures.

"Accumulation of freight held out for New York continues to show reduction.

"Harbor conditions improving.

"Steamers bunkered 14, with total of 10,320 tons."

On account of the extremely severe weather, which has particularly affected operations of railroads crossing the Allegheny mountains, Director General McAdoo on Wednesday, upon recommendation of Regional Director Smith, authorized him to place an embargo on all freight, except food, fuel and such war munitions and war supplies as are specifically approved by the War Department, upon the Pennsylvania Lines East of Pittsburgh, Baltimore & Ohio east of Ohio river, and Philadelphia & Reading for the purpose of enabling these lines, which are the heaviest bituminous coal carriers, to continue specializing upon coal for the double purpose of relieving the acute conditions in New England and the Harbor of New York and elsewhere, and to provide empty cars for the mines and coke ovens. This embargo is a temporary one. It should last but a few days if the weather moderates.

Metropolis Bridge Now in Service

THE PHOTOGRAPHS SHOW TWO VIEWS of the recently completed Ohio river bridge which connects the Chicago, Burlington & Quincy and the Nashville, Chattanooga & St. Louis at Metropolis, Ill. This structure was

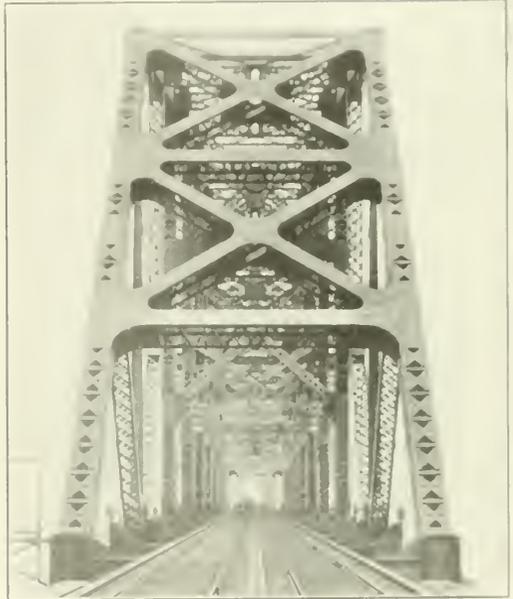


View of the Bridge from the Kentucky Side, the Long Span in the Foreground

recently opened to service and affords a new all rail route for traffic from the northwest to the southeast. The bridge is notable primarily as containing the longest simple truss

span in the world (107 ft. between end posts). Various phases of the progress in this structure have appeared in the *Railway Age*, *January 21, 1917*, page 109, *May 12, 1916*, page 114, and *September 8, 1916*, page 109.

In addition to the use of the long simple span, a truss of construction selected because of the practicability of securing river foundations, suitable must be made at another departure from usual practice. The use of concrete steel for the main compression members. The first truss was erected from the falsework on December 13, 1916, its completion being followed during 1917 by that of the two main spans, each 255 ft. long, but of the same general type of construction as the main span. The north approach 1,290 ft. long and the south approach 600 ft. were completed previously. The erection of the record span on falsework revealed unusual



The Portal of the 720-ft. Span

problems requiring the use of more unusual equipment and methods, such as a 150-ton locomotive crane having a maximum boom length of 185 ft. and the 300-ton hydraulic jacks used in lowering the span truss from the falsework.

The sub-structure also involved noteworthy features that were brought about primarily through the necessity for a large spread of the footings because of the low bearing pressure permissible on the available foundation material. Structural steel and reinforced concrete worked largely into the design of the caissons and Upright piles piers were used to float the caissons into place.

The work on this structure was started in the early part of 1915. The sub-structure was built by the Union Bridge & Construction Company of Kansas City, and the super-structure was fabricated and erected by the American Bridge Company. The bridge was designed and its construction started under the direction of C. H. Crethore, late chief engineer of the Missouri & Illinois Railroad and bridge engineer of the Chicago, Burlington & Quincy. Ralph Modjeski, Chicago, Ill. was consulting engineer on the project and took over the execution of the work following the death of Mr. Crethore.

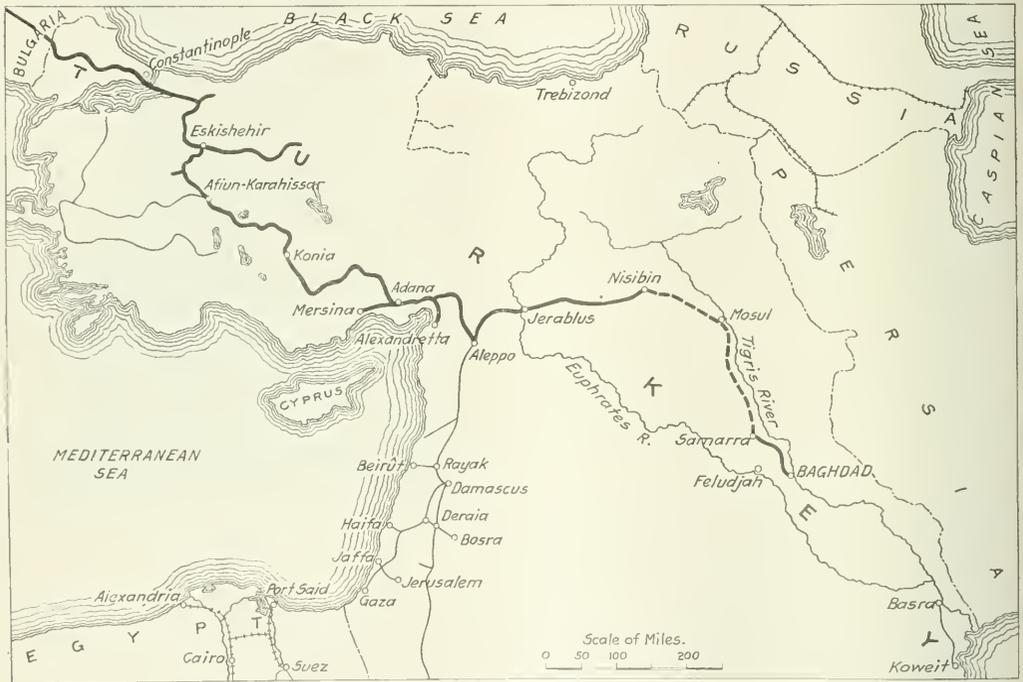
The Baghdad Railway and Its Part in the War

The Mesopotamia Campaign Has Hindered the Completion of This Threat Against Egypt and India

THE BRITISH CAMPAIGNS in Palestine and Mesopotamia, which occupy a prominent place in the news of the day, may be observed in a new light when it is considered that one of the urgent reasons for them is the forestalling of the completion of the Baghdad Railway and its being put into effective military use as a route towards the Suez Canal and towards India. This fact was clearly brought out by H. Charles Wood in an illustrated lecture on the Baghdad Railway in the war, delivered before the American Geographical Society in New York on January 8. Mr. Woods is a fellow of the Royal Geographical Society

follow a line which would necessitate the shortest sea passage. The other, and from political and military points of view, far more important reason for the change of plan was that German influence in Turkey was entirely directed toward the construction of a Baghdad Railway which would not be easily attacked by a group of powers possessed of the command of the sea.

Indeed, the Germans have always realized the importance of the fact that Constantinople, the Bosphorus and the Dardanelles were and are interdependent and that in the defense of the straits and the construction of railways there existed



The Baghdad Railway*

and an author of several books on the Near East. An abstract of his paper follows:

In opening his lecture Mr. Woods briefly referred to the earlier schemes for the construction of a railway from the Mediterranean to the Persian Gulf—schemes which were more or less dropped in 1876 when the British purchased shares to the value of \$20,000,000 in the Suez canal. From that time onward two reasons gradually led to the connecting not of the Mediterranean, but the Bosphorus with the Persian Gulf. The first of these was that from the moment of the opening of a through railway to Constantinople in 1888, the overland route to the Persian Gulf was naturally destined to start from the Turkish capital and therefore to

a sort of set-off to British sea power. Thus while a line starting from the Mediterranean would have been valueless to Turkey or Germany as a means of through communication between East and West or vice versa, a railway only broken at Constantinople gives to the enemy an iron road, the value of which is one of his principle assets in the war. In short, so long as the forts of the straits remain intact the Sultan and his allies enjoy the advantage of naval supremacy in a limited area—the Bosphorus, the Sea of Marmora and in the Dardanelles—without the possession of a fleet.

Counteracting British Sea Power

That this question of counteracting British sea power has never been forgotten by the Germans is also clearly demonstrated by the fact that they objected to a modification in

*Map adapted from a similar map in the National Geographic Magazine. Opportunity was lacking to compare it with the map shown by Mr. Woods at the lecture.

the original route to be followed by the Baghdad Railway, a modification destined to have taken the main line through Alexandretta and Aleppo instead of by the more northerly route through Baghe. This modification, which was strongly advocated in many quarters after the Young Turkish Revolution of 1908, would have had the dual advantage of placing Alexandretta and Aleppo on the main line, and also of taking the railway, not through the heart of the Amanus mountains, but by a more southerly route which would have minimized the course of construction. But had it been accepted, such a change would have meant that instead of the railway going within about ten miles of the coast, it would have run for a good many miles actually along the sea shore. In case of war, therefore, there would have been a much greater menace to the Turkish and German communication from the sea, for while the section of the railway in the neighborhood of the Gulf of Alexandretta is still the most easy of attack, that attack would now constitute a far larger undertaking than were the line to have run close to the water's edge.

The Route

Before entering into a detailed account of the history, geography and construction of the Baghdad Railway, Mr. Woods went on to give a general account of the present facilities provided by that line. Starting from Scutari opposite Constantinople, since the recent opening of the Taurus and Amanus tunnels through communication has been established as far as a junction located about ten miles to the north of Aleppo. From here the northern prong, or Baghdad Railway proper, continues in an easterly direction, certainly as far as Heliç and probably at least to Nisibin—thus making about 1100 miles of line in working order. At the other, or Baghdad end, the railway has been completed in a northerly direction for 75 miles, and as far as Samarra. This means that out of the total distance of approximately 1,500 miles from Constantinople to Baghdad, nearly 1,200 miles can be accomplished by train. Moreover of the remaining 300 miles not more than about 150 have to be covered by road, for the rest can be accomplished in boats and rafts doctored or sailed down the River Tigris from Mosul. In addition, as the railway now crosses the Euphrates at Jerusalem, there is an alternative means of communication with Mesopotamia by way of that river as far as Feludjah, now connected by a light railway with Baghdad. The military advantages which have and are to accrue to Turkey in her Mesopotamian campaign are therefore obvious. But, in addition, the Baghdad Railway now also provides the easiest and quickest means of communication between Constantinople and northeastern Asia-Minor, for the distances to be covered by road from its present terminus, near Nisibin, are less than those which otherwise have had to be traversed from Angora—formerly the nearest point in railway connection with Constantinople.

From Aleppo the great southern prong which is not part of the Baghdad system proper runs through Damascus to Deraa. From there two roads proceed southwards. The first is the Hedyas line which nominally goes as far as Medina. The second bends in an easterly direction towards Heliç, but before reaching that point turns south near Nazareth, ultimately extending as far as El Auja a few miles to the southwest of Beersheva. Although there is at least one break of gage at Kark, not at Aleppo, as is sometimes stated, the strategic importance of these lines, some of which have only been built since the beginning of the war, is enormous. They rendered possible the formerly threatened attack upon Egypt, and they enabled the Turco-Germans to bring up the reinforcements with which they so strongly opposed the British advance at southern Palestine. That this advance has now been successfully accomplished, is a matter of enormous political and military importance. In

addition to giving the British a foothold in the northwest of the desert the occupation of Jerusalem and its neighbourhood provided them with a good command of play for future operations.

The History of the Project

In 1858 the only iron railway existing in Asia-Minor were completely, or at least practically, in the hands of the British capitalists. Thus, London, to the nearest development of German influence in the Near East, all except one of these lines had passed out of British control on the termination of the war and the Germans demanded the re-annexation of the Asiatic dominions of the Sultans.

In 1859 they obtained promise to preserve the railway from Esaki-Shehr to Konya (modern Samsat) along communication with the railway from Smyrna to Agha-Karahisar. This connection was of considerable value in the Dardanelles campaign, for it was by this line and by its branch to Panderna on the Sea of Marmara, that the Turks were able to convey many of their reinforcements to the strategic neighborhood of the southern shores of the Straits. This resulted in the substitution of a very short sea trip for a longer voyage from Constantinople to the Peninsula of Gallipoli—a longer voyage which was dangerous owing to the presence of allied submarines in the Marmora.

From the time of the opening of the railway to Konya in 1876 the German plans became more definite and positive. A verbal promise having been given in 1878, the final concession for the Baghdad line was secured in 1880. It gave not only the right of the construction of a line from Konya to Basra, but it also authorized the building of several branches and the construction of part of the Persian line, and at some point on the Persian Gulf. It had done the financial arrangement to erect between the government and the company, which included a kilometer equivalent of \$7,100 per kilometer.

The completion of the first section of the line from Konya to Paurgurlu was followed by a projected delay. This was due partly to the fact that the second or Persian section was the most costly of construction of the whole line and partly to the international complications which arose in resolving the necessary guarantees and to the possibility of international cooperation in the scheme. Even after the signature of the necessary documents in June, 1908, there was a further delay owing to the road works created by the Young Turkish Revolution of the following year.

After carefully describing the details and business of the Taurus section and showing that the railway favored not the ancient route to west of the Cilician Gates, but a more easterly line by way of the valley of the Çarçur Su, Mr. Woods took up the important background of the concession granted to the Ottoman State for the construction of a branch to the port of Alexandretta. This concession had been disposed of by the way of a public loan in the annual note—a concession which would have taken the main line of the road through Alexandretta to Aleppo instead of to the British coast, naturally, the business the Asiatic Minor of the railway then required could be considered as a part of the line of Alexandretta and its extension, bound to be carried on the former concession by the German or Kio-Choo Company. Consequently, though not the purpose of the part of Alexandretta was of great importance, they formed an element of cooperation for the Baghdad Railway in any way.

In addition, some delay occurred at Alexandretta because concession had been made to the Ottoman Government and the German in 1911 made a provision for the building of a line from Baghe to Baghdad. At the same time the concession from Constantinople to the Persian Gulf, the section from Baghdad to the Persian Gulf, had been a matter of delay and delay.

with many of the more important results which preceded and followed the signing of this agreement, those events might be possessed of political consequence, the significance of which it would be impossible to exaggerate. It came almost directly after the meeting of the Czar with the Emperor at Potsdam in November, 1910, a meeting during which the relations existing between Russia and Germany were temporarily adjusted. Though the exact nature of that agreement was not known until afterwards, it was certain that Russia agreed no longer to oppose the construction of the Baghdad Railway, and either herself to build or to allow the Germans to build a line from Khanikin—the terminus of a branch already agreed upon between Turkey and the Baghdad Company—to Teheran. As compensation for this the Russian position in northern Persia was recognized by Germany. It remained then for Berlin to negotiate with England and France for agreements concerning future developments in their respective spheres.

The Tripoli War of 1911 and the Balkan War of 1912 were not, however, favorable periods for negotiation, and it was thus only in 1913 that Turkey in agreement with Germany dispatched to London the ex-Grand Vizier—Hakki Pasha—to try to bring about agreements to be drawn up between the foreign office, the German Embassy and the Ottoman Embassy—agreements to settle the outstanding differences as regards the Baghdad-Persian Gulf section and other cognate matters of river transport in these regions. This agreement peaceably presupposed a continuance of friendly and peaceful relation between Turkey, Germany and Great Britain, and it is believed that it was practically already concluded when in August, 1914, Great Britain found herself compelled to declare war on Germany, Turkey subsequently throwing in her lot with the enemies of this country.

The Service Called For

Turning to the actual facilities which the railway provides or which it might provide for travel, Mr. Woods said that the agreement with the company stipulated for the provision of a fortnightly express train between Constantinople and the Persian Gulf, and vice versa. This train was to run at an average speed of about 28 miles an hour, including stops, for the first five years from the opening to traffic of the whole of the main line, that speed subsequently to be increased to 37 miles an hour including stops. This meant that were the express train to run at its lower speed the journey from Constantinople to Baghdad would be accomplished in about 54 hours, and from the Turkish capital to Basra in about 66 hours. Taking the pre-war time necessary for the journey from London to Constantinople by the "Orient Express," and allowing for a very short delay at the latter place, theoretically it would be possible to travel from London to Basra in about six days. From Basra to Bombay the distance is just over 1900 miles—a distance which at say 20 knots could be accomplished in about 84 hours. Thus taking all the conditions at their most favorable value and allowing only a margin of five hours in Basra, travelers and mail could be conveyed from London to Bombay by that route in just under ten days instead of as before the war in between 13 and 14 days. But against these advantages must be set the facts that the journey by way of Brindisi and the Suez Canal could be speeded up and that on the great cross-country journey from Constantinople to the Gulf there would be bound to be considerable delays and irregularities in the running of the railroad trains.

Influence on Allied Military Plans

Mr. Woods went on to point out that knowledge of the coming improvements upon the Baghdad and Syrian Railways must have had a prominent influence upon the Allied

plan of operations. In November, 1914, when the Ottoman Government threw in its lot with the Central Powers there was a gap of 30 miles in the Taurus, the Amanus tunnels were not complete, the Jerabelus bridge across the Euphrates was not in position, and the terminus of the railway was at Tel-el-Abiad, only about 60 miles to the east of the river. This meant not only that the Turkish reinforcements and material destined for Mesopotamia had to be detrained at least twice, but that the enemy was unable to derive the full benefits provided by the Euphrates route for water transport. Under these circumstances it was obvious that it was necessary to forestall the Turks and to inaugurate a Mesopotamian campaign before the improvement and completion of the Baghdad Railway. Moreover, the fact that the enemy was compelled to utilize the finished parts of the line for military purposes prevented these sections from being available for the transportation of railway material to be utilized for the extension of the line. Equally in regard to the Syrian campaign, had the British delayed taking the proper precaution on the Egyptian frontier until the opening of the Taurus and Amanus tunnels and until the completion of the new railway on the west of the Jordan, the magnitude of their task and the dangers of the situation would have been enormously increased.

The Future Prospects

It is difficult, if not undesirable, to make a detailed forecast as to the future of the Baghdad Railway and of the other lines in Asiatic Turkey. The only alternative was, therefore, to say that two things seemed certain—firstly, sooner or later the Baghdad or some other line from the Bosphorus to the Persian Gulf would be completed—and secondly, its ownership and control would depend not so much upon any agreement already made as upon the results of the war and particularly upon the fate of Turkey. For years the Germans have turned their attention towards the development of an influence which, so to speak, pivoted upon the Baghdad Railway. It is for this reason that whatever concession might be offered to them nearer at home the Allies must leave no stone unturned to prevent the conclusion of a peace which will leave the enemy still possessed of the predominating control in an undertaking, which, once it were robbed of its political significance could easily be established upon an international basis and controlled as a result of some scheme of internationalization.

TRANSPORTING TROOPS TO THE ITALIAN FRONT.—A British authority, Major Redway, has contributed to the London Globe some interesting calculations relative to the movement of troops by rail, with special reference to the Italian front. A British division up to war strength requires, he says, a total of 85 trains, made up as follows: Two specials for headquarters, 27 trains for three brigades, one for a cavalry squadron, 45 for artillery, two for engineers, two for the supply units, and six for field ambulances. Italian conditions may differ somewhat, but under normal conditions the average speed would be something under 20 miles an hour, and it would take at least 24 hours to unload a dozen battalions from one platform. As regards the Italian campaign, two Franco-Italian routes are available, the Marseilles-Nice-Genoa coast line, and that from Calais to Rome, via Modane. The enemy can bring troops from Bavaria only via the Adige Valley and Trieste to Verona, and from Vienna to Venice there is but one through line, via Udine, and the coastal line from Trieste to Venice, via Monfalcone. "With all the talk about the mechanism of war," no belligerent has found the strategical concentration of a modern army by rail, utilizing the ordinary resources of a passenger and freight line, anything but a sore tribulation, from the first marshalling of the rolling-stock to the detrainment of the last S. A. A. cart.

The New Haven Saves a Million Dollars in Fuel

Marked Economies Are Effected by Supervision of Locomotives on the Road and at the Terminals

THE NEW YORK, NEW HAVEN & HARTFORD estimates a yearly fuel saving amounting to more than a million and a third dollars, based on comparison of actual performance of its locomotives in December, 1917, as against December, 1916.

Care of Fires at Engine Terminals

The necessary use of locomotives on short runs to an unusual extent because of the characteristics of traffic on the New Haven causes a relatively large detention under steam at terminals, so that the proportion of coal consumed while the locomotives are standing is large. This feature of the problem being of prime importance, much attention has been given to it during the past six months with gratifying results. Fuel supervisors follow up the subject with those in charge of locomotives, and have established fairly stable values for coal burned per hour for the several classes of power when the fires are banked, when covering the full grate area, and when dumped and then rebuilt as needed.

Master mechanics are encouraged to prepare estimates of savings based on such unit consumption rates applied to locomotives held at terminals, versus what the consumption would have had the locomotives been permitted to stand with the full grate area covered, as formerly.

Recent reports of master mechanics to the general fuel supervisor containing estimates of savings for one week follow:

Division	Pounds of fuel saved
New York	36,458
New Haven	170,137
Hartford	225,300
Hartford	46,400
Baltimore	81,076
Old Colony	46,588
New London	33,839
N. E. Ry.	49,653
Total	1,081,325 = 541.5 tons

It is endeavored to have the terminal forces bank the fires of locomotives which are not to be used within a short time. When locomotives are to be held three to four hours the grate area covered is reduced by 60 per cent. In the case of locomotives to be held 24 hours or more, the fires to be dumped.

The men at terminals have also been drilled as to the necessity of careful and economical handling of coal in the work of cleaning and banking the fires. Ashpit men are taught, so far as changing forces permit, to minimize the amount of coal placed in the firebox after the fire is cleaned and also to be particularly careful in cleaning the fires that good coal is not wasted. This has, undoubtedly, resulted in considerable saving.

Education of Firemen

Frequent changes in the personnel of firemen in service make education much less complete than is desirable or possible in more stable times, but continued effort is made to instill into the engineers and firemen the seriousness of the coal shortage and the tremendous burden which the present high prices place on the road, and the entire nation. When the men are told of the current prices of coal to the company they usually express surprise, as, generally, they have not realized that the extraordinary prices of the present affect the railroad to the same extent as they are affected in their personal living expenses. Almost without exception the men agree to co-operate in fuel saving.

Attention has been called to what the savings of one dollarful of coal per mile amounts to, figures have been compiled for the year ended June 30, 1917, as to just what had done and what could have been done (in one example) of coal per mile saved. This starts the men thinking and shows them what they can do if they practice rigid economy in the use of fuel. Good results are being produced, as is shown in current report.

Regulation of Nozzle Sizes

It is desirable to standardize, as far as practicable, the sizes of exhaust nozzles, using, of course, the largest size consistent with free steaming. Variations in the quality of coal available make this no simple matter, but constant supervision is productive of better results than permitting the matter to drift along lines of least resistance. Fuel supervisors render good service in this respect by constant checking of locomotives, and co-operation with engine house forces.

A concrete example of the benefits was the trial of switching power with larger nozzles than formerly, the result indicating roughly that there was a reduction of coal used amounting to 128 lb. per hour. That would mean over 50,000 tons per year on the New Haven.

Constant effort to strengthen the interest and co-operation of engine and terminal men to assist, and to feel themselves partners in the work, is made, largely through the use of such figures as mentioned above.

Individual Performance Data

Of prime importance is the use of figures for individual road locomotives, showing consumption of coal in pounds per 1,000 gross ton miles, both in passenger and freight service. This data is prepared by an accounting force and the records of the various locomotives are examined and memoranda made covering cases of locomotives where consumption is running out of line with good practice, show of power and service being considered. Fuel supervisors then ride the locomotives and make report of defective boilers, machinery, draft rigging, grates, plunger (boom) to the master mechanics. Also, if necessary, the crews are instructed in proper handling in times, or the terminal may be checked with regard to coal used during lay-overs.

Superheating Smaller Power

Modernizing older locomotives by applying new valve gear and superheaters results in a saving on the New Haven of over 20 per cent in the coal used per 1,000 gross ton miles. Superheating is absolutely necessary in order to obtain the lowest unit coal consumption and the greatest power output from the locomotive.

Miscellaneous Coal Losses

The supervision of fuel naturally checks losses by overloading tenders; by waste around cooling stations; by failure to remove all coal from coal cars, by theft, by loss through holes in the decks of locomotives, etc.

Fuel supervisors report the need for picking up coal dropped along the right of way so that it can be utilized at section houses and for section roads and the switch stands, etc.

Train Operation

The general fuel supervisor tries to the notice of the higher operating officers those instances of power, resulting in fuel waste, as, for example, unnecessary double-heading,

*Figure report by George W. Wilden, general manager of the New York, New Haven & Hartford, to the Bureau of Mines.

light mileage, excessively large locomotives on small trains, etc.

Superintendents endeavor to lessen the delay in transit of all trains, and particularly heavy freight trains. Attention is given to the fact that the stopping of freight trains entails a serious loss of fuel from which no returns are had, and care is exercised by despatchers to avoid, if possible, the stopping of trains at the foot of steep grades, from which points it is difficult and expensive to start.

Proper Engine Loading

Proper loading of trains with respect to locomotive capacity is of the greatest importance in obtaining a low unit consumption. An overloaded locomotive is wasteful of fuel. An underloaded locomotive is equally so, measured in "gross ton miles per unit of coal used." A locomotive with two-thirds its rating will burn nearly as much coal per train mile as it will with full rating, and the ton-mile cost is correspondingly high.

It is particularly important to have locomotives properly loaded to get the greatest benefit from superheaters. A corps of fuel supervisors cannot gain headway on a gross-ton-mile-consumption basis against any considerable decrease in the loading of engines.

Saving from Fuel Supervision

In a word, the saving of fuel has the constant attention of practically all employees in the operating department, beginning with the superintendents and ending with the men who clean the fires on the ashpit. Their attention is constantly directed to the savings produced by careful thought and action and to the losses resulting from inattention and neglect.

The foregoing gives information as to the principal methods followed on the New Haven to conserve locomotive fuel. In order to determine the net results on a broader scale than by such estimates as have gone before, figures from actual operation of all locomotives in freight and passenger service, both yard and road, are appended to show that the varied efforts have produced a considerable reduction in coal consumption, and consequent large money saving.

Comparison is made between the performance in September of 1917 and 1916; the results of which are typical of those for broader periods. The statistics of coal used are those covering all issues to locomotives as charged under the primary accounts, Interstate Commerce Commission classification.

ROAD FREIGHT STEAM LOCOMOTIVE SERVICE

	Pounds of coal per 1,000 G. T. M.	Pounds of coal per engine mile.	G. T. M. per engine mile
September, 1916	227.44	166.76	796
September, 1917	199.74	163.24	945
	27.70—11.9 per cent (Decrease)	3.52—1.8 per cent (Decrease)	149—18.7 per cent (Increase)

There were 632,287,097 gross ton miles handled in September, 1917, which, if the 1916 consumption rate had prevailed per 1,000 G. T. M., would have required 8,757 more tons of coal than were actually burned. Since the cost of coal on tenders averaged \$5.09 per ton, the saving was \$44,573 for the month, or at rate of \$534,876 per year.

It is gratifying to note that with an increase of 149 gross ton-miles per locomotive mile, or 18.7 per cent, there was a decrease of 3.5 lb. of coal per locomotive mile, or 1.8 per cent. Greater locomotive loading naturally has benefited the gross ton-mile consumption, but the coal used per locomotive mile would have also increased if the supervision had not been effective.

FREIGHT YARD LOCOMOTIVES

	Pounds of coal per car received	Pounds of coal per engine mile
September, 1916	111.19	116.25
September, 1917	99.31	97.78
	11.88—9.9 per cent (Decrease)	18.47—15.5 per cent (Decrease)

There were 383,413 freight switch locomotive miles in September, 1917. Therefore, the coal saved on a locomotive mile basis was 3,540.5 tons for the month. At the rate of \$5.09 per ton, the saving was \$18,021 during the month, or at rate of \$216,252 per year.

	ROAD PASSENGER STEAM	LOCOMOTIVE SERVICE	G. T. M. per engine mile
September, 1916	426.68	111.16	261
September, 1917	364.65	109.07	299
	62.03—14.5 per cent (Decrease)	2.09—1.8 per cent (Decrease)	38—14.5 per cent (Increase)

There were 313,713,362 gross ton-miles handled in September, 1917, which, if the 1916 consumption rate had prevailed this year per 1,000 gross ton-miles, would have required 9,729.5 more tons of coal than were actually burned. Since the cost of coal on tenders averaged \$5.09 per ton, the saving was \$49,523 for the month, or \$594,276 at the yearly rate.

It is gratifying to note that with an increase of 38 gross ton-miles per locomotive mile, or 14.5 per cent, there was a decrease of 2 lb. of coal per locomotive mile, or 1.8 per cent.

PASSENGER YARD LOCOMOTIVES

	Pounds of coal per locomotive mile
September, 1916	112.09
September, 1917	95.17
Decrease	16.92—15.1 per cent

There were 65,568 passenger switch miles in September, 1917. Therefore, the coal saved on a locomotive mile basis was 554.5 tons. At the rate of \$5.09 per ton, the saving was \$2,822 during the month, or at an annual rate of \$33,864.

SUMMARY OF ESTIMATED FUEL SAVINGS BASED ON COMPARISON OF ACTUAL PERFORMANCE SEPTEMBER, 1917, VERSUS SEPTEMBER, 1916

	Per month	Per year
Passenger service:		
Road	\$49,523	\$594,276
Yard	2,822	33,864
Total	\$52,345	\$628,140
Freight service:		
Road	\$44,573	\$534,876
Yard	18,021	216,252
Total	\$62,594	\$751,128
<i>Recapitulation</i>		
Savings in passenger service	\$52,345	\$628,140
Savings in freight service	62,594	751,128
Grand total savings	\$114,939	\$1,379,268

OBSERVING MILITARY TRAFFIC FROM THE AIR.—Hardly a train moves within five miles back of the German trenches, or a squadron of men come up for relief, or digging begins on a new series of emplacements but a pair of keen eyes, steadily watching from great observation balloons just behind the Allied front takes notice of it, says a letter from a captain in the U. S. Aviation Corps to the St. Louis Republic. Every movement, every activity, is registered until a schedule of the usual enemy routine is built up and the average amount of motion known. Any departure from this schedule is suspicious. A train running late or with more cars than usual, men in the trenches being relieved too frequently, new roads or emplacements being built too earnestly, give the first hint that "Fritz," across the line, is up to something. A keen balloonist notes any of these changes and at once telephones down to the ground, "An extra train of six cars passed — at 10:40." Half a mile farther down the line another pair of eyes reports, "Large convoy moving up to front, range so-and-so." Still a little farther down another suspicious circumstance is noted, until the general staff down below, assembling all these straws, foresees the beginning of a big offensive across the line. Counter measures are taken, batteries directed, convoys and trenches are smashed up, and the enemy's plans thrown askew.



Mikado Type Locomotive for the Santa Fe System

Developed from Earlier Class of Same Type; Greater Horsepower Capacity, No Change in Adhesion

THE SANTA FE SYSTEM is now receiving from the Baldwin Locomotive Works a consignment of heavy Mikado type of locomotives, which are intended for freight service on the Eastern Lines. These engines are coal burners and were developed from lighter Mikado type locomotives built in 1916. The new design was worked out conjointly by the railway company and the builders, and existing Santa Fe standards were used generally throughout the construction. A comparison of the leading dimensions of the new locomotives with those of the previous engines is as follows:

Date built	Cylinders, dia and stroke, in	Diameter drivers, in	Steam pressure, lb	Grate area, sq ft	Water heating surface, sq ft	Superheating surface, sq ft	Weight on drivers, lb	Weight total engine, lb	Traction effort, lb
1916	25 by 32	57	200	58.5	4,411	880	100,000	144,000	57,600
1917	27 by 33	63	200	84	4,414	880	100,000	144,000	57,600

Wheel load limitations prohibited a material increase in the weight on drivers, as compared with the design of 1916; and while the new engines are heavier, the additional weight is carried on the front and rear trucks. The principal advantage derived from this greater weight is the increased steaming capacity of the enlarged boiler. With this additional steam supply the larger cylinder horse power incident to the use of driving-wheels of greater diameter can be developed. For an increase in total weight of not quite eight per cent there has been an increase in water heating surface of over 11 per cent. The starting tractive efforts, with steam pressures giving approximately the same ratio of adhesion, are practically the same for both locomotives, but the larger cylinders, wheels and boilers of the new engines by their greater horse power capacity. This additional power will be utilized in maintaining higher speeds with the same or possibly a little greater tonnage.

The boiler is of the standard water-tube type designed for a pressure of 225 lb per sq in., but its rating is 190 lb. It contains a 45 element superheater and the air box is equipped with a brick arch supported on four tubes. An auxiliary dome, mounted over an opening in the shell of sufficient size for inspection purposes, is placed back of the main dome and on the same course with it. A single liner is placed under both domes; it also covers the longitudinal

steam, which is placed on the right hand side of the center line.

The boiler accessories include a power-operated fire-door and grate shaker. The minimum air opening provided for the ash-pan is 15 per cent of the grate area. The grate valve is fitted with an auxiliary drifting valve.

The cylinders are designed with direct exhaust passages of ample area, free from abrupt bends. Gun iron is used for the cylinder and steam chest building, piston and valve seat and packing rings, and cross-head shoes. The piston rods are of rolled steel, and the cross-head bolts of 40 carbon cast steel of the Laird design. Special steels are used for the piston rods, valve stems, main and side rods and main crank pins. The Baker valve motion is supplied and is controlled by the type "B" Riggsone power reverse gear. Fifty per cent of the weight of the reverse gear is followed.

The frames are of substantial design, the main members having a width of 5 1/2 in., while the depth over the main driving pedestals is 8 1/2 in., and over the remaining pedestals 7 1/2 in. The top and bottom rails are bolted together between adjacent pairs of pedestals by strong vertical ribs of I section. These ribs carry the vertical loads, column pins, which are fitted into reinforced bearings. Tractive forces are applied at both ends of driving pedestals. Three of these bearings are at the second row of pedestals and one at the fourth; the remaining bearings are provided through the main shaft, but are also connected by with two frames by the verticals. They transmit respectively the guide pull, the cross motion power, and a tractive action force.

The drive and suspension of each axle and the driving force are of the same character, with four link frame. Long coil spring hangers are used. The drive is of diamond and direct action type applied to the leading drivers.

The leading truck is of the E-coupler standard type and has cast iron ball bearings of the Holmes type. Each truck is supplied with two rows of spring wheels. The arrangement of cross connections, frequently called by the builder, consisting of two transverse beams connected by a central vertical link, is used between the rear drivers and leading truck.

The cast iron wheels will carry three times ample deck load. Special attention has been paid to the location of the oil boxes, glands to place all levers, valves, etc., with-

in east track of the box, and to locate the steam air and water gates where they can easily be read.

The tender is carried on two six-wheeled trucks, which are equipped with clasp brakes and Standard rolled steel wheels. The tender frame is of cast steel, in one piece.

The link between the engine and tender is of the radical type. A coal pusher is applied.

These locomotives, in accordance with Santa Fe practice, are fitted with steam heat equipment so that they can, in cases of emergency, be used on passenger trains. Their leading dimensions are given in the table:

Capacity	4 1/2 tons
Service	Freight
Length	61 ft. 6 in.
Tractive effort	10,000 lb.
Weight in running order	111,000 lb.
Weight on drivers	75,000 lb.
Weight on trailing truck	36,000 lb.
Weight on trailing truck in working order	35,000 lb.
Wheel base, engine	16 ft. 6 in.
Wheel base, tender	25 ft. 1 1/2 in.
Wheel base, engine and tender	41 ft. 6 1/2 in.
EQUIPMENT	
Weight in drivers in running order	3.8
Total weight in running order	5.1
Tractive effort in running order	603.4
Equivalent loading on grate area	93.7
Flashes heating surface in grate heating surface*	4.1
Weight of boiler in running order	30.7
Total weight in running order	50.4
Volume both cylinders	41.2 cu. ft.
Length of heating surface in both cylinders	3.0

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*Equivalent heating surface in grate heating surface is 15 times the grate heating surface.

Senate and House Committee Railroad Hearings

Necessity for Stabilizing Credit. Controversy Over Short Lines. Cummins Asks Salary List

WASHINGTON, D. C.

W. G. McAdoo, director general of railroads, testified on Saturday before the Senate committee on Interstate Commerce which is considering the administration bill for federal control of railroads. He did not discuss at length the details of the bill, which had been dealt with exhaustively by Commissioner Anderson, but confined his testimony principally to answering questions by members of the committee. Before he had concluded he was asked by Senator Cummins to furnish a list of all directors, presidents, vice-presidents, general managers, secretaries, treasurers and counsel of the railroads under government control, with their salaries. He promised to do so as soon as it could be compiled.

Mr. McAdoo urged the early passage of the bill, saying it would be a great advantage to have the question settled promptly because both the railroads and the government have to face the question of what improvements and additions to equipment are to be made this year and no expenditures can be made until the appropriation is available.

Purpose of the Appropriation

The appropriation of \$500,000,000 proposed is about the smallest amount that the government could get along with, he said. It may be necessary to meet any deficiency in earnings to pay the guarantees, and while he hoped it will not be necessary to make good any deficiency he could offer only a hope and an expectation based on general knowledge and what some railroad officers have told him that some economies will be possible. On the other hand, he said, any economies resulting from unification may be offset by increases in wages and in other items of expense that cannot be avoided.

improvements and some roads may need assistance in financing. He thought that the companies themselves, once their status is settled, can take care of refunding their maturing obligations, which, according to a statement he had prepared, would amount to \$222,000,000 in 1918, \$288,000,000 in 1919, and \$215,000,000 in 1923. These figures include equipment obligations. It may be necessary to give some financial assistance to roads now in receivers' hands.

In reply to a question, Mr. McAdoo said he thought the basis of compensation proposed in the bill is on the whole a fair one and he thought it wise to arrive at a fair basis which would be generally accepted as such in order that a settlement could be promptly made.

The necessity of stabilizing market conditions, which had been underlined to an extent that certainly threatened the financial structure of the country by the breakdown of railroad securities, was one of the important reasons for the organization of government control of the railroads, Mr. McAdoo said.

The Serious Condition of Railroad Credit

Why was federal control necessary? Asked Senator Frank B. Rowan:

"I think your question was covered in the President's statement," replied Mr. McAdoo. "It was necessary to stabilize the competitive system of some responsibility to get the transportation which was necessary to the different conduct of the war, but it was also necessary to make a credit situation which was stabilizing the whole basis of credit and was attempted to solve both problems at once. There were somewhere over \$11,000,000,000 worth of railroad bonds outstanding which were held not only by individuals, but by banks and fiduciary institutions, and which formed an essential part of the credit structure."

A fund is also necessary for equipment and additions and

ture of the country. The values of these securities had shrunk very much under the uncertainties of the situation and the railroads were experiencing great difficulty in selling new securities to finance the new equipment and facilities needed to meet the unusual demands upon them. Something had to be done to stabilize the railroad financial condition. The shrinkage in the value of the assets of savings banks and other institutions and in the credit power of firms and individuals, was threatening a very serious situation."

Senator Smith asked whether the difficulty in the transportation situation was due to lack of facilities or to the failure to secure their full use.

"It was due to both," replied Mr. McAdoo. "Every railroad man naturally felt an obligation to the owners of the property to get all the business he could for his road. That was his duty, but when some took more than they could carry congestion resulted. When I took charge I found a terrible congestion on the eastern lines caused not only by insufficient facilities of all kinds but particularly by the shortage of motive power and the fact that a large percentage of the freight cars were being used for warehouses. The equipment might have been sufficient if it had been possible to get the full use of it. We hope to be able to remedy that by the higher demurrage rates." He also said that it was hoped that the situation would be improved by the order to the locomotive builders to deliver all locomotives turned out during January, February and March, to the eastern roads. That could not have been done under private management, he said.

In reply to Senator Poindexter as to what other things he had been able to accomplish, Mr. McAdoo said a great deal had been done in diverting cars from the overloaded lines by distributing the traffic via the lines that can handle it the best regardless of the shippers' orders.

Little Improvement Yet

"Has there been any clearing up in the situation?" he was asked.

"Through the East I don't think there has been much improvement," Mr. McAdoo replied. "The railroad men were left on the job and in addition were given the benefit of the power of the federal government, but there was a serious congestion when the government took hold, and while I do not believe in excuses the railroad men tell me that the weather has been unprecedented. Blizzards have come so fast that it was impossible to dig out of one before another came."

In discussing the causes for the congestion Mr. McAdoo said that no one condition could be singled out but that one of the most serious causes was that consignees have held cars for an unreasonable length of time because it was easier to pay demurrage than to unload them. Other causes were the shortage of power and the scarcity of labor to repair locomotives. He thought that in a short time, with the aid of the government, it would be possible to get more efficient operation.

"Government control didn't have any effect on the weather," remarked Senator Poindexter.

Causes of Congestion

Mr. McAdoo also referred to the undue congestion of export traffic at New York which should have been distributed to other ports. He said the railroads were not wholly to blame for this situation because they did not control the shipping but he thought lines terminating at New York had preferred to take freight to that port and that under government control it would be possible to distribute it more equitably.

"Had not the Railroads' War Board taken steps to do so?" asked Senator Watson.

Mr. McAdoo said it may have done so; that he was familiar only in a general way with what it had done but

he thought that while it had done good work it had tried to accomplish by agreement some things the government could order.

Senator Kellogg asked if the principal reason for the congestion was not the enormous increase in traffic and the inability of the railroads to secure additional cars and locomotives because of the prior demands of the government for materials and for cars and engines for France and Russia. He also asked if the War Board had not been able to draft 100 locomotives from western roads without the assistance of the government and if the railroads had not been hampered by letters from the attorney general warning them not to violate the laws.

Mr. McAdoo said he had only a general knowledge of these things.

"But how has government control benefited the situation?" asked Senator Kellogg.

"I haven't said it has benefited it yet," replied the director general.

He said that the statistics show that during the last two or three years the railroads had expended for new equipment much less than in former years and while he was not prepared to say just why this was so it might have been because the railroads had found themselves confronted with the great increase in cost and hesitated to buy as much as they should. "However," he said, "the fact that they did not makes it very obvious that when the enormous increase in traffic came, they found themselves in a very awkward situation."

Senator Cummins asked whether the present organizations, officers and employees of the railroads will be retained.

"As long as they prove satisfactory and efficient, and I hope they will," said Mr. McAdoo.

Officers' Salaries

"What provision ought to be made with regard to the compensation of officers and high-priced employees? What are you going to do with these big salaries that are charged to operating expenses?"

"I haven't had time to give any study to that question," replied Mr. McAdoo. "We are not going to carry any one in the government account that is not necessary but it is necessary that the integrity of the railroad organizations be preserved until the railroads are restored to their owners or at least until Congress determines what shall be their status, and we must pay whatever it costs to get the right kind of talent. The railroads ought to keep up their organizations to the extent that they are serviceable and efficient." He added that the government would not be assuming directly the expense of railroad salaries because they are already charged to operating expenses. The corporations are operating the railroads for government account, and he had not assumed that their employees were government employees.

Senator Cummins then asked for the list of officers and their salaries which Mr. McAdoo promised to furnish as soon as possible.

Mr. McAdoo also conferred with the committee in executive session.

Not in Favor of Government Ownership

Mr. McAdoo continued his testimony before the Senate committee on Monday, laying special emphasis on the importance of an early passage of the bill and upon the necessity of allowing for a period of readjustment after the war without fixing any time limit for the return of the roads to their owners. In reply to a question by Senator Watson Mr. McAdoo said that personally he was not in favor of government ownership of railroads, but he thought it would be impossible to return to the same status that existed before the war, because fundamental conditions will have been so altered, if the period of government control is a long one.

that new legislation will be required to fix the new status and Congress should have a free hand in dealing with the new conditions. The entire method of routing traffic will have changed, he said, and a sudden taking away of the government control would leave both traffic conditions and the position of the security owners in a chaotic condition. Moreover, he said, the expiration of the period might come during a recess of Congress or a filibuster might prevent action within the time limit.

If the plan of government control proves beneficial, Mr. McAadoo said, the people will not be satisfied to go back to the competitive system, and a larger measure of government control than has prevailed would be the result. He suggested the possibility of a plan somewhat along the lines of the present plan, by which the government would not actually take title to the roads but which would free them from the complications resulting from the conflicting jurisdictions of 48 states and the federal government.

"We are dealing with absolutely uncertain conditions," he said, "and if the control should last for three years conditions will be more changed than if it lasted only six months. The longer it lasts the greater will be the government's investment in these properties, if it should last three years the investment might be \$1,500,000,000, and time would be required to effect the liquidation. It is in the interest of the security owners to have the status preserved until intelligent action is taken to settle what it shall be. My view is that it is wiser for Congress to keep this under control, so that it may be free to deal with conditions as they exist at the end of the war."

Senator Kellogg asked if he thought it wise to give the President absolute power over rate-making.

"I think it would be extremely unwise to hamper him in any way," replied Director McAadoo, who explained that there was no purpose to interfere with the exercise of the power of the interstate or the state commissions in ordinary matters, but that it was considered essential that the President should have paramount power to act when the public interest requires it without consulting all the various commissions. He cited as examples his action in ordering coal shipped through the Pennsylvania tunnels to save the people of Long Island from freezing, although it was contrary to a franchise provision, and also his action in prescribing new demurrage rates and rules. It would have been impossible to take prompt action, he said, if he had had to apply for permission to every state commission and some legislatures that had prescribed demurrage rates by statute. The President has a great many powers he does not exercise, Mr. McAadoo said, and while ordinary procedure will continue to be observed in ordinary cases it is necessary for him to have power over rates to prevent the possible action of a state to reduce the revenues on which the government depends to meet its guarantees.

That means that until Congress sees fit to order otherwise one man is going to fix all the rates and their relations," said Senator Kellogg.

"It does not mean that," replied Mr. McAadoo. "It merely means that he has the power to act when it is necessary for the purposes of the war."

If Congress shall fail to legislate to terminate the period of government control, Mr. McAadoo said, the courts could be appealed to to terminate it. If there is any fear of government ownership in the desire to fix a definite time limit, he said, Congress cannot prevent the consideration of that question hereafter by anything it may do now. "Why should we allow the specter of government ownership to influence action that it is wise to take now?" he asked. "The reason we haven't ships now is the fact that Congress in 1914 refused to pass the shipping bill for fear of government ownership, and now we are again confronted with the same specter if we try to do something that is needed to be done."

Senator La Follette protested against the use of the word "specter." "It is a reality," he said, "and we will have to meet it some time anyway."

It has no terrors for me," remarked Senator Cummins.

Mr. McAadoo said he thought the proposed basis of compensation is eminently fair and reasonable, and that a basis that will be accepted so soon will aid the government incalculably in carrying on its own financial operations. When a member of the committee pointed out that the roads which would receive a liberal guarantee would probably make an agreement with the government while the roads whose earnings in the three-year period had been low would not, for more, Mr. McAadoo replied, "Well, what is the remedy for that? We cannot be less than fair to any one. The government cannot stand for doing a double standard to anyone. We can only establish a fair principle as the basis of a settlement." He added that the amount of the guarantee to be paid by the government might be more than the outlay for this reason.

Senator Cummins was more worried about the danger that the President should continue to exercise absolute power over the transportation system after the war than he was about the effect of a sudden removal of the guarantee upon security owners, and asked if Congress should not provide against the possibility of leaving the entire transportation system of the country in the hands of one man.

"I am inclined to feel that the people have more confidence in the President than in anyone else," replied Mr. McAadoo, "and as an American citizen I would be more confident with the railroads in the hands of the President, no matter who he might be, than in the hands of any board or commission. I think he would handle them better and with greater responsibility to the people."

The step taken by the President was necessary, Mr. McAadoo said, not only to secure the necessary coordination of transportation facilities but to give the necessary stability to financial conditions, and that this purpose would not be accomplished unless the basis of compensation is made such as to give assurance of fair treatment to the railroad security owners.

Permanent Acquisition Not Intended

"This step was was not intended to be a permanent acquisition of the railroads," he said. "The government acted to meet an emergency and the compensation should be on an emergency basis. It cannot be put on the same basis as if the assumption of control were to be permanent. The proposed guarantee is about \$100,000,000 less than the income of 1917, and it will be reduced still further by the deflation of war taxes. If that is not a fair trade for the government I don't know what would be fair."

Discussing the order of the Fuel Administration curtailing the use of coal, Mr. McAadoo said that "attaining a reasonable quality of weather," he hoped that conditions would soon improve to such an extent that the order would not have to go as far as is now contemplated, and that "an immense improvement" has resulted already.

Attitude of Congress

Although President Wilson has made several attempts to urge Congress to expedite its consideration of the railroad federal control legislation, no prospects for early action are yet apparent, and no one so far is venturing even an opinion as to what the bill will do out of the assumption that have been holding through continuous hearings for over two weeks.

Committee Chairman Anderson, the leader of the administration bill, which has already been referred to the Anderson bill, is one of the members of the administration that introduced it. He is currently pursuing self-interests of several sections and "has no interest" in discussion of views having authority of

the committees as to various provisions of the bill that a considerable length of time will be taken in agreeing upon the reports. After the bill gets on to the floor of Congress a protracted debate is likely to ensue.

The most sharply defined issue is presented by Section 13 of the bill, which is being bitterly contested by those who, rightly or not, see in it a "joker" for the purpose of keeping the roads in the possession of the government, including a large number of Republicans and also some Democrats who do not believe in government ownership. Another point of controversy has been aroused by the announcement that Mr. McAdoo does not propose to conduct an eleemosynary institution for orphan railroads and will relinquish control of any of the short lines that he does not consider essential. A great many congressmen who are very little concerned about the things that worry the officers and owners of the big railroads are showing not only sympathy for the little roads but are interesting themselves in their local institutions.

Very little opposition is heard to the general plan of the bill for compensating the railroad owners for the use of their property, although some of the radicals and those who are constitutionally anti-railroad will object to it as being too liberal. On the other hand, the ranks of those who may be considered friendly to the railroads—and these are more numerous than they were two or three years ago—are likely to be considerably augmented by those who regard the action of the government in taking over the roads as absolutely unnecessary and unwarranted. The situation was not made more harmonious by the drastic order of the Fuel Administration, which many Republicans chose to interpret as an indirect method adopted for easing the strain on the Democratic railroad administration. One representative called the order "nothing more than a camouflage for the real railroad situation."

The hearings before the Senate committee were continued throughout all of last week. After the representatives of the short line roads had been heard Luther M. Walter, a traffic attorney representing numerous shippers, but who appeared at the request of the committee, suggested some changes in the bill. He was particularly desirous of protecting the powers of the Interstate Commerce Commission and of the station commissions in rate-making and he urged that the three-year average net operating income be based on the period ending December 31, instead of that ending June 30, 1917. He asked that the act to regulate commerce be not interfered with except as to the right of the shipper to route his freight and he thought the shipper should be allowed to designate the delivering carrier. He also urged that a representative of the shippers should be included in the staff of the director-general. The period of government control should terminate 30 or 60 days after the war. In the case of new roads or roads whose traffic has recently been greatly increased, he said, provision should be made for a guarantee representing a reasonable earning capacity.

Joseph L. Bristow, chairman of the Kansas Public Utilities Commission and of the legislative committee of the National Association of Railway Commissioners, began his testimony by asking whether the standard rate of return was meant to be a percentage rate and if so whether it was to be computed on the book value or the capitalization. He was promptly assured by Mr. Anderson that the return was to be a sum of money without reference to any value. Mr. Anderson, to avoid any possibility of confusion, offered to strike out the words "annual rate," but Alfred P. Thom, counsel for the Railway Executives' Advisory Committee, said that that would give the roads only one year's net income for the entire period of federal control. He also said that at the proper time the railroads would ask that provision be made for payment of the guarantee at certain periods, perhaps quarterly, in order that they might meet their obligations. Mr. Bristow and Mr. Walter both asked that the guarantee

of adequate maintenance and depreciation should be made more specific. Mr. Bristow said it would be difficult to define the exact condition of the roads at the time they were taken over and at the time they were restored—"if they ever are restored"—and he feared that there might be many claims for inadequate maintenance.

Mr. Bristow said that, stating the proposed guarantee in terms of the percentage, of the book value made it look smaller than it really was, and he proposed that a definite rate of return based on the market value of the securities, or that the actual dividends be guaranteed. He based his attack on the book value on some of the results obtained in the tentative valuations made by the Bureau of Valuation, but when one of the senators suggested calling Director Prouty to testify, Commissioner Anderson said he had asked him, and that the director said he had as yet no information that would be worth anything as a basis for the compensation of the roads. Chairman Smith said Mr. Prouty had told him the same thing.

Mr. Bristow objected to the proposed guarantee on the ground that it would give some roads 25 per cent on their common stock and bankrupt others. He read a list of 25 roads with the percentages which the three-year average net operating income would represent in the common stock, but Commissioner Anderson said he had omitted to deduct for war taxes, and that if the committee thought the figures material he would like to have them checked by the commission's statistical department.

Senator Kellogg pointed out that under the bill the owners of the stock could not collect their large percentages anyway, because dividends are limited, and Senator Underwood pointed out that the government is confronted by a condition, not a theory, in that it has taken the roads and must pay a fair compensation no matter how painful it may be to do so because the railroads will hardly accept less than they can get from the courts.

The Short Line Railroads

One of the most complicated phases of the problem created by the taking over of the railroads is that affecting the status of the short line railroads, many of which had earned an inadequate return or a deficit in place of a net operating income during the three years ending June 30, 1917, but many of which are now handling a considerable traffic and most of which had very high hopes for the immediate future. But Bird M. Robinson, president of the American Short Line Railroad Association, had not completed his argument for a provision in the bill to give special consideration to their peculiar conditions when John Barton Payne, Mr. McAdoo's legal advisor, announced that there was no intention on the part of the government of taking over a large number of the short roads which had been unprofitable and which were not considered essential and that, therefore, they need not worry about their guarantee.

This announcement fell like a bomb-shell among the representatives of the short lines, who showed copies of the notices received from the director general that they had been taken over, and of the various requests for information sent out by the Interstate Commerce Commission. It also produced some surprise among members of the Senate and House committees. The representatives of the short lines said that while they would be forced into bankruptcy if they were taken over without an adequate guarantee they would be "assassinated" if left out of the government system. Mr. Payne could not say what roads would be left out but, he said that Mr. McAdoo does not think that the proclamation by the President or the notices sent to all railroads in the country constitute taking over all the lines and that he does not think the railroads not necessary for war purposes should be taken.

"The smaller roads cannot live if this interpretation is

trial," said Mr. Robinson. "They will get no freight or cars from the larger line and in addition will be forced to pay the higher wage scale which the government will allow."

"You might as well try to run a rural free delivery route in opposition to the government as to try to run one of these roads in opposition to the government system," said B. B. Dean, of the Gannville & Northwestern, testifying before the Senate committee. "If the government is going to take any it should take all."

Most of the testimony on behalf of the short lines was in regard to the necessity of providing for a guarantee in the discretion of the President or of some board of a return commensurate with the present carrying capacity of the road. The three year average, it was said, would not pay the bond interest on many roads which are now able to pay their interest, particularly in the case of roads which have recently built new lines, or which have recently been reorganized. "You wouldn't fix the rental of a lot which had been vacant on the basis of what it had earned from a peanut stand on it," said Mr. Dean. He thought the "Anderson bill" would be a good bill with a few amendments. Commissioner Anderson said he would not object to a provision giving the President discretion to agree on a basis which would cover interest charges, on valid outstanding obligations and proposed a re draft of section 3 which appeared satisfactory to the representatives of the short lines. This provides that all claims not adjusted shall be submitted to boards of referees appointed by the Interstate Commerce Commission. Mr. Anderson said that section 7 of the bill provides for any necessary financing of a road taken over by advances from the government.

A telegram was received by the Senate committee from the Western Association of Short Line Railroads protesting against any arbitrary basis of compensation. The committee decided that the association might file a brief.

Commissioner Woolley and Mr. Payne are understood to be compiling a list of the railroads and information on which to base a decision as to which lines shall be taken over. The decision will be based on the usefulness of the roads to the government.

Mr. McAdoo was questioned at length by the Senate committee regarding his attitude toward the short line railroads, which he said would not be taken over unless upon investigation they are found to be useful and necessary to the national purpose. "They are hollering before they are hit," he said in reference to their claim that they would be injured if left out of the government system, "and if they are damaged in any way which imposes a liability on the government they have a remedy in the courts." He said that traffic would not be diverted from them except as a war necessity and that there would be no disposition to treat them unfairly. Any non-essential railroad that has been taken over may be relinquished, he said, and a road found useful could be taken at any time, just as canals and other inland waterways could be taken over if desired.

Before the House Committee on Interstate and Foreign Commerce on Saturday, A. De Bernardi, general manager of the Kansas City, Mexico & Orient, said his road had not earned expenses for three years and thought it ought to be guaranteed operating expenses and enough to pay interest charges.

Clifford Thorne, representing several organizations of shippers, urged the incorporation of a specific provision to prevent the Interstate Commerce Commission "being forced into oblivion" by the usurpation of its jurisdiction over rates.

Mr. Thorne also testified before the Senate committee on Tuesday, objecting to the proposed basis of compensation as too high and urging an amendment to provide for the reduction of the guarantee in the case of roads that had failed to maintain their properties adequately.

Before the House committee Glenn E. Plumb, representing

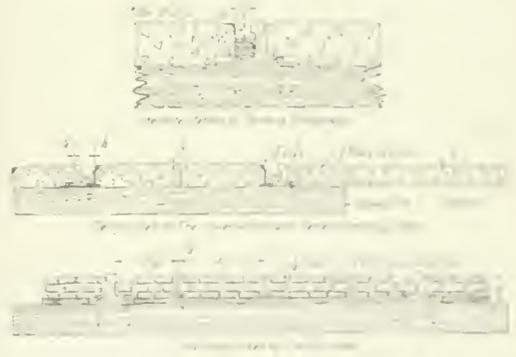
the railroad trade, testified, reported that arguments he had heard in the various bills introduced from the railroads do not seem to be property but are limited by those claims governing to the right of way over it. He proposed an amendment providing that the Interstate Commerce Commission shall determine the amount of such claims necessary to establish a return, and that the return shall be a percentage on this amount. Pending the determination of the amount, he would allow the roads to be paid their present net operating income and provision for a refund of such excess.

Nathan F. Ayer, of Boston, also testified. He would commit his opposition to complete their language, he said.

Concrete Highway Crossings

EXPERIENCES WITH THE use of concrete in road construction for road crossings in certain parts of the country progress on several crossings in the middle west in various periods up to two years and have demonstrated the merits of this material. A recent study of these smaller crossings by the engineer of the Universal Portland Cement Company has led to the preparation of a new design that is to be used at the various crossings of railway tracks and highways in the plant of this company at Burlington, Ind. The drawings and photographs illustrate the manner in which the crossings have been worked out in several cases.

This concrete construction has taken two general different forms. On the Chicago, Burlington & Quincy, at the installation at Harvard, Ill., at La Grange, Ill., and at Dowers Grove, the design is an exact concrete equivalent of the usual wooden plank and tie construction, plank 12 in. thick, 8 in. wide and 8 ft. long, except that the cross



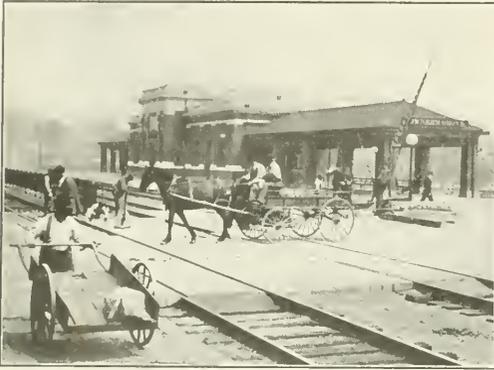
Typical Designs of Concrete Crossings

and planks are 4 ft. long to permit spanning the tracks. The reinforcement consisted of American Steel & Wire Company No. 27 steel rods, made and fastened as follows: One at the bottom and one on each side of the top. Concrete was supported on 2-in. by 4-in. wooden ties, laid on top of the ties.

On the Chicago, Burlington & Quincy road the Gates Rapids & Hook City (Harrison & Grant Roads, Iowa, and in the north of the Eastern Steel Company, at South Chicago, a concrete bridge has been installed, in which use is made of concrete slabs that have considerably more than the thickness of these bridges, the rails of the track are at least a width that tends to produce an uneven roadway. The slabs at Gates Rapids are only 8 ft. long so that they just fit over to make a full concrete width, shown in South Chicago as 7 ft. 6 in. Long, therefore there are 14-ft. wide openings. The slabs at Hook City have a continuous span to the head of the road.

so that they rest directly on the ties without the use of filler blocks or strips. It has been the idea in all of the concrete crossings to make the top surface level with the rail, except that in the case of the new design for the Universal Portland Cement Company, the slabs are crowned $\frac{1}{2}$ in. on the center line of the track and depressed $\frac{1}{2}$ in. on the center line between tracks.

The formation of the flangeway on the gage side of the rails is an important detail and was provided for in nearly all of the cases mentioned by some form of all-metal flangeway such as that obtained by a rail laid on its side with the head bearing against the web of the running rail, or with the use of an angle iron, supported on a wooden strip to give



A Concrete Slab Crossing Installed by the Burlington at Downers Grove, Ill., in May, 1917

the desired elevation. With a flangeway formed in some such manner, no special detailing of the concrete slabs is necessary, although it is desirable to protect the edge of the slab adjacent to the flangeway by means of a metal guard. In the Universal Portland Cement Company's design a Kahn curb bar is used. One of the drawings shows a Burlington design in which the slab is notched out to fit under the rail and provide an adequate flangeway without the use of an extra rail or an angle bar.

Some question has been raised as to the need of fastening the units of the concrete crossing in place, and the use of



A Crossing Installed at Cedar Rapids, Ia.

lag screws driven through holes cast in the slabs has been suggested, but in none of the installations recorded has it been considered necessary to take this precaution. In the concrete plank design used by the Burlington there has been some tendency for the row of planks next to the rail to creep but this has been overcome by driving a stake at one or both ends of the row.

A detail that is of far greater importance is the provision of a ramp at the ends of the crossing to insure that dragging

brake beams or other parts of cars will be carried safely over the top of the crossing, instead of catching on or underneath the ends. At South Chicago, a ramp of this kind has been built up of wooden planks, while on the Burlington a steel plate is used for this purpose.

Construction

It is generally found of advantage to build units for use in installations of this kind at concrete plants where other unit construction work is carried on. The work in the field is then restricted to the preparation of the foundation and the lifting of the units into place. On the Burlington the slabs placed in the space between tracks were founded on a sand cushion tamped by means of a 25-lb. tamper and carefully leveled off. The slabs were placed $\frac{1}{2}$ in. below the top of rail, but after two or three days' service some of them worked up flush with the top of rail. The joints between the slabs were also filled with sand. At the Illinois Steel Company crossing at South Chicago, granulated slag was used for the foundation bed and filling material.

Service

The two crossings at Cedar Rapids have been in use for nearly two years and the crossing on the Burlington at Hannibal, Mo., has passed through one winter, while those at the other two locations on that road have been in service since early in the spring. The conclusions based on an examination of these crossings after this service indicate that the concrete crossing planks afford a serviceable permanent construction. The units are readily kept in place, and with a grade of material and workmanship suited to the purpose, the concrete will stand up well under the vehicle traffic. The principal advantage of this form of construction is that it affords a roadway surface that compares favorably with that of any pavement that may be in service on either side of the tracks while retaining the ready removal feature so necessary for the proper maintenance of track.

MATERIALS NECESSARY FOR A SINGLE AIRPLANE.—The following figures, according to the Official Bulletin, have been received from the Signal Corps, Aviation Section, of the materials necessary for a single airplane of the more simple type, and exclusive of all the materials necessary for the engine:

Nails	4,326
Screws	3,377
Steel stampings	921
Forgings	798
Turnbuckles	276
Veneer	square feet 57
Wire	feet 3,262
Varnish	gallons 11
Dope	gallons 59
Aluminum	pounds 65
Rubber	feet 34
Linen	square yards 201
Spruce	feet 244
Pine	feet 58
Ash	feet 31
Hickory	feet 1 1/2

GAGES IN WARFARE.—Most military lines constructed within the past three years have been either on the standard gage or on the 3-ft. and meter gages, but 2-ft. lines have also been of considerable use. Speaking generally the standard gage carries men, material and food to within some miles of the trenches, railroad going forward in each fresh advance, while the meter gage lines, the so-called "trench railways," run thence to points well within the zone of fire. These narrow gage lines also serve as connecting links in the main system in much the same way as the Belgian light railways feed and tap the main lines in normal times, and we believe that in certain districts mixed gage lines have been laid as well. Results prove our frequent contentions as to the traffic handling capacities of narrow gage railways, subject to the proviso that the very heaviest artillery requires standard gage tracks for its transportation.—*Railway Gazette, London.*

Pennsylvania Lines Specialize in Car Conservation

Excellent Results Are Achieved by Promoting the Intensive Utilization of Car Space

A SAVING IN CAR SPACE equivalent to 4,000 cars is the enviable result achieved by the Pennsylvania Lines West of Pittsburgh in November, 1917, in its campaign for heavier loading of l. c. l. freight. This record represents the decrease in the number of cars required to handle the l. c. l. business of the lines in November, 1917, the last month for which statistics are available, as compared with the number used in July, 1912, the first month in which special attention was directed to intensive loading. The saving in cars was made possible by an increase in the average lading per car from 10,849 lb. in July, 1912, to 19,076 lb. in November, 1917, or 76 per cent. By conserving cars used for l. c. l. freight, more equipment has been made available for the movement of c. l. business. However, the road is not concentrating its attention on l. c. l. traffic exclusively, but is also directing its efforts to increase the average lading of c. l. freight.

Beginning with March, 1917, the road extended its intensive loading campaign, prior to that month applicable to l. c. l. freight only, to include c. l. business. The results achieved subsequently have been encouraging. A large number of commodities for which records have been kept since that time show increases in carload weights for September, 1917, averaging about eight per cent above March. The details of the work of stimulating the greater utilization of cars both in handling l. c. l. and c. l. traffic are carried on under the direction of J. W. Roberts, superintendent of freight transportation of the Pennsylvania Lines West, and under the immediate supervision of W. T. Wolff, superintendent of freight station service.

Heavier Loading of Less-Than-Carload Freight

Previous to July, 1912, l. c. l. freight on the Pennsylvania Lines was handled without reference to the conservation of car space. When the intensive loading campaign was inaugurated there was considerable opposition to the plan on the ground that the delay incident to holding cars for capacity loading would result in a loss of traffic and that heavier loading would lead to an increase of damage claims. Neither objection has proved tenable. The holding of cars for heavier loading has actually expedited the delivery of l. c. l. freight, inasmuch as it has facilitated the movement of traffic to destination or the nearest transfer point, thereby opening the way for extensive consolidation of loading classifications, with a resultant saving in cars.

Damage claims are no more attributable to heavy loading than to light loading. Damage results from *improper* loading, not intensive loading. In fact, a well-stowed car loaded to capacity is less liable to damage than a car only partially filled.

To reduce loss and damage claims to the minimum the Pennsylvania Lines has issued a booklet of detailed instructions for the stowing and bracing of l. c. l. freight, and has taken special pains to employ experienced stowmen or stewdores to stow and brace freight in cars. In the first few years following the inauguration of intensive loading of l. c. l. freight, Mr. Wolff, as the special representative of the superintendent of freight transportation, spent considerable time on the road keeping in personal touch with the freight agents at the large stations of the system. Each agent was required to prepare a daily report of cars loaded at his station, from which monthly statements were drawn showing the average pounds per car of l. c. l. freight forwarded from each

station showing division of cars per month, as well as for each division at a cost.

Establishment of Rule Prescribing Minimum Carloads

In August, 1912, an order was issued requiring agents to hold cars until they contained 10,000 lb. or more of freight if destined to a station on another division or 4,000 lb. or more if consigned to a station on the same division. This practice of holding cars for loads in equivalent to the sailing day plan, with the exception that it is more flexible, i. e., no particular days of the week are designated as shipping days but cars are merely held until they contain at least minimum lading.

The records kept by the freight agents enable the superintendent of freight station service to improve in agent or division superintendent if cars are forwarded lightly loaded. The following form letter is one which has been used to require why lightly loaded cars have been forwarded contrary to the rule:

PENNSYLVANIA LINES WEST OF PITTSBURGH

Office of the Superintendent of Freight Station Service

Pittsburgh, Pa.,

Mr.
Supt. Div.
On 191 Station load and
forwarded Carload to
with only lb. of freight. Please advise
as to this light loading. See Rule 2, General Notice 91 -
W. T. WOLFF,
Supt. of Frt. Station Service.

The fixing of minimum carload weights for l. c. l. freight was merely a starting point in the intensive loading campaign. Subsequently, instructions were issued providing that all cars used for the movement of l. c. l. business must be loaded to cubical capacity.

Monthly Bulletins Show Improvement or Decline in Loading

On about the seventh day of each month the superintendent of freight station service issues a bulletin showing the average pounds per car of l. c. l. freight handled on each division and at each station forwarding 15 or more cars per month. The monthly standing of a station or division is a source of pride and interest to each division superintendent and freight agent. It is thoroughly understood, of course, that differences in local conditions may make it difficult for one agent or superintendent to compete with another, but nevertheless an improvement on the part of any station or division proves a source of satisfaction to the officers responsible. One of the sources of strength of the intensive loading campaign has been the fact that personal letters of commendation are often sent to freight agents and division superintendents when they direct a result in the average pounds per car forwarded from their station or division.

Prior to October, 1917, statistics for the loading of l. c. l. freight included only those stations forwarding five cars or more per month and beginning with October, 1917, the statistics were further extended to stations which forward but 15 cars or more per month. This new rule was put into effect at the request of the Pennsylvania Lines West, but in compliance of its policy of the Commission on Car Service of

the American Railway Association, applying to all member railroads in the country.

Comparative Statistics of L. C. L. Loading

In November, 1917, the average lading per car of l. c. l. freight was 17,860 lb. for the Central system and 19,521 lb. for the Southwest system of the Pennsylvania Lines West, or the highest averages ever attained for these two systems. The increases in loading over July, 1912, for the Lines West as a whole and its three constituent systems are as follows:

	Average lading L. C. L. freight in pounds		Increase in pounds	Per cent increase
	November, 1917	July, 1912		
Pennsylvania Lines West.....	19,076	16,849	8,227	75.83
Southwest system.....	19,521	16,655	8,866	83.20
Central system.....	17,860	9,029	8,831	97.80
Northwest system.....	18,819	11,463	7,356	64.17

Each system also showed increases in the average lading per car of l. c. l. freight forwarded in November, 1917, over November, 1916. The increase for the entire road was 1,459 lb. per car, or 8.28 per cent; for the Northwest system, 408 lb., or 2.21 per cent; for the Central system, 3,036 lb., or 20.48 per cent; and for the Southwest system, 1,988 lb., or 11.33 per cent. Although the total l. c. l. traffic handled in November, 1917, was considerably below that of the same month of 1916 and somewhat smaller than that of July, 1912, this decrease was not due to the loading methods of the road, but to chronic embargoes and to the fact that, as previously stated, effective October, 1917, the monthly statistics include only stations forwarding 15 or more cars per month instead of five or more cars per month. The records for March, 1917, show conclusively that heavier loading has not led to a loss of business. The volume of l. c. l. traffic forwarded in that month surpassed all previous records and was moved with 29,000 fewer cars than the total l. c. l. business of July, 1912.

Of the 118 stations on the Pennsylvania Lines West for which statistics were prepared in November, 1917, 22 achieved the highest loading records ever made at those stations. The station at Economy, Pa., which stood forty-first in rank of loading in November, 1916, was third in rank in the same month of 1917; Allegheny, Pa., rose from thirty-eighth in rank to fourth in the same period, and Chicago (Dairy Station) from twenty-seventh to sixth. Other stations showed like improvement. The comparative loading

year. These factors have affected some stations more seriously than others, and in some instances account for the less favorable showing of stations which made good records a year ago. In spite of these difficulties, it is quite well established, on the Pennsylvania Lines at least, that the holding of cars for two or three days to secure full lading does not work a hardship on shippers, because it permits a longer haul without interruption at transfer or intermediate points, thereby eliminating costly delay.

How Heavier Loading of C. L. Freight Has Been Accomplished

Intensive loading of c. l. freight is more difficult to effect than intensive loading of l. c. l. freight because its success rests almost entirely with the shippers; the railroads are able only to assist by suggestion and by furnishing the shippers with statistics indicating whether or not their efforts have produced good results. The Pennsylvania Lines West keeps monthly records of all cars loaded with the heavier commodities, giving the average lading for each commodity and for each individual shipper. In the case of some commodities of low specific gravity arbitrary maximum carload weights were established which were found, through experience, to be within the bounds of physical possibility. These bases were established, instead of following the policy of asking that all cars be loaded to 110 per cent of the stenciled capacity, a plan which in many cases would serve only to antagonize the shipper. Under this scheme the standard lading for earthenware was placed at 28,000 lb. per car regardless of stenciled capacity, that of oats at 65,000 lb., that of flour, corn, wheat and barley at 96,000 lb. if loaded on cars stenciled 100,000 lb. capacity, and if loaded on cars stenciled under 100,000 lb., at marked capacity plus 10 per cent. The standard lading for tinplate, steel shapes, nails, cement, stone, salt, brick, lime, tinplate bars, steel and soda ash (dense), ballast, gravel, sand, limestone, pig iron, structural steel, sheet steel, bar steel and flux was placed at 10 per cent above the stenciled capacity, as all of these commodities are of high specific gravity.

Each report prepared by the railroad shows the percentage of capacity utilized for the current month and the preceding month, indicating to the shipper whether or not he is making any improvement. The accompanying table is a sample of a monthly report showing carload averages for a number of typical commodities. On the basis of a maximum stand-

STATEMENT SHOWING LOADING OF CARLOAD FREIGHT IN JULY, 1917

Commodity	No. of cars checked	Total weight of commodity loaded into cars	Average pounds per car loaded	Total capacity (lbs.) of cars checked	Average capacity (lbs.) per car	Percentage of capacity utilized		Per cent increase	Per cent decrease
						July, 1917	June, 1917		
Tin plate.....	373	31,380,212	84,129	33,869,000	90,801	92	83	9	..
Iron.....	111	7,808,596	70,350	9,405,000	84,739	83	78	5	..
Sheet steel.....	42	3,505,816	83,471	4,026,000	95,857	86	77	9	..
Cement.....	734	57,647,059	78,538	59,201,000	80,791	97	97	..	..
Stone.....	640	69,786,400	109,041	74,893,000	117,015	93	89	4	..
Flux.....	412	43,707,800	106,807	46,365,000	112,536	94	86	..	2
Soda ash (dense).....	43	3,520,795	81,878	3,613,500	84,034	97	99	8	..
Brick.....	515	39,897,850	77,005	42,872,500	84,896	92	93	1	..
Flour.....	16	873,970	54,633	1,288,000	80,510	68	81	..	13
Wheat.....	22	1,716,100	78,004	1,974,000	89,727	89	87	..	12
Corn.....	172	12,279,240	71,391	14,741,000	85,703	83	87	..	4
Oats.....	173	9,843,318	56,000	11,245,000	65,000	87	75	12	..

ard carload for each commodity the loading record for 28 of the most important commodities was 92 per cent in July, 1917, as compared with 85 per cent for the preceding month.

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Considerable improvement has been effected in the loading of coal. In general, coal is now loaded to 100 per cent of cubical capacity, or about 5 per cent above the average lading for May, 1915.

On October 1, 1917, the Commission on Car Service of the American Railway Association issued an order directing that all carloading records be based on 110 per cent of the stenciled capacity of the car. While commodities of low specific gravity make a poor showing under this plan as com-

In general, the continuous loss of experienced labor to other industries offering higher wages, has intensified the difficulties which the ever-changing multiplicity of embargoes has placed in the way of heavier loading during the past

Station	Station average lading in pounds		Increase in per cent	Rank among stations	
	Nov., 1917	Nov., 1916		Nov., 1917	Nov., 1916
Economy, Pa.....	31,216	19,206	62.53	3	41
Allegheny, Pa.....	30,317	19,391	36.30	4	38
Chicago (Dairy Station).....	28,438	21,188	34.21	6	27

pared with those of higher specific gravity, this order has the advantage of establishing a universal basis from which intelligent comparisons can be made between different railroads. If, under this scheme, freight of low specific gravity registers but 35,000 lb. when loaded to the cubical limits of a car of 100,000 lb. capacity, it will be understood by the shipper and the railroad alike, that a load of 30 per cent of the stenciled capacity of the car, plus 10 per cent, constitutes the best that can be done with that commodity. On the other hand, in comparing the records of one road with another, the line handling commodities of low specific gravity will, under this plan, show up at a disadvantage with lines handling heavy commodities.

Comparison of Monthly Records of Commodity Loading

The Pennsylvania Lines' records for October and succeeding months have been prepared in accordance with the order of the Commission on Car Service. As a result, the average loading percentages for commodities of low specific gravity have fallen considerably. For instance, the loading of earthenware which averaged 103 per cent of what the railroad considered a maximum lading in September, fell to 33 per cent in October. Likewise, enamelware fell from 91 per cent to 25 per cent, stoneware from 95 per cent to 36 per cent and flour from 73 per cent to 69 per cent. In spite of these decreases on account of the new method of calculation, the lading of 33 commodities for October averaged 91.5 per cent of 110 per cent of stenciled car capacity, as compared with an average of 92 per cent for September on the old basis of arbitrary maximums for different commodities. The holding up of the average is accounted for by the fact that substantial increases in average carload weights were effected for commodities of high specific gravity. The following statement indicates the percentage of capacity utilized in loading various commodities of c. l. freight both on the new basis, for the month of October, and on the old basis, for preceding months:

TABLE 1.—PERCENTAGE OF CAPACITY UTILIZED IN LOADING VARIOUS COMMODITIES OF CUBICAL FREIGHT, AS ASCERTAINED BY A MONTHLY CHECK.

Commodity	May	June	July	Aug.	Sept.	Oct.
Flour	73	69	69	63	60	96
Earthenware	103	103	103	103	103	33
Enamelware	91	87	87	103	103	25
Stoneware	95	91	91	91	91	36
Flint	77	71	71	64	73	69
Oil	65	61	61	67	68	74
Oats	87	84	75	87	91	94
Steel	88	80	80	88	84	93
Stone	88	80	80	88	84	93
Stim.	88	80	80	88	84	93
Stim.	88	80	80	88	84	93
Stim.	88	80	80	88	84	93

One of the greatest obstacles in the way of the more intensive loading of c. l. freight is the trade unit basis of doing business in various industries. Trade units date back to the time when cars were smaller, and are based on what were then considered well-filled carloads. The Pennsylvania Lines West, in common with other railroads, is doing all it possibly can to induce shippers' and manufacturers' associations to discontinue this method of doing business, and to base all orders on a modern c. l. basis, i. e., the loading of cars to full cubical or stenciled capacity. They have been assisted materially by the National Industrial Traffic League and its various car service committees throughout the country, which have brought home to the individual shippers the great importance of this change in methods. Some shippers have gone so far as to refuse orders which do not permit heavy carloading.

Intensive Loading Important Both in War and Peace Times

In the intensive loading of l. c. l. freight the Pennsylvania Lines West was a pioneer among American railroads. The persistent campaign which it has carried on in this direction has resulted in an increase of over 75 per cent above the

average loading per car when l. c. l. freight was handled without reference to the commodity. That saving in car space is reflected in a decrease of about 25,000 cars per month in the equipment required to handle the total l. c. l. business of the line.

However, loading of l. c. l. freight has broken into percentages only recently because it is a matter almost entirely under the control of the shipper. The great volume of traffic which has been pressing for shipment during the past two years, and the prime importance of coast-to-coast transportation from the entrance of the United States in the war has forced shippers and consignees to consign railroad equipment to releasing cars more quickly and to utilizing available car space more fully. The Pennsylvania Lines West has been able to stimulate heavier loading of c. l. freight since last spring because shippers have been in the mood to need to give consideration to the suggestions of the road.

The loading of heavy commodities has been increased appreciably through the cooperative efforts of the railroad and shippers. Cement which was loaded to 92 per cent of car capacity in March, 1917, showed a percentage of 79 in October; the loading of nails increased from 60 per cent to 72 per cent in the same period, stone from 86 per cent to 98 per cent. The more important commodities (exclusive of coal) were loaded 7.5 per cent heavier in October than in March, 1917, despite the fact that the computation of loading percentages on the basis of stenciled car capacity, introduced in October, resulted in marked drops in percentage for some commodities. Car conservation (whether applied to l. c. l. or c. l. traffic, is particularly important in war times and is likely to receive even more attention if the freight traffic of the country continues to increase in volume. Of paramount consequence in war times, it is a practice worthy of continuance after the return of peace.

A Substitute for the Frog

FROGS IN TURNOUTS ARE A CONSIDERABLE SOURCE OF WEAR AND TEAR to rolling stock and track and on lines of heavy traffic frog maintenance and frog renewals become very burdensome. For this reason any device of practical application that will replace the frog and eliminate the trouble-



A Will Frogless Switch Operated from a Switch Stand

may also be used on a variety of the old road as it is used in making both in straight and curved track matter. An application of this kind has been developed which consists of a short parallel rail positioned on a pivot so that it can be swung

into line with the running rails of either track. The movement is accomplished by a system of rods and levers actuated from a switch stand or interlocking plant. A suitable locking device is provided to secure the rail in line for either track, the arrangement being such that the switch stand lever cannot be locked unless the locking bolts of the swing rail have been fully driven home. When connected with an interlocking plant it conforms to the usual locking requirements.

All parts of this device exposed to the traffic are mounted on a steel plate which is spiked to the ties. The four rail ends are fastened to this plate by means of bolts and suitable cast steel blocks bolted to both the plate and the rail so that there is no opportunity for the rails to run under the effect of traffic and temperature. The swing rail is supported for its entire length by two cast steel bars, having the general shape of two supporting rail-joint bars except that each one of them is provided with bolts which lock the rails into position by passing into holes in the cast steel blocks supporting the ends of the running rails.

In the earlier designs, illustrated in the photograph, the swing rail was moved by rods attached near its end, and

was locked by means of rods driven end-wise between the stock rails. In the improved design, the working mechanism is contained in a cast iron drum located directly under the pivot and the operating rods entering this drum are below the top of the ties. The operating mechanism consists of two concentric shafts, one to swing the rail and the other to lock and unlock it.

The photograph shows one of these frogless switches in service in the eastbound freight track of the Atchison, Topeka & Santa Fe, at Argentine (Kansas City), Kan. This installation is operated from a switch stand and has been in service for over four years. The anchoring of the ends of the running-rails to a plate makes it possible to reduce the clearance between the abutting ends of the rails to a very small amount. In consequence wheels pass over this joint with but little jar. The device requires much less metal than the usual frog and obviates the need for guard rails. All parts of the device subjected to wear from traffic can be renewed readily and in a short time.

The device is manufactured by the Walls Frogless Switch & Manufacturing Company, Kansas City, Mo.

Supreme Court Decisions Affecting Railroads

Interstate Commerce and the Relations Between State and Federal Regulating Authorities

THE UNITED STATES SUPREME COURT on January 14 rendered two important decisions in cases involving the relations between state and federal authority in matters affecting interstate commerce. In one case the order of the Texas railroad commission imposing penalties for failure to run passenger trains within 30 minutes of the advertised schedules was held to be an unlawful interference with interstate commerce. In the other the court sustained the dismissal of suits brought by the Illinois railroads in the effort to have set aside the Illinois two-cent fare law on the ground of the Interstate Commerce Commission's order requiring the removal of the discrimination against interstate commerce. While the court repeated the principles of its decision in the Shreveport case, that the federal power is ample to remove discriminations arising from the relation of state and interstate rates, it held that the uncertainty of the commission's order was such that it could not be used to nullify the effect of the state law. The Illinois case came before the court on cross appeals by the Illinois railroads and the state authorities from a decision by Judge Landis of the district court for the northern district of Illinois. An abstract of the decision is as follows:

The Illinois Case

These cross appeals present a controversy over the validity, scope and effect of an order of the Interstate Commerce Commission dealing with discrimination found to result from a disparity in interstate and intrastate passenger rates. For some years prior to December 1, 1914, interstate passenger rates between St. Louis and Keokuk on the one hand and points in Illinois on the other were on a substantial parity with intrastate rates between East St. Louis and Hamilton, respectively, and points in Illinois. All were on a basis of 2 cents per mile, save that the rates to and from St. Louis and Keokuk included a bridge toll over the river. All other rates between points in Illinois were also on the same basis, any intrastate rate in excess of 2 cents per mile being prohibited by a statute of that State. On December 1, 1914, the rates between St. Louis and Keokuk, respectively, and

points in Illinois were increased by the carriers to 2½ cents per mile, plus bridge tolls, the parity theretofore existing being thereby broken. Following this increase the Business Men's League of St. Louis filed with the Interstate Commerce Commission a petition charging that the rates between St. Louis and points in Illinois were unreasonable in themselves, and, in connection with the lower intrastate rates, worked an unreasonable discrimination against St. Louis and in favor of Illinois cities, particularly East St. Louis and Chicago, and a like discrimination against interstate passenger traffic to and from St. Louis and in favor of intrastate passenger traffic to and from East St. Louis and Chicago. An association representing interests in Keokuk, Iowa, intervened and urged that any relief granted with respect to St. Louis be extended to Keokuk. The state of Illinois, the Public Utilities Commission of that state, an association representing interests in Chicago and another association representing interests in East St. Louis, also intervened and opposed any action contemplating or requiring an increase in intrastate rates. After a hearing the Interstate Commerce Commission filed a report finding that the existing bridge tolls at St. Louis and Keokuk were unobjectionable, that rates between either of those cities and points in Illinois were reasonable when not in excess of 2.4 cents per mile, plus bridge tolls, and that the service, equipment and accommodations provided for intrastate passengers to and from East St. Louis, Hamilton, and Chicago, were the same as those provided for interstate passengers to and from St. Louis and Keokuk. In that report the commission also found that the contemporaneous maintenance between East St. Louis and Hamilton, respectively, and other points in Illinois, of rates on a lower basis than those maintained via the same routes between St. Louis and Keokuk, respectively, and the same points in Illinois, bridge tolls excepted, gave an undue preference to East St. Louis and Hamilton and to intrastate passenger traffic to and from the latter points, and subjected St. Louis and Keokuk and interstate passenger traffic to and from those cities to an unreasonable disadvantage; that the existing disparity in interstate and intrastate rates worked an

unjust discrimination against St. Louis and in favor of Chicago in so far as the rates between St. Louis and points in Illinois approximately equal, but from those cities exceeded by more than the difference in the rates between Chicago and the same points, that the disparity worked a like discrimination against Keokuk and in favor of Chicago, and that the existence on the reasonable direct lines of the carriers in the territory between Chicago on the one hand and St. Louis and Keokuk on the other of intrastate rates on a lower basis per mile than the rates between that territory and St. Louis and Keokuk, bridge tolls excepted, operated to subject interstate traffic to an unreasonable disadvantage.

The commission then made an order intended to result in the installation of rates not exceeding 2.4 cents per mile between St. Louis and Keokuk, respectively, and points in Illinois and to remove the discrimination shown in the report, but shortly thereafter the commission recalled that order and filed a supplemental report indicating that lawful interstate rates between St. Louis and Keokuk on the one hand and Illinois points on the other could be defeated by the use of two tickets, one purchased at the interstate rate for a part of the journey and the other at the lower intrastate rate for the remainder, and therefore that the order should be so framed as to cover the rates between the intermediate points. In this connection it was said that the discrimination against interstate traffic resulting from the lower intrastate rates "would not be removed merely by an increase in the intrastate fares to and from the east bank points," and that "any contemporaneous adjustments of fares between St. Louis or Keokuk and points in Illinois, and generally within Illinois, which would permit the defeat of the St. Louis, Keokuk, East St. Louis, or any other east side city fares by methods such as described above, and which would thereby permit the continuance of the undue prejudice which we have found is suffered by St. Louis and Keokuk, and continue to burden interstate commerce," would not comply with the order.

In obedience to that order the carriers—of whom there were 29—took the requisite steps to establish and put in force interstate rates on a basis of 2.4 cents per mile between St. Louis and Keokuk, respectively, and points in Illinois, and those rates became effective. Then, believing the order required all intrastate rates in Illinois to be on a level with those interstate rates, bridge tolls excepted, the carriers proceeded to establish and put in force new rates between all points in that state on a basis of 2.4 cents per mile. This met with opposition on the part of the state authorities and the carriers severally brought suits against them, in the district court for the northern district of Illinois, to enjoin them from interfering, by civil or criminal proceedings, or otherwise, with the establishment and maintenance of such intrastate rates under the commission's order. The suits were consolidated and the present appeals are from decrees dismissing the bills for want of equity and dismissing cross bills of the state authorities for want of jurisdiction.

Mr. Justice Van Devanter, after making the foregoing statement, delivered the opinion of the court.

After discussing questions of jurisdiction the opinion holds that the district court had rightly disposed of the jurisdictional questions by entertaining the principal suits and declining to entertain the cross bills. The opinion continues:

Whether the suits by the carriers were rightly dismissed on the merits is the principal question, and its solution turns on the power of the commission to deal with discrimination arising out of a disparity in interstate and intrastate rates, and on the scope and effect of the order made.

In their answers the state authorities took the position that in so far as the order purports to authorize or require a removal of the discrimination found to exist by a change in intrastate rates it is in excess of any power that has been or can be conferred on the commission, and therefore neither relieves the carriers from full compliance with the state rate

laws and provides that they have been being thus enforced against them. If the carriers were bound the commission's jurisdiction would be broken for where the commission makes an order which it has no power to make, the order is operative, yet not for its execution. But that the power to be asked is entitled by the *Interstate Commerce Act*, § 101. It is not for consideration if there was any.

1. Under the authority given to the Commission Congress has ample power to prevent the common transportation of interstate and intrastate commerce, and on the railroad, from being used in their respective operations in such manner as to affect interstate trade, when an interstate.

2. Where unjust discrimination against interstate commerce arises out of the relation of intrastate to interstate rates this power may be exerted to remove the discrimination and this whether the intrastate rates are maintained under a local statute or by the voluntary act of the carrier.

3. In correcting such discrimination Congress is not restricted to an adjustment or reduction of the intrastate rates, but may prescribe a reasonable standard to which they shall conform and require the carrier to adjust the intrastate rate in such way as to remove the discrimination; for where the interstate and intrastate transactions of carriers are so related that the effective regulation of one involves control of the other, it is Congress, and not the state, that is entitled to prescribe the dominant rule.

4. It is admissible for Congress to provide for the execution of this power through a subordinate body, such as the Interstate Commerce Commission, and this is authorized by the act to regulate commerce.

5. Where in the exercise of its delegated authority the commission not only finds that a disparity in the two classes of rates is resulting in unjust discrimination against interstate commerce but also determines what are reasonable rates for the interstate traffic, and then directs the removal of the discrimination, the carrier not only is entitled to put in force the interstate rates found reasonable but is free to remove the forbidden discrimination by bringing the intrastate rates to the same level.

Upon further consideration that decision was approved and followed in *American Express Co. v. Caldwell*, 244 U. S. 617.

The parties differ widely about the scope of the order. The carriers assert that it covers every intrastate passenger rate in Illinois, is addressed to the removal of discrimination found to be state-wide, and gives ample authority for increasing all rates between points in Illinois from 7 cents to 2.4 cents per mile. On the other hand the state authorities assert that it is not state-wide and that the extent to which it is intended to affect the state made rates is so indefinite and vaguely stated as to make it inoperative and of no effect as to them. Of course, the commission could object the remedy to the evil and make the order be based on the wrongful discrimination; and not improbably it would intend to go that far and no farther. But the object of the discrimination found and of the remedy applied must be gathered from the reports and order of the commission, for they constitute the only authoritative evidence of its action. The reports show that not only discrimination found relate to the passenger traffic between Illinois and points outside that state—St. Louis and Keokuk. There is no finding that this traffic operates in operable systems in all sections of Illinois. As to some sections, it is stated that it is very large and as to others almost negligible. At least the report leaves the matter open. Obviously the traffic is not a small part of the interstate passenger traffic passing over the railroads in Illinois, and yet the finding is made that there was discrimination against this part. Had the commission regarded the discrimination as state-wide it is not reasonable to believe that it would have said so in its

findings. And had it intended to require or authorize a state-wide readjustment of the intrastate rates it doubtless would have given direct expression to that purpose, which easily could have been done in a few lines. But neither in any part nor as a whole does the order plainly manifest such a purpose. In harmony with the reports it deals with the intrastate rates in so far only as they result in discrimination against interstate traffic to and from St. Louis and Keokuk. Its most comprehensive paragraph—the next to the last—declares that the carriers must “abstain from the undue preferences and the undue and unreasonable prejudices and disadvantages found in said report to result from the contemporaneous maintenance between Illinois points of passenger fares, which fares, in combination with other fares required or permitted by this order, would produce the discrimination against interstate commerce and the undue preference in favor of intrastate commerce condemned in the report of the commission.” But even here the general terms are so far restrained by the reference to the reports as to show that nothing more is intended than to command the removal of the discrimination to which the traffic to and from St. Louis and Keokuk is subjected. Besides, this paragraph evidently proceeds upon the theory that some of the intrastate rates are not affected by the other paragraphs, and ought not to be disturbed save where their use in connection with rates sanctioned by the order will be productive of the discrimination which it is intended to correct.

But while the order shows that it is not intended to require or authorize a readjustment of all the intrastate rates, the description of those to which it applies is at best indefinite.

There may be less uncertainty in some parts of the order than in others, but when each is read in the light of the rest and all in the light of the reports it is apparent that none has a certain or definite field of operation. The uncertainty arises out of a failure to designate with appropriate precision the territory or points to and from which the intrastate rates must or may be readjusted, and this omission accords with the absence from the reports of any finding showing definitely the territory or points where those rates operate prejudicially against the interstate traffic which the order is intended to protect.

To be effective in respect of intrastate rates established and maintained under state authority an order of the commission of the kind now under consideration must have a definite field of operation and not leave the territory or points to which it applies uncertain.

In construing federal statutes enacted under the power conferred by the commerce clause of the Constitution the rule is that it should never be held that Congress intends to supersede or suspend the exercise of the reserved powers of a state, even where that may be done, unless, and except so far as, its purpose to do so is clearly manifested. This being true of an act of Congress, it is obvious that an order of a subordinate agency, such as the commission, should not be given precedence over a state rate statute otherwise valid, unless, and except so far as, it conforms to a high standard of certainty.

We conclude that the uncertainty in this order is such as to render it inoperative and of no effect as to the intrastate rates, established and maintained under a law of the state, and therefore that the suits by the carriers were rightly dismissed on the merits.

The Texas Case

In the Texas case the court reversed the judgment of the lower court in a suit brought by the state of Texas to recover penalties for violation of an order of the State Railroad Commission. This order required passenger trains in Texas to start from their point of origin and from stations on the line in accordance with advertised schedule, allowing them

not exceeding 30 minutes at origin or points of junction with other lines to make connection with trains on such other lines, and not exceeding 10 minutes more if at the end of the 30 minutes the connecting trains were in sight. There were some other qualifications not necessary to be stated.

The defendant's passenger trains concerned were numbers 9 and 209, and were parts of a train, also numbered 9, of the Missouri, Kansas & Texas Railway, a different corporation, taken charge of by the defendant at Denison, Texas, about five miles south of the Texas and Oklahoma state line, under a contract with the Missouri, Kansas & Texas. In pursuance of this contract they were forwarded via Dallas and Fort Worth to Hillsboro, thence as one train to Granger and there again divided, the two parts going respectively to Galveston and San Antonio. There were similar arrangements for trains to the north. The cars received by the defendant came from St. Louis and Kansas City, Missouri, uniting at Parsons, Kansas, and thence proceeding south to Denison. The court of civil appeals at first held that the movement must be regarded as a continuous one from Kansas City and St. Louis, and that the order did not apply to the train; but on a rehearing decided that as the defendant took control at Denison with new crews and engines, and as the defendant could not go beyond the state line, the movement so far as the defendant was concerned was wholly within the state. Breaches of the order having been proved, it affirmed a judgment imposing a fine. A writ of error was refused by the supreme court of the state.

Justice Holmes in the decision said:

The supreme court gave up the manifestly untenable ground taken by the court of civil appeals and recognized that the defendant's trains were instruments of commerce among the states, but it construed the order as applying to them none the less and held it valid as so applied. The only question with which we have to deal is whether the state commission could intermeddle in this way, especially when there was sufficient accommodation for local traffic independent of the through trains. The defendant in error attempts to open this last matter, because the opinion of the court of civil appeals in which the fact was stated was reversed by it for a different reason, and that of the court of first instance was the other way. But we regard the decision of the intermediate and the supreme court as proceeding upon the assumption that we have stated and that we see no reason to disturb. Again, the question is not what the state commission might require of a road deriving its powers from the state, with regard to local business, *Missouri Pacific Ry. Co. v. Kansas*, 216 U. S. 262, 283, but whether the order if applied to this case would not unlawfully interfere with commerce among the states.

On its face the order as applied was an interference with such commerce. It undertook to fix the time allowed for stops in the course of interstate transit. It was a serious interference, for it made the defendant liable for an interstate train not starting on schedule time, when the train did not come into the defendant's hands, from another company in another state, until late. This, as we understand the facts, was the train to which the advertised schedule applied, and if so, the mere statement of the result is enough to show that the burden imposed not only was serious but was unwarranted as well as unjust. The suggestion that compliance with the order could have been secured by having an extra train ready to run if the regular one was not on time hardly is practical, and is not an adequate answer, even in form. For the defendant advertised, or at least had the right to advertise, the interstate train, and, if it did so, would not free itself from liability for a delay on the part of that train by offering another. We think it plain that this order was applied in a way that was beyond the power of the commission and courts of the state.

Report of Commission on Adamson Eight-Hour Law

The report of the commission of three appointed in 1916 to observe the operation and effects of the Adamson Eight-Hour law has been transmitted to the President and to Congress. It is signed by General George W. Goethals, chairman, E. E. Clark and George Rublee. The report contains, among other things, findings of the commission with regard to the effects of the institution of the eight-hour standard work day upon wages and hours. It shows an increase in cost to the railroads, increase in wages in each occupation and class of service, increases in wages as affecting individual employees, amount of overtime payments and additional allowances, typical wages by occupations in relation to services performed, and average hours of service.

The eight-hour day, says the report, as a measure of a day's work for the purpose of reckoning compensation of certain classes of railroad employees, has become an accomplished fact, and it is not understood that the roads have any intention of further contesting the establishment of the eight-hour day for the employees concerned. The employees recognized by roads as entitled to the eight-hour basis under law are: Engineers, firemen, conductors, assistant conductors, baggagemen, brakemen and flagmen in road and yard service, and generally also hostlers. The average number of employees in these classes in the calendar year 1916 was about 17 per cent of the total number of railroad employees. The law does not limit the actual duration of work to eight hours per day.

As actually applied in practice, the eight-hour standard which is being observed in road service is the so-called speed basis of $12\frac{1}{2}$ miles per hour. On a run of 100 miles or less, however, overtime begins after eight hours. Notwithstanding the permission of overtime the law has had some effect in reducing the actual hours of work. This is true

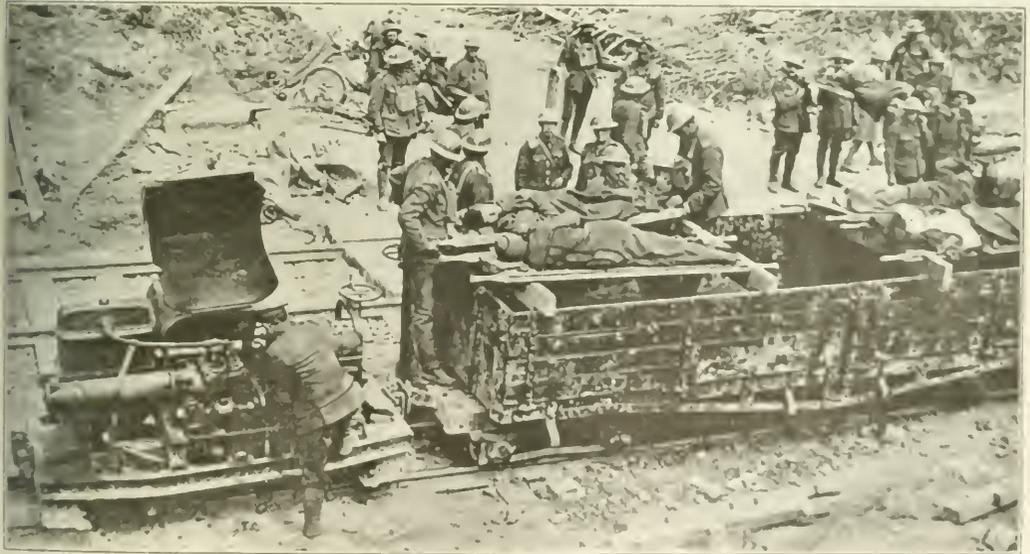
chiefly in yard service. Between March and October, 1917, over 11,000 yard crew were placed on eight-hour duty.

In road service the reduction in hours has been slight. Where hours have not been reduced the law has had the effect of increasing wages. Detailed reports for the month of January, 1917, indicate that the law caused the addition of over \$61,000,000 annually to railroad operating expenses. To what extent economies may be introduced to offset this increase in expense cannot be stated. Except in short turn around and suburban service passenger service is but little affected by the law. In road freight service the increase in wages averages about 15 per cent and about 25 per cent in yard service. Where there has been an actual reduction in hours the total pay of the individual is not necessarily increased by the eight-hour law, and his pay may actually be less than it was in the year 1916 before the law became effective.

A detailed study of the payrolls indicates that 10 per cent of the employees in the classes named received no increase in pay in January, 1917. Under the eight-hour law 30.2 per cent received less than \$10 per month increase, 22.6 per cent received from \$10 to \$20 a month increase, and 34.5 per cent received \$20 or more per month increase. The figures are subject to modification to the extent that the hours of work have subsequently been reduced.

Concerning hours of labor, the report says that in the Eastern district in slow freight service the actual time during which engineers are on duty is from 12 to 13 hours per run. In the Southern and Western districts the corresponding figures are considerably smaller. In local freight service men work from 11 to 12 hours per run in all districts.

Among the subjects which receive special treatment are speed and delays of freight trains, railway wage schedules and agreements, employment conditions in road and yard service, and practicability of an actual eight-hour day in railroad train service. The report itself is a book of about five hundred pages. Only a press summary was given out for general publication.



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Light Railway with Gasoline Engine Being Used for Transportation of Wounded Soldiers

New Night Lights for Pullman Cars

THE PULLMAN COMPANY has been experimenting for some time with various lighting arrangements designed to provide suitable illumination for the aisles of sleeping cars after the passengers have retired. A satisfactory installation has recently been developed and is now being applied to all new cars built and also to cars which pass through the shops for repairs.

It may be of interest to give a few details of the numerous installations which were tried before a method of lighting was evolved that would fulfill all the requirements. In one of the experiments a light was placed at the bulkheads at the ends of the aisles and shaded with an amber glass, with a view to providing a non-glaring light to illuminate the aisle at night. This was found to be unsatisfactory as it lighted the end sections to some extent. An attempt to secure the

main switchboard, separate switches being used for the lights on the right and left sides of the car.

The fixture, which is attached to the aisle seat end and the seat rail, is pressed out of sheet steel. The base carries a small switch of the push button type which makes it possible to control each light individually. The lamp is placed in the fixture in a horizontal position, being held in place by a plain Edison type socket secured by a spring clip. The casing around the light, like the base, is of pressed steel.



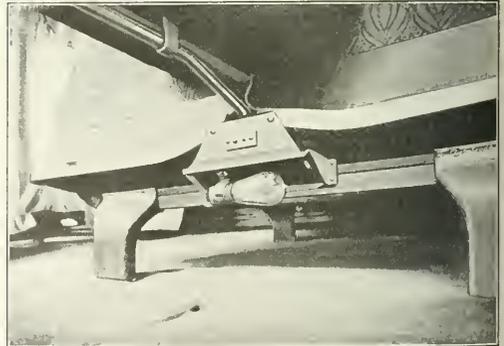
Sleeping Car Aisle Illuminated by Lights Under Seats



Location of Aisle Light Under Seat End

In one side it carries a green glass which throws a subdued light over the floor. The connections are dust tight and with the exception of the green glass, which can readily be reached from the aisle, the parts will require cleaning at infrequent intervals. As will be seen from the illustrations all parts of the fixtures are easily accessible when the seats are removed and in case it becomes necessary to replace a lamp or any other part it can be done with little difficulty.

The Pullman Company is now planning to install fixtures



Lighting Fixture with Case Removed

same results by dimming the ceiling lights also proved a failure. An installation with lights under the seat ends was tried, but the light was found to be annoying to the occupants of the lower berths opposite the fixtures. This objection has now been overcome by shading the light with a green glass.

The lighting arrangement which has been adopted for illuminating the aisles consists of 15 watt, 32 volt, type S tungsten lamps in receptacles placed under the ends of alternate seats. As the ends of the aisle are illuminated by the lights at the bulkheads it is not necessary to provide lights under the single seats in the end sections. Every second seat end on each side of the car carries one of the lighting fixtures, which are placed alternately on opposite sides of the car. Thus a 12 compartment car has 5 aisle lights and a 16 compartment car has 7. The lights are controlled at the

similar to those used on the berths at the steps, to provide illumination for the treads. Clear glass, instead of green glass, will be used in these fixtures. Applications have been made by the Pullman Company for patents to cover the principal features of this system of lighting.

AUSTRIAN FARES INCREASED 50 PER CENT.—Austrian railway fares have been increased by 50 per cent since December 1.

General News Department

George Hodges, chairman of the Committee on Relations Between Railroads of the American Railway Association, and its related committees, has been re-elected for a term of two years.

Edwin F. Wendt, member of the engineering board of the Interstate Commerce Commission, and past president of the American Railway Engineering Association, has been elected president of the Washington Society of Engineers.

Repeal of the Valuation Act, under which the Interstate Commerce Commission is making a valuation of railway property, is the object of a bill which has been introduced in Congress by Senator King of Utah. It is Senate bill No. 3530.

All freight must be unloaded within seven days, if Congress should pass a bill, introduced by Senator Nelson of Minnesota on January 18. The Senator believes that this would be more effective than demurrage charges, to prevent cars from being used as storehouses.

The shopmen of 29 roads west of Chicago have laid before the director-general of railroads a request for better pay and for an eight-hour day; also for overtime rates for work done on Sundays and holidays. They want a maximum rate of \$6 a day and a minimum of \$3.50 for all shopmen, except carmen. The carmen want a maximum of \$5 a day.

The steel manufacturers of Canada, following conferences with the War Committee of the cabinet, have announced that the production of steel in the Dominion, this year, will be made 20 per cent more than last year, provided there is no failure of raw materials. Since the beginning of the war the railroads have suffered seriously from lack of rails because of the preferences given to makers of munitions.

Commanding officers on troop trains are forbidden to interfere with the schedules of the trains. This is an order from the War Department issued as a result of repeated protests from railroads. The railroads complained that officers on trains, ignoring carefully arranged schedules, have in some instances followed their own opinions as to where and when the trains should stop for resting or exercising the men, or for feeding and watering animals.

Surprise tests on the Pacific system of the Southern Pacific Company in the month of December numbered about 3,000. Among the most common tests are the removal of markers, extinguishment of lights, and the display of wrong numbers in caboose and engine indicators. In every test of this kind the trainmen detected the false condition and reported the error. The per cent of efficiency was 99.77. The few failures noted were mostly of a technical character, not involving the immediate element of risk.

Western Society of Engineers Elect Officers

The Western Society of Engineers, Chicago, has elected Charles Burdick, consulting hydraulic engineer, Chicago, president; James N. Hatch, consulting mechanical engineer, first vice-president; Kempster B. Miller, consulting electrical engineer, second vice-president; A. S. Baldwin, chief engineer, Illinois Central, third vice-president and C. R. Dart, bridge engineer, Sanitary District of Chicago, treasurer.

Railway Regiments' Tobacco Fund

The Machinery Club, New York, has voted to set aside one-third of the net profits of the cigar department for a tobacco fund for troops abroad and is dividing this third equally between the Railway Regiments' Tobacco Fund and the New York Sun Tobacco Fund. A check for \$295.94 has been received from F. A. Sullman, acting chairman of the House Committee of the Machinery Club, as the Railway Regiments' Tobacco Fund proportion of this distribution for the month of December.

Another War Bonus in England

The English Government has granted another war bonus to railway workers, the fifth since the beginning of the war. The new bonus amounts to six shillings a week, bringing the total increase since February 1915, to 21 shillings a week. The average pre-war wage was 30 shillings. The bonus to boys is increased to 10s. 6d. a week, while women and girls receive 8s. 6d. and 4s. 9d. extra a week, respectively.

Report on Telegraph-Wire Disturbances

The California State Railroad Commission, summarizing the results of an investigation extending over five years, has compiled a large mass of material on questions connected with inductive interference with the operation of telegraph and telephone wires by parallel power circuits, and persons interested in the subject and desiring information may apply to Richard Sachse, chief engineer of the commission, 833 Market Street, San Francisco. The full report is not yet available.

This investigation has been made, at an expense of \$100,000, by the commission jointly with power companies and utilities interested in the subject.

Freight Moving Week in New York

The "Clean-up Week" ordered by the director-general of railroads was badly neutralized by the severe cold and snow, but the freight stations in New York City reported considerable success, in spite of the obstacles. Substantially all of them report hearty co-operation on the part of the consignees and the steamships. The Lehigh Valley reported 1,418 loaded cars on Jan. 10 on the 21st, as compared with 1,747 on the 14th, a decrease of 329. The New York Central reported a similar decrease of from 9,176 to 8,758.

The coal situation in New York City has been increasingly critical, not so much because of railroad congestion as from difficulty in getting boats across the river from New Jersey. More than half of the available tugs in the harbor were temporarily disabled by broken propellers or other damage caused by ice; and floating ice greatly reduced the speed of all water movements. Many barges were sunk while being towed through ice fields. Receipts of coal in the city have been from 20,000 to 25,000 tons daily when the normal needs aggregate 40,000 tons.

Western Lines Move Large Quantities of Coal

Following the severe storm of January 11, 12 and 13, a protracted period of severely cold weather greatly handicapped railway operation in the Central West. As a result the Chicago terminal district and other transportation centers in the Middle West are congested at the time of writing, and interchanges of cars between roads are slower than under normal conditions. The danger of a coal famine, which caused the United States Coal Administration to stop the wheels of commerce for five days, January 18-22, led western lines to devote most of their attention to the movement of coal when train operation was resumed after the storm. It was not until the 19th, however, that the railroads were able to move anywhere near the coal traffic they are capable of handling. In the 48 hours ending with midnight, January 20, fuel movements into the Chicago Terminal district by all roads with the exception of the Elgin, Joliet & Eastern, reached the high figure of 2,501 cars, of which 327 contained anthracite, 2,000 bituminous coal and 174 coke. During the same period 16 cars were delivered to industries, 53 cars were placed at room tracks and 93 at coal yards, while 2,226 cars in the district remained unplaced. Of the cars delivered 558 remained unplaced at the termination of the two-day period. Whether this rate of movement will be maintained depends upon whether the milder weather which made its appearance in the early part of the week continues.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER, 1917.—(Continued)

Table with columns: Name of road, Average mileage operated during period, Operating revenues (Total, Freight, Passenger, etc.), Operating expenses (Way and structures, Equipment, Maintenance, etc.), General, Total, Net from operations, Operating, Railway accruals, Increase (or decrease) last year.

Figures operation April 1, 1917.

REVENUES AND EXPENSES OF RAILWAYS

ELEVEN MONTHS (CALENDAR YEAR 1917)

Name of road.	Average mileage operated during period.			Operating revenues.			Maintenance of way and structures.			Operating expenses.			Net railway operating ratio.	Railways tax acc't.	Operating income (or loss).	Increase (or decrease) last year.
	Freight.	Passenger.	Total.	(inc. misc.)	Equip-ment.	Way and structures.	Traffic.	Trans-portion.	General.	Total.	Operating ratio.	Net railway operating ratio.				
Alabama & Vicksburg	131	4,296,365	1,927,191	267,645	\$321,273	\$60,993	\$1,939,456	160,000	1,003,343	1,003,343	71.06	6527.218	\$164.35	\$192,484	\$28,418	
Alabama Great Southern	342	4,462,376	1,545,626	6,472,138	1,241,059	1,000,000	1,860,000	860,000	1,000,000	1,000,000	74.65	730.889	144.40	5,865,971	51,417	
Albany	37	3,053,473	563,602	3,916,635	389,734	295,165	1,616,485	163,442	1,616,485	1,616,485	67.46	132,658	47.19	1,671,661	224,254	
Arizona, Topeka & Santa Fe	8,339	90,811,639	27,662,012	138,660,967	14,581,033	21,511,876	2,127,452	39,833,913	4,866,063	40,739,915	67.46	4,182,638	1,790,531	1,622,818	1,422,818	
Atlanta & West Point	61	813,105	589,157	1,603,311	150,767	263,727	71,152	539,874	561,516	1,102,704	83.66	496,077	116,115	379,644	67,331	
Atlanta, Birmingham & Atlantic	640	2,713,197	3,611,900	3,600,251	530,818	608,656	167,080	1,899,794	112,725	3,711,975	79.66	599,277	154,770	424,711	78,888	
Atlantic & St. Lawrence	176	1,109,547	2,784,117	1,626,963	456,183	363,216	48,577	1,543,626	77,764	1,448,560	31.11	117,031	1,171,031	1,35,474	88,909	
Atlantic City	170	1,492,347	1,780,177	3,027,832	374,603	237,599	39,616	1,493,659	133,073	1,415,989	79.18	1,009,242	1,100,000	1,492,347	142,440	
Atlantic Coast Line	4,787	26,080,124	10,389,711	49,455,335	3,463,137	6,481,732	629,239	14,418,694	28,619,991	22,226,606	79.18	1,155,000	317,956	3,976,214	197,441	
Baltimore & Ohio	4,723	94,716,165	17,924,589	132,945,271	13,611,530	21,641,520	2,919,428	51,018,494	94,681,999	94,681,999	76.63	8,237,177	4,761,522	24,716,672	1,109,378	
Baltimore & Ohio Chicago Terminal	79	758,331	8,808	1,818,865	204,518	348,308	16,710	1,179,250	79,415	1,816,550	76.70	1,144,444	1,000,000	1,816,550	349,649	
Baltimore, Chesapeake & Annapolis	47	381,579	1,201,365	559,634	285,296	285,296	48,537	1,338,760	134,753	1,600,438	66.82	1,144,444	48,537	1,548,000	100,000	
Bell Ry. of Chicago	631	3,094,724	775,673	3,537,891	264,232	500,158	15,059	1,670,995	79,574	2,530,019	71.51	1,171	146,131	161,745	63,741	
Bessemer & Lake Erie	98	11,077,172	358,782	11,682,313	1,340,065	2,763,673	129,416	3,610,500	246,371	7,016,819	69.77	3,765,631	941,015	1,566,214	1,641,516	
Birmingham & Northern	44	2,769,123	1,108,000	3,769,123	376,000	500,000	19,000	1,900,000	43,000	2,330,000	66.74	1,843,000	1,566,214	2,330,000	135,646	
Boston & Maine	23	1,155	2,135	1,089,724	179,925	290,990	9,102	531,103	43,706	615,116	66.74	378,548	36,572	1,155,646	135,646	
Boston & Massachusetts	2,305	32,448,745	16,425,049	54,759,015	5,072,922	7,781,124	408,466	27,021,086	1,297,855	42,244,564	78.09	12,144,841	1,817,974	10,328,477	1,817,974	
Buffalo & Susquehanna R. R. Corporation	252	1,534,681	66,632	1,629,913	249,055	455,335	18,974	511,244	70,402	1,305,210	70.63	3,142.3	6,000	1,305,210	18,974	
Buffalo, Rochester & Pittsburgh	586	1,210,576	1,191,601	13,790,365	1,414,566	3,662,189	174,316	5,273,910	323,223	10,867,044	78.8	5,038,310	431,000	2,411,961	617,760	
Canada Pacific Lines in Maine	234	1,766,520	282,831	1,849,806	429,987	330,541	64,646	990,126	56,374	1,971,673	85.63	314,132	16,500	1,141,673	60,604	
Carolina, Chesapeake & Ohio	283	3,931,670	770,233	3,752,598	393,521	580,531	181,392	840,215	147,540	2,139,285	58.60	1,613,777	14,400	1,466,265	80,665	
Carolina, Chesapeake & Ohio S. C.	277	3,991,406	175,899	3,790,436	119,853	119,853	178,670	444,318	107,255	1,994,366	66.60	79,947	85,500	674,000	82,713	
Central New England	301	4,511,603	371,992	5,080,635	672,039	820,000	13,801	1,601,741	101,255	3,000,310	70.35	1,750,141	19,400	1,500,510	31,605	
Central of Georgia	1,918	9,457,662	3,214,909	14,387,635	1,413,833	4,485,362	400,576	47,300,236	455,350	10,150,950	71.98	5,291,821	661,141	4,635,214	677,184	
Central of New Jersey	681	25,191,639	6,401,784	34,329,974	2,861,106	5,992,178	340,243	13,632,764	712,255	17,241,537	69.16	7,072,610	1,711,664	16,500,000	1,818,114	
Central Vermont	269	6,695,756	3,538,418	8,094,065	788,457	1,046,999	215,539	3,770,348	188,175	6,088,444	71.65	3,519,010	1,100,000	4,919,010	1,100,000	
Central Vermont Western	342	1,441,188	408,065	2,157,340	370,009	559,093	48,220	758,836	42,160	1,437,083	66.60	79,947	85,500	674,000	82,713	
Chesapeake & Ohio	2,478	39,482,341	7,048,466	49,902,850	6,349,112	9,819,446	640,250	16,794,120	1,017,440	34,900,358	77.77	14,088,466	2,171,101	18,827,311	1,418,500	
Chicago & Alton	1,023	13,775,726	4,418,810	18,989,283	2,093,146	3,885,985	138,383	6,737,131	100,183	11,935,460	71.98	5,291,821	661,141	4,635,214	677,184	
Chicago & Erie	1,031	14,468,756	3,118,997	19,329,242	2,029,146	4,885,320	307,183	7,297,601	451,340	14,016,465	71.58	4,331,322	741,141	3,590,181	477,184	
Chicago & Northwestern	2,609	6,695,756	3,538,418	8,094,065	788,457	1,046,999	215,539	3,770,348	188,175	6,088,444	71.65	3,519,010	1,100,000	4,919,010	1,100,000	
Chicago, Burlington & Quincy	8,373	79,484,457	23,191,357	111,054,305	12,499,755	17,279,791	1,553,041	37,607,794	575,295	74,902,794	75.48	10,311,688	2,171,101	18,827,311	1,418,500	
Chicago, Detroit & Cass Isl. Ferry	1,006	81,074	101,815	1,214,566	118,661	174,579	16,578	667,318	107,318	1,015,382	72.14	488,955	100,000	388,955	48,955	
Chicago, Great Western	1,406	10,136,114	3,551,979	14,991,897	1,137,610	2,631,534	50,005	5,790,688	17,415	11,515,349	72.14	488,955	100,000	388,955	48,955	
Chicago, Indianapolis & Louisville	654	4,751,511	1,971,962	8,411,663	601,560	1,555,400	257,642	3,065,510	302,642	3,668,152	72.14	488,955	100,000	388,955	48,955	
Chicago, Milwaukee & St. Paul	10,364	71,713,847	19,448,664	111,530,781	10,179,905	19,873,928	1,674,666	43,705,001	1,422,011	74,000,501	74.12	2,018,887	461,141	1,557,746	161,141	
Chicopee & St. Louis	55	1,659,110	26,758	2,016,410	376,318	442,202	65,784	1,641,141	117,000	1,758,141	72.14	488,955	100,000	388,955	48,955	
Chicopee & St. Louis	8	6,084,106	1,006,713	7,111,333	904,844	1,507,266	112,902	3,519,010	1,311,000	4,830,010	72.14	488,955	100,000	388,955	48,955	
Chicopee, St. Paul, Minn. & Omaha	175	1,211,810	571,469	1,166,011	2,341,484	3,719,023	1,115,416	3,719,023	1,115,416	4,830,010	72.14	488,955	100,000	388,955	48,955	
Chicopee, Terre Haute & Southwestern	374	3,137,667	1,176,667	4,314,334	410,852	856,718	50,353	1,181,575	5,800	2,616,244	76.4	4,182,638	1,790,531	2,392,107	224,254	
Cincinnati, Indianapolis & Western	311	1,693,315	518,116	2,445,234	814,154	472,160	78,184	1,035,310	86,585	1,921,895	71.41	533,989	113,000	420,989	41,000	
Cincinnati, New Orleans & Texas	317	8,555,729	3,851,201	12,017,663	1,010,980	2,717,190	314,343	3,488,074	100,660	8,086,274	71.41	3,811,691	1,000,000	2,811,691	271,691	
Cincinnati Northern	345	7,052,540	1,657,970	7,630,840	301,433	309,506	39,506	3,578,175	35,238	1,657,970	71.41	3,811,691	1,000,000	2,811,691	271,691	
Cleveland, Cincinnati, Che & R. Lines	197	31,411,955	10,811,000	48,406,493	4,361,042	9,051,659	966,256	19,416,404	666,211	14,033,244	71.41	13,423,248	3,000,000	10,423,248	1,000,000	
Coal & Coke	197	31,411,955	10,811,000	48,406,493	4,361,042	9,051,659	966,256	19,416,404	666,211	14,033,244	71.41	13,423,248	3,000,000	10,423,248	1,000,000	
Colared & Western	11	7,898,431	1,443,724	9,601,600	940,780	1,714,183	171,341	3,015,446	79,316	4,008,631	61.64	3,201,272	4,000,000	1,201,272	301,272	
Colared & Western	45	1,100,000	117,214	1,016,516	6,377	152,000	4,270	31,153	41,116	80,465	71.41	4,000,000	4,000,000	4,000,000	4,000,000	
Colared, Middle & Western	3	8,400,000	158,093	1,342,111	85,280	97,403	17,810	766,148	76,148	842,296	71.41	4,000,000	4,000,000	4,000,000	4,000,000	
Comberland Valley	93	1,008,340	44,081	4,460,111	412,845	50,412	50,412	1,431,108	118,368	590,941	53	6,000,000	4,000,000	2,000,000	200,000	
Delaware & Hudson C. R. R. Dept.	88	1,466,584	479,711	571,011	403,515	507,555	86,678	1,158,807	26,811	1,185,618	71.41	1,771,384	1,000,000	771,384	100,000	
Delaware & R. Dept.	2,668	30,000,000	1,441,000	1,777,100	1,777,100	4,648,400	440,311	1,777,100	51,000	1,777,100	71.41	1,771,384	1,000,000	771,384	100,000	
Detroit & St. Lake	358	1,419,688	1,394,348	1,844,518	60,863	60,863	2,553	1,394,348	1,394,348	1,394,348	71.41	4,000,000	4,000,000	4,000,000	4,000,000	
Detroit & Mackinac	314	1,660,000	111,443	1,210,111	154,011	135,111	26,000	1,000,000	1,000,000	1,000,000	71.41	4,000,000	4,000,000	4,000,000	4,000,000	
Detroit & Mackinac, Shore Line	100</															

Tank Car Tests and Safety Appliances

The executive committee of the Master Car Builders' Association has issued a circular regarding the hydrostatic tests of tanks of tank cars, stating: "That part of section 23 of the standard specifications for tank cars, classes I, II, III and IV, which requires that the tanks be retested hydraulically at stated intervals, is hereby suspended as to tanks for which such tests shall become due prior to January 1, 1920, except when the cars are shopped for repairs. The requirements of section 23 of each of the specifications named, that new tanks shall be tested before being put into service, and that tanks damaged to the extent of requiring patching or renewal of one or more sheets, or extensive riveting or recalking of seams, shall be retested before being returned to service, are not suspended."

A circular was also issued regarding safety appliances, stating: "The date effective of rule 3, paragraph m, of the rules of interchange, regarding the interchange of cars not equipped with United States safety appliances or United States safety appliances, standard, is hereby extended from January 1, 1918, to March 1, 1918."

The Dilution of Labor

As an illustration of the difficulties experienced by the railroads since and prior to the entrance of this country in the European War, the following comparative figures for one of the large railroads are of interest, as showing the number of men employed during the year 1917, such as firemen, brakemen and telegraphers, as compared with the normal force:

	Normal force	Employed	Men employed per man required
Firemen	3,000	5,491	1.83
Brakemen	5,560	8,531	1.6
Operators	1,300	585	.45
Total	9,860	14,607	1.5

On one division located in the iron and steel district it was necessary to employ four firemen, 2½ brakemen and 1½ telegraphers to maintain the normal force. The figures reflect not only the enlisting and drafting of men into the government service, but also the widespread shifting of employees, during the present abnormal conditions, because of offers of improved pay or conditions.

Mr. Willard Returns to B. & O.

The resignation of Daniel Willard as chairman of the War Industries Board of the Council of National Defense was reported in last week's issue. The White House has given out the text of his letter to President Wilson tendering his resignation, which says, in part: "The taking over of the railroads by the government has naturally raised many unforeseen and intricate questions, and it seems clear to me that I ought now to give my whole time to the affairs of the Baltimore & Ohio. In common with all other American railroads its operating organization has been considerably weakened during the last year because of the large number of officers and skilled employees who have gone to France and Russia."

In an interview at Baltimore Mr. Willard is quoted as saying that President Wilson left him free to take whatever steps would enable him to render the most useful service. "If I thought that I could be of greater service to my country by running a locomotive attached to freight trains over the Baltimore & Ohio than by doing what I am doing today, I would assume the new task without hesitancy. I was an engineer long before I became President of the Baltimore & Ohio. It is my desire to follow the line of activity that will produce the best results for my country in the midst of the supreme struggle in which it is now engaged. . . . Over 2,000 of our men have joined the colors, and it was right that they should do so. Of course, this left us short of men. Our officers have been working night and day. They are overworked; some of them have been ill. Facing such conditions, I could not help feeling that it was my duty to come back and devote my whole time to the railroad property. Our men in the trenches in France are depending on us for munitions and supplies. I have a boy at the front in France. I do not know what is going to happen to that boy before this war is over. But I do want to say that if all I am called upon to experience while my son and the sons of other parents are at the battlefield is a

little inconvenience to myself that might arise through compliance with some government order, I shall be delighted. This is no time for thinking of ourselves and slight interferences with our daily lives."

American Railway Engineering Association Convention

The American Railway Engineering Association is proceeding with its plans for its annual convention which will be held at Chicago on March 19 to 21 inclusive. Reports will be presented from the standing and special committees. In addition a large part of the session on Wednesday will be devoted to the consideration of the problems with which the maintenance of way department is now confronted in the handling of labor. It is expected that the report of the Committee on Economics of Railway Labor, discussing methods of securing men and of feeding and housing them, will be presented on that day. Letters have been sent out to a selected list of about 100 members of the Association asking them to prepare and submit descriptions of devices and methods for the conservation of labor which have come to their attention.

The annual dinner will be held as usual on Wednesday evening and will be in the nature of a war dinner. It is expected that two prominent railway men will speak on the railway situation at that time.

Pere Marquette Inspection Awards

Announcement has been made of the results of the 1917 track inspection on the Pere Marquette, based on a trip made in October, conducted by Frank H. Alfred, president of the road. A prize of \$100 was given to William Meier, roadmaster of the Detroit division, Benton Harbor, Mich., for the district receiving the highest grade and a prize of equal amount was given to H. Morris, roadmaster on the Canadian division at Walkerville, Ont., for the district showing the greatest improvement during the year. Prizes of \$25 were awarded to 12 foremen receiving the highest grade on each roadmaster's district and to 11 foremen making the greatest improvement as compared with 1916.

In addition to the examination of the track the inspection trip covered a consideration of signals and an inspection of station grounds and shops, shop grounds, repair tracks and engine houses, three additional inspection committees being appointed to grade these special features. Based on these gradings a prize of \$50 was awarded to E. Smith, the signal supervisor receiving the highest grade for the condition of interlocking and automatic signals. A prize of \$100 was given to Charles Montgomery, division master mechanic at St. Thomas, Ont., whose shop grounds and buildings received the highest awards, and \$25 to the station agent on each superintendent's division for the highest grade on station grounds.

The various prizes were awarded on the basis of grading made by committees assigned to consider the various phases of track maintenance, as well as signals, shop grounds, stations, etc.

Government to Mobilize Labor

The United States Department of Labor has recently reorganized its employment service for the purpose of conducting a campaign for the mobilization of labor. This is to meet the greatly increased demand of war industries and one of the announced objects is to furnish 250,000 men for transportation service. The employment office formerly under the jurisdiction of the commissioner-general of immigration has been turned over to the United States employment service under the direction of John B. Densmore; and the Secretary of Labor has appointed a special advisory council, including representatives both of employers and of employees, with John Lind, former governor of Minnesota, as chairman. This advisory council is to direct the campaign for co-ordinating the supply and the demand. Secretary Wilson intends later to increase the advisory council by the appointment of representatives from the War and Navy departments and the Department of Agriculture and the shipping board.

"The labor administrator and his advisory council," says Mr. Wilson, "will at once take in hand the questions of standardization of labor policies; will consider labor dilution and

training, priority demands, the adjustment of disputes and the safeguarding of employment. The advisory council will study all phases of the problem, make recommendations and plans for additional machinery and supervise their execution."

Arrangements are being made for the early transportation of 50,000 common laborers to the United States from Porto Rico. As soon as vessels are available 60,000 others will be brought from Porto Rico and the Virgin Islands, sufficient, it is hoped to take care of the shortage of the domestic supply of railroad and agricultural workers. Director-General McAdoo has asked the employment service to assist in employing the railroads with labor for maintenance of way and for shop work.

Embargo Zone System Now in Effect

The new system of handling embargoes briefly outlined in the *Railway Age* of January 11, page 140, became effective on January 21. The railroads of the United States and Canada have been divided into 26 zones for this purpose. Hereafter all railroads will transmit their embargo notices, modifications, extensions and cancellations to all zone chairmen concerned and at the same time to all their agents at non-subscriber connections. No road may transmit its embargoes to any of its direct subscriber connections except as may be specifically arranged and agreed upon with the zone chairman. Embargoes received by zone chairmen are transmitted immediately upon receipt to roads listed under their jurisdiction according to their discretion, both as to whether a road may be affected in any particular by the embargo, or whether the method of transmission should be by wire, mail or messenger. When embargoes are placed because of congestion, accumulation, or threatened conditions at a particular gateway, or against shippers at stations where more than one railroad may be involved, the zone chairman will be responsible for any embargo action necessary to prevent accumulations or congestions on other lines entering the gateway or serving the shippers in question. Embargoes must be transmitted by wire to the zone chairman and become effective 24 hours after 11:59 p. m. of the date issued. The 26 zone headquarters and zone chairmen follow:

Zone Headquarters	Name of Embargo Chairman
Atlanta, Ga.	I. L. McCullum
Birmingham, Ala.	H. F. Hutcheson, Southern Ry. Wash. & N. D. C.
Boston, Mass.	A. G. Thomson
Chicago	D. J. Fessly (vice-chairman)
Columbus, Ohio	I. W. Geer, Pennsylvania Lines
Denver, Colo.	E. L. Brown, Denver & Rio Grande
Detroit, Mich.	F. M. Nowell, Wabash
Galveston, Tex.	J. H. Keefe, G. Colo. & Santa Fe
Indianapolis, Ind.	J. W. Conroy
Kansas City, Mo.	O. C. Hill, Kansas City Terminal
Louisville, Ky.	W. R. Hensley
Memphis, Tenn.	A. H. Fran, Y. & M. V.
Minneapolis, Minn.	A. T. Slade, Northern Pacific
Montreal, Que.	W. M. Neal (secretary)
Nashville, Tenn.	M. Wrenne, N. C. & St. L.
New Orleans, La.	I. B. Riley
New York, N. Y.	E. Williams
Omaha, Neb.	G. E. Peterson, C. B. & Q.
Philadelphia, Pa.	H. O'Donnell, Penna. R. R.
Pittsburgh, Pa.	H. I. Crawford, Penn. & Lines West
Richmond, Va.	W. B. Luke, R. Fred. & Pot.
San Francisco, Calif.	K. M. Nicoles, West Pac.
Seattle, Wash.	J. H. O'Neill, Great Northern
St. Louis, Mo.	W. F. Garry
Wilmington, N. C.	T. King, Atlantic Coast Line
Winnipeg, Minn.	Grant Hill, Canadian Pacific

Additions to Railway Honor Roll

Data received from the Standard Air Line and the Florida East Coast indicate that 443 employees of those lines are now with the colors. Information received from these roads, together with additional statistics published in the *Railway Age* of January 18, page 181, increase the number of railroad employees and officers in the nation's service reported in the *Railway Age* of January 4, page 22, to 55,302 men. Up to date returns have been received from 126 roads representing 209,463 operated miles. The number of railway officers and employees of these lines now holding commissions in the army or navy number 1,482. The following statistics show the number of men in army or navy service and the names of officers and employees who have re-

ceived commissions in the Standard Air Line and Florida East Coast respectively.

STANDARD AIR LINE

Employees Who Received Commissions

Name	Railroad	Military Position	Rank	Army or Navy
Hugh H. Hays	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
I. S. Waters	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
W. W. R. K. ...	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
J. H. Farmer	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
C. M. Blauco	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
W. P. Briggs	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
Raymond Booth	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
I. D. Hightower	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
D. R. Wynn	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
Charles Pickett	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
G. E. Vaught	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
Robert Ould	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
H. N. Morris	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
J. W. Cooper	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
J. L. Gresham	Standard Air Line	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army

Employees who received commissions in the Standard Air Line: 11
Number of employees volunteering for draft: 11
Total number of employees in government service: 22

FLORIDA EAST COAST

Employees Who Received Commissions

Name	Railroad	Military Position	Rank	Army or Navy
C. S. Coe	Florida East Coast	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army

Employees Who Received Commissions

Name	Railroad	Military Position	Rank	Army or Navy
E. H. Sheeran	Florida East Coast	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
E. H. Talaferro	Florida East Coast	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
R. W. Wood	Florida East Coast	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
Gayle McFadden	Florida East Coast	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
R. M. DeGars	Florida East Coast	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army
George S. Ward	Florida East Coast	Chief Engineer	1st Lieutenant	1st Lt. U. S. Army

Officers who received commissions in the Florida East Coast: 6
Employees who received commissions in the Florida East Coast: 6
Number of employees volunteering for draft: 6
Total number of employees in government service: 12

American Society of Civil Engineers Elects Officers

The American Society of Civil Engineers has elected the following officers for the ensuing year: President, Arthur N. Talbot, professor of engineering, University of Illinois, Urbana, Ill.; vice-presidents, John F. Coleman, J. F. Coleman Engineering Company, New Orleans, La.; Nelson P. Lewis, chief engineer, Board of Estimate and Apportionment, New York. Among the directors elected are George W. Gothals, Samuel Thomas Wagner, chief engineer, Philadelphia & Reading, Philadelphia, Pa.; Milo Smith Ketchum, Dean, College of Engineering, University of Colorado, Boulder, Colo.; C. A. Morse, chief engineer, Chicago, Rock Island & Pacific, Chicago; and C. F. Johnston, general manager, Kansas City Southern, were among those elected members of the Nominating Committee.

Professor Talbot is the author of several engineering texts including "The Railway Transition Spiral" extensively used by railway engineers. He is also chairman of the Joint Committee on Stresses in Track of the American Railway Engineering Association and the American Society of Civil Engineers which is now engaged in exhaustive experimental studies of the steel which railway track sustains under traffic. He has also been active in other engineering associations including the American Society for Testing Materials, 55-57 E. 17th St., New York City.

Air Brake Association

The executive committee of the Air Brake Association at a recent meeting decided to hold the 1918 meeting in person at the announcement stating that "Executive committee has unanimously believed by your executive committee to be a commendable move to hold a convention." The national convention will be held at Cleveland on May 7 to 10.

Railway Business Association Dinner Postponed

The annual meeting and dinner of the Railway Business Association scheduled for January 25 has been postponed. "The steel industry," says President G. A. Felt in the telegram to the members, "is now in all industries with such a serious situation of business, the dinner attendance and consequently the cost of this entertainment will be very unprofitable."

Traffic News

The Public Service Commission of Oregon has abolished the average agreement provision in the demurrage rules of that state.

J. F. Holden, vice-president in charge of traffic of the Kansas City Southern, has been appointed supervisor of transportation and traffic of the United States Shipping Board, with office at Washington, D. C.

The Hartford & New York Transportation Company, which usually suspends business during the winter, will continue to run one steamer three trips a week between New York and Saybrook, Conn., at the mouth of the Connecticut River, 44 miles south of Hartford.

The Railway Commission of Canada, granting the requests of western grain shippers, has postponed until June 1, next, the date on which rates for the transportation of wheat shall be increased. The increases which have been approved went into effect on all other commodities on February 1.

The new demurrage rules recently announced by William G. McAdoo, director-general of railroads, have been adopted for application to intrastate traffic by the state commissions of Alabama, Illinois, Indiana, Kentucky, Mississippi, Ohio, Tennessee, and practically all of the states west of the Mississippi river.

The New York, Chicago & St. Louis has discontinued through trains Numbers 3 and 4. No. 3 left Buffalo at 6:40 a. m. and No. 4 left Chicago at 2:30 p. m. Train No. 2, Chicago to New York heretofore leaving at 10:35 a. m. now leaves at 8:30 a. m. The Pittsburgh & Lake Erie has discontinued the daily train leaving Pittsburgh for Cleveland at 11 p. m.

The recent order of the Fuel Administration closing certain industries for a period of five days, beginning on January 18, and stopping practically all business except transportation and government work on the ten Mondays beginning with January 21, led to considerable uncertainty on the part of both shippers and railroads as to whether these coalless holidays should be omitted in the computation of demurrage charges. A telegraphic inquiry sent to Washington authoritative on these days just as on any ordinary week-day and that the order of the Fuel Administration prohibiting the operation of most industries did not prevent the loading or ties from Chicago brought the reply that demurrage would unloading of cars at those industries.

Cars Unloaded Even After 26 Days

On the tracks of the Bush Terminal Railroad, New York City, the inspectors of the Port Committee found, on January 10, nearly 100 loaded cars which had been there 26 days or more (out of a total of 443 cars that were waiting to be unloaded); and the committee proposes to take measures to punish any railroad officer or consignee who is responsible for these unreasonable delays. This committee consists of James S. Harlan, member of the Interstate Commerce Commission; Ralph W. E. Donges, of the New Jersey Public Utilities Commission and Travis H. Whitney of the New York State Public Service Commission. Their report says that 29 of the cars referred to as unreasonably delayed had been there since November, and no less than 273 had been on hand more than 10 days. The committee says also that the records of the Bush Terminal Railroad are not well kept, and that the inspectors had found difficulty in getting at the actual facts. The committee also makes public the case of a car containing 90 drums of caustic soda which had been standing in one of the yards of the New York Central for three weeks (with over \$70 demurrage accumulated) which had been reconsigned three times and still was waiting to be unloaded.

Freight Solicitors on Their Jobs

One of the first interpretations of the President's proclamation taking over the railroads was that competition was abolished, thereby eliminating the need for freight solicitation. Accordingly, many of the roads of the country called in their freight solicitors and employed them at other work. But solicitors are valuable in non-competitive work and most of the lines west of Chicago have put these men back at their posts. They handle claims, trace freight, quote rates, aid in routing cars to avoid congestion, and work to encourage heavy loading and the prompt release of cars by consignees. Operating officers and freight agents in many cases are so busy with operating matters that the solicitors in reality afford the only point of contact between the shippers and the railroads. They are more necessary now, to expedite the movement of the immense traffic of the country than ever before.

Illinois Roads Prepare to Refund Excess Fare

The legal committee of the Illinois railroads, composed of S. H. Strawn, general solicitor of the Chicago & Alton, R. B. Scott, general solicitor of the Chicago, Burlington & Quincy, and A. P. Humburg, commerce attorney of the Illinois Central, conferred with Edward J. Brundage, attorney-general of the state of Illinois, on January 21 to work out the details of refunding to the public the excess fares collected in the state since January, 1917, above the two cents a mile provided by state statute. This action was necessitated by the recent decision of the United States Supreme Court declaring that the order of the Interstate Commerce Commission in the case of the Business Men's League of St. Louis versus the Atchison, Topeka & Santa Fe et al. was not sufficiently specific to justify the application of the 2.4 cents interstate rate to intrastate passenger business throughout Illinois. According to the agreement reached at the conference, the railroads will receive for redemption the coupons evidencing the payment of excess fare, commencing at midnight January 26. These coupons may be presented at any ticket office of the issuing railroad and will be transmitted by the agent to headquarters where checks will be made out promptly and sent to those asking refunds. It is the intention of the railroads to ask the Interstate Commerce Commission to revise its order in that case so that the points in Illinois between which the 2.4 cents fare will apply will be specifically defined.

Government Appeals to Southern Farmers

W. G. McAdoo, secretary of the treasury and director-general of railroads, has issued a statement urging the farmers of the southern states to raise enough food for their own section. Reminding them that one of the great tasks of the day is to make the railroads more efficient, he tells them that the people of the South, especially the farmers, are in the habit of using the transportation system of the country to a degree that is highly uneconomic and unnecessary; that is, for the purpose of transporting food and feed from other parts of the United States, because they do not produce enough for themselves.

"Do everything possible during the next year to relieve the strain on the railroad agencies of the Nation by producing your own food and feed crops. The best farmers of the South recognize the fact that it pays as a matter of good farming to produce on each farm the hay and grain for the live stock, all the garden products, fruit, and poultry products which are needed by the farm, and if possible a surplus for sale in the immediate vicinity.

"The growing of cotton is not to be discouraged. Every Southern farmer should raise all the cotton that he can well cultivate, but he should grow the hay and grain to feed his draft animals. He should produce his own milk, butter, eggs, poultry, fruit, and vegetables, and every city and town of the South ought to be supplied with these commodities by the farmers of the South. If the South can feed itself it will release from unnecessary service in the South a vast number of freight cars and engines and will help win the war."

THE AMERICAN WAR TRUCK—There are, approximately, 7,500 parts in the American war truck, which weighs complete just over four tons, and is propelled by a 58 horse-power engine, running at 1,350 revolutions per minute.

Commission and Court News

Interstate Commerce Commission

The commission has approved without hearing the filing of tariffs by E. Morris and R. H. Countiss providing for increased demurrage and storage charges and new regulations on export traffic to North Pacific coast ports.

Personnel of Commissions

Oscar S. Straus, chairman of the New York State Public Service Commission, first district, has been reappointed, his present term expiring on February 1. Mr. Straus has told the governor that he expects to be allowed to resign as soon as the extensive new subway construction work has been brought near enough to completion to allow a new man to take up the chairmanship without detriment to the public interest.

Court News

Liability of Initial Carrier

The Iowa Supreme Court holds that where a shipper consigned wood to itself at St. Louis, and the wood was later consigned to the shipper at Philadelphia, the shipper's claim for conversion by the final carrier at Philadelphia waived any right based on conversion at St. Louis by the reassignment, and ratified the reassignment. *Adams Seed Co. v. Chicago Great Western (Iowa)* 165 N. W. 367. Decided December 10, 1917.

Failure to Stop at Flag Station

Unless it was a passenger train, the North Carolina Supreme Court holds that recovery cannot be had for failure to stop at a flag station on signal of one desiring to take passage; and if it was a passenger train nothing more than actual damages can be recovered, unless the engineer actually saw the signal or with reasonable care ought to have seen it. After the failure of a train to stop at a flag station on the signal of a woman, she, instead of waiting for another train or proceeding by a highway, needlessly attempted to walk to her destination on the track and fell into a cattle guard. It was held that the failure to stop at the station was not the proximate cause of her injuries and she could not recover therefor. *Brown v. Linville River (N. Car.)* 94 S. E. 431. Decided December 5, 1917.

Change in Demurrage Tariff

The Circuit Court of Appeals, Fourth Circuit, holds that a local tariff of demurrage charges applies after it has gone into effect, by notice for the required time, to all cars, including those accepted for transportation before the tariff was issued; and the optional allowance at destination is wholly disconnected with the service of transportation. A railroad, therefore, may lawfully apply a new tariff to cars transported before the old tariff was canceled. The court said that the opposing view, to say nothing else, overlooks the essential difference between the service of transportation, which must be furnished and paid for, and the accommodation of storage, which may or may not be provided. Broadly speaking, the former is a right which the carrier cannot deny or abridge, the latter a privilege which it is at liberty to accord or refuse. One is obligatory, the other optional. The court also holds that in the absence of anything in a demurrage tariff, or the statute, requiring the carrier to give notice of arrival of cars, absence of such notice does not affect the time when the demurrage charges commence, notwithstanding notices are usually given on the day of arrival as matter of courtesy or custom. *Chesapeake etc. Coke Co. v. Toledo & Ohio Central*, 245 Fed. 917. Decided July 5, 1917.

Local and State Taxation of Railroad Property

Part of a lot of crocks which were being treated at a railroad's crockoting plant were intended for use outside the state of New Jersey and part within the state. The local assessors attempted to impose a tax on the whole lot. The New Jersey Court of Errors and Appeals held that this was in violation of the state's right to tax the property for state uses under the Railroad Tax Act of 1911 providing that the property of railroad corporations used for railroad purposes within the state is not taxable by the local taxing district, but by the state board of taxes and assessments for state uses. What the local assessors should have done was to have ascertained what proportion of these ties was intended to be used outside of New Jersey and what proportion within the state and to levy the local tax accordingly. The fact that that might have been difficult to do was no justification for their action. *P. & R. v. Woodbridge (N. J.)* 102 Atl. 592. Decided November 21, 1917.

Act of God and Delay in Transportation

The Indiana Appellate Court holds that where a piano was shipped to a point 163 miles distant, and 15 days later, when standing in a yard, it was damaged by the Dayton flood, the proximate cause was the act of God, and not the carrier's delay, and the carrier was not liable. The court thus stated its views on the much debated question as to whether an act of God exonerates a carrier for delay. Two conflicting rules have been established in different jurisdictions. (1) In several states it is held that the act of God completely exonerates the carrier, even though there has been negligent delay in transportation, and these cases rest on the proposition that the delay is not the proximate cause of the loss. (2) In some other states it is held that the act of God does not exonerate the carrier where there has been negligent delay in transportation, and these cases rest on the proposition that the delay is a contributing cause, or a concurring cause, or a proximate cause, or a concurring proximate cause. The first rule has been consistently followed by the federal courts. The Indiana court holds that that rule is sound. The law holds men responsible for the effects of their acts and omissions within the sphere of human control only. An act of God is the manifestation of a superhuman power which breaks the chain of causation in the realm of human activity. It upsets the best-laid plans of men and spoils all their calculations. Because its coming is beyond the scope of man's provision and its power beyond his strength to resist, he is relieved from the consequence thereof. In the case at bar the flood was held the sole cause of the loss of the piano. As between the delay and the damage the relation of cause and effect did not exist. So far as the court was aware, the question had not been previously decided in Indiana.—*Chicago & Erie v. Schaff (Ind.)*, 117 N. E. 869. Decided December 4, 1917.

Recent Decisions Under the

Federal Employers' Liability Act

The federal district court for the Western District of New York holds that a railroad employee pumping water into a tank for the use of locomotives engaged in interstate commerce is engaged in such commerce where such use is not dependent on remote possibilities.—*Collins v. Erie*, 245 Fed. 811.

The New York Court of Appeals holds that work contributing to the safety and integrity of an interstate railroad is a part of such railroad's interstate commerce, and no recovery could be had under the State Workmen's Compensation Act for the death of an employee killed while mowing weeds along the right of way to prevent spread of fire and slippery rail.—*Plaza v. Central New England (N. Y.)*, 117 N. E. 952.

The New York Appellate Division holds that a plumber engaged in the maintenance of a department of an interstate carrier, who was engaged in repairing pipes on a station and was killed by a train while crossing tracks in the course of his employment, was entitled to no compensation under the Workmen's Compensation Act, since he was engaged in interstate commerce.—*Vollmer v. New York Central*, 167 N. Y. Supp. 426.

The New Jersey Supreme Court holds that a crossing flagman employed by a railroad company engaged in interstate and intra-

state commerce who was struck and killed by the engine of a train was engaged in interstate commerce.

The California Supreme Court holds that the interstate transportation of mail by a railroad under a contract with the federal government is "interstate commerce." Proceedings under the California Workmen's Compensation Act sought an award for the death of an employee of the Atchison, Topeka & Santa Fe who, while delivering pouches of mail from the station at Riverhead to a train, was run down by another train. It is held no recovery could be had under the state law.—*Zenz v. Commission (Cal.)*, 168 Pac., 364.

The West Virginia Supreme Court of Appeals holds employees in the machine shops of a railroad company are not engaged in interstate commerce when pushing a carload of lumber about the shops to the place where it is to be unloaded, the car having been loaded at a point in the state and hauled to the shops (its point of destination, likewise in the state), although the lumber was intended for use in building and repairing cars thereafter to be used, in part, in carrying interstate traffic.—*Barnett v. Coal & Coke Ry. Co. (W. Va.)*, 94 S. E., 150.

United States Supreme Court

Texas Train-Regulation Void

The decision of the Supreme Court annulling, as applied to interstate traffic, the Texas law requiring trains to be run regardless of late connections, was noticed briefly last week, page 186. This suit was brought by the State of Texas against the Missouri, Kansas & Texas of Texas to recover penalties for the violation of an order of the State Railroad Commission. This order required passenger trains in Texas to start and to run on time, or not over thirty minutes late, and not exceeding ten minutes more (at a junction) if at the end of the thirty minutes a connecting train were in sight. The trains concerned were numbers 9 and 209, received by the defendant at Denison, about five miles south of the Oklahoma state line. The Texas Court of Civil Appeals at first held that the movement must be regarded as a continuous one from Kansas City and St. Louis, and that the order did not apply to the train; but on a rehearing decided that as the defendant took control at Denison with new crews and engines, and could not go beyond the state line, the movement so far as the defendant was concerned was wholly intrastate. Breaches of the order having been proved, it affirmed a judgment imposing a fine. A writ of error was refused by the State Supreme Court. That court recognized that the trains were interstate, but it construed the order as applying to them none the less. The case then came before the Supreme Court of the United States.

The Supreme Court held that the only question with which it had to deal was whether the State Commission could intermeddle in this way, especially when there was sufficient accommodation for local passengers independent of the through trains. The question was not what the State Commission might require of a road deriving its powers from the State, with regard to local business, but whether the order, if applied to this case, would not unlawfully interfere with interstate commerce. On its face the order was an interference with such commerce. It undertook to fix the time allowed for stops in the course of interstate transit. It was a serious interference, for it made the defendant liable for an interstate train not starting on schedule time, when the train did not come into the defendant's hands from another company in another state, until too late. This, as the court understood the facts, was the train in which the advertised schedule applied; and if so, the mere statement of the result was enough to show that the burden imposed not only was serious but was unwarranted as well as unjust. The suggestion that compliance with the order could have been secured by having an extra train ready to run if the regular one was not on time was "hardly practical," and was not an adequate answer, even in form. For the defendant advertised, or at least had the right to advertise, the interstate train, and if it did so, would not free itself from liability for a delay on the part of that train by offering another. The court thought it plain that the order was applied in a way that was beyond the power of the Commission and courts of the State, and the judgment was reversed.—*M. K. & T. of Texas v. State*. Decided January 14, 1918.

Equipment and Supplies

Locomotives

THE PHILADELPHIA & READING will build 15 locomotives in its own shops.

THE CHESAPEAKE & OHIO is inquiring for a number of ten-wheel switching locomotives.

THE ILLINOIS CENTRAL, which was reported in the *Railway Age Gazette* of November 30 as having ordered 25 switching locomotives from the American Locomotive Company, has also ordered 4 Santa Fe locomotives from the same company. The switching locomotives are superheated six-wheel locomotives and weigh 169,000 lb. The Santa Fe locomotives are also superheated and will weigh 367,000 lb.

NORFOLK & WESTERN.—This company's order for 20 Mallet type locomotives reported this week as having been given to the American Locomotive Company was placed in December. Full details concerning it and an order for 20 Mallet locomotives given to the Baldwin Locomotive Works at the same time were given in the list of locomotives ordered during 1917 which appeared in the Annual Statistical Number of the *Railway Age*.

Freight Cars

THE UNITED STATES ORDNANCE DEPARTMENT is asking prices on 150 ammunition cars.

THE AMERICAN SHEET & TIN PLATE COMPANY, Pittsburgh, Pa., is inquiring for 10 50-ton, 7,000-gal. capacity tank cars.

THE UNITED STATES WAR DEPARTMENT has issued inquiries for 400, 15-ton, 150, 30-ton and 75 20-ton flat cars for service in France.

THE VULCAN STEEL PRODUCTS Co., New York, is in the market for 40 box, 19 cattle, 27 flat and 13 gondola cars, all of 28-ton capacity and for export to Brazil.

THE UNITED STATES NAVY has issued inquiries for 10 to 40 flat cars. The Navy has ordered 6 underframes for 30-ton box cars, this item having been incorrectly reported in last week's issue.

Passenger Cars

THE VULCAN STEEL PRODUCTS Co., New York, is in the market for 5 first-class passenger cars, 6 second-class passenger cars and 4 combination mail and express cars for Brazil.

THE UNITED RAILWAYS OF YUCATAN have ordered from the Railway Storage Battery Car Company, New York, three 55-ft. all-steel storage-battery passenger cars, and two 27-ft. baggage and express trailers for service between Progreso and Merida.

Miscellaneous

PERU. The January 17 issue of Commerce Reports published by the Bureau of Foreign and Domestic Commerce contains the following notice: A cablegram from Commercial Attaché William F. Montavon, at Lima, Peru, states that he has immediate use for catalogues of railway equipment and construction material, and requests that they be forwarded to his office at once.

Signaling

THE CENTRAL OF GEORGIA has contracted with the General Railway Signal Company for an electric interlocking plant at Macon Junction to replace one recently destroyed by fire. The machine will have 97 working levers and 15 spare spaces. All switch levers will be provided with lever lights, and an illuminated diagram with 23 lights will also be provided. All track circuits will be changed from direct to alternating-current, and there will be approach, route and section locking on all through passenger routes.

Supply Trade News

R. J. Morgan, formerly supervisor of sales for the American Steel Export Company, Woolworth building, New York, has been appointed assistant general manager of sales.

H. M. Aubrey, who has served in various capacities with the Quaker City Rubber Company and the H. W. Johns-Manville Company, has been appointed special packing representative of the Union Supply Company with headquarters at Chicago.

Frank Bartholomew, who has been erecting engineer for the Shaw Electric Crane Company for the past 20 years and who resigned his position with that company in December, 1917, has become associated with N. B. Payne in the Have-meyer building, 25 Church Street, New York, specialist in electric cranes.

R. A. Van Houten, whose appointment as vice-president and general manager of the Sellers Manufacturing Company with office at Chicago, Ill., was announced in these columns

on January 18, entered railway service in March, 1887, with the Erie, serving consecutively as chairman and rodman on the New York division for two years; rodman for two years; assistant engineer on the New York division for seven and one-half years and division engineer on the Delaware division for eight and one-half years. In June, 1908, he became division engineer of the New Jersey & Lehigh division of the Lehigh Valley, which position he held until October 15, 1912.



R. A. Van Houten

when he was appointed eastern sales agent for the Sellers Manufacturing Company with office at New York. After seven months in New York, he was transferred to the sales department at Chicago, as sales agent and on April 1, 1917, he was appointed works manager of the plant at Mayfair, (Chicago), which position he held until January 1, 1918, on which date his appointment, as noted above, became effective.

Edward M. Hagar, president of the American International Steel Corporation, a subsidiary of the American International Corporation, and former head of the Martin-Wright Aeroplane Company and the Universal Portland Cement Company, died January 18, from pneumonia at his home in New York. Mr. Hagar was born in Salem, Mass., 45 years ago. He was educated at the Massachusetts Institute of Technology and at Cornell. Going to Chicago, he became president of the Portland Cement Company, serving 15 years in that capacity, and resigned to become president of the Wright-Martin Company. He became president of the American International Steel Corporation last June.

Bertrand H. Wait has entered the employ of the Portland Cement Association, and on February 1 will take up his duties with the association as district engineer in charge of the Portland Cement Association, New York office, 101 Park avenue. Mr. Wait graduated from Cornell University in 1902 with the degree of civil engineer. In 1903 he was appointed assistant engineer with the Rapid Transit Subway Commission, New York, and remained on this work until 1907, when he was transferred to the Board of Water Supply, city of New York. In 1911 he was transferred to the City Aqueduct Department as assistant division engineer of the Bronx Division, and in

August of that year was made district engineer. In 1913 he resigned to accept the appointment as Division Engineer, New York State Highway Department in charge of Division No. 1, which consisted of ten counties adjoining New York city. During the past year Mr. Wait has also served as Consulting Engineer for the U. S. Government on certain road construction.

Frank J. Foley, formerly manager of the mining department of the Westinghouse Electric & Manufacturing Company, on January 1, became connected with the Edison Storage Battery Company, Orange, N. J., as manager of the mining and traction department, with headquarters at the main office in Orange. During the two years Mr. Foley was connected with the New York City service department of the Westinghouse Electric & Manufacturing Company, he helped install the original multiple unit control on the Brooklyn Rapid Transit system, helped install the switchboards and turbines in the Kent Avenue power station of the Brooklyn Rapid Transit, and the turbo generator unit at the Waterside Station of the Consolidated Gas Company, New York. He then became connected with the East Pittsburgh plant of the Westinghouse Electric & Manufacturing Company, and after attending that company's engineering sales school for a year, was associated with the industrial sales department going into the mining section in 1910, in which position he had occasion to handle electrical equipment for mines, including storage battery and trolley locomotives. In 1915 Mr. Foley was promoted to manager of the mining section.

Guy E. Tripp Made Ordnance Executive

Guy E. Tripp, of New York, heretofore chairman of the Westinghouse Electric & Manufacturing Company, has been appointed by the War Department, with the rank of colonel, as chief of the production division of the ordnance department, entrusted with the task of supervising and stimulating the production of all ordnance supplies.



Guy E. Tripp

The appointment of Mr. Tripp is one of the important steps in the reorganization of the ordnance bureau, announced recently by its chief, General Crozier.

Mr. Tripp was selected because of his experience in the manufacture of munitions of all kinds, the Westinghouse company having obtained large contracts from the British and Russian governments immediately on the outbreak of the European war. Mr. Tripp is credited with bringing to the department the highest obtainable type of experience and ability to insure speedy and careful production of munitions. The board of directors of the Westinghouse company has given him a leave of absence for the duration of the war.

Trade Publications

REINFORCING BAR—The Cambria Steel Company, Philadelphia, has issued a 24-page illustrated booklet describing the Cambria Slick concrete reinforcing bar. This booklet contains detailed information concerning the properties of this bar and data of value in designing structures in which it is to be used.

LONDON CAR TOLL DISPUTE—It was announced in London on December 21 that the railway companies have decided not to enforce for the present the toll of one penny for each cab entering the London stations for hire. This settles a dispute of six months' standing causing considerable inconvenience to arriving passengers.

Financial and Construction

Railway Financial News

BALTIMORE & OHIO.—This company has applied to the Ohio Public Utilities Commission for permission to issue \$10,284,384 of refunding and general mortgage bonds.

BOSTON & MAINE.—Attorney General Henry C. Atwill in his annual report to the Massachusetts Legislature recommends the state purchase of the Boston & Maine as a means of protecting its investment in the Fitchburg Railroad bonds. "The Commonwealth holds \$5,000,000 of bonds of the railroad acquired in 1900 at the time of the lease of the Fitchburg Railroad to the Boston & Maine in exchange for 50,000 shares of the common stock of the Fitchburg Railroad. Upon these bonds there is now due accrued interest amounting to about \$225,000. These bonds are unsecured. In order to insure that these bonds and interest will be paid upon any sale of the road, a price necessarily must be realized sufficient to pay at least all outstanding bonds with accrued interest, together with the floating indebtedness.

"There are at present outstanding bonds of the Boston & Maine amounting to \$43,338,000. The floating indebtedness amounts to \$13,306,000. That a sale of the road might not realize an amount sufficient to pay these obligations in full, under the present financial conditions of the country, is by no means improbable. There is no assurance of the payment of the Commonwealth's claim in full unless some method is provided by which the Commonwealth can appear as a competitor for the purchase of the property of the railroad in the event of a proposed sale by the receiver."

CHESAPEAKE & OHIO NORTHERN.—Articles of incorporation increasing this company's capital stock from \$3,500,000 to \$4,200,000 were filed recently at Maysville, Ky.

DENVER & RIO GRANDE.—Stay of execution of judgments for \$36,515,000 granted against the Denver & Rio Grande by the Federal courts of the Southern District of New York and of Colorado and appointment of a receiver for that road were asked in a petition filed January 18 in the Federal District Court at Denver. The petitioner is the Elliot Frog & Switch Company, of East St. Louis, Ill., which asserts about \$18,000 is due it. The hearing on the application for a receiver has been set for January 24.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company is preparing plans for terminal improvements at Tulsa, Okla., to cost approximately \$800,000.

ILLINOIS CENTRAL.—This company has purchased 83 acres of land east of its right of way and south of One Hundred and Seventy-first street, Chicago, which will be used for new classification yards.

PHILADELPHIA & READING.—A contract has been given to the William Steele & Sons Company, Philadelphia, Pa., for building a steel and concrete engine house at Philadelphia, part circular and to contain 10 stalls 90 ft. long and 6 stalls 110 ft. long, also to build a machine shop of irregular shape. The latter will be 130 ft. wide at one end and 156 ft. 6 in. at the other by 216 ft. 7 in. long. The cost of the work will be about \$326,183.

SOUTH MOUNTAIN & HANCEVILLE.—This company is building a line between Hanceville, Ala., and Stouts Mountain, six miles. P. A. Kearny, president, and C. F. Wheelock, secretary, and chief engineer, American Trust building, Birmingham.

SOUTHERN PACIFIC.—This company plans to remodel its timber preserving plant at West Oakland, Cal., at an estimated expenditure of \$350,000. The improvement includes the reconstruction of the track layout, the filling of a portion of the bay to provide room for expansion and the new installation of modern timber treating equipment.

Railway Officers

Executive, Financial, Legal and Accounting

Clyde West has been appointed paymaster of the Missouri, Kansas & Texas of Texas with office at Dallas, Tex., succeeding **E. E. Deisher**.

C. B. Zabriskie, secretary and treasurer of the Tonopah & Tidewater, has been elected also first vice-president with headquarters at New York City.

John T. Reid, cashier of the Atlantic Coast Line, at Norfolk, Va., has been elected treasurer with headquarters at Wilmington, N. C., succeeding **James F. Post**, deceased.

W. G. Davison, treasurer of the Spokane, Portland & Seattle with office at Portland, Ore., in addition to his duties as treasurer, will act as tax agent. **J. C. Daries**, right of way and tax agent, will be relieved of his duties as tax agent but will perform, in addition to his duties as right of way agent, those of sales manager of the Ruth Realty Company with office at Portland, Ore., as before.

A. W. Johnston, assistant to the president of the New York, Chicago & St. Louis at Cleveland, Ohio, retired from active service on January 1. Mr. Johnston had been in the service of the Nickel Plate continuously since April, 1, 1884. He was born at Boston, Mass., on March 4, 1853, and is a graduate of the Massachusetts Institute of Technology. He entered railway service in July, 1875, as a clerk in the office of the general superintendent of the Pittsburgh, Cincinnati & St. Louis. He was later assistant engineer on that road, following which he was superintendent of an industrial corporation in Arizona, chief engineer of the Toledo, Delphos & Burlington and superintendent of the Leavenworth, Topeka & Southwestern. On the Nickel Plate he was successively division engineer, division superintendent, general superintendent, general manager and assistant to the president. He was president of the American Railway Engineering Association for the year 1907-8.

Operating

C. P. Shaughnessy has been appointed trainmaster on the Kent division of the Erie, with headquarters at Mansfield, O.

J. A. Pierson has been appointed trainmaster of the Denver & Salt Lake with office at Denver, Colo., succeeding **F. B. Miller**.

W. A. Couch has been appointed superintendent of the Memphis, Dallas & Gulf with office at Arkadelphia, Ark., succeeding **J. A. Couch**.

M. M. Sisson, trainmaster of the Detroit, Toledo & Ironton at Springfield, Ohio, has been promoted to superintendent of car service with the same headquarters.

John M. Condon, assistant superintendent of the Mahoning division of the Erie, with office at Youngstown, Ohio, has been appointed superintendent of terminals, with headquarters at Jersey City, N. J., vice **Frank J. Moser** assigned to other duties.

J. H. Johnson, trainmaster of the Northern Pacific, with office at Minneapolis, Minn., has been appointed assistant to the general superintendent of the Eastern district, with headquarters at St. Paul, vice **O. F. Ohlson**, granted leave of absence.

R. C. Morgan, superintendent of the Winnipeg terminal division of the Canadian Pacific, has been appointed acting general superintendent of the Manitoba district with office at Winnipeg, Man., succeeding **C. Murphy** who has been assigned to special duties.

F. G. Archer, general yardmaster of the Atchison, Topeka & Santa Fe at Clovis, N. M., has been appointed assistant superintendent of the Third district, Middle division, of the

St. Louis Southwestern of Texas with headquarters at Texarkana, Tex., effective January 12.

A. E. Wallace, superintendent of the Chicago, Rock Island & Pacific, with office at Manly, Iowa, has been appointed general superintendent of the Chicago and Marion divisions of the Erie, with headquarters at Chicago, succeeding **Franklin G. Robbins**, who has entered military service.

William J. Jenks, whose appointment as general manager of the Norfolk & Western with headquarters at Roanoke, Va., has already been announced in these columns was born



W. J. Jenks

near Raleigh, N. C., and was educated in public and private schools. He began railway work in November, 1886, and served as telegraph operator and agent at various places consecutively on the Raleigh & Augusta Air Line, now a part of the Seaboard Air Line, the Richmond & Danville, now a part of the Southern and the Norfolk & Western. From January, 1889, to September, 1901, he was successively train dispatcher, chief dispatcher, and car distributor on the Norfolk & Western and then to December, 1901, was chief dispatcher, on the Seaboard Air Line, at Savannah, Ga. In December, 1901, he was promoted to trainmaster, and from January, 1904, to March, 1908, served as superintendent on various divisions of the same road. From March, 1908, to May, 1912, he was chairman of the Car Allotment Commission, of the Norfolk & Western, and then to December, 1912, was superintendent of the Pocahontas division of the same road. In December, 1912, he was promoted to general superintendent, of the western general division with headquarters at Bluefield, W. Va., which position he held until his recent appointment as general manager of the same road as above noted.

E. A. O'Donnell, whose appointment as superintendent of terminals of the Southern Pacific at Houston, Tex., was mentioned in these columns on December 28, was born at



E. A. O'Donnell

Navan, Ont., on August 6, 1884. He attended the Collegiate Institute at Ottawa, Ont., from 1898 to 1900 and business college at Ottawa during 1900. He entered the service of the Great Northern on July 10, 1901, and remained in its employ until September 1, 1905, serving as clerk, stenographer and telegraph operator in the office of the trainmaster, chief dispatcher and superintendent at Havre, Mont. From October 1, 1905, to September 15, 1906, he was clerk in the traffic department of the Southern Pacific at Los Angeles, Cal. In the subsequent four months he was a clerk with the Cananea Consolidated Copper Company at Cananea and Senora, Mexico. From January 2, 1907, to August 1, 1917, he was with the Southern Pacific consecutively as secretary to the superintendent and to the general superintendent, yard clerk, switchman, yardmaster, trainmaster and inspector

of transportation in California, Louisiana and Texas. On August 1, 1917, he was promoted to assistant superintendent with headquarters at El Paso, Tex., which position he held until his appointment as noted above, effective December 1.

R. J. Barry, division superintendent of the Southern Pacific Texas line, with headquarters at Austin, Tex., has been transferred to the Galveston branch at the Galveston, Harrisburg & San Antonio and the Texas & New Orleans, with office at Houston, Tex., succeeding **W. L. Cox**. **L. H. Cecil**, general superintendent of the Louisiana & Pacific and superintendent of the Lake Charles & Northern with headquarters at De Ritter, La., has been appointed superintendent of the second division of the Houston & Texas Central with office at Austin, Tex., succeeding Mr. Barry.

F. B. Miller, whose appointment as general superintendent of the Colorado, Wyoming & Eastern in these columns on January 4, was born at Galesburg, Ill., on September 28, 1866. He began his railway career as a rodman and brakeman on the Peoria & Farmington, in June 1884. In 1887, he entered the service of the St. Louis Southwestern, serving as train baggage man and freight conductor. From 1886 to 1907, he was employed as brakeman, conductor, trainmaster, general yardmaster and superintendent on the Chicago, Burlington & Quincy; from 1907 to 1912 he was superintendent on the Colorado Midland, and from that date to 1913 he was superintendent on the Denver & Salt Lake, resigning in the latter year to engage in farming. From 1915 to 1916 he was assistant superintendent of the Moffat Coal Company and in 1917 returned to the Denver & Salt Lake as trainmaster serving in that capacity until his appointment as noted above.

C. O. Bradshaw, whose appointment as superintendent of the Illinois and the Racine & Southwestern divisions of the Chicago, Milwaukee & St. Paul with headquarters at Savanna,



C. O. Bradshaw

Ill., was announced in these columns on January 18, was born at Grand River, Iowa, on November 11, 1884. His railway career began on June 1, 1900, when he was employed by the Chicago, Burlington & Quincy as a water boy with the bridge and building department. While in that position he learned telegraphy and on July 1, 1901, he was promoted to agent and operator, which position he held until July 14, 1902, when he resigned to enter the service of the Great Northern. He remained with that road until

August 1, 1917, serving successively as operator, dispatcher, assistant chief dispatcher, chief dispatcher and trainmaster. He was appointed transportation inspector by the Special Committee on National Defense at Washington, D. C., on August 1, 1917, in which capacity he remained until November 5, 1917, when he was appointed inspector of transportation at the Chicago, Milwaukee & St. Paul with headquarters at Chicago, Ill., which position he held until January 15, 1918, on which date his appointment as noted above, became effective. He succeeded **G. R. Morrison**, who has been assigned to duties with the land department of the St. Paul.

Traffic

W. J. Doyle, was appointed general agent in the general freight department of the St. Louis Southwestern of Texas at Dallas, Tex., effective December 1.

H. H. Hunkins, district passenger agent of the Chicago, Milwaukee & St. Paul at General Office has been transferred to Chicago, Ill., as city passenger agent.

E. C. Newman, city passenger agent of the Illinois Central at Memphis, Tenn., was appointed district passenger agent with the same headquarters, effective December 1.

S. C. Frost, passenger and freight agent of the Los Angeles & Salt Lake at Ocean Park, Cal., has been appointed commercial agent at Santa Ana, Cal., succeeding **W. H. Lee**.

J. B. Payne, assistant freight traffic manager of the Texas & Pacific, with headquarters at Dallas, Tex., has been appointed traffic assistant to the receivers, effective February 1.

Ralph H. Wallace, general passenger agent of the Erie, with headquarters at New York, in addition to his present duties will in future have direction of the suburban passenger traffic.

C. E. Norris, traveling agent of the Chicago & Alton at Cincinnati, Ohio, has been appointed division freight and passenger agent at Mexico, Mo., succeeding **J. E. Fish**, who was appointed local agent at Peoria, Ill., effective January 16.

J. S. Talbot, general traffic manager of the Evansville & Indianapolis with headquarters at Terre Haute, Ind., resigned and the office was abolished, effective December 1. **E. P. Lowery** has been appointed general freight and passenger agent with office at Terre Haute, Ind.

J. F. Osborne, commercial agent of the Missouri, Kansas & Texas at Denison, Tex., has been transferred to Dallas, Tex., succeeding **L. T. Fowler**. **D. Allen**, travelling freight agent with headquarters at Chicago, Ill., has been appointed commercial agent at Denison to succeed Mr. Osborne.

Neal M. Leach, general traffic manager of the Texas & Pacific, with headquarters at New Orleans, La., will retire from that position on February 1, to become vice-president of the J. H. W. Steele Company, engaged in freight forwarding, steamship chartering, etc., with offices at New Orleans; also at New York and at other places. Mr. Leach was born on September 14, 1869, and was educated at Kentucky University, Lexington, Ky. He began railway work in 1886, with an engineering corps of the Chesapeake & Ohio, and from 1887 to 1894 he was consecutively clerk in the purchasing and commissary departments of the Queen & Crescent Route. From 1895 to 1897 he served as chief of the commissary department and paymaster of the Q. & C. R., and then to 1901 as commercial agent of the New Orleans & North-eastern, the Alabama & Vicksburg, and the Vicksburg, Shreveport & Pacific, at New Orleans, La. From 1901 to March, 1905, he was general agent of the Mobile & Ohio, at the same place, and in March, 1905, was promoted to assistant general freight agent. On February 1, 1908, he was appointed general freight agent of the International & Great Northern at Palestine, Tex., and from May to August, 1911, he was traffic manager of the International & Great Northern, and Texas & Pacific, with office at San Antonio, Tex. From August, 1911, to September, 1913, he served as assistant to the president of the International & Great Northern and as traffic manager of the Texas & Pacific, with office at New Orleans, and since September, 1913, as general traffic manager of the Texas & Pacific.

The authority of **Robert C. Wright**, traffic manager of the Pennsylvania Railroad, with headquarters at Philadelphia, Pa., has been extended over the New York, Philadelphia & Norfolk; **R. B. Cooke**, traffic manager of the New York, Philadelphia & Norfolk with office at Norfolk, Va., has been appointed assistant to the traffic manager of the Pennsylvania Railroad and of the New York, Philadelphia & Norfolk, with

headquarters at Norfolk. and **Randolph B. Cooke**, freight solicitor of the New York, Philadelphia & Norfolk, has been appointed division freight and passenger agent of the New York, Philadelphia & Norfolk, with headquarters at Norfolk.

Engineering and Rolling Stock

L. F. Couch has been appointed master mechanic of the Memphis, Dallas & Gulf with office at Nashville, Ark., succeeding **F. J. Sears**.

W. O. Galbreath has been appointed chief engineer of the Missouri, Oklahoma & Gulf with office at Muskogee, Okla., succeeding **N. C. Van Natta**.

Daniel Sinclair, road foreman of engines of the Northern Pacific, with office at Glendive, Mont., has been appointed fuel supervisor, with headquarters at Glendive.

J. M. Roeschlaub, resident engineer on the Denver & Salt Lake with headquarters at Denver, Colo., has been appointed chief engineer with the same headquarters.

F. T. Mumma, electrical engineer in charge of the electric sub-stations of the Chicago, Milwaukee & St. Paul main line, has been appointed superintendent of the telegraph and telephone department on the Anchorage division, of the Alaska Railways, succeeding **Herbert Gaytes**, resigned.

Major Frederick Mears for the past three years member of the Alaskan Engineering Commission, operating the government railroad in Alaska, has been recalled from Alaska by the War Department to engage in railroad work in France. **William Gerig** consulting engineer for the past two years of the Alaskan Engineering Commission has been appointed engineer in charge of the Anchorage division of the Alaska Railways.

Purchasing

A. Gerrard has been appointed material agent and assistant purchasing agent of the Missouri, Oklahoma & Gulf with office at Muskogee, Okla.

Obituary

Joseph Hunter Garahty died at his home in Chicago on January 15. Mr. Garahty was the purchasing agent of the old Columbus, Hocking Valley & Toledo and later of the Cleveland, Cincinnati, Chicago & St. Louis. A number of years ago for some time after leaving railroad service he was associated with the Griffin Wheel Company, Chicago, following which he engaged in the development of large bituminous coal mines in the Middle West. About 10 years ago he sold his coal interests and retired from active business.

James F. Post, treasurer of the Atlantic Coast Line, with headquarters at Wilmington, N. C., died on January 5, at his home in that city. He was born in February 1851, at Wilmington and began railway work in August 1871, as a freight clerk on the Wilmington & Weldon. In 1886 he was appointed assistant treasurer of the same road, the Wilmington, Columbia & Augusta, and the Central Railroads and from 1887 to 1900, served as secretary of the same roads, all of which now form part of the Atlantic Coast Line. From April, 1900, to November, 1902, he was secretary and treasurer of all the roads in the Atlantic Coast Line System, and since the latter date was treasurer of the same system.

F. M. Luce, treasurer of the Association of Transportation and Car Accounting officers from 1904 to December, 1916, and formerly auditor of car accounts on the Chicago & North Western and since connected in an advisory capacity with the transportation department of that road, died at Chicago on January 22, at the age of 72. From 1872 to 1899 he was general car accountant of the Chicago & North Western and later became auditor of car accounts. He was the originator of the "Luce System of Car Accounts" now in use on many railroads. At the time of his death he was superintendent of car service of the Menasha Wooden Ware Company and the Two Rivers Wooden Ware Company; and was treasurer of the Central & Western Association of Car Service Officers.



N. M. Leach

EDITORIAL

Railway Age

EDITORIAL

It has been assumed that under the new policy of government control, the director general of railroads would have the same authority over railway regulation as over railway management. Some are contending, however, that the Interstate Commerce Commission should be allowed to continue to fix railway rates as in the past. This raises the interesting and important question whether any government official or body except the director general should be allowed to control railway earnings. For the power to regulate rates is the power to control earnings; and the power to control earnings would be, while the government guaranteed the companies' return, the power to create a railway deficit which the government would have to pay from the public treasury. It would seem that the same government official who is charged with responsibility for the financial and operating management of the railroad should also be given authority over the fixing of their rates. An independent official or commission possessing the rate-making authority would be able to embarrass and hamper the director-general in many ways. On the other hand, if the director-general is given power to fix rates it doubtless will be desirable for him to exercise it on the advice of the Interstate Commerce Commission. The commission is the country's most important railway regulating body; and while the director-general should control the general level of rates, the commission's views as to the way in which they should be adjusted in relation to each other should carry very great weight.

Who Shall Fix Railway Rates?

One Month of Government Control

Ever a man on a new job had worse luck than Director General McAdoo, we have never heard about him. The railroads have now been operated under Mr. McAdoo's direction a little over a month. There is always likely to be at least a temporary decline in morale and efficiency in any business following a change of management. If, therefore, there had been some loss of efficiency immediately after Mr. McAdoo took charge it would not have been surprising. But the director-general has had something worse than some loss of morale to struggle against. Never in the history of this country, we suppose, has there been a January throughout which weather conditions were more unfavorable to satisfactory railroad operation than they were during the month which ended yesterday. Even if there had been merely a normal traffic tonnage, the railways would have had difficulty in handling it, and the traffic was abnormal in both size and complexity. Those who during this trying period have visited Mr. McAdoo's office regularly know that he and his assistants have worked as hard as men can work; and they have received as loyal and energetic support as railway officers and employees could give them, in the circumstances; but no loyalty, energy and skill can do more than minimize the effects of a succession of terrible northern blizzards. Mr. McAdoo hasn't had a square deal from the weather man. The weather man also is a government official. We suggest that the best solution of the problem of railroad operation during February might be for President Wilson to direct the weather man to get his orders during that month from the director general of railroads. The secretary of the treasury was appointed director

general partly to co-ordinate the treasury department and the railroads. The most important need that for however has been more co-ordination between the weather department and the railroads.

It legibly written, a train order is likely to be correctly read, and mistakes in reading have usually occurred in connection with poor penmanship or faint or dimmed or blurred copy—though how men who are competent to run a train can ever take the risk of accepting anything but the clearest wording must always remain a puzzle. When not legibly written an order brings trouble, if not danger, and those first three words—"if legibly written," constitute an important *if* in the recommendation, printed on another page, for the universal delivery of train orders without requiring the conductor to sign a receipt. The arguments for the use of Form 19 which have been published during the past few years have a convincing sound, yet many roads continue to ignore them; can it be that this extreme cautiousness is due to a feeling that a good many operators ought to be required to reform their chirography before they can safely be trusted to impress an order on a conductor's mind without reading it to him aloud? To throw some light on this subject the *Railway Age* would like to print fac-similes of some well-written train orders, and this is an invitation to any reader to send to the Editor, at New York, any original orders, dated prior to February 1, which would illustrate good and satisfactory practice. Orders copied by a slowly hand have often been exhibited; it will be encouraging if some of the opposite kind can be shown. Also, let us have some typewritten orders. To what extent are typewriters used at stations for writing train orders?

Industrial Fuel Conservation

The drastic action of the United States fuel administrator in prohibiting the industrial use of coal for five days, except in those industries absolutely essential to the continuance of our national life, has brought home the seriousness of the fuel situation to every citizen. The present situation is a lesson in the need for conservation which should not go unheeded, and any plan which offers the possibility of a material saving in the use of fuel should be given the most thoughtful consideration. In a paper presented by David Moffat Myers before the last annual meeting of the American Society of Mechanical Engineers, an abstract of which will be found on another page of this issue, the amount of fuel wasted in the production of steam which may practically be prevented by a campaign of education, is estimated to be 1,000,000 car loads a year. The relief that such a reduction in the coal requirements of the country would offer to the railroads in the present congestion and shortage of railroad facilities is clearly indicated by the author in his statement that it is nearly equal to the annual coal carrying capacity of the Pennsylvania Railroad. Of course such a plan would be of very little value as a means of remedying the acute shortage of fuel existing at the present time. Another winter is coming, however, and there is no reason

to believe, with many of the activities essential to the conduct of our share of the world war just getting well started, that a reduction of 1,000,000 cars in the coal consumption of the country would leave any of our transportation facilities idle. The number of cars and locomotives which can be added to the resources of the railroads during the coming year will not be sufficient to provide a reserve large enough to insure that under adverse weather conditions, congestion and shortage may not again be encountered.

The report of the Railroad Committee of the Investment Bankers' Association, a part of which is printed elsewhere

For the Protection of Bondholders

in this issue, was made before the appointment of Mr. McAdoo as director general of railroads, but it is worthy of study and discussion. The idea on which the report is based is that the association should favor the formation of a bondholders' protective committee at the time that an issue and sale of bonds is made, this committee to employ an expert to continuously keep tab on the management of the railroad selling the bonds. The association referred the report back to the committee for further study. Government control in any case would have made a restudy of these suggestions necessary. It is interesting, however, to note that some of the tendencies of thought in regard to railroad financing which are indicated in this report have been quite clearly expressed in the discussions at Washington which have taken place following the President's proclamation announcing government control. Mr. McAdoo has made it perfectly clear that he recognizes and respects the huge stake which the creditors of the railroads have in their proper management and maintenance. It is hardly conceivable that when the railroads are turned back to their owners (the stockholders), many of the old theories of the rights of the controlling interests among the stockholders to manage and finance the road primarily or solely in their own interests, will have survived. Happily, even before government control the call of patriotism had gone far toward making this type of management unfastionable. It would seem highly probable that in the readjustments which take place after the war, bondholders' (the railroads' creditors') interests will receive very full recognition. The Investment Bankers' Association's committee report, therefore, may very profitably be studied both by railroad men and bankers and the committee should, and presumably will, welcome suggestions, especially from practical railroad men.

After all the commotion caused during most of the year 1916 and the early part of 1917, in the public press, in

Report of the Eight-Hour Commission

Congress, and elsewhere, by the demands of the four brotherhoods of railroad train service employees for an eight-hour day and their threats to strike if they didn't get it, it seems rather strange that practically no attention has been paid to the report of the Goethals commission appointed by the President under the Adamson law to observe its operation and effects. The report was submitted to Congress and the President last week but the newspapers carried but a few lines on it and many failed entirely to notice it. Most of those who believed the impassioned statements of brotherhood leaders that they were seeking a reduction in hours rather than higher wages, or of those who believed the statements of the railroads that the eight-hour day in train service would be impracticable and that the Adamson law would merely increase the wages of the highest-paid railroad employees, while decreasing by that much the ability of the roads to pay a more adequate compensation to some of their

men who had a much greater need for the increase, probably will never know what the Eight-Hour Commission has found out about those disputed questions after an exhaustive investigation of the subject. But those who will have an opportunity to see the report, an abstract of which is published elsewhere in this issue, will be interested to note that most of the claims made by the railroads during the long controversy have been sustained, while most of those made by the other side have been refuted. The report says that the eight-hour day, as a measure of a day's work for the purpose of reckoning compensation for certain classes of railroad employees, has become an established fact, and that while the law has had some effect in reducing the actual hours of work, chiefly in yard service, in road service the reduction in hours has been slight and the principal effect has been to raise wages. The commission also estimates that the increase in expenses caused by the law amounts to over \$61,000,000 annually, which is about the same as the estimate made by the railroads in advance. To what extent economies may be introduced to offset this increase in expense, the report says, cannot be stated. While the report is by no means conclusive, and the commission itself states that it was not possible to make authoritative findings as to the ultimate effects of the eight-hour standard work day because conditions during the period of its study were in many respects abnormal, it contains a wealth of valuable information on many disputed questions as to wages and conditions of employment. If it be claimed that the results predicted for the law were not fulfilled only because of the stubbornness of the railroads it may be remarked that the brotherhoods in their latest demands, presented to the railroads and now under consideration by the Railroad Wage Commission, have not asked for a real eight-hour day but a still further increase in wages.

A Great Opportunity for Public Service

THE OFFICERS AND EMPLOYEES of the railways of the United States have at this time the most splendid opportunity to render a great public service that they ever had. Furthermore, the conditions are such that they should be more disposed than they usually would be to work cordially together in rendering it.

There has been in the past much friction between the managements and certain classes of employees. This has been mainly due to controversies over wages and conditions of employment. All wage questions having now been referred to a government commission, the main cause of friction has been removed for the period of the war.

When in the past the operating officers have tried to increase efficiency, many employees have been luke-warm because, whether with good ground or not, they have felt that increased efficiency would mean fewer jobs for employees and more profits for the company. No employee can now have any such reason for refusing to co-operate in all efforts to increase efficiency. No company now can get as many men as it needs. No increase in efficiency will now add to the profits of any company, for under the guarantee plan, no matter what a railway's net earnings are, its owners will get the same amount of money. Every increase in efficiency will benefit the public, and it alone. It will benefit the public by causing more freight and passengers to be hauled for commercial and military purposes. It will also benefit the public either by reducing the deficit or increasing the surplus the government will have after paying the companies the amounts guaranteed them.

There never was in the past—and let us hope there never will be again—a time when the government and the people of the United States needed the very most efficient service which railway officers and employees could render as much

present owners of the teams and other facilities can agree to consolidate their energies and their capital, under conservative management, no better thing could be desired. It is understood that a sufficient number of the truckmen of the city are already favoring the plan to assure a successful start. There are more than a hundred of them, not counting the multitude of smaller establishments, and the task of arousing the co-operative spirit is by no means a simple one; but the Merchants' Association and those working with it have done much already. The term "pool" is used only in its theoretical sense; the more exact definition would be, division of traffic. The proposal contemplates zones of railroad stations and zones of stores and factories, each zone to be assigned to a single trucking concern. Actual payments of surplus earnings by one concern to another would not, probably, be necessary; satisfactory benefits should accrue to all interests without carrying the scheme that far.

As to rates to be charged for trucking, there will have to be a comprehensive and stable tariff, of course, and the director-general will have to prescribe it. The state and federal commissions, stopping to listen to a swarm of objectors, would take half a year just to make up their minds—assuming that they felt legally authorized to act—and relief is needed without any unnecessary delay. Moreover, the tariffs, at first, would have to rest on a rather arbitrary basis, for the calculation of the costs of the different kinds of wagon-service might require a good deal of experimental work.

For the protection of the monopoly (as well as for the maintenance of rates) dependence would have to be placed on the iron hand of the director-general. Trucks not subject to rigid discipline would have to be kept out of the freight-station piers. Consignees would have to accept freight sometimes at the cost of a little inconvenience, in order not to clog the delivering machinery. Everybody would have to do his best to promote the scheme for the general good, even if at his own loss.

Now, when we have a transportation dictator, and when everybody is disposed to do his best to hold up the hands of a dictator, would seem to be the right time to try this experiment. The single objective, to save one day's time on thousands of shipments, is alone well worth all the expenditure necessary to effect this reform. Because of the magnitude of the problem and the varied and conflicting interests involved, such a bold venture, in ordinary times, would require not only a genius but a prodigious expenditure of time and labor, and would involve no one knows how much delay; but when people are anxious about their daily bread, and are in danger of freezing, bulls are being taken by the horns every day; and are vanquished. The federal and state authorities (represented by Messrs. Harlan, Whitney and Donges) have already been interested; and Mr. McAdoo knows how to listen to a thing of this kind intelligently. And, finally, the immediate arrangements are in the hands of a veteran railroad officer, J. C. Lincoln, manager of the Merchants' Association's traffic bureau.

New Books

Selected Bibliography on Ports and Harbors. Compiled by W. J. Barney. 144 pages, 6 in. x 9 in. Bound in paper. Published by the American Association of Port Authorities, 110 West Fortieth street, New York City. Price \$1.

This book contains a fairly complete list of articles and books, published during the past ten years, concerning ports and harbors; and it deals with prints in the English, French, German, Italian, Spanish and Portuguese languages. The researches of the compiler have covered administration, laws, finance, equipment and engineering.

Letters to the Editor

Green Firemen—One Out of Three

NEW YORK CITY.

TO THE EDITOR:

For many of the positions in the operating department of the railroads of the country it is necessary, under the present stress, to employ a new man every ten weeks, or five times a year; a condition which would be startling if we stopped to realize it in its full meaning. This high percentage of resignations is, no doubt, familiar to readers of the *Railway Age*; it was published in the issue of January 4, page 89. And this dilution of the quality of the personnel is not to be put aside (as a matter that rightfully may be neglected) on the ground that the figures represent only an average; or because the totals include trackmen and freight-house men whose work, for the most part, can be performed with some degree of efficiency even by a green man. The conditions are deplorable in important branches of work directly affecting the prosecution of the war.

On one of the trunk lines, no less than *thirty-two per cent* of the locomotive firemen now in the service went to work, absolutely without experience, within the last four months. Of about fifteen hundred employees in one large locomotive and car repair shop, forty-three per cent have been employed within the last three months.

As has been said in connection with our five-day suspension of business to see if a little coal can be accumulated, the American people can adjust themselves to *anything*. Some local freight agents in and near large cities have learned how to get cars loaded, with a tolerable degree of efficiency, by gangs of men containing many individuals who have had only one day's experience and others whom it is safe to bid good-by, on the certain assumption that at the end of the day they will ask to be paid off. All things are possible.

But the lesson is there, just the same. Mr. Basford and others have told of the virtues of systematic education and the value of a general apprentice system; but here we go on in apparent utter obliviousness to his teaching. The editorial columns of your paper have rung with warnings against the danger of running trains without two first-class men in the cab of the locomotive; yet here we see evidence that hundreds of locomotives have only one man competent to deal with the varied emergencies that are liable at any time to arise in train operation. As I have said, we can adjust ourselves to anything. It is true, without doubt, that our best conductors and enginemen can get a train over the road, when they set themselves resolutely to accomplish the task, with crews whose ignorance is mountainous. All credit to such skillful operating men. Emergencies arise where, but for their ingenuity and fidelity, our transportation machine would break down. Within the last month there have been great numbers of such emergencies. But what I am driving at is that we have no right to tolerate this condition a single day beyond the time necessary to cure it.

To have competent men it is essential not only to pay adequate wages but also to train beginners as long as may be necessary. To have first-class firemen today men had to begin their course of education two years ago. We cannot set the calendar back two years, or even two days; but there remains the duty to begin. War-time pressure does not excuse neglect of this duty. To begin two years behind time is humiliating, but it is the only way out. It is better to begin two years too late than two years and one day too late.

L. D. W.

Senate and House Committee Railroad Hearing

Commissioner Anderson Has Prepared a New Draft of Administration Railroad Control Bill

WASHINGTON, D. C.

THE ADMINISTRATION BILL providing the terms under which the government is to exercise its control of the railroads during the war and providing the basis for agreements with their owners as to the compensation to be guaranteed for their use, is now being considered in executive sessions of the Senate Committee on Interstate Commerce and the House Committee on Interstate and Foreign Commerce. Although it is uncertain when the bill will be reported, Chairman Sims of the House Committee has stated that only a short time will be required. In the Senate Committee it is possible that more time will be required to reach a vote on the amendments to be proposed by Senator Cummins, who feels that the proposed basis of compensation is altogether too liberal and who has not yet been brought around to the idea that the restrictive ideas that he and others have advocated in the past are largely responsible for the emergency with which the government is now trying to deal.

Undoubtedly some time will be required also to consider the amendments proposed to provide that the government control shall terminate after a definite period after the end of the war, but the general prediction is made in Washington that the bill will pass in substantially its present form.

A new draft of the bill prepared by G. W. Anderson of the Interstate Commerce Commission as a result of the points brought out in three weeks' discussion of the bill in the hearings before the two committees was laid before the members last Thursday and after hearing arguments the Senate Committee concluded its hearings on Saturday and the House Committee on Tuesday. Mr. Anderson spent Friday in explaining the provisions of the redrafted bill to the Senate Committee.

The redrafted bill has been introduced in the Senate by Senator Smith as S. 3632 and in the House by Representative Sims as H. R. 8172. The Senate Committee on Tuesday voted 7 to 6 to amend the bill to provide that the government shall relinquish control over the railroads within one year after the end of the war. Those supporting the amendment were Chairman Smith, and Senators Pomerene, Underwood, Watson, Townsend, McLean and Kellogg.

Redraft of the Railroad Control Bill

Sections 1, 2, 3, 4, 9 and 11 of the bill have been entirely rewritten, a new section 13 has been inserted and the former section 13, which has thus far been the principal storm center in the bill, has been changed to section 14. The section now provides that the federal control shall continue during the period of the war and until Congress shall thereupon order otherwise and the following has been added: "But this act is expressly declared to be emergency legislation enacted to meet conditions growing out of war; and nothing herein is to be construed as expressing or prejudicing the future policy of the federal government concerning the ownership, control, or regulation of carriers or the method or basis of the capitalization thereof."

Mr. McAdoo and Commissioner Anderson have insisted that it would be extremely unwise to include in the bill a definite time for the termination of the government control, on the ground that its continuance will be necessary to protect the interests of the security owners as well as those of the government during the period of readjustment and that to set a time limit for action by Congress would be dangerous.

The new section 1 of the bill is as follows:

That the President having in his own war taken over the possession, use, control, and operation (called herein federal control) of certain systems of transportation (called herein federal carriers), is hereby authorized to agree with and to guarantee to any such carrier making returns to the Interstate Commerce Commission that during the period of such federal control it shall receive as just compensation an annual sum (herein called standard return), payable in reasonable installments, for each year and pro rata for any fractional year of such federal control, at a rate equivalent as nearly as may be to its average annual railway operating income (including therein such income of lines acquired by, leased to, or consolidated with such carrier between July 1, 1918 and December 31, 1917), for the three years ended June 30, 1917, and in addition thereto an annual sum payable likewise in reasonable installments reckoned at a rate per centum to be fixed by the President upon the cost of any additions or improvements, less retirements, made during the six months ended December 31, 1917. In the computation of such income, debits and credits arising from the accounts called in the monthly reports to the Interstate Commerce Commission, equipment rents and joint facility rents shall be included. The standard return and the cost of such additions and improvements are to be ascertained by the Commission from the reports, books, and other pertinent data of such carrier and certified by it to the President. No certificate shall, for the purpose of such agreement, be taken as conclusive of the amount of such average annual railway operating income and of such cost.

Every such agreement shall provide that any federal tax under the act of October 3, 1917, or acts in addition thereto or in amendment thereof, commonly called war taxes, assessed for the period of federal control beginning January 1, 1918, or any part of such period, shall be paid by the carrier out of its own funds, or shall be charged against or deducted from the standard return; that other taxes assessed under federal or any other governmental authority for the period of federal control or any part thereof, either on the property used under such federal control or on the right to operate as a carrier, or on the revenues or any part thereof derived from operation (not including, however, assessments for public improvements or taxes assessed on property under construction and chargeable under the classification of the Interstate Commerce Commission to investment in road and equipment), shall be paid out of revenues derived from railway operations while under federal control, that all taxes assessed under federal or any other governmental authority for the period prior to January 1, 1918, whenever levied or payable, shall be paid by the carrier out of its own funds or shall be charged against or deducted from the standard return.

The President is further authorized by such agreement to make all reasonable provisions for the maintenance, repair, and removal of the property and for the location of reserve funds thereon, and for the depreciation thereof, to the end that at the termination of such federal control either the property shall be returned to the carrier or satisfactorily re-gold repaired and in excellent condition and equipment at the beginning of federal control or that just payment shall be made therefor.

The President is further authorized by such agreement to make all other reasonable provisions, not inconsistent with

the provisions of this act or of the act of August 29, 1916, that he may deem necessary or proper for such federal control or for the determination of the mutual rights and obligations of the parties to the agreement, arising from or out of such federal control.

If the President shall find that the condition of any carrier was during all or a substantial portion of the period of three years ended June 30, 1917, because of non-operation, receivership, or other undeveloped or abnormal conditions, so exceptional as to make the basis of earnings, hereinabove provided for, plainly inequitable as a fair measure of just compensation, then the President may make with the carrier such agreement for such amount as just compensation as under the circumstances of the particular case he shall find just.

The principal change is in the addition of a provision for a return on the capital invested during the last half of 1917, estimated at \$240,000,000, and in the definition of the "standard return" to avoid the use of the term "net operating income" which is not well understood because it has not been used in most of the reports of the Interstate Commerce Commission, although it was recently inserted in the monthly report forms. A change was also made in the provision in the second paragraph, for the purpose of clarifying the provision that war taxes shall be paid out of the guarantee and not charged to operating expenses, and in the provision authorizing the President to make agreements in the case of roads in exceptional conditions.

The new sections 2, 3 and 4 are as follows:

Sec. 2. That if no such agreement is made, the President may nevertheless pay to any carrier while under federal control, an annual amount, payable in reasonable installments, not exceeding ninety per centum of the estimated annual amount of just compensation, remitting such carrier to its legal rights for any balance claimed to the remedies provided in section three thereof. Any amount thereafter found due such carrier above the amount paid shall bear interest at the rate of six per centum per annum; and any excess amount paid hereunder shall be recoverable by the United States with interest at the same rate.

Sec. 3. All claims for just compensation not adjusted as provided in section one shall, on the application of the President or of any carrier, be submitted to boards, each consisting of three referees to be appointed by the Interstate Commerce Commission, members of which and the official force thereof being eligible for service on such boards without additional compensation. Such boards of referees are hereby authorized to summon witnesses, require the production of papers, view properties, administer oaths, and may hold hearings in Washington and elsewhere, as their duties and the convenience of the parties may require. Such cases may be heard separately or together or by classes, as the Interstate Commerce Commission or any board of referees to which any such cases shall be referred may determine. Said boards shall give full hearings to such carriers and to the United States; shall consider all the facts and circumstances; and shall report as soon as practicable in each case to the President the just compensation, calculated on an annual basis and otherwise in such form as to be convenient and available for such agreement as is authorized in section one. The President is authorized to enter into an agreement with such carrier for just compensation upon a basis not in excess of that reported by such board, and may include therein provisions similar to those authorized under section one. Failing such agreement, either the United States or such carrier may file a petition in the Court of Claims for the purpose of final ascertainment of the amount of such just compensation, and in the proceedings in said court the report of said referees shall be prima facie evidence of the amount of just compensation and of the facts therein stated.

Sec. 4. The just compensation that may be determined as hereinbefore provided by agreement or that may be adjudicated by the Court of Claims shall be increased by an amount reckoned at a reasonable rate per centum to be fixed by the President upon the cost of any additions and improvements, less retirements, to the property of such carrier made by such carrier with the approval of or by the President while such property is under federal control.

Section 3 provides more specifically for the handling of claims for just compensation which are not adjusted by agreement. No change is made in section 5 and only slight changes in section 6. This now provides that the appropriation of \$500,000,000, together with any funds available from any operating income of the carriers, may be used as a revolving fund for the purpose of paying the expenses of the federal control and, so far as necessary, the amount of just compensation, as well as to provide for terminals, improvements, etc., as provided in the original bill. It is also provided that the President may expend such an amount as he may deem necessary or desirable for the purchase, construction or utilization and operation of canals, as well as other water transportation facilities mentioned in the original bill.

In place of section 9, authorizing the President to direct that the federal workmen's compensation act shall be extended to apply to carrier employees, a new section is inserted as follows:

Sec. 9. The President may prescribe a reasonable system and schedule of compensation for the disability or death resulting from an injury occurring, or that may have occurred at any time after the beginning of such federal control, and sustained in the course of his employment by a person employed, either directly by the United States, or indirectly through such carrier, in connection with such federal control and operation; and may likewise prescribe the means and method for the administration of such system and the determination and adjustment of any claim for such compensation and the payment thereof, as well as the expenses of the administration thereof, out of the operating revenues derived from the federal operation of the carrier, or out of any reserve fund or funds created therefrom. The President may, from time to time, revise and modify such system, schedule, means, and method. He may, in his discretion, transfer the administration thereof to the United States Employees Compensation Commission. The rights and remedies so provided shall exclude all other rights and remedies of the person injured, his personal representatives, dependents, or next of kin, either at common law or by statute, whether federal or state, against either the carrier or the United States on account of such injury or on account of the disability or death resulting therefrom.

The President may further prescribe that a reserve fund or funds shall be created, to be charged to operating expenses, for the commuted value of any or all claims for compensation allowed or accrued during such federal control.

To section 10 is added the following: "The provision of this act shall also apply to any carriers to which federal control may be hereafter extended." The new section 11 is as follows:

Sec. 11. That carriers while under federal control shall, in so far as is not inconsistent therewith, or with the provisions of this act, or any other act applicable to such federal control, or with any order of the President, be subject to all laws and liabilities as common carriers, whether arising under statutes or at common law; and suits may be brought by and against such carriers and judgments rendered as now provided by law. But no process, mesne or final, shall be levied against any property under such federal control. The President shall prescribe the means and methods for the payment, out of the operating revenues derived from such federal control, of any judgments and the

enforcement of any leases or orders that may be imposed against the carrier arising out of any act or act done in the course of such federal operation and control.

No change is made in section 17. The new section 14 is as follows:

Sec. 13. All pending cases in the courts of the United States affecting railroads or other transportation systems brought under the act to regulate commerce approved February 4 1887, as amended and supplemented including the non-stop clause so-called, or under the act to protect trade and commerce against unlawful restraints and monopolies approved July 2 1890, and amendments thereto shall proceed to final judgment as soon as may be, as if the United States had not assumed control of transportation systems but in any such case the court having jurisdiction may upon the application of the United States stay execution of final judgment until the further action of Congress in respect of control of transportation systems by the United States.

Mr. McAdoo's Testimony

William G. McAdoo, Director General of Railroads, testified before the House Committee on January 23, repeating in general the statement he had previously made before the Senate Committee and urging the importance of early action on the bill in order to allow the railroad administration to proceed with its plans and as necessary to the success of the government financing. Some statements he had made before, however, were made clearer or more emphatic in his later testimony and some additional ideas as to his plans were given which made it clear that he does not desire to disorganize the roads. He said he hoped that the proposed appropriation of \$500,000,000 would be sufficient to meet the expenditures for the first year for new equipment, locomotives and improvements, and to make advances to roads that need it and that while he hoped to be able to make the roads earn a surplus he thought it would be unwise to rely too much on that.

Asked about the status of railroad employees and railroad revenues he said that in his opinion the legal status of the employees has not been changed and that while they are in effect government employees they are not technically so. He also thought it would be most unwise to try to handle railroad revenues through the government accounting system. The government has not taken permanent possession of the roads and may never do so; it has taken them for war purposes and the anticipation is that the properties will be restored to their owners. The corporations are acting for the government and he thought it most important that their organizations shall continue unimpaired.

Representative Winslow said a report is abroad that the employees are already assuming that they are government employees and are growing lax in the performance of their duties. "I do not believe there is any laxity," said Mr. McAdoo. "I have had occasion to look into that and my reports don't confirm it. At first there was some feeling of uncertainty but I think that has been overcome. There has been a most gratifying good spirit on the part of both officers and employees and I don't think we need feel any apprehension on that score."

President Must Have Paramount Authority

Mr. McAdoo was emphatic in his contention that the President, as commander-in-chief, must have paramount authority over all phases of the transportation system, including rates, but that the power ought not and will not be exercised except as it may be necessary for the public interest. Some members of the committee were inclined to draw a distinction between the necessity for paramount authority over all matters of operation and the necessity for presidential authority over rates, but Mr. McAdoo said that while

the emergency and acute administrative matters require a more free presidential discretion, the rate question is better handled and controlled by the legislative branch. He said that the President possesses the power by virtue of the act authorizing him to take over the roads and that the Interstate Commerce Commission "has no power to penalize the President."

In reply to a charge that the Interstate Commerce Commission would have had no voice in the matter he said that the Interstate Commerce Commission, Mr. McAdoo stated in appreciation of some of the suggestions regarding freight and regulations. He stated to be justified on the part of Congress in taking freight out of warehouses as part of the control structure in the control of business and he had no doubt that it had reduced the usefulness of freight equipment by 25 per cent. Representative Esh asked if he would like to have authority if he wished to increase rates. Mr. McAdoo stated that if there were time to deliberate he would like the opportunity for recommendations. He said he had received many suggestions that passenger fares could be lowered to encourage travel out, which he did not feel it necessary to consider at the present time. He stated, however, he would not hesitate to act.

In reply to the argument advanced by Clifford Thorne that the President ought not to disrupt the power of the Interstate Commerce Commission over rates for governmental traffic Mr. McAdoo said the committee would be very busy deciding just such questions but that the power to create a deficiency in the revenues from which the surpluses are to be met would be a very dangerous one to have unprotected. If it should be considered necessary to increase rates to offset increases in wages he thought the Interstate Commerce Commission ought to hold hearings and make a recommendation to the President.

The Director General was most positive in his contention that no time limit should be prescribed in the bill, saying that though the fixing of a definite period within which the roads must be restored would be more likely to result in government ownership than if Congress were allowed all the time necessary to work out a plan of readjustment.

C. A. Preuty, Director of the Bureau of Valuation of the Interstate Commerce Commission, testified before the committee that it would take two years more to complete the field work of the valuation and another year to complete the office work. He opposed the idea of allowing the President to have arbitrary authority over rates.

Clifford Thorne, representing the independent railroads, in his testimony proposed that the railroads be guaranteed only the dividends actually paid in the case of roads that had earned "reasonable" dividends and that any surplus be divided between the roads and the government. He strongly opposed the idea of allowing the President to have power to veto a decision of the Interstate Commerce Commission by a state commission saying that if the committee of a state commission was to be decided by a majority vote of its members the railroads could overcome the decision too easily by presenting a case based on a slight amount of financial depression. He stated that it was not necessary to have control in that way the roads would almost certainly have been able to convince Mr. McAdoo on the existing condition that the Interstate Commission which has a large competence and authority and control the railroad problem could handle the matter. He stated he did not believe the railroad law would stand up to the test of the Supreme Court and that the Interstate Commission would have received from the "average commission" which he is back up when Mr. Thorne finally asked him why he did not recommend the Interstate Commerce Commission to be re-

increase in wages to the trainmen, which were made effective as of January 1, into the February expenses, "but in a perfectly open and aboveboard way" and that they had not stated to the commission that the February returns were not representative or "indicative of tendencies." He said that if an advance in wages is granted that should not be made an excuse for higher rates but should be paid for by the government as a war expense and while he had no objection to the President's raising rates on war materials, where the government is the shipper, he did object to any advance in commercial rates.

Frank J. Warne, a statistician who has often represented the brotherhoods, testified before the Senate Committee on January 24, giving statistics to show the extent of intercorporate holdings of railway securities. He said that over 30 per cent of the outstanding stock is held by railroads for purposes of control while only 16 per cent of the bonds is held by railroads. He described the practice of acquiring the stock of subsidiary companies and issuing bonds against the property, saying that the result has been to practically convert stock into bonds and to make fluid capital subject to rigid interest requirements, and that this practice has exposed the railroads to financial crises in times of depression and has prejudiced the interests of the employees. "Our railway structure," he said, "rests on a financial structure of sand, a house of cards threatened by the slightest wind." He did not oppose the plan of guarantee proposed, saying that it is better to give the railroads too much than too little and that it would be impossible to measure the value of the service performed by the transportation system, but his apparent purpose was to show the committee that most of the money would go to a comparatively few large holders of securities.

Arguments on the Bill

Alfred P. Thom, counsel for the Railway Executives' Advisory Committee, presented a legal argument before the Senate committee on January 26 on the attitude of the carriers toward the administration bill.

Mr. Thom emphasized the fact that the basis of compensating the railroads proposed in the bill is not intended to fix the compensation directly but outlines a basis for an agreement between each company and the government and he declared that it is in the public interest that there shall be agreements in as many cases as possible.

It is not in the public interest, he declared, for a railroad to accept for its security holders less than an adequate return, for these securities lie at the base of the credit of the financial institutions of this country and constitute the foundation and support of those that have financial strength. It would not be an act of patriotism or in the public interest to agree to a reduction of these values. No mere sacrifice of these holdings which would weaken the financial structure of the country would be in the public interest.

"There should be paid to the owners of these properties what the Constitution requires," Mr. Thom said, "and that is the fair equivalent of the value of the use of that which is taken. You have but one precedent of a similar case to guide you. England is the only great nation that has done what this country has done and in that case the railroads were paid the demonstrated value of their use in the hands of their owners. You have also the recommendation of the President and of the secretary of the treasury to justify that basis."

Senator Cummins asked if he would contend for the basis of the actual earnings if the Interstate Commerce Commission had reduced the rates 15 per cent on December 29.

"Can you justify the crippling of a horse in order to buy him?" asked Mr. Thom. "The value cannot be affected any more by the possibility of the exercise of the legislative power to reduce rates than by the possibility of an increase

in rates. There is greater prospect of an increase in rates than of a decrease, but the carriers would not be entitled to the benefit of it. The compensation should be determined on the basis of the value as of the time of the taking and we must look at the conditions and circumstances as they existed at that time."

"If a railroad had been operating at a loss could we take it without paying anything?" asked Senator Cummins.

Mr. Thom replied that the fairly demonstrated earning power was the minimum which could not be reduced without confiscation and that where there was no fairly demonstrated earning capacity some other principle must be taken as a basis. He cited the case of two warehouses, one which had earned a profit and the other one similar but new and without demonstrated earning capacity, saying that the new warehouse could not be taken without compensation.

He also pointed out that the earning capacity of the roads at the time they were taken was based on rates which had long been subject to regulation and which during the past 10 years had been practically fixed by the Interstate Commerce Commission and, therefore, must be presumed to be reasonable. "If one railroad earned more than another from reasonable rates," he said, "it was because it performed a larger measure of public service. Congress, through its deputy, the Interstate Commerce Commission, cannot fix rates as reasonable and then reduce them on the ground that the earnings are too high."

Mr. Thom also urged that provision be made in the bill for returning the roads to their owners within a year after the expiration of the war or at the discretion of the President. He repeated his argument before the House committee on Monday.

Brief arguments were also made before the Senate committee by S. H. Cowan, representing Texas shippers; Glenn E. Plumb, representing the brotherhoods; Clifford Thorne and Commissioner Anderson.

Mr. Cowan argued that the roads were not entitled to be guaranteed any surplus and suggested that the advantages of competition be retained by allowing the roads part of the surplus if they could earn it, the rest to go to the government. "You ought to give the roads all they are entitled to and a little bit more," he said. "Whether they have bought the property, whether it was given to them, or whether they stole it, they are entitled to a reasonable return on it if their consciences will let them take it, but after you have guaranteed interest and dividends, that is all that is required. Let the government use part of the surplus to help the weaker roads and furnish a stimulus to the managers by giving them a chance to earn a little more than the guarantee. Mr. Thom talks about crippling a horse in order to buy him, but the plan proposed here is to take a crippled horse and doctor him up and then pay as much for him as for a good horse."

Mr. Plumb argued that railroad property is irrevocably devoted to public use and under the charter limitations is not private property. He said that if the carriers insist on their right to the "pound of flesh," an examination of the "bond" will show that they are not entitled to a drop of blood and they can be prevented from taking it because under their state charters they have no right to do a dollar's worth of interstate business.

Mr. Thorne argued particularly against letting the President, or Mr. McAdoo for him, fix rates. He said the railroads want the rates placed as high as possible, both for the effect on the value they may claim if the government buys the roads, and also so that they will be on a high basis if the roads are restored to their owners, and that the government will have a temptation "to milk the shippers of the country for money to carry on the war by an indirect tax in place of a bond issue."

Senator Cummins asked if the men surrounding Mr.

McAdoo are not those who in the past have consistently advocated higher rates. Mr. Thorne replied that they were and that whereas formerly the Interstate Commerce Commission building was all cluttered up with railroad men who crowded the elevators and halls and offices "swamping the commission" with their efforts to put forth their views as to higher rates, now they are permanently lodged there by the government and frequently a shipper cannot get to Mr. McAdoo except through a railroad man.

This aroused the indignation of Commissioner Anderson who asked if it was not just as much the duty of a Commissioner to hear a railroad man as to hear Thorne or other representatives of the shippers.

Mr. Thorne replied that that was, of course, the case, but that the shipper is entitled to a hearing and that the National Industrial Traffic League had been denied a hearing in the demurrage rates, while the "other fellows could discuss the matter in an ex parte way in Mr. McAdoo's private office." "If you turn this power over to a one-man tribunal," he said, "it will work disaster to many industries."

"If Congress wants to avoid litigation," he said, "it will have to accept the proposition made by the carriers," meaning presumably the proposition made by the President. He urged, however, that the guarantee be confined to fixed charges, reasonable dividends and a share of the surplus. He read resolutions adopted at a convention of the Iowa Grain Dealers' Association on January 24, advocating that the Interstate Commerce Commission should retain its present authority over rates and saying that "to substitute the snap judgment of one man would be a calamity to American industry."

Commissioner Anderson said that he had been working night and day on the bill and on methods for dealing with the situation since November 18. This is about the time the Railroads' War Board sent for the vice-presidents of the eastern roads to take what were considered at that time drastic measures for the relief of the congestion. The President's proclamation, which was given out on December 26, he said was completed on December 24. The essence of the plan he originally worked out has stood the fire of criticism better than he had hoped it would and while he had no idea that the bill is perfect, he said that practically no proposition has been presented that is not now represented in the redraft of the bill which has not been excluded "as an impossible proposition."

The plans proposed by Messrs. Cowan and Thorne for guaranteeing interest, dividends, and part of the surplus, he said, "would be destructive of the very purpose of federal control, which is to co-ordinate the railroads into one system and to make railroad men feel that they are working for the nation instead of for individual companies." "If you reject that," he added, "there is practically nothing before you attacking the proposed basis as the foundation for an agreement. These plans all have the same inherent vice—they won't work."

"To show the views as to the right of a carrier to earn a return on invested surplus, which he holds "when not dealing with war emergency conditions," Mr. Anderson read from an article he had written, advocating that the return to be allowed should be based on the "amount of cash capital actually invested honestly and with prudence," but, he said, "we are now dealing with a war emergency and a condition, not a theory, confronts us. This is no time for Senator Cummins, with whom I thoroughly agree, and myself or Mr. Plum) or Mr. Thorne, to indulge our pet theories. If, though we are right, Mr. Thorne is somewhat radical and Mr. Thom is all wrong."

Mr. Anderson said he had very reluctantly come to the view that it was necessary to leave the absolute power of rate making in the hands of the President, although he ought not to use it except in emergencies and ought to

employ the machinery of the commission. He had suggested that a statute be drafted which would retain in the Interstate Commerce Commission all of its power not inconsistent with the necessary war power of the President but had found no one who can draw a statute that will work, although he thought that the President had made it clear in his proclamation that he would not interfere except in special cases. He said that if Mr. Plum) had had to draft a bill that would meet all his criticisms, instead of merely presenting an oration about them, he would not have had time to read "The Merchant of Venice" recently.

As to the rate question he said: "If the railroads are not self supporting it will be the duty of the President to raise the rates."

To meet an objection that under the wording of the revised bill a railroad once taken over by the government would have to remain under government control until Congress orders otherwise, Mr. Anderson suggested an amendment to Section 14 providing that the President may at any time relinquish control of all or any part of any system of transportation which it was not needful or desirable to retain.

As to the proposal to set a time limit Mr. Anderson said that most thinking people who have studied the question are coming to the conclusion that there should be no time limit. Mr. Thom had referred to the possibility of a political campaign on the question of government ownership. This would be even more dangerous, Mr. Anderson said, if Congress were required to decide the question by a certain date. "That is a question you have got to face," he said. "We can't do anything now that will head it off."

New Form of Application for Priority Certificates

THE PRIORITIES DIVISION of the War Industries Board has issued a new form of application for priority certificate which will be put in effect immediately for all future applications for priority in war orders. Since September 21 the division has been issuing two kinds of certificates—principal and subsidiary priority certificates. From now on, only one kind of certificate will be issued, to be known as a "priority certificate." There will be no change whatever in the status of the principal and subsidiary certificates now outstanding, but the new form will be used alike in the future for all who have been accustomed in the past to apply for principal certificates as well as those who have been applying for subsidiary certificates.

The new form of application differs from the previous forms chiefly in that it is much more complete and calls for all of the facts which the division must have in order to consider the request intelligently, and in the second place, each application must be verified by an affidavit of the applicant, except the applications which are made by representatives of the American or allied governments.

The division will continue in the future, as in the past to issue certificates only on special orders for materials, commodities or work. No industrial plant, material, or commodity will be given blanket certificates. A new priority certificate is known as Priority Certificate No. 7, with additional general information about the priority system will be issued within a few days.

The new priority certificate application contains 10 questions which must be filled out as described by the applicant. The questions are as follows:

1. Insert here name and address of person who is to supply the materials, etc., or perform the work described in certificate; 2. Insert here name of person in whom certificate is desired.

3. Insert here name and address of applicant.

3. State here number and date of order placed with person named in paragraph 1, above, for which priority is desired and date delivery is promised and desired, respectively.

4. If order was placed by other than the applicant named in paragraph 2, above, insert here name and address of person who did place the order.

5. Insert here particulars of order on which priority is desired, viz.: Quantity and description of material; or amount and description of work.

6. List here the numbers, ratings, and subject matters of priority certificates, if any, under which the applicant is working, and for which the material, etc., described in paragraph 5, is needed.

7. If material or work described in paragraph 5 is ultimately destined to fill one or more government or original orders, insert name of government department or of original contractor and number and date of orders.

8. State fully why priority is desired and what effort, if any, has been made to secure delivery without priority assistance. The above must include a statement that no part of the material, etc., for which priority is asked, has been shipped.

9. (a) Has applicant the plant and equipment necessary and now available to execute all orders upon which he is now engaged? (b) What per cent of applicant's plant output is now devoted to government orders?

10. If applicant has not the plant and equipment adequate to execute all orders upon which he is now engaged, what plant extensions or additional equipment are necessary?

Train Despatching*

THE PROMPT MOVEMENT of trains affects the earnings of the road quite as much as the successful operation of any other department. The train despatcher's office is the clearing house; all departments come in contact with, and do business through, this office. The despatcher's work depends more upon the co-operation of all than that of any other employee, and a great measure of his success is due

*From a paper by S. F. Spurbeck, despatcher, Duluth, Missabe & Northern, Proctor, Minn.; read before the Missabe Railway Club of Proctor.

to help accorded him by train and engine men, yardmasters, and operators. Despatchers should be given the opportunity to go out over the road at frequent intervals, without loss of sleep or pay. This is profitable to the company, for there is no question but many an unwise move is made on the despatcher's checker board, which would not be made were he thoroughly familiar with the situation. Tell the despatcher as far ahead as possible when a train expects to move, where to, and nature of work. Tell him of any expected delay. If you are on a special train and you are authorized to run at a certain speed, whether fast or slow, tell the despatcher, so he may plan accordingly. How much ahead would you be if you ran 45 miles an hour when he was figuring on 30 or 35, and he stuck you 15 or 20 minutes?

It is a mistaken idea that because a despatcher is not sending orders continually, he is not working. Let no one attempt to estimate the amount of his work by the number of orders. Unlike other officers, who do the thinking and tell some one else to do the work, he does both. Care should be taken that the trick despatcher shall not be burdened with detail work and that his office be kept private. To make the despatcher responsible for all transportation matters in addition to the handling of trains has proved that a man cannot do a half dozen things at one time; something must be slighted; and this is false economy.

The operator is the eyes and ears of the despatcher. Good, prompt, efficient operators are worth their weight in gold to the despatcher, while the slack, inattentive ones are not worth their salt. I sometimes imagine that this department does not receive equal attention with others, considering its importance.

In your daily work and complaints, "have a heart." We are all striving toward the same end, to move the company's business. It has been said that the life of a train despatcher's nervous system is about 15 years, under present conditions; and I sincerely believe that the time is not far off when the despatcher is going to be allowed his one day off a week, the same as other workers.

We are gradually, year by year, striving more, co-operating more, and more intelligently realizing the importance of each other's work. This is the day of trained experts. Put the best you have into your job, and your future is assured.



Photograph from Underwood & Underwood, N. Y.

A Machine Gunner and Big Boulders Will Help Block the Progress of the Austrians Along This Italian Railway Line

Hopper Bottom Gondola Cars for C. M. & St. P.

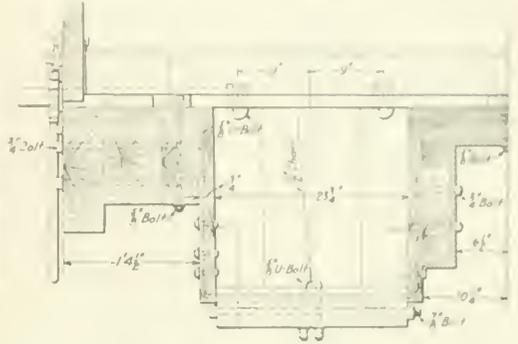
Composite Construction With Heavy Steel Center Sill for
Equipment Built in Company's Shops

The Chicago, Milwaukee & St. Paul is now building at its shops at Milwaukee and Tacoma 1,500 50-ton gondola cars. A composite design has been adopted for this equipment, principally on account of the difficulty of securing prompt deliveries of steel at this time. Although heavy

end sills are 42 in. the maximum width 10 ft 11 in., and the maximum height from the top of the rail 8 ft 6 in. The body of the car is 10 ft 11 in. long, 8 ft 7 in. wide



Hopper Car for the C. M. & St. P.



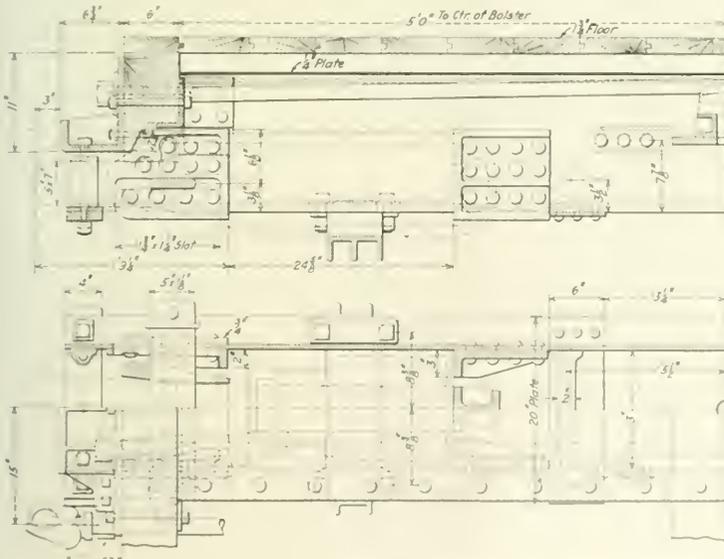
Cross Section of Car at Hopper

sills are used, the ratio of light weight to capacity has been kept reasonably low, the average light weight being 42,100 lb. The ratio of the revenue load to the maximum total weight is therefore 72 3 per cent.

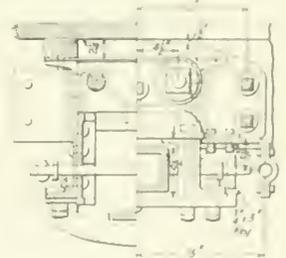
In the design of the car the principal aim was to use wood as extensively as possible and yet provide a car that would give good service and insure economy from the standpoint of

and 4 ft. 3 3/8 in. deep. The cubical capacity, with the load heaped 2 ft. above the sides, is 2,000 cu. ft.

In the construction of the car body the metal parts have been confined almost wholly to the center sill members. Two channels, of 15-in., 57-lb. section, extend from end to end

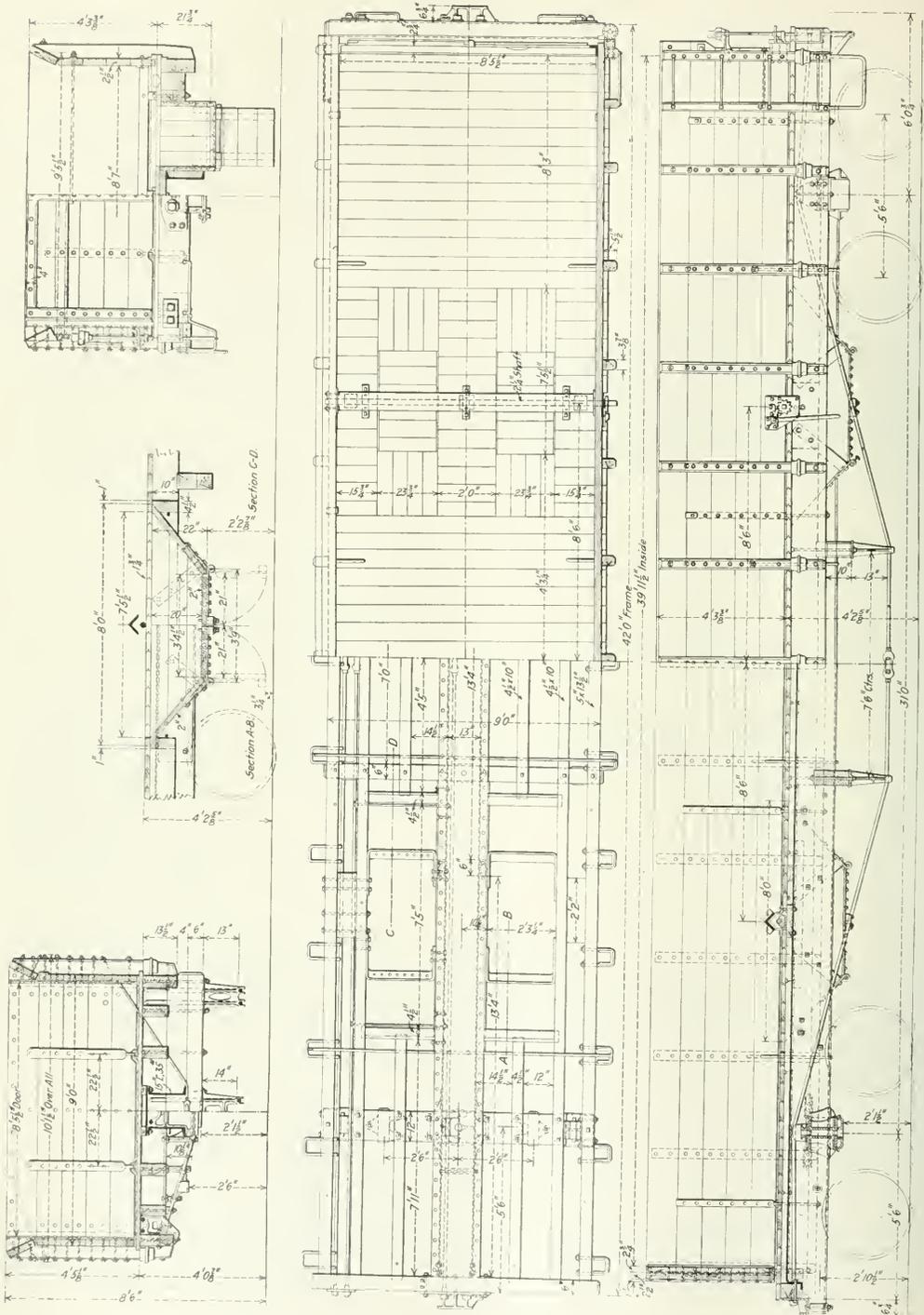


Details of Center Sills and Draft Attachments



maintenance. With this thought in view, a heavy steel center sill has been provided to take care of the buffing and pulling stresses, while the weight of the body and lading is carried on wooden sills and truss rods. The length of the car over the

of the car and are reinforced for the entire length by 1 1/2 in. by 20 in. cover plate. Under the center sills two truss rods, 1 1/2 in. in diameter with 1 1/2 in. upset ends are provided to carry the weight of the lading. The body bolsters are built



General Arrangement of the C. M. & St. P. 42-Ft., 100,000-Lb. Capacity Gondola Car

up of rolled sections and tilled casting. The tension member which passes through the neutral axis of the center sills is 4 in. by 12 in., while the compression member is 1 1/2 in. by 12 in. The sides of the car body are supported by two wooden sills the outer 8 in. by 15 1/2 in. the inner 4 in. by 10 in. These sills are also reinforced with two 1 1/2 in. truss rods.

The four hoppers, 23 1/2 in. wide and 8 ft. long are placed between the center sills and side sills, the centers being 1 1/2 ft. 3 in. from the ends of the car. Short intermediate sills extend from the ends of the car to the hoppers and between the hoppers, being supported by the end sills, body bolsters and needle beams. The side stakes are 3 3/8 in. by 5 1/2 in. Every third pair of stakes is tied together with a 1 1/2 in. rod extending under the center sill. The sides of the car body are 2 1/2 in. thick and the floor is 1 1/2 in. thick.

The hoppers are supported on the side and the ends by metal struts fitted on two inner side to the center sill, L-barrel and on the outer side to the two side sills. The hatching mechanism consists of 2 1/2 in. shafts extending across the car above the deck, with chains to raise the hopper doors. A 3 in. by 3 in. angle iron is placed over each shaft to set it off from the lading. The details of construction of the hoppers are shown in one of the illustrations.

On account of the difficulty of securing clearance between the brake wheel and the end of the bar, special types of ratchet brakes have been applied. Among the other specialties used on these cars are Bettendorf truck and frame, Bettendorf and Buckeye cast steel truck bolsters, Barber lateral rollers, Ajax brake beam, Ajax coupler with Buckeye cast steel yokes and Miller traction draft gear.

The Zone System for the Distribution of Coal

The Committee Appointed Jointly by Mr. McAdoo and the Fuel Administration Begins Work

AS BRIEFLY NOTED in last week's issue, Director General of Railroads McAdoo and the Fuel Administration have appointed a joint committee to work out a plan for eliminating the cross-hauling of coal by dividing the country into districts or zones of production and distribution to the end that coal produced in each district will be consumed in that district or in defined districts of destination. The plan is to limit the shipment of coal to certain restricted consuming districts, which will prevent long and circuitous hauls, cross-routings and congestion.

The committee consists of Howard Elliott, of the New York, New Haven & Hartford, and A. G. Guthrie, of the Bureau of Car Service of the Interstate Commerce Commission, appointed by Mr. McAdoo; G. N. Snider, traffic manager of the Fuel Administration and formerly coal traffic manager of the New York Central, and S. A. Taylor, a Pittsburgh mining engineer, named by Dr. Garfield, and C. E. Leshner, chief statistician of the Bureau of Mines. Some preliminary details of the zone plan were announced by the Fuel Administration on January 25.

The adoption of such a plan was repeatedly urged upon the Fuel Administration by the Railroads' War Board last fall but the railroads had no power to put it into effect. The Fuel Administration did not display marked enthusiasm toward it when its adoption might have made unnecessary the expedient of declaring an embargo on manufacturing and a series of Monday holidays. The War Board, however, continued to recommend the zone system and on December 19 submitted to the Fuel Administration a completely worked out plan in which the producing and consuming districts for the entire United States were defined in detail. This plan was later described in testimony before the Senate committee conducting an investigation into the causes of the shortage of coal, by F. S. Peabody, a practical coal man, who worked out the details with the railroad committee. Dr. Garfield also outlined a plan before the Senate committee on December 26. Mr. Peabody, who was chairman of the Committee on Coal Production of the Council of National Defense before the policy of coal production was supplanted by the policy of coal conservation, testified that the plan would result in a saving of 20 per cent in the use of coal cars and a corresponding reduction in the cost of coal at destination.

In a letter of December 19, submitting the plan to the Fuel Administration, Fairfax Harrison, chairman of the

Railroads' War Board, said: "We again urge upon you the paramount necessity of adopting the principle of limitation of cross-hauling of coal upon which this plan is based. The power to do this comprehensively lies with the Fuel Administration and, as we understand it, with no one else."

The Railroads' War Board's plan has been printed in pamphlet form, with a series of maps showing the various producing districts in red and the consuming territory to be served from each in yellow. The producing districts are all carefully defined and a destination index shows the producing districts from which each territory is to be served. It is understood that it was used to a considerable extent as the basis of the new plan.

The Fuel Administration's statement outlining the new plan is as follows:

"The plan contemplates a system of coal distribution that will insure the speediest possible movement of coal from the mine to the consumer, and the immediate return from consuming centers to the mines of empty coal cars. It will eliminate so far as possible cross-hauling of coal by providing for the movement of coal from the mine to the consumer along the shortest possible transportation lines.

"Under the plan each state will be allotted its quota of the estimated output of bituminous coal. This allotment will be supplied from the output of certain definite producing districts. Coal for each state must move from the producing districts in which the state's allotment is located and from no others.

"The producing fields of the country have been divided into some 20 districts and a district representative will be named in each of these. Each district representative will equitably allot all orders and requests for fuel from the Fuel Administration among the various shippers and mines within his district. They will be responsible for the prompt filling of coal orders and the prompt movement of coal out of the producing fields. They will see to it that each state receives only its authorized quota from the producing districts. All requests and orders for emergency coal, either by the federal fuel administration or by state fuel administrators, will go through these district representatives.

"The whole system of coal distribution and apportionment will be under the general direction of J. D. A. Morrow, manager of apportionment and distribution, working directly under U. S. Fuel Administrator Harry A. Garfield. The new distribution plan, which was conceived by the

Fuel Administration soon after its organization, called for an enormous amount of detail work in the establishment of temporary quotas in the coal budget for each state. This work has been progressing for two months under tremendous pressure. Hundreds of statistical experts, under the direction of experienced coal men and transportation executives, have been at work on this problem, in co-operation with the Geological Survey. It is expected that within a short time a definite announcement of the temporary quotas of the consuming states and of the producing sources from which each shall secure its supply may be made.

"Representatives of the Fuel Administration and representatives of the railroads named by Director General McAdoo are now at work developing the phases of the plan which concern transportation, in order that the best results, both for the movement of coal and for transportation generally, may be secured."

The operation of the plan, so far as it has now been inaugurated, was explained to federal fuel administrators in the various states in a letter from Dr. Garfield. The letter said in part:

"As soon as district representatives are appointed, all state administrators who may call upon them will be notified. Individual shippers and mines within those districts for which district representatives have been appointed will be notified to refer any orders or requests for shipment of coal made upon them by any member of the U. S. Fuel Administration to the proper district representative. No emergency requests should be made directly to Washington by state administrators unless the proper district representative has been unable to supply the necessary coal.

"In order that the bituminous coal supply of the country may be apportioned equitably among the different states, and among the various consumers in each state according to the relative importance of their needs, it is necessary that the work of the Fuel Administration in regard to the apportionment and distribution of bituminous coal be not limited to the relieving of emergency shortages. Accordingly, the available coal production of the country is to be apportioned among the various states, based upon previous consumption and the changes resulting from the entrance of the United States into the war. In order that cross hauling may be reduced to a minimum and that each state may receive coals adapted to its needs, the particular fields from which each state shall draw its supply will be designated, (by-product and gas coal excepted). When this budget is complete, the

consumers of each state will be notified through the press that their coal must be obtained from certain specified fields. Producers will then be allowed to ship only to consumers in the states designated, and jobbers will be required to observe the same rules. In other respects the normal distribution of coal will go on without interference.

"State administrators, as soon as the tentative apportionment is complete, will be informed as to the particular fields upon which they may call for coal, and the quantities they may secure from each. When a state is currently receiving its full allotment of coal, all further needs must be met by reducing the quantity supplied to other consumers in that state. District representatives will be instructed to comply with any requests for coal made by designated state administrators up to the amount allotted to their respective states. Should any state have a demand for coal in excess of its allotment, this excess will have to be taken care of by a curtailment of consumption, or a temporary or permanent readjustment of the allotment be made by Washington.

"The foregoing is a part of the new plan, details of which are being worked out as rapidly as possible and will be announced as soon as they can be perfected."

Under the regulations of the United States Fuel Administrator Garfield of January 17, fuel will still be shipped to the list of preferred consumers contained in the order before industry generally receives its supply. After this preferred list has been cared for, the Fuel Administration in each locality throughout the country will endeavor to supply those concerns whose operations have been listed by the departments of the government as most necessary to the conduct of the war. Section 1 of the order of January 17 provided:

"Until further order of the United States Fuel Administrator, all persons selling fuel in whatever capacity shall, in filling their contracts or orders now on hand, give preference to necessary current requirements of: railroads, domestic consumers, hospitals, charitable institutions; Army and Navy cantonments, public utilities, by-product coke plants supplying gas for household use, telephone and telegraph plants, shipping for bunker purposes, the United States for strictly governmental purposes (not including factories or plants working on contracts for the United States), manufacturers of perishable food or of food for necessary immediate consumption, and municipal, county, or state governments for necessary public uses. Any tonnage remaining after the foregoing preferred shipments have been made may be applied in filling any other contracts or orders."



Central News Photo Service

Armored French Train in Action in the Vosges Mountains



Left to right are: J. Edgar Hoover, Director of the Bureau of Investigation; Charles P. Neill, manager of the Bureau of Information of the Southeastern Railroads; F. A. Burgess, assistant grand chief of the Brotherhood of Locomotive Engineers; and A. O. Wharton, president of the American Federation of Labor. Seated at the table are: Frank K. Lane, Secretary of the Interior; William L. Carter, representing the Brotherhood of Locomotive Firemen and Engineers; and A. O. Wharton representing the mechanical employees, helpers and apprentices and railway clerks. It is understood that railroad officers will also be heard.

Railroad Wage Commission Begins Hearings

Makes Statement as to Its Duty and Hears the President of the Railroad Telegraphers

THE RAILROAD WAGE COMMISSION, appointed by Director General of Railroads McAdoo to make a general investigation of railroad wages as the basis for a recommendation to him, began a series of public hearings at Washington on Monday, January 29, and was confronted at the outset by a request from H. B. Perham, president of the Order of Railroad Telegraphers, for a 40 per cent increase in wages for the members of the organization and others of the same class of employees. This request, he said, had not been made to the railroads, although requests for a revision of schedules had been presented on 24 railroads before the government took them over, but his members had "become excited" when they heard that the government was going to raise wages and he had received thousands of letters urging him to present the request.

The wage commission has established itself in offices in the Department of the Interior building. T. W. Lehman has been appointed general counsel and a board of statisticians has been appointed consisting of Charles P. Neill, manager of the Bureau of Information of the Southeastern Railroads and formerly United States Commissioner of Labor; F. A. Burgess, assistant grand chief of the Brotherhood of Locomotive Engineers; and A. O. Wharton, president of the Railroad Department of the American Federation of Labor.

A tentative program of hearings has been outlined, at which the following labor leaders will be heard: T. H. Garvey, representing maintenance of way employees; E. H. Norton, representing the Order of Railway Station Agents; W. G. Lee, president of the Brotherhood of Railroad Trainmen; A. B. Garretson, president of the Order of Railway Conductors; S. E. Heberling, president of the Switchmen;

Union W. S. Carter, representing the Brotherhood of Locomotive Firemen and Engineers; and A. O. Wharton representing the mechanical employees, helpers and apprentices and railway clerks. It is understood that railroad officers will also be heard.

Statement of Commission

Franklin K. Lane, Secretary of the Interior and Chairman of the commission, read an opening statement regarding the scope of the investigation. The commission is acting under the authority of General Order No. 7 issued by the Director General which provides that:

"The commission shall make a general investigation of the compensation of persons in the railroad service, the relation of railroad wages to wages in other industries, the causes of such a structure wages in different parts of the country, the special problems resulting from wage scales made at five times usual in emergency periods and the adoption of living, as well as the effect of General Order No. 7 issued by the Director General."

The commission shall advise the Director General and make reports to the Director General, giving its recommendations in general terms, with detailed statements of compensation that should be made.

"Officers, agents and employees of the railroads are to report to Secretary of the Railroad Wage Commission upon request all information of their wages and allowances and the conditions of their service."

In the statement Secretary Lane said:

"This commission understands that the rate at which it will be heard by judges is different a restricted case on behalf of the interests and their employees. The government has power over the control of the railroads for the period of the

war and to meet war needs. It is a matter of necessity that we secure from the roads their fullest usefulness. They must be made to play their part to the limit in the making of war, the carriage of goods and men. To this end it is fundamental that the employees shall feel that a spirit of justice animates the government. We should seek to give not what may be forced by contest, struggle, intimidation and coercion, but what is fair, all things considered. This is our attitude. We look at the problem before us as not, 'what does organized labor or unorganized labor demand,' but what with war upon us and living costs as they are, should be the compensation given for the services rendered. We seek for no counsel of perfection. The status of labor for all time is not to be determined by our studies. We shall not expect to give all that under pressure the workman might compel any more than we shall ask him to accept the wage that our soldiers receive for their unequalled sacrifice. But a working basis must be arrived at between the government and those who are employed on the roads by which good feeling shall be maintained and the fullest service obtained, for this is the prime need of the hour that each man's hand and brains shall serve the nation now as never before. We wish, in short, to stimulate production by doing what is just.

"This being a government inquiry we shall hear those who wish to contribute anything that is helpful, but it is mandatory that we shall reach a quick conclusion. Therefore the greater part of the data upon which we must act will be gathered for ourselves. There are 1,800,000 employees on our railroads. Some are organized and have great power for self-help. The great majority, more than two-thirds, are, however, not organized. We shall consider both classes, and upon an equal footing, so far as that may be practicable.

"This very statement of the number employed makes evident the unparalleled size of the task that is before us. If with this fact is considered the extent of the territory covered and the significance of the different conditions obtaining in the varying sections of the country it will at once be realized that no such hearing as this has been held before, nor one that carries such possibilities in affecting for good or ill the mass of our workers in all industries and the part they will play in carrying on the pressing duty of making war with characteristic American energy, enthusiasm and masterfulness. We wish first of all to know what present conditions are. What data have already been gathered as to the number of employees, their classification in groups according to their duties, their compensation in money and that compensation converted into terms of support for themselves and their families. This leads into a study of the present cost of living as contrasted with the cost at other periods. The various governmental agencies, the railroads themselves, the larger organizations of labor and individual studies will doubtless prove to have already gathered the greater part of these facts. Wherever there is a shortage this must be supplemented, and to this end we shall feel free to call upon railroads and employees, the government departments and other agencies for such facts as they can furnish.

"We shall also seek from foreign governments and from the industries of the country for the presentation of methods by which conditions such as we must meet have been met. In a word, we shall make this inquiry upon the broadest possible lines consistent with an early closing of our research, and the great body of the material we shall gather will, we trust, come to us in compact written or printed form rather than by oral statement. Each one who appears in person or otherwise shall be regarded as being animated by the same purpose that animates the government itself. No selfish or narrow ends are to be served by this hearing. We are looking to the greater welfare of the nation, and through service to the nation we seek the welfare of mankind. Our

end is not to justify a theory or to reach or approximate an ideal, but rather as practical men to deal with a situation present in a spirit of fair-mindedness."

Telegraph Operators Ask Increase

Mr. Perham said he was appearing on behalf of telegraph operators, dispatchers, station agents, telephone operators, levermen and similar classes of employees, of which there are 84,233. Of these about 50,000 are members of his organization. Secretary Lane brought out the fact that the organization is making a broader request of the government than when it was presented to the roads. Mr. Perham said that he had always followed the plan of dealing with railroads individually and that while the 40 per cent request was never presented to the roads committees are now negotiating with 20 roads, 3 mediation proceedings are under way and 1 arbitration proceeding. Seven roads had denied the petitions since the wage commission was created.

The employees he represents have never been adequately compensated, Mr. Perham said, but have always accepted compromises rather than go on a strike, although their wages are below those of other classes of labor. He read from the statistics of the Interstate Commerce Commission showing the average daily compensation of station agents, increasing from \$1.73 in 1896 to \$2.31 in 1913, and of telegraph operators and dispatchers ranging from \$1.93 in 1896 to \$2.52 in 1913. In later years, he said the method of compiling the statistics has been changed and he read from the report of the Eight-Hour Commission showing the average compensation per hour in 1916 of train dispatchers and directors, 55.6 cents; telegraph, telephone and block signal operators, 28.2 cents; telegraphers and station agents, 23.03 cents; telegrapher clerks, 25.04 cents; non-telegrapher levermen, 22 cents.

He said it had never been feasible to adopt a standard wage for telegraph operators and agents because of varying local conditions and varying degrees of responsibility, that station agents receive from \$40 to \$105 per month and that in some cases men receive higher pay than others for the same work.

Asked by members of the committee whether he considered the present relation of wages as between the various classes a proper one Mr. Perham said that if they could have their way they would like to have an increase amounting to 40 per cent and distribute it as circumstances seem to call for because some men ought to have more of an increase than others. He said it is usual for a road to agree to pay an increase amounting to a certain sum to be divided among the various divisions and among the individual men according to the circumstances of each case, and he believed this has resulted in a fair adjustment in general.

Mr. Perham said he assumed to represent all the employees in the classes represented by his order whether they are organized or not, and that the lowest wages are paid on the organized roads, although he said the Pennsylvania advances wages to keep men out of the organization.

He said that hundreds of agents and operators are working for as little as \$38 a month, but when he was asked to file a list of such cases he thought he could not show so many because he was unable to get the exact figures for the unorganized roads. Chairman Lane asked him to file a statement showing the number of men in the various classes of employees receiving less than \$50 a month, from \$50 to \$60, and so on by \$10 stages. Mr. Perham suggested that these statistics be obtained from the I. C. C.

Representatives of the train dispatchers appeared before the commission on Tuesday and of the maintenance of way employees on Wednesday.

The Board of Examiners will include Lathrop Brown, special assistant to the Secretary of the Interior; E. J. Barcalo of Buffalo, and Riley Redpath of Kansas City.

The Activities of the Railroad Administration

Economy of Expenditure of Operating Revenues Ordered. Federal Anti-Pass Law Applied to States.

WASHINGTON, D. C.

DIRECTOR GENERAL OF RAILROADS McADOO on January 28 issued his first order looking toward economy in the expenditure of railroad operating revenues during the period of the war. This was General Order No. 6, issued to officers and directors of railroad companies, as follows:

"During the period of possession, operation, and government control of railroads, it is necessary that officers, directors, and agents of railroad companies be very careful in the handling of moneys and in the dealing with transportation matters. Without attempting at this time to give general directions, there are a few matters involving the expenditure of moneys for purposes having no direct relation to transportation, which should receive immediate attention, as well as the issuance of free transportation.

"It is therefore ordered that the carriers' operating revenues shall not be expended:

"1. For the payment of agents or other persons who are employed in any way to affect legislation.

"2. For the employment of attorneys who are not actually engaged in the performance of necessary legal work for the company.

"3. For the payment of the expenses of persons or agencies constituting associations of carriers unless such association is approved in advance by the Director General.

"4. For any political purpose or to directly or indirectly influence the election of any person or an election affecting any public measure.

"No passes or free transportation shall be issued by any carrier under federal control or any official of such carrier unless the issuance of such free transportation is expressly authorized by the Act of Congress entitled 'An Act to Regulate Commerce, approved February 4, 1887, and Amendments thereto' and any such passes or free transportation heretofore issued not in conformity with said act must be recalled.

"This order applies to all carriers under federal control, whether inter-state or intra state."

The order as it applies to passes simply extends the provisions of the federal law to cover intra-state as well as inter-state transportation. Some states have no anti-pass laws and the laws in many states are more liberal than the federal law, many of them allowing or even requiring railroads to give free transportation to public officials.

General Order No. 5, which preceded this order, was the formal appointment of the Railroad Wage Commission.

Blizzards Handicap Railroads

The Director General of Railroads and his staff have continued to draw most of their attention to problems created by the weather and the succession of blizzards and low temperatures has made it impossible to raise the embargo against general freight ordered on January 25 on the Pennsylvania, Baltimore & Ohio and Philadelphia & Reading, which it was expected would be in force but a few days. While one of the most serious conditions, the inability of ships to embark because of the delay in obtaining bunker coal, has been remedied, many of the eastern roads have, owing usually to handle much new freight except food, fuel and necessary government freight for several days and most of this report received at Mr. McAdoo's office have been discouraging while the daily reports of the Interstate Commerce Commission's inspectors from various terminal points received

by Commissioner McChord continue to show conditions approaching a paralysis of transportation at many points due to weather conditions, congestion in yards, shortage of crews, and engine and cars in bad order with a shortage of labor to repair them.

A. H. Smith, regional director in charge of the eastern lines, reported on January 26 that it had been necessary to suspend operations in Northern New York on account of a heavy snow storm and that on account of a very severe snow storm at Chicago all belt roads had discontinued accepting cars. Assurances that an adequate supply of cars will be furnished for the transportation of food supplies for export to the allies was given by Director General McAdoo at a conference with commissioners representing the British, French and Italian governments on Saturday and some discussion was given to the question of diverting more export freight to gulf ports.

Director General McAdoo has instructed in the matter of embargo on the Pennsylvania Lines east of Pittsburgh, Baltimore & Ohio east of the Ohio River, and Philadelphia & Reading, that the following exceptions be made:

(a) Food for animals.

(b) Material used in the operation and upkeep of coal mines.

To provide for the rail movement of food and supplies consigned to the French, British and Italian governments for ports on the North Atlantic seaboard, already accepted or under permit, arrangements have been made to consolidate these shipments and move them in solid trains or groups of cars, east from Chicago, St. Louis and intermediate terminals.

Congestion on Pennsylvania

In addition to the daily reports from various terminal points Commissioner McChord, on January 29, issued the following statement, summarizing reports of the Interstate Commerce Commission's inspectors, relative to the congestion of freight traffic on the Pennsylvania Railroad and calling attention to the lack of any marked relief from the congestion on that line.

"A condition of serious congestion exists on the Pennsylvania Railroad in the Philadelphia district and in the Pittsburgh district and the line between is practically blocked with cars destined for those two points and beyond.

In the Philadelphia yards the normal daily movement of cars is 1,925. The reports covering the period from January 14 to January 25 inclusive, except for January 19 to which no report was furnished show that the maximum daily movement was 2,210 cars and the average was less than 2,000. And on those same days there were from 54 to 61 trains left over in the Philadelphia yards ready for movement but for which no movements were made by 11:00. The number of cars left in the yards varied from 2,875 to 5,740. During this entire period there were from 1,400 to 2,200 empty empty cars in the yard for movement westward, and the number actually forwarded averaged varied from 119 to 287 per day.

On the Mobile system, for movement in both directions, there were approximately 11,000 cars left over over day. While it is stated the traffic accepted by the Philadelphia and the Pittsburgh districts was restricted, the traffic has been almost completely paralyzed by accumulating delays in freight movements of 10 to 60 per cent of the normal business.

At the Pittsburgh district, the average number of cars

for which no locomotives were available in Pitcairn and Conway yards was more than 100 trains daily, and there were approximately 10,000 cars left over in those two yards each day.

"For four days on which the information was furnished, coal mines in the Pitcairn district were supplied with a very small percentage of empties required, in one instance 324 cars being required and only 24 furnished on account of no other empties being available.

"The principal cause assigned for the serious congestion on this railroad is shortage of motive power, but it is clearly apparent that the real cause is the impaired condition of motive power available, as well as the lack of adequate facilities for properly maintaining it, and excessive terminal delays. For example, the inspector reports that the facilities for maintaining the 149 locomotives assigned to Pitcairn are entirely inadequate, and only such repairs as are absolutely required are made, the demand for power being so great that minor repairs and other work which would greatly increase efficiency of locomotives are left undone; further, that even if more locomotives were assigned there, it is doubtful if they could be properly maintained or promptly handled. And at Altoona, on January 23, the report for that date being typical, all of the 50 stalls of the engine-house were occupied by locomotives undergoing repairs, 190 of the 230 locomotives despatched were repaired on inspection pit and storage tracks where there was no shelter or protection from snow and weather. Under such conditions, and in the crowded and unheated enginehouses existing at many points, some of which are too small to accommodate the large locomotives in use today, it is not reasonable to expect that necessary work can be promptly and efficiently performed. Vigorous action must be taken to improve the condition of motive power before relief can be expected."

Russian Locomotives

Former President Roosevelt, in an address before the National Press Club at Washington on January 25, criticised the administration for delay in obtaining the use of 200 locomotives built in this country for the Russian government, which have not been delivered to Russia because of the political situation.

"You all know the fuel shortage," he said. "You know it has been due largely to an insufficiency in the number of locomotives, and you know that ships needed to carry food to our troops in France have been at the docks for some weeks, because they could not load on account of the failure in locomotives. There are here 200 locomotives built for the Russian Government, and the Russian minister here, as I am informed, (and if necessary, if the question is queried, I will give my informants' names,) assented to our taking them. The Russian minister assented two months ago, and for eight weeks we have been leisurely discussing as to whether we could, under the circumstances, take these 200 locomotives and use them. I understand that the discussion is inching along to a favorable conclusion, and that in a few days, or a week or two, we will have the locomotives. But it will be two months after we ought to have had them. What I think, of course, in my views of the proper governmental policy, should have been done, was to take the 200 locomotives and then discuss."

It was announced some time ago that arrangements had been made for the use of the Russian locomotives by eastern railroads, but there has been some delay. Mr. McAdoo has stated, however, that they will be made available. It was planned that they should be used on the basis of a rental of \$50 a day, which is the same basis on which locomotives will be used by the eastern railroads which will be delivered under orders from Mr. McAdoo for temporary use on those lines, regardless of who ordered them. The title to the locomotives will remain with the road that ordered them and it will receive the rental for the time until conditions

are such that the locomotives can be delivered to the owning road.

Judge Payne Appointed General Counsel

Director General McAdoo announced on January 26 that Judge John Barton Payne, who has been acting as his legal advisor, has permanently retired from the firm of Winston, Payne, Strawn & Shaw, of Chicago, and has accepted appointment as general counsel to the director general of railroads. He has also severed all connection with railroad or other transportation corporations.

John Barton Payne was born at Pruntytown, Fauquier county, Va., January 26, 1855. He was educated in the private schools of Orleans, Va. At the age of 15 he became a clerk in a country store and studied law with the county clerk at Kingwood, Preston County, W. Va., being admitted to the bar there in 1876. In 1877, he was chairman of the Democratic committee of Preston County, and in 1880 was appointed a special judge of the circuit court of Tucker County, W. Va. In 1882 he was elected mayor of Kingwood. The following year he removed to Chicago, where he practiced law until 1893, in which



John Barton Payne

year he was elected judge of the superior court of Cook County, Ill. He resigned from the bench in 1898, and shortly afterward became a member of the firm of Winston, Payne, Strawn & Shaw, which has represented the Chicago & Alton, Chicago Great Western and other roads. Judge Payne was for some years president of the Board of South Park Commissioners of Chicago and has devoted much of his time and means to the artistic betterment of that city.

Judge Payne is the only member of Mr. McAdoo's permanent staff, aside from the three regional directors, whose appointment has yet been announced. It is understood, however, that announcement will be made shortly of the permanent organization and that it will include Edward Chambers, Vice-president of the Atchison, Topeka & Santa Fe, in charge of traffic; John Skelton Williams, Controller of the Currency, in charge of financial matters; C. A. Prouty, Director of the Bureau of Valuation of the Interstate Commerce Commission, in charge of public service and accounts; W. S. Carter, President of the Brotherhood of Locomotive Firemen and Enginemen, in charge of labor matters, and Mr. Payne, in charge of legal matters.

Carl R. Gray, President of the Western Maryland, has been acting in charge of transportation matters for almost two weeks in the absence of Mr. Holden, and it is rumored that he will be permanently appointed. Another appointment is to be made in the maintenance and construction department. W. T. Tyler, assistant to the vice-president of the Northern Pacific, is acting as assistant to Mr. Gray. G. W. Kirtley, who has been assistant to Judge R. S. Lovett in his office as Director of Priority in Transportation, is acting as an assistant to Mr. Chambers, as the office of Priority Director is now practically obsolete.

The offices of the Railway Administration in the Interstate Commerce Building have displaced the Bureau of Valuation, which has been transferred to the building formerly occupied by Railroads War Board.

After conferring with the directors, Messrs. Eustis and Ayres, who had expected to certain features of the demurrage rules prescribed in general order No. 7, the Director General on Wednesday issued general order No. 7, making a number of modifications to the rules. The provision for using the average agreement of carload is not only for use in connection with cars held in unloading. It will not apply in the case of empty cars passed for loading. The number of days for which demurrage debts will be considered will be four, instead of five as formerly. The regular demurrage rate, instead of increasing \$1 each day, will be \$1 a day for the first four days, the same proportion of the free time, \$6 a day for the next three days, and \$10 a day thereafter. The free time rule will be restored, but with some modification.

The demurrage rules apply to carload freight except empty coal and coke cars placed for loading, or under load, export freight awaiting slips, coal for transshipment at tidewater or lake ports, and empty private cars stored.

Issues are congressionally in favor of New Orleans and officers of the New Orleans municipally-owned Public Belt Railroad have been very busy trying to find out whether the road, which they would like to be taken over by the govern-

ment. Mr. McAdoo recently referred the question to C. H. Merriam, railroad attorney for the Shipping Board, without transportation, and at Atlantic City, was advised that it was not needed by the government.

Mr. McAdoo on January 24 next delivered a message to the railroad directors at the American Federation of Labor, the International of Maritime Workers, and the organizations of longshoremen, stevedores, dock and wharf workers, and warehouse, blacksmiths, and mechanics. Their request for increased wages have been referred to the Railroad Wage Commission.

It was stated last week's issue that L. J. Higgins, vice-president in charge of traffic at the Kansas City Southern, has been appointed supervisor of transportation and traffic of the Central States Shipping Board. Five Missouri men slightly to credit. Mr. Higgins has been appointed by Director General McAdoo as an assistant to Edward C. Greenleaf, his traffic adviser, and he will have general supervision over the transportation of the supplies and materials for the Shipping Board, and reference to the materials and the Shipping Board, but as a member of Mr. McAdoo's staff rather than of that of the board.

Passenger Traffic and Labor Supervision Discussed

Western Railway Club Has Paper on Organization Maintenance and Address on Traffic Problems

THE MONTHLY MEETING of the Western Railway Club was held at the Hotel Sherman on January 21. A. R. Ayres, superintendent of motive power of the New York, Chicago & St. Louis, read a paper on Organization Maintenance, and P. S. Eustis, passenger traffic manager of the Chicago, Burlington & Quincy, gave an informal talk on the Passenger Traffic Problem of Today.

Mr. Eustis' Address

Mr. Eustis spoke in part as follows: "If we would find the causes of the present trouble on the railroads we must look back. When the European war broke out, the roads were unprepared. They had no surplus facilities because they had had no surplus earnings to put into the properties and could not get capital from other sources to take care of the needed expansion. The main trouble was too much regulation and lack of confidence. Manufacturers too were not prepared for the enormous orders that came, and the ships and docks and mines were unable to take care of the demands made upon them. The industries of this country have always lived from hand to mouth. They keep stocks of fuel and supplies to last but a very short time. The mines did not work at full capacity during the summer, and the country had come to think that strikes of miners during that period were of no consequence. This has been largely responsible for the shortage of fuel we are now experiencing."

"The amount of work done since the war started is wonderful, considering how poorly prepared this nation was. The railroads operating under the direction of the War Board were still hampered by the restrictions of State and Federal laws. Yet in 1917 they moved 27 per cent more freight per car than ever before. At the same time there was a great increase in passenger traffic, varying on individual roads from 10 to 70 per cent. The passenger traffic of the entire country is probably 25 per cent greater than at any previous time. A great deal of this increased traffic has been in one section, and it is not to be wondered at that there is congestion in the east.

"One of the greatest mistakes the railroad men could

make would be a failure to back Mr. McAdoo in his railroad directorship. If Mr. McAdoo doesn't manage to work out some plan that will make government direction a success, then look out that officials don't charge you with having obstructed his work.

"One of the difficulties that will be met in unifying the roads is due to the fact that the carriers, because of competition, have furnished better service for less money in this country than anywhere else in the world. If we try to do away with part of this service there will be strong opposition. Nevertheless, we should save coal by running only the passenger trains that are needed."

Organization Maintenance

By A. R. Ayers,

Superintendent Motive Power, N. Y. C. & St. L. Ry.,
Cleveland, Ohio.

One of the greatest problems before the railroads, as a result of the present intense industrial activity, is that of keeping up their organizations to a point which will accomplish the necessary results. One of the factors which make this problem difficult is the constantly changing personnel of the organizations, brought about by officers and foremen as well as workers leaving railroad service for industry or industrial organizations. The same year railroads have been operated by men of long experience in that particular work. The workers, as well as those in supervisory capacities were dissatisfied. Together with the losses, and property handling, more attention is needed of routine and with very little detailed supervision. This trouble about a situation, where an engine handling of a given task will frequently get up to the workers to whom it was assigned and give them no detailed supervision from the man who assigned the work, the engineer was supposed to know his business.

"Untrained men obtained in recent months, and all over the railroad we are doing the work with very little in many

cases, have had no previous railroad experience; this applies to the road work as well as shop work. This condition makes a heavy burden on supervision and it is necessary for supervision to change its methods materially; the work can no longer be put up to the man without instruction. When a man lacks previous experience, or perhaps lacks initiative, it is necessary to instruct him in detail concerning the work which he is to do, and in many cases even supervising officers and foremen, who may be new in their present positions, do not understand very definitely just what is expected of them.

Difficulty in getting results is sometimes ascribed to indifference on the part of the men, and while this may be so in many cases, it is also true that much of the difficulty is due to lack of experience of the men, and lack of proper supervision and instructions. There are many conditions existing in shops and engine houses which were not very strongly objected to by the old timers, who were used to them, but which contribute quite largely to indifference and inefficiency on the part of the new and inexperienced employees. Some of these conditions are, poor light, lack of sufficient heat, poor floors, lack of proper small tools and worn out machinery. Men who are used to working with labor saving devices do not take kindly to places where they have to do the same work by main strength and awkwardness.

There is no question that a much heavier burden has been placed on our supervision, on account of the necessity of giving detailed instructions to new men, which were not required with the older men, and where this has been recognized, and where the supervising force has been organized to meet the conditions, excellent results may be obtained which will more than repay the additional expense.

The continual changing of the working force, requiring the constant educating of new men, requires more than usual courage, resourcefulness, cheerfulness and enthusiasm on the part of the foremen, as well as ability in their particular kind of work. Nothing is more important at this time than to inspire these qualities in the men who are close to the firing line.

In the present emergency, I am prompted to quote from the address of J. F. Deems, when he was president of the American Railway Master Mechanics Association in 1907: "We may work in brass and steel and leave the most perfect

mechanism; we may develop and improve and evolve methods and practices until nothing more can be desired; we may reach perfection in all these, in mechanism, structure and method, and yet our bequest be a failure and itself a burden unless we provide that which is paramount, which is over and above the sum total of all this, and for which, even today, events throughout the world are crying aloud—the man. A man prepared, experienced, earnest; hopeful and happy; consecrated to his work and ready to the hand of the future." There are many such men in our organizations; some of them we know, others we have not yet discovered, and it is up to us to know that our working conditions in shops and on the road are the best that can be afforded, that our supervision is ample and capable, so that men will understand their duties and will be happy, contented and enthusiastic in the performance of them, in order that nothing may be left undone to give our last ounce of energy in supporting this Government and those who are fighting for us to win this war.

Discussion

The consensus of opinion was that there is need for an increased number of foremen at this time. Less supervision is required where the piece work system is in effect than where the men are on day work. Some stated that it was impossible to get men to stay on the work long enough to train them. A. R. Kipp (Soo Line) brought out the fact that the workers at this time have not the same spirit as formerly and it will take a different kind of supervision to secure results. As there is a spirit of carelessness and indifference in the workers, the foremen must put in a personal touch to give them inspiration and incentive. T. H. Goodnow (C. & N. W.) expressed the opinion that the seniority rule makes it very difficult to secure foremen and often makes it impossible to get the best men who could be chosen in supervisory positions. The organization and rules of the unions have removed the ambition which workers formerly had. Another difficulty is due to the fact that the majority of men now doing the work in some departments are foreigners. With the shortage of labor and the attitude of the labor organizations it is difficult for the foremen to secure results. The men in the higher positions should uphold the foremen in order that they may secure the support of the men in the ranks.



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Showing How the Railway and Motor Truck Are Co-ordinated Behind the British Lines

Report of the Eight-Hour Day Commission

Wage Increase Resulting from Adamson Law Estimated at
\$61,000,000. Some Reductions in Hours

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A BRIEF SUMMARY was published in last week's issue of the report submitted to the President and Congress by the Eight-Hour Commission, General George W. Goethals, Edgar E. Clark and George Rublee, appointed by the President under the terms of the Adamson Law. The following is an abstract of the text of the report, which is accompanied by nearly 500 pages of appendices, including statistical exhibits, and the reports of the commission's special agents on topics connected with the investigation.

This commission is directed by law to observe the operation and effects of the institution of the eight-hour standard work day established for certain railroad employees during a period of not less than six months nor more than nine months, in its discretion, and to report its findings to the President and Congress within 90 days thereafter. The law does not state when the period of observation shall begin. It this period was intended to begin with the legally effective date of the eight-hour standard day, January 1, 1917, the report would have been due not later than October 31, 1917. By reason of occurrences beyond the control of this commission, it was not possible to make a satisfactory report by October 31, 1917. We had to decide whether, in pursuance of a strict construction of the statutory direction, we should, on that date, make a report which, for lack of information, could have little, if any, value, or whether we should wait until we could obtain a sufficient body of the statistics to give weight to our findings and enable our report, in some measure at least, to fulfill the purposes which Congress had in contemplation. After careful consideration it seemed to us that we were justified in taking such additional time as would be necessary to complete a reasonably informative report. Early in October, however, it seemed probable that the relations between the brotherhoods and the railroads would again come prominently into public notice before the close of the year. Under these circumstances we concluded that it would be best to transmit our report in December, even though it would be in many respects incomplete.

A brief statement of the events leading to the enactment of the law creating the commission is here inserted to make clear the nature and extent of its duties.

Scope of the Duties of the Commission

The commission is directed to report the operation and effects of the institution of the eight-hour standard workday and the facts and conditions affecting the relations between common carriers and employees. This language is broad enough to authorize an encyclopedia on railroad labor, but it seemed to the commission that it could reasonably be expected to deal only with topics connected with the proposal to insert an eight-hour basic day in the wage schedules as the time measure of a day's work, and with topics connected with the proposal of the roads. This indicated that there should be shown the increase in wages resulting from the law, as well as the actual hours and wages paid, by classes of service and occupations; the relation of "straight" time and overtime payments and arbitrary allowances; a description of the leading features of the wage schedules; the conditions of train operation which result in overtime, and the possibility of eliminating those conditions; and, finally, a description of the conditions under which train and engine crews work. This view eliminates the question of the reasonableness of the present wages, as well as the question of the financial condition of carriers as bearing upon their

ability to pay an increase. These collateral questions it did not seem possible to deal with adequately. To determine whether the increases made as a result of the eight-hour law were justified would be to decide again a question already settled by negotiation, and to attempt to determine whether further increases would be reasonable in advance of a demand for them would be futile.

Consideration was given to the advisability of including in this report a study of the trend of wages of train and engine crews in relation to changes in ton-miles, car-miles, and train miles. A beginning on such a study was made, but it appeared that an adequate treatment would require such a comprehensive investigation of railroad operations and of the financial conditions of carriers over a series of years that the project was abandoned on the ground that no thorough and conclusive showing could be made, and also on the ground that this matter had to do with the reasonableness of increases in wages. After it is conclusively shown whether wages per locomotive-mile or per ton-mile have increased or decreased, it still remains to be decided what is the significance of the showing. How much increase in the wages per locomotive mile are required to compensate for the increased fatigue or hazard of operating the larger locomotives? If the tonnage of a train is doubled, in what proportion should the wages of the crew be increased? An answer to such questions we think is outside of the province of this commission.

Plan and Progress of Commission's Work

The President appointed the members of this commission on October 11, 1916. At a conference held on November 23, 1916, the railroad executives present agreed to give all necessary information, and at a conference held on November 28, 1916, the chief executives of the Brotherhood also expressed a willingness to co-operate. At the request of the latter, the headquarters of the commission were transferred from New York City to Washington, D. C., as the men whom they expected to appoint as their representatives to assist in checking the returns of the companies could not leave Washington. The railways have been represented before the commission by a sub-committee of the National Conference Committee of the Railways, A. S. Gregg, C. P. Neill, J. G. Walker, and J. W. Higgins. The Brotherhood appointed W. J. Lauck and F. J. Warner as their representatives, with authority to go over the work of the commission from month to month and approve it. These representatives met from time to time during December, January and February in conference with the secretary of the commission, and a series of forms to be filled out by the railways were agreed upon.

It was impossible for carriers to fill out these forms until after the provisions of the eight-hour law which, in general, in its terms, had been made definite by judicial interpretation or by agreement of the parties.

The railroads in November and December, 1916, instituted many suits to enjoin the enforcement of the law. By a stipulation between the attorney general of the United States and counsel for the railroads, a consent order was entered continuing all of these cases except one, which was made a test case. The final determination of this case was to be expedited as much as possible. The roads agreed to keep their books and accounts in such a manner that if the constitutionality of the act was upheld the same could be paid

from January 1, 1917, in accordance with the terms of the law. This meant, in practice, merely that the roads kept the time slips showing the service performed by each man. The calculations of the pay on both the old and new bases could not be made currently, because the very general terms of the law could not, without interpretation, be applied to individual schedules.

The case was argued before the Supreme Court of the United States on January 8, 1917. Before the case was decided, the brotherhoods again threatened to strike if a settlement was not effected at once without waiting for the decision of the Supreme Court. The strike was to begin on March 17 at 7 p. m. The President of the United States appointed a committee, representing the Council of National Defense, and consisting of Hon. Franklin K. Lane, secretary of the interior; Hon. William B. Wilson, secretary of labor; Daniel Willard, president of the Baltimore & Ohio Railroad; and Samuel Gompers, president of the American Federation of Labor, to effect a settlement of the controversy through mediation. At the request of that committee, the date of the strike was postponed until March 19. Early on the 19th a settlement was effected in harmony with the eight-hour law, but defining somewhat more specifically the application of the eight-hour basis to existing schedules and practices. On the same day, March 19, the decision of the Supreme Court of the United States upholding the constitutionality of the law was handed down. The award above mentioned provided for a "Commission of Eight," four members representing the brotherhoods and four the railroads, to decide disputed questions arising thereunder. This body found it necessary practically to rewrite the schedules for the entire country. Negotiations were continued during the summer, the decisions of the Commission of Eight not being completed until September 23, 1917. The eight-hour day as the measure of a day's work for the purpose of reckoning compensation of certain classes of railroad employees has thus become an accomplished fact. We do not understand that the roads have any intention of further contesting the establishment of the eight-hour day for the employees concerned in the negotiations.

During the months of deliberation by the Commission of Eight, the work of filling out the blanks agreed upon was retarded. Some of the returns included in this report were received as late as November 10.

In addition to the information to be entered on the blank forms agreed upon, the commission proceeded to collect information through three special agents on the following topics: (1) Railway wage schedules and agreements; (2) employment conditions in road and yard service; and (3) the practicability of an actual eight-hour day in railroad train service. These topics were assigned respectively to William Z. Ripley, Victor S. Clark, and Charles P. Howard. Their reports are described in subsequent sections, and are printed in full in appendixes. Although the commission exercised care in selecting men of impartiality and of scientific standing for these special reports, and made suggestions as to their plan and scope, the reports themselves should be taken as representing the individual views of their authors.

Railroads and Classes of Employees Affected

It is not possible for this commission to make authoritative findings as to the ultimate effects of the eight-hour standard workday. In the first nine months of 1917 traffic conditions were in many respects abnormal. Furthermore, it takes some time for railroads to adjust themselves to these new conditions. It will require further study by others in the future to make anything like a final showing. Nevertheless, we believe that certain truths regarding the operation of the eight-hour law are now apparent, and the presentation of such facts as have been collected will be of some service.

(1) *The roads included:* The law applies to all common

carriers by railroad subject to the act to regulate commerce with the exception of railroads independently owned and operated not exceeding 100 miles in length, electric street railroads and electric interurban railroads, such exceptions, however, not applying to certain terminal and transfer roads. "One hundred miles in length" presumably means first track mileage operated under any form of ownership or contract, so long as the ownership and operation are independent. "Independently" here probably means independently of some parent or controlling company. The roads excluded from the above exception and thus subject to the law are those whose principal business is leasing or furnishing terminal or transfer facilities to other railroads; or which are themselves engaged in transfer of freight between railroads or between railroads and industrial plants. This, taken strictly, would leave very few if any steam roads excluded, since probably nearly all roads make interchanges of freight between other roads. The exact determination of this matter must be left to the courts. In order not to increase the extent of the commission's correspondence uselessly, it was decided to address only the roads which reported to the Interstate Commerce Commission and which were 100 miles or more in length, or were classed as switching and terminal companies, as well as roads less than 100 miles in length if known to be parts of larger systems.

(2) *The employees included:* Neither the eight-hour law nor the decision of the Supreme Court makes an enumeration of the classes of employees affected. The terms of the law are general. It applies to persons actually engaged in any capacity in the operation of trains used for the transportation of persons or property. The restrictions to trains transporting persons or property is of no practical importance, since it is customary to pay engineers, for example, at the same rate whether their engines run light or loaded.

In a broad sense, nearly all employees of railroads are engaged in the operation of trains, that being the business of a railroad; in a more restricted sense, the language of the law might apply to all persons connected with the movement of trains, directly or indirectly, including not merely the enginemen and trainmen, but also the telegraphers who send messages controlling the movement of trains. In a still narrower sense, the law might be understood to apply only to those physically on moving trains and having something to do with their operation. The narrowest view might exclude yard employees as engaged in making and breaking up trains but not in operating them, and it might also exclude hostlers.

The railroads have taken the view that the act does not apply to employees other than those who were represented by the brotherhoods in the negotiations which led to the passage of the law, and in fact only the latter classes are recognized by the roads as entitled to its benefits.

It is a fact, however, that the demands of the brotherhoods related to freight service only, while in its actual application, the eight-hour law has affected the passenger service also. It clearly applies to that service. We must look to the language of the law as well as to the negotiations between brotherhoods and railroads to find out what the law means in detail, the classes of employees threatening to strike at a particular time affording the general basis for classification, and, as the Supreme Court has ruled, an adequate basis. In other words, Congress, although moved to legislate because of a crisis affecting certain employees, may be assumed to have made a logical classification in framing the act. The proper interpretation of the words, "actually engaged in any capacity in the operation of trains," must be left to the courts.

This commission has received inquiries whether such employees as switch tenders and car inspectors are entitled to the eight-hour basis, but no definite answer could be given in advance of interpretation by the courts.

We find that the roads in actual practice have applied the eight hour day as a basis for reckoning the compensation of the following classes of employees: Engineers, firemen, con-

ductors, assistant conductors, baggagemen, brakemen and lagmen in road and yard service, and generally also hostlers. The average number of the employees in these classes, including a small number classified as "Other road train employees," in the calendar year 1916, was 308,373, which was 7.37 per cent of the total number of railway employees. This refers to the large roads, having annual operating revenues of more than \$1,000,000. The corresponding percentages in the three geographical districts are: Eastern, 17.69 per cent, southern, 17.45 per cent; and western, 16.86 per cent. The aggregate number of employees in the eastern district is in excess of those in the South and West combined. The aggregate compensation paid during the year 1916 to the employees above mentioned was \$410,748,044, which was \$1.11 per cent of the compensation paid to all railroad employees. The corresponding percentages in the three geographical districts are: Eastern, 29.19 per cent, southern, 7.71 per cent, and western, 26.93 per cent.

Effect of Eight-Hour Law Upon Wages and Hours

(1) *The Increase in Cost to the Railroads.* At the time the eight-hour law was being considered, there was much speculation as to the extent of the probable effect upon railroad operating costs. Obviously, the increase in cost in absolute figures will vary from year to year with the volume of traffic. We cannot do more than to state what the increase would be if the percentages derived from observations during a limited period are applied to a year's business.

The following table shows the increase in pay due to the eight-hour law as reported for the month of January, 1917, and the percentage relation to the compensation under the 1916 schedules of wages. The table covers 104,355 miles of road, of which 20,093 were in the eastern district, 24,502 in the southern, and 59,760 in the western.

COMPENSATION UNDER EIGHT-HOUR LAW AND UNDER 1916 SCHEDULES, BY DISTRICTS, SO FAR AS REPORTED: MONTH OF JANUARY, 1917.

[This table covers 104,355 miles of road.]

District and service.	Compensation under 1916 schedules.	Increase due to 8-hour law.	Per cent of increase.
Passenger:			
Eastern.....	\$1,131,570	\$48,048	4.246
Southern.....	854,186	10,027	1.800
Western.....	1,260,141	22,349	1.774
Total.....	2,945,906	80,424	2.730
Freight:			
Eastern.....	2,955,411	567,046	19.197
Southern.....	1,674,594	181,359	10.841
Western.....	2,974,305	394,188	13.252
Total.....	7,604,313	1,142,773	15.028
Yard:			
Eastern.....	2,139,219	531,940	24.866
Southern.....	651,500	153,287	23.525
Western.....	1,218,136	300,576	24.675
Total.....	4,008,855	985,803	24.590

If the percentages shown in the preceding table are applied to the total compensation paid to these same classes of employees for the calendar year 1916, the following estimate of total increase in value cost results: Passenger service, \$5,240,977; freight service, \$1,668,998; yard service, \$7,744,457; total for the United States, \$14,554,532. This does not include increases paid to hostlers, which would amount to about \$1,875,000 additional, if all roads paid hostlers on an eight-hour basis, the increase for this occupation being generally nearly 25 per cent for January, 1917. The foregoing estimates relate to "Class I" roads, or those having operating revenues of more than \$1,000,000 per annum. The approximate correctness of the percentages shown above is indicated by a study of the amount of the back-pay checks yard employees during the months of January and February, 1917, in relation to the pay rolls of those months.

But the estimate is subject to certain qualifications. It does not include the increase which may be granted to miscellaneous employees who come in contact with yard employees and who are asking why they should not receive the same treatment.

Again, the accuracy of the estimate will be questioned by those who believe that conditions in January of this year were abnormal in the matter of overtime and by those who believe that the carriers will and were of adjusting their operations so as to avoid paying overtime.

The wide difference between the per cent of increase in the eastern as compared with the southern and western districts indicates that an increase of facilities or other adjustments may reduce the amount of overtime.

Actual experience has demonstrated that the decrease for the first month of 1917 is subject to modification. First, to yard service there has been a wide spread change to eight-hour shifts. Report in answer to our circular of January dated October 5, 1917, covering 178,744 miles of road, show that between January 1, 1917, and the date of the report, 11,890 yard crews were placed on eight-hour shifts, and at the time of the reports 3,486 crews were still working longer than eight hours. To what extent this change will be permanent, we do not know, but a reduction in hours means by the men that they do not get the wage increase indicated above, and in some cases it means a considerable decrease, as where men formerly working 12 hours now work 8 hours for the former 10 hours' pay. To the carriers, however, the reduction in hours does not necessarily mean an escape from all of the increased cost shown in January. With a 25 per cent increase in pay per hour the total labor cost must be increased unless the total number of man hours required for a given amount of switching is reduced through increased efficiency. There may be additional economies in the use of the equipment or facilities. The general change to the eight-hour shift has been so recent that it was not practical for this commission to undertake a special study of the effect of reduced hours on efficiency. We can make no finding as to how much the percentage of increase in labor cost shown for yard service can be reduced.

In road service, actual experience has shown a much less marked change in operation, but, considering the repeated statement of representatives of the railroads that their operation would not be affected by the eight-hour law, the report of the carriers were somewhat surprising in revealing hundreds of instances of an actual shortening of the hours of road employees. The replies of the carriers in answer to the questions in regard to changes in operation are printed in full in Appendix IV. That of the Baltimore & Ohio is here given as being of especial interest:

The time of freight cars has been extended as a result of putting on additional trips resulting in some cases in the shortening of the mileage, and in other cases in the reduction of the service being done in a portion of the work in order to have the number of cars to be switched at the switching points reduced to a minimum. Work has been done during the past several weeks in the repair of the freight cars, and the result has been a reduction in the number of cars to be switched at the switching points. The time of passenger trains has been extended as a result of the same cause. The following is a statement of the changes above mentioned:

Line	Number of trains	Number of cars	Number of switches
Atlantic Coast	100	100	100
...
Total	100	100	100

These changes have been demonstrated at some points, and have been found to be beneficial in other cases. The result has been a reduction in the number of cars to be switched at the switching points, and a reduction in the amount of work done during the past several weeks in the repair of the freight cars, and the result has been a reduction in the number of cars to be switched at the switching points. The time of passenger trains has been extended as a result of the same cause. The following is a statement of the changes above mentioned:

switching performed by crews of freight trains. The following is an illustration of the performance on one of the divisions where helpers were discontinued and double-header operated:

Trains	Time consumed per train.				
	Initial yard. Hrs.	Road. Hrs.	Final yard. Hrs.	Total. Hrs.	Min.
July, 1916.....	37	9 06	24	10 07	
July, 1917.....	35	7 12	21	8 08	

The Increase in Wages in Each Occupation and Class of Service

The foregoing discussion is based upon aggregates of the wage increases in passenger, freight, and yard services. It is important to show also the increases in the various occupations in each sub-class of service. Illustrative results are shown in the following table:

PER CENT OF INCREASE IN COMPENSATION UNDER EIGHT-HOUR LAW IN EFFECT JAN. 1, 1917, AS COMPARED WITH COMPENSATION PAID UNDER 1916 SCHEDULES, FOR SELECTED ROADS: MONTH OF JANUARY, 1917.

Class of service and occupation.	Eastern district.					Southern district.					Western district.				
	Pennsylvania R. R. Co.	New York Central R. R. Co.*	Lehigh Valley R. R. Co.	Cleveland, Cincinnati, Chicago & St. Louis Ry. Co.	Central R. R. Co. of New Jersey.	Delaware & Hudson Co.	Southern Ry. Co.	Louisville & Nashville R. R. Co.	Seaboard Air Line Ry. Co.	Central of Georgia Ry. Co.	Mobile & Ohio R. R. Co.	Alchison, Topeka & Santa Fe Ry. Co. (eastern lines).	Great Northern Ry. Co.	Chicago, Rock Island & Pacific Ry. Co.	Missouri, Kansas & Texas Lines.	Chicago & North Western Ry. Co.
Passenger, through:															
Engineers.....	P. ct. 0.4	P. ct. 0.1	P. ct. 1.5	P. ct. 0.2	P. ct. 0.5	P. ct. 0.2	P. ct. 0.6	P. ct. 2.0	P. ct. 1.9	P. ct. 0.1	P. ct. 0.9	P. ct. 0.1	P. ct. 0.1	P. ct. 0.6	P. ct. 0.3
Firemen.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Conductors.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Assistant conductors (ticket collectors).....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Baggagemen.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Brakemen and flagmen.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Total.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Passenger, short turn-around:															
Engineers.....	6.9	4.9	5.3	12.8	13.2	7.4	7.2	14.3	(a)	20.8	5.0	(a)	4.5	15.8	2.2
Firemen.....	8.4	5.0	7.9	9.7	13.6	6.3	7.2	14.2	(a)	23.2	4.7	(a)	7.7	9.0	2.1
Conductors.....	7.5	8.3	14.8	14.4	7.5	6.4	10.3	8.9	(b)	27.2	3.5	(b)	1.1	17.8	31.3
Assistant conductors (ticket collectors).....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Baggagemen.....	9.8	13.7	14.2	20.8	6.3	7.6	14.1	11.1	(a)	20.2	7.2	(a)	1.0	16.9	16.9
Brakemen and flagmen.....	11.0	8.5	13.1	18.2	7.5	7.3	11.7	14.9	(a)	20.2	4.0	(c)	14.0	18.6	6.2
Total.....	8.3	7.4	10.3	13.7	10.3	7.0	8.8	12.7	(b)	22.4	4.7	(b)	2.8	14.7	10.6
All passenger service:															
Engineers.....	3.1	-9	2.8	1.2	8.6	3.4	-8	4.5	(a)	3.3	-4	(a)	1.1	2.2	-7
Firemen.....	3.6	1.0	3.7	1.0	9.5	3.9	-9	4.7	(a)	3.2	-4	(a)	1.1	1.1	-6
Conductors.....	3.5	2.5	1.4	1.8	3.1	6.3	2.4	4.1	(b)	3.3	-5	(b)	3.1	3.7	5.4
Assistant conductors (ticket collectors).....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Baggagemen.....	5.0	3.4	6.1	1.4	4.1	5.5	2.6	-2	(a)	-9	-7	(a)	-2	3.5	29.2
Brakemen and flagmen.....	4.6	2.0	6.7	1.6	5.5	9.2	2.3	6.4	(b)	2.6	-6	(b)	2.7	-9	6.6
Total passenger service.....	3.8	1.7	4.9	1.4	7.0	5.5	1.6	4.7	(b)	3.0	-5	(b)	.6	2.2	1.2
Freight, fast:															
Engineers.....	9.2	5.2	6.0	12.1	14.6	14.2	2.0	1.5	1.1	-4	1.8	4.4	(a)	7.5	5.0
Firemen.....	10.6	4.0	6.7	11.2	14.5	14.0	2.3	1.2	1.6	-4	2.1	4.3	(a)	7.5	4.2
Conductors.....	8.5	2.8	5.4	10.6	15.1	14.6	-9	3.0	2.3	-2	1.4	3.8	(a)	5.6	3.6
Brakemen and flagmen.....	8.4	4.4	9.7	10.8	15.1	14.8	-9	3.3	1.5	-3	1.3	3.6	(a)	5.2	3.4
Total.....	9.0	3.5	5.9	11.2	14.9	14.5	1.5	2.2	1.5	(d)	1.7	4.0	(a)	6.4	4.2
Freight, slow:															
Engineers.....	18.5	17.7	23.3	18.5	23.1	23.4	7.4	2.7	3.3	-2	3.1	11.7	16.1	13.3	8.2
Firemen.....	19.0	11.8	20.9	16.1	23.0	23.5	7.8	2.9	3.6	-2	4.4	11.9	15.4	11.6	8.1
Conductors.....	19.4	16.3	19.5	16.3	23.4	23.3	5.0	5.6	2.8	-3	3.2	10.9	17.2	11.1	8.7
Brakemen and flagmen.....	18.4	16.0	18.8	18.7	23.1	23.6	6.9	6.1	5.8	-3	1.7	10.9	17.3	11.6	8.8
Total.....	18.7	15.6	20.3	17.6	23.1	23.5	7.2	4.5	3.8	(e)	2.6	11.4	16.5	12.0	9.5
Freight, local:															
Engineers.....	19.0	24.5	23.3	22.1	24.1	22.7	21.2	17.0	21.2	22.5	17.7	21.8	17.3	18.5	21.4
Firemen.....	21.1	23.6	23.5	22.2	23.9	22.6	20.8	15.7	24.7	24.9	18.5	21.7	16.9	19.1	20.8
Conductors.....	21.0	23.5	22.0	21.6	23.1	22.1	16.3	23.3	23.3	18.4	21.7	17.7	18.0	25.5	23.3
Brakemen and flagmen.....	19.8	23.6	22.1	20.6	23.2	22.1	21.7	17.8	22.1	23.2	17.8	20.7	18.0	16.8	23.6
Total.....	20.1	23.8	22.6	21.4	23.5	22.4	21.4	17.2	22.4	22.9	18.0	21.4	17.6	17.9	20.2
Total freight and miscellaneous service:															
Engineers.....	18.3	20.6	20.4	18.7	22.3	22.3	14.1	7.2	9.8	9.4	6.4	12.5	16.3	13.9	13.6
Firemen.....	18.9	16.8	19.6	17.0	22.1	20.6	14.1	7.3	10.9	10.6	6.3	12.4	15.8	12.8	13.2
Conductors.....	19.2	19.3	18.3	16.9	22.0	22.0	14.4	9.2	11.9	11.0	6.9	12.0	17.4	12.3	16.0
Brakemen and flagmen.....	18.3	19.0	18.4	18.4	21.9	21.9	15.0	10.8	13.1	11.9	7.8	12.2	17.6	12.5	17.0
Total freight and miscellaneous service.....	18.6	19.0	19.1	17.9	22.1	21.8	14.5	8.8	11.3	10.7	6.9	12.3	16.8	12.9	15.1
Yard:															
Engineers.....	24.9	24.7	24.5	24.9	25.0	24.6	22.7	24.3	21.5	24.5	22.1	24.4	24.3	22.6	24.4
Firemen.....	24.9	24.9	24.4	25.0	25.0	24.4	24.5	24.0	21.5	24.3	23.2	24.1	24.2	26.7	24.4
Conductors.....	24.8	25.0	24.6	25.0	24.6	24.7	24.5	20.5	23.4	24.7	23.4	25.0	25.0	24.2	24.9
Brakemen (switchmen and helpers).....	25.1	25.0	24.7	24.8	24.4	24.6	25.0	21.1	18.2	24.5	25.0	25.1	25.0	22.7	25.5
Total yard service.....	25.0	24.9	24.6	24.9	24.7	24.6	24.3	22.1	21.3	24.5	24.0	24.7	24.7	23.7	24.6
All services:															
Engineers.....	16.8	18.2	18.5	16.2	19.7	20.1	11.9	10.3	9.0	10.1	8.4	11.5	13.6	12.3	11.4
Firemen.....	17.5	17.4	18.1	15.6	20.0	19.2	12.4	10.3	9.1	10.5	8.5	11.6	13.3	12.1	11.2
Conductors (including yard foremen).....	17.4	19.2	18.2	16.7	18.9	20.2	13.7	11.2	11.3	11.2	10.1	12.8	14.6	12.7	14.2
All other trainmen.....	19.5	20.3	19.3	18.7	20.0	21.1	15.5	13.8	11.3	13.4	12.0	16.1	16.8	14.1	18.4
Total road and yard service.....	18.1	19.0	18.8	17.0	19.7	20.3	13.5	11.7	10.2	11.4	9.8	13.1	14.7	12.8	14.0

* Syracuse, Rochester, and Buffalo divisions only.
a No increase or decrease.
b Less than one-tenth of 1 per cent increase.
c Decrease.
d Less than one-tenth of 1 per cent decrease

It will be seen that here again the heaviest increase appears for eastern roads. In the main the increase in through passenger service is slight, but in the short turn around service it is substantial. Short turn-around or suburban service was intended to include those turn-around passenger runs on which the distance in either direction does not exceed 80 miles, although one road reports that it drew the line at 50 miles. In slow freight and local freight services the increase is decidedly heavier than in fast freight service. Fast freight service was defined to include trains actually operated with reduced tonnage to make possible a rate of speed higher than that of ordinary slow freight for the purpose of making required deliveries or connections with other trains, regardless of whether designated as fast freights, symbol trains, red ball, or other special designations. The increase shown for yard service is subject to the qualifications noted.

In order to determine whether the percentages for January were representative, carriers were asked to give data for engineers only for the months of March and May. Such returns as have been received indicate that the percentages of increase are similar from month to month for the same road in the same sub-class of service, except where they reflect the change to the eight-hour shifts in yards, beginning on some roads in May. In this connection it should be explained that the increase in compensation shown in these tables is merely a computation of the difference between the amounts due under two sets of wage schedules for the service performed in a given period in 1917. No account is taken of the actual service and compensation for the corresponding period in 1916. Consequently, where there has been a reduction in the hours of labor per man per day, these percentages may indicate neither the change in the total labor cost to the carrier nor the change in the total wages received by the individual employee.

Increases in Wages as Affecting Individual Employees

The average increase in compensation in each occupation is by no means applicable to each individual in that occupation. Many employees received no increase whatever, while others received remarkably large increases.

Out of a total of 69,202 employees in 13 occupations on 64 roads included in a special study on this point, it was found that 12.6 per cent received no increase in January as a result of the law, and 30.2 per cent received an increase of less than \$10 per month, as appears from the following table:

Amount of Increase per Month	Number of persons receiving increase	Per cent of total
No increase	8,707	12.6
Under \$10	21,207	30.7
\$11 and under \$20	17,107	24.7
\$21 and under \$30	10,107	14.6
\$31 and under \$40	7,107	10.3
\$41 and under \$50	4,107	5.9
\$51 and over	1,107	1.6
Total	69,202	100.0

Overtime Payments and Additional Allowances

In the statistics requested of the carriers, a distinction is drawn between overtime compensation and the amount paid for "straight" mileage or "straight" time. In road service, the straight mileage is all mileage paid for at the mileage rate, and in yard service, or in other purely time service, straight time means the minimum hours which constitute a day. Overtime is the time paid for in addition to the straight time or mileage payments. But not including the allowances under special rules, which are paid in addition to the compensation for the mileage or time of the entire service.

The eight-hour standard which is the basis of service in road service is the so-called speed basis of 12.5 miles per hour. This simply means that overtime is considered as beginning after the expiration of the number of hours indicated by the

payment schedule by dividing the number of miles run by 12.5. The same rule of the miles per hour basis that overtime begins after 8 hours have elapsed. Thus under the rules are considered 10 miles or more per payment of compensation. For runs longer than 100 miles, overtime does not necessarily begin after the expiration of 8 hours. On a run of 12.5 miles, for example, overtime will begin at the expiration of 10 hours, 10 being two fifths of 12.5 divided by 12.5.

This arrangement may seem to be a violation of the statute, which says nothing about mileage or "straight" miles, it merely the measure of a day's work. But if the regulations and discussions preceding the enactment of the statute be considered, the 12.5 miles per hour basis is not an unreasonable interpretation of its meaning. The Supreme Court of the United States has referred to the demand of the employees as being for a "permanent agreement of to wages for a fixed period should be shortened in which the fixed mileage then previously existing should be performed." The court also said that the statute "permanently applied an eight-hour standard for work and wages which existed and had been in practice in about 15 per cent of the roads."

The effect of the law as applied is normally to turn the compensation for straight mileage or straight time unchanged. The same payment to be made for 7 minimum days of 8 hours as was formerly made for a minimum day of 10 hours. The mileage rate remains unchanged, while the rate per hour is increased. The increase in pay which the enactment of the law brings to the employees is chiefly in the form of payment for more hours of overtime at an increased rate per hour.

The following two cases will serve to illustrate these distinctions further, and will also show what savings possible under the law as interpreted. In the first case a passenger conductor on the Southern Railway received an increase of \$124.70 per month, or 88.7 per cent of his former pay.

The details of his service and pay are as follows:

He ran 126 miles in short turn-around passenger service each day for 31 days, or a total of 3,906 miles. His constant time, counted continuously from the beginning to the end of the day's work, averaged 10 hours and 35 minutes a day, but his actual time averaged 6 hours and 8 minutes daily. Under schedules in effect in 1916, his mileage paid for a straight mileage was 155 per day, which was the maximum mileage in that service constituting a day according to the Southern Railway schedules, at a rate of 2.9 cents per mile, making \$4.50 per day, or \$139.50 for 31 days. On one day he received 2 hours' initial terminal allowance at 58 cents per hour, or \$1.16, or a total pay of \$140.66.

Under the eight-hour day settlement, overtime in short turn-around and suburban passenger service is allowed not only when there is more than 8 hours of minimum service within any 10 hours, but overtime is also allowed for all time in excess of 10 hours, taking the entire span of the day's work as a whole. In this case the conductor ran 10 hours 35 minutes and 35 minutes each of 31 days. Accordingly, his constant time received the former day's pay of \$4.50 per day for 31 days, or \$139.50, and in addition 7 hours overtime each day at 58 cents per hour, or \$131.80, making a total payment of \$271.30, hence an increase of \$124.70, or 88.7 per cent.

On the same railroad, a case was found where the pay of a passenger conductor had been according to the agreement made the road four years from before the enactment in force in 1916. He made 9 runs, three in the month of January, and the pay received was increased that the schedule had at the original time been usually eight hours per day. Thus, with the overtime and extra mileage, on each day, he would be paid by the old basis \$26.73. On one of the days, however, there was 8 hours and 25 minutes and 9 hours and 7 minutes, respectively. On the old basis, overtime began

after 7 hours and 36 minutes (152÷20), making the overtime over one-half hour (8 hours 25 minutes—7 hours 36 minutes), which was counted as 1 hour. On the new basis the overtime began at 8 hours, and was thus less than one-half hour, which was not counted. Two such instances in the month at 58 cents per hour, made the total pay \$1.16 less under the new basis.

For 29,608 employees on the Pennsylvania Railroad in January the "straight" payments, for miles, hours, or trips, aggregated \$2,624,078 under the 1916 schedules, and \$2,622,267 under the eight-hour law, or substantially the same. The increase in compensation appears in the overtime payment, being for this road \$321,420 under 1916 schedules and \$857,661 under the eight-hour law, an increase of \$536,241, or 166.8 per cent. The allowances under special rules amounted to \$40,119 under the 1916 schedules and \$45,117 under the present standard, being in both cases less than 2 per cent of the total compensation.

While the allowances under special rules are relatively unimportant in the aggregate, they do affect a large proportion

of occupations. Similar information for additional occupations is given in an appendix. Attention is first directed to the number of persons receiving specified amounts of wages per month.

NUMBER OF PERSONS RECEIVING SPECIFIED WAGES FOR THE MONTH OF JANUARY, 1917.

[Covers 26 eastern, 17 southern, and 21 western roads, in whole or in part.]

Wages.	Road freight engineers.						Road freight brakemen.					
	Eastern.		Southern.		Western.		Eastern.		Southern.		Western.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Under \$10.....	22	0.85	23	1.67	82	3.52	216	3.74	164	5.65	405	6.30
\$10 to \$19.....	33	1.19	29	1.88	98	4.21	169	2.92	120	4.14	355	5.32
\$20 to \$29.....	18	7.9	23	1.67	68	2.92	156	2.70	102	3.51	242	3.77
\$30 to \$39.....	26	1.14	21	1.52	50	2.15	166	2.87	119	4.10	227	3.53
\$40 to \$49.....	23	1.06	24	1.74	39	1.67	140	2.42	102	5.58	221	3.44
\$50 to \$59.....	22	.96	13	.94	28	1.20	207	3.58	621	7.62	286	4.45
\$60 to \$69.....	31	1.36	10	.73	32	1.37	270	4.67	208	7.17	354	5.51
\$70 to \$79.....	34	1.49	22	1.59	41	1.76	375	6.49	281	9.68	456	7.09
\$80 to \$89.....	40	1.75	39	2.84	40	1.72	556	9.62	306	10.54	614	9.55
\$90 to \$99.....	30	1.31	23	1.67	44	1.89	800	13.84	583	20.27	788	12.26
\$100 to \$109.....	50	2.19	41	2.97	55	2.36	908	15.71	390	13.44	835	12.99
\$110 to \$119.....	65	2.84	49	3.55	64	2.75	801	13.86	257	8.86	662	10.30
\$120 to \$129.....	86	3.76	46	3.33	73	3.13	667	9.80	138	4.76	412	6.41
\$130 to \$139.....	109	4.77	69	5.00	88	3.78	294	5.08	39	1.34	294	4.42
\$140 to \$149.....	146	6.39	89	6.45	106	4.55	118	2.04	8	.28	146	2.27
\$150 to \$159.....	154	6.74	80	6.52	123	5.28	32	.55	1	.03	72	1.12
\$160 to \$169.....	203	8.88	91	6.59	142	6.06	3	.05			21	.48
\$170 to \$179.....	206	9.01	107	7.75	163	7.00	1	.02	1	.03	15	.23
\$180 to \$189.....	246	10.72	103	7.46	155	6.65	1	.02			12	.19
\$190 to \$199.....	229	10.02	111	8.04	168	7.21	1	.02			8	.12
\$200 to \$209.....	198	8.66	88	6.38	118	6.78					2	.03
\$210 to \$219.....	135	5.90	68	4.93	150	6.44					1	.02
\$220 to \$229.....	58	2.54	67	4.86	112	4.81						
\$230 to \$239.....	54	2.35	46	3.33	82	3.61						
\$240 to \$249.....	42	1.84	32	2.32	56	2.40						
\$250 to \$259.....	12	.53	20	1.45	34	1.46						
\$260 to \$269.....	8	.35	14	1.01	30	1.29						
\$270 to \$279.....	1	.04	9	.65	14	.60						
\$280 to \$289.....	3	.13	9	.65	12	.51						
\$290 to \$299.....	5	.26	7	.50								
\$300 and over.....	2	.09	6	.43	26	1.12						
Total.....	2,286	100	1,880	100	2,330	100	5,781	100	2,902	100	6,428	100

The advantage of such a statement over that of a simple average is apparent. The typical earning of an eastern freight engineer, for example, was around \$180 a month, and that of the eastern freight brakemen \$100 a month, but there were many who received more and many who received less. It is not enough, however, to show how many persons received the specified earnings. It is desirable to know also the amount of service rendered in each of these classes. The tables in Appendix III will show by occupations an analysis of the days, miles and hours for each of the wage classes shown in the preceding table. It may be noted here that the very low earnings indicate that work was performed for only a fraction of the month and the high earnings imply large mileage or long hours.

Average Hours of Service

The following table shows the average hours per run, in the case of road service, and the average hours per day, in the case of yard service, for engineers on representative roads, as reported for the months of January, March, and May, 1917. These averages are on the basis of actual time for each of the subclasses of service except short turn-around and suburban passenger service, for which both elapsed time and actual time are shown.

It will be observed that the hours are shortest in through passenger service. This fact should be considered in connection with the number of miles run in this service. Data concerning the miles run by employees in various occupations and services will be found in Appendix II and Appendix III to this report. The foregoing table shows further that on the eastern roads in slow-freight service the actual time during which engineers are on duty is from 12 to 13 hours per run. In the southern and western districts, the corresponding figures are considerably smaller. In local freight

PER CENT WHICH OVERTIME IS OF TOTAL COMPENSATION UNDER EIGHT-HOUR BASIS: MONTH OF JANUARY, 1917.

Service.	Cleveland, Cincinnati, Chicago & St. Louis.	Norfolk & Western.	Mobile & Ohio.	Atchafalaya, Topeka & Santa Fe (eastern lines).	Chicago, St. Paul, Minneapolis & Omaha.
Passenger:					
Through.....	1.8	5.4	0.5	0.9	3.7
Short turn-around.....	25.6	32.2	6.6	3.5	11.4
Freight:					
Fast.....	14.2	8.0	2.9	4.4	12.7
Slow.....	28.0	17.4	4.6	16.1	23.9
Local.....	39.9	27.8	11.4	31.3	32.6
Mine run.....	40.2	33.4		37.4	
Helper.....	28.3	29.1		17.8	27.3
Mixed.....	30.8	28.8		23.6	21.4
Wreck.....	41.1	33.9	46.6	21.9	14.0
Work and construction.....	39.3	33.4	29.7	33.4	19.7
Breaking in engines.....	36.3		4.4	6.6	7.2
Attending court.....	29.5	5.9		17.1	
Yard service.....	29.5	25.5	27.0	28.1	30.0
All services.....	24.1	30.8	11.5	17.7	23.4

tion of the men. The count of 69,202 individual cases to which reference has been made above, shows that 29,321, or 42.4 per cent, had received allowances under special rules. Overtime was made by 59,849, or 86.5 per cent of the individuals.

There is a wide variation in the relative importance of overtime to total pay in the various subclasses of service, as is shown in the above illustrative table.

Typical Wages by Occupations in

Relation to Service Performed

In addition to the report of the aggregate compensation under the old and new basis of pay, carriers were asked to give the names of the individuals to whom this compensation was paid, so far as they were employed in any one class of service during the month, and to show what was the service rendered by each individual as expressed in days, runs, miles and hours. This report concerning individuals was intended to serve partly as a check upon the accuracy of the general report, and partly as a basis for a study of the range of pay and hours in each occupation.

This study has been made for only 69,202 employees, as the tabulation had to be confined to those reports which were received promptly. For each of these individuals a card was punched in the office of the commission showing his compensation for the month of January, 1917, under the eight-hour law settlement and the number of days, miles and hours of service for the month, as well as other data. The cards were then classified and the items counted with the cooperation of the Bureau of the Census.

In the following tables certain results are shown for two

service, men work from 11 to 12 hours per run in all districts.

In road service the average hours shown in the table are nearly the same from month to month. In yard service the effect of the introduction of eight-hour shifts on certain roads in the month of May is apparent.

COMPARATIVE STATEMENT OF ACTUAL TIME ON DUTY PER RUN OR PER DAY, AS INDICATED, FOR ENGINEERS IN VARIOUS SECTIONS OF SELECTED ROADS, MONTHS OF JANUARY, MARCH AND MAY, 1917

Class of service.	Month, 1917.	Eastern district			Southern district			Western district.				
		Pennsylvania R. R. Co.	Cleveland, Canton and St. Louis R. Co.	Central R. R. Co. of New Jersey	Delaware & Hudson Co.	Louisville & Nashville R. R. Co.	Mobile & Ohio R. R. Co.	Atchafalaya, Topeka & Santa Fe R. Co. (western line)	Chicago, Rock Island & Pacific R. Co.	Missouri, Kansas & Texas	Chicago & North Western R. R. Co.	
Hours per run—Passenger service—	Through.	Jan.	6.6	6.5	10.4	7.4	5.7	5.5	6.5	6.4	7.4	
		Mar.	5.9	6.0	10.2	8.1	5.8	5.4	7.9	5.9	6.8	
		May.	5.8	5.9	10.2	8.5	5.9	6.1	6.7	5.9	5.1	6.5
		Jan.	8.6	7.7	11.9	9.9	5.2	10.8	7.7	6.9	7.2	7.3
		Actual	10.9	10.4	13.9	11.1	7.1	10.8	10.0	8.4	10.3	7.5
		Elapsed	8.8	8.2	11.9	9.5	7.9	10.7	8.0	11.3	5.9	7.7
Short, turn-around and suburban.	May.	Jan.	10.9	13.1	11.9	11.6	10.0	12.4	11.3	13.7	8.9	10.4
		Actual	8.6	7.6	11.7	9.3	7.8	10.3	5.9	6.8	6.9	6.8
		Elapsed	10.8	11.1	11.7	11.2	9.9	10.3	6.1	9.3	10.0	8.7
		Jan.	10.6	9.1	10.0	11.6	10.2	8.3	8.1	9.6	6.9	9.1
		Mar.	10.8	10.4	10.3	11.1	10.4	7.8	8.4	9.1	6.9	8.1
		May.	10.3	10.3	10.1	11.8	10.0	8.2	8.2	9.4	6.5	8.6
Slow	Jan.	Jan.	12.5	13.0	13.0	13.0	9.5	10.0	10.3	10.5	10.2	10.2
		Mar.	12.1	12.4	13.0	12.5	9.9	9.5	10.2	10.4	9.7	10.0
		May.	11.7	12.5	13.0	13.0	9.1	9.2	10.0	9.9	10.1	10.1
		Jan.	11.7	12.6	12.6	12.1	11.2	11.4	12.0	11.6	12.2	11.7
		Mar.	12.6	11.6	12.6	12.3	11.6	11.1	12.2	11.9	11.9	11.1
		May.	11.2	11.9	12.0	11.9	11.1	10.9	11.2	11.2	11.2	11.6
Local	Jan.	Jan.	11.7	11.5	12.1	11.4	10.7	10.9	11.0	10.7	11.6	
		Mar.	11.6	10.9	12.0	11.5	10.8	10.7	11.8	10.5	11.2	
		May.	9.1	10.0	9.0	8.6	10.6	8.0	9.4	8.1	8.8	11.0
		Jan.	11.7	11.5	12.1	11.4	10.7	10.9	11.0	10.7	11.6	
		Mar.	11.6	10.9	12.0	11.5	10.8	10.7	11.8	10.5	11.2	
		May.	9.1	10.0	9.0	8.6	10.6	8.0	9.4	8.1	8.8	11.0
Hours per day.	Yard service.	Jan.	11.7	11.5	12.1	11.4	10.7	10.9	11.0	10.7	11.6	
		Mar.	11.6	10.9	12.0	11.5	10.8	10.7	11.8	10.5	11.2	
		May.	9.1	10.0	9.0	8.6	10.6	8.0	9.4	8.1	8.8	11.0
		Jan.	11.7	11.5	12.1	11.4	10.7	10.9	11.0	10.7	11.6	
		Mar.	11.6	10.9	12.0	11.5	10.8	10.7	11.8	10.5	11.2	
		May.	9.1	10.0	9.0	8.6	10.6	8.0	9.4	8.1	8.8	11.0

* Represents hours per day, runs being incompletely reported.
 † No service reported.

The statistics concerning the average hours on duty per run have been supplemented by a study of the total hours of individual employees for the month of January. The reports for 2,286 freight engineers in both slow and fast freight services, in the eastern district, show that 1,040, or 45.5 per cent, were on duty for periods aggregating less than 200 hours, the equivalent of 10 hours per day for 20 days, and 1,240, or 54.5 per cent, were on duty 200 hours or longer during the month. Those working 340 hours or longer, the equivalent of 11 hours a day for 31 days, were 235 in number, or 10.2 per cent of the total number considered. In the southern and western districts, the percentages corresponding to the one last given are respectively 4.7 per cent and 6.7 per cent.

The Speed and Delays of Freight Trains

The blank forms drawn up in conference with representatives of the Brotherhoods and of the railways included in dealing with train operation from the standpoint of speed, tonnage and delays. This form provided for a statement of all freight trains in the two weeks' period ending March 17, 1917, classified as fast freight or slow freight, on certain selected roads agreed upon as representative. Such data as the following were requested to be shown separately for each train: Miles run by the train, the loaded and empty car mileage, the gross ton mileage, the delay at initial and final terminals, the delays en route, the time actually running, the miles assisted by helper and pusher engines, as well as the wages paid the crew on both the old and new basis. This last requirement delayed the filling out of this form because of the uncertainty of what would be the

method of payment under the new law. Replies were received a time to be obtained from the companies in full or in part. The general purpose kept in mind in summarizing the information was to throw light upon the conditions under the present system, that the increasing size of freight trains has been the direct cause of lengthening the haul per run. The replies have revealed two distinct causes of slow average train movement in the case of fast traffic, slower than the size of the train. The statistical showing will not demonstrate that there are a variety of reasons. Occasionally a heavy train can within certain limits be made to run as fast as a lighter one, if sufficiently increased power is used, but taking the situation as we find it with the assistance of locomotives actually made by the roads, it is true that the statistics indicate a somewhat slower running time for the heavier trains. There is no clear statistical showing as to the relation between the size of train and the amount of delay per train, but probably this is not to be expected, since an accident to one train may cause delay to a number of others of a different class. There is the further difficulty that heavy freight trains and loads of traffic, usually go together, so that it is difficult to distinguish the one cause from the other, and the picture is also blurred by variations in grades, weather conditions, and character of tracks, and the inadequacy of power and other factors.

A very general survey of the results is shown in the following table:

ANALYSIS OF SPEED AND DELAYS OF TRAINS IN SLOW FREIGHT SERVICE ON REPRESENTATIVE ROADS, TWO WEEKS ENDING MARCH 17, 1917

Road	Number of slow freight trains on divisions reported.	Per cent having speed, including delays, less than 12 miles per hour	Per cent having less than 30 or more loaded cars.	Per cent having less than 4 days' delay.	Per cent having speed of less than 15 miles per hour actually running.	Percentage of train service miles per mile of main track.
Atchafalaya, Topeka & Santa Fe (eastern line)	1,330	47.4	42.5	56.6	97.2	.....
Hillman & Ohio (western line)	322	41.0	33.5	67.1	87.9	3,299
Atlantic Coast Line	1,257	36.2	35.1	83.7	93.7	2,198
Atchafalaya, Topeka & Santa Fe (western line)	1,018	28.3	49.3	48.4	73.1	4,122
Illinois Central	2,704	26.1	47.5	49.2	86.6	1,271
Atchafalaya, Topeka & Santa Fe (western line)	1,698	28.2	39.1	43.1	87.7	6,122
Union Pacific	1,969	25.0	43.3	51.1	69.4	4,747
Chicago, Rock Island & Pacific	2,516	21.6	27.1	55.1	75.3	41,732
Southern	2,488	20.3	49.3	39.8	79.4	3,969
Norfolk & Western	2,160	16.2	24.6	35.3	73.2	6,111
Great Northern	2,134	10.4	47.4	24.4	58.2	2,807
Chicago, Milwaukee & St. Paul	149	11.4	57.2	37.3	65.0	.....
Toledo & Ohio Central	434	9.9	44.9	24.2	64.5	6,817
Cleveland, Cincinnati, Chicago & St. Louis	1,750	9.5	53.5	15.0	77.9	4,969
Baltimore & Ohio	2,248	7.7	57.8	16.0	79.6	5,703
Pennsylvania R. R.	4,786	7.3	44.9	17.5	67.1	7,969
Erie	1,243	4.5	60.3	23.4	75.3	6,873
New York, New Haven & Hartford	133	4.5	21.1	28.6	88.0	7,227
Boston & Maine	1,759	4.1	29.5	25.6	79.9	6,774
Baltimore & Ohio	2,104	2.4	54.3	11.1	65.0	6,136
Pennsylvania R. R.	4,772	2.4	54.2	11.1	67.2	5,860
Bessemer & Lake Erie	290	2.1	60.6	61.3	61.4	7,368
Chicago, Indianapolis & Louisville	257	1.2	53.6	13.3	66.1	5,193
Philadelphia & Reading	2,083	0.5	61.0	24.4	29.9	9,479
Chesapeake & Ohio	223	.....	69.1	29.2	20.9	5,118

† Includes both freight and passenger. Column 1 is based on the annual reports of operating carriers to the Interstate Commerce Commission for the year ending Feb. 28, 1917.
 ‡ Includes 8 divisions.
 § The Erie was included in the 1916 report.
 ¶ 4 divisions.
 ** 17 divisions including that of the Pittsburg (Cincinnati, Chicago & St. Louis) Ry.
 †† 12 divisions.
 ††† Old line only.
 †††† 10 divisions.
 ††††† Huntington and its branches.

It will be observed that the percentages of the trains in slow freight service are shown as 12.4 miles per hour running, or 27.3 miles per hour. Generally speaking, the slow

having heavy train loads and many trains per mile of main track are near the bottom of the list, and those of less density and lighter loads near the top. Whether the variations from the rule support one side or the other of the controversy above mentioned is a question that can not be decided except upon a study far more comprehensive than it has been possible for us to make. Incidentally, it may be noted that the percentages for the Baltimore & Ohio and Pennsylvania Railroad shown in columns (b) and (c) are the same. This is a curious coincidence and not an error.

For a smaller number of trains a study was made of those having fewer than 50 cars as compared with those having 50 cars or more per train. It was necessary to take the number of cars as a basis for classification rather than the gross weight, as not all roads could give data as to gross ton-miles. The general result was as follows:

COMPARISON OF THE SPEED AND DELAYS OF LONG AND SHORT TRAINS IN SLOW FREIGHT SERVICE ON REPRESENTATIVE DIVISIONS FOR THE TWO WEEKS ENDED MAR. 17, 1917.

Item.	Trains having fewer than 50 cars per train.		Trains having 50 or more cars per train.	
Number of trains included in this table.....	11,050	4,467		
Average number of cars per train:				
Loaded.....	24.29	35.54		
Empty.....	8.30	28.03		
Total.....	32.59	63.57		
Average number of miles run per train.....	106.75	103.78		
Average delay per train..... hours and minutes..	5 32	5 41		
Average actual running time..... miles per hour..	15.91	13.59		
Average speed including delays..... do.....	8.71	7.92		

The selection of the operating divisions in these tables was determined by the order in which reports were received from carriers and the degree of completeness of the work of compilation, as many as possible being included.

It should be noted that trains having more than 50 cars are not always heavier than those having fewer than 50 cars, since the former may include relatively more empties. As a general rule, however, the long trains are the heavier. On roads reporting gross ton-miles it appeared that for 6,520 trains having fewer than 50 cars and 2,552 trains having more than 50 cars the average gross weight per train was 936 tons for the short trains and 1,289 tons for the long trains.

The difference in speed between 8.71 and 7.92 miles per hour for a 100-mile run means a difference of 1 hour and 9 minutes per run in favor of the shorter train. But this cannot be set down as a universal rule. In the following table the results are given for each of the roads represented in the total figures above mentioned. In a number of cases, no appreciable difference is shown.

Certain theoretical aspects of train speed are presented in the special report by C. P. Howard.

Railway Wage Schedules and Agreements

The eight-hour day act has effected a considerable change in the wage agreements under which men in train and engine service work. In simple language, it provides that eight hours shall, in contracts for labor and service, be deemed a day's work and the measure or standard of a day's work for the purpose of reckoning the compensation for services of employees engaged in the operation of trains; but the task of revising the very numerous and complex schedules or agreements with the different classes of employees so as to comply with the law has involved a difficulty like that which would be met with in changing the size of one wheel in a clock and then making the clock keep time. A presentation of the development and nature of these agreements or schedules governing wages and hours, together with a record of the

changes resulting from the eight-hour law, is properly a part of this report. A detailed examination of this subject was made for the Commission by Prof. William Z. Ripley, of Harvard University.

DELAYS AND RUNNING TIME OF TRAINS IN SLOW-FREIGHT SERVICE BY ROADS.

Name of road.	Number of trains.		Delays per train.		Actual running time.	
	Short trains. ^a	Long trains. ^b	Short trains.	Long trains.	Short trains.	Long trains.
Atchison, Topeka & Santa Fe (11 divisions).....	1,112	600	H. m. 5 06	H. m. 4 38	M.p.h. 17.66	M.p.h. 17.88
Chicago, Rock Island & Pacific (12 divisions).....	1,436	248	4 08	5 05	16.37	15.79
Great Northern (12 divisions)...	1,442	658	6 11	5 03	16.93	15.28
Union Pacific (2 divisions).....	1,911	4 46	4 40	18.75	18.40	
Atlantic Coast (3 divisions).....	1,062	227	5 04	5 19	19.42	20.88
Southern Railway (3 divisions)...	445	33	5 50	4 41	17.41	17.89
Boston & Maine (2 divisions)...	371	13	5 38	4 29	15.64	12.49
New York Central (3 divisions)...	237	561	6 32	6 28	16.20	12.64
Pittsburgh, Cincinnati, Chicago & St. Louis (3 divisions).....	702	167	6 31	5 48	16.60	14.09
Philadelphia & Reading (4 divisions).....	1,577	799	5 52	6 52	11.96	9.93
Pennsylvania Co. (2 divisions)...	651	148	6 32	7 17	12.26	12.49
Baltimore & Ohio (4 divisions)...	437	229	7 11	10 14	15.62	14.56
Bessemer & Lake Erie.....	260	98	4 21	5 13	14.19	13.57
Erie (4 divisions).....	344	244	6 32	5 37	13.24	12.22
Kanawha & Michigan (2 divisions).....	117	122	2 35	1 26	13.29	13.59
Toledo & Ohio Central (2 divisions).....	364	129	5 09	6 32	15.06	10.88
Total.....	11,050	4,467	5 32	5 41	15.91	13.99

^a Fewer than 50 cars.

^b Fifty cars or more.

^c The fact that this figure is the same as the corresponding one in the preceding column is a coincidence and not an error.

In describing the schedules concerning the work of train operatives, this report by Prof. Ripley necessarily deals with the same subject matter which underlies the report of Dr. Clark on employment conditions, but the point of view is distinct. The one is a study of the development of the employment contract, while the other is a record of field observations.

As a result of his investigations, Prof. Ripley is led to make certain recommendations regarding the organization of a permanent wage board. These should not be taken as recommendations of this commission, as they lie beyond the scope of its work.

Employment Conditions in Road and Yard Service

The commission is directed among other things to observe the facts and conditions affecting the relations between carriers and their employees. As previously indicated, we have not considered it our duty to study the adequacy or inadequacy of the wages in relation to the cost of living. Consideration was given to undertaking a study of occupational fatigue, it being frequently asserted that a reduction of hours would reduce fatigue and prevent accidents. But no practical plan of procedure that could be carried out within a few months at small cost was suggested. It is possible that an amplification of the monthly accident reports required by the Interstate Commerce Commission, so as to show the number of hours on duty and hours of rest preceding accidents for which individual employees are responsible, might in the course of years yield definite results. The whole matter of accidents to train employees was set aside in order not to duplicate the work of other departments of the government. The statistics of the Interstate Commerce Commission amply demonstrate the hazardous character of the work of train operation.

The task of investigating and writing a description of the working conditions in train and yard service was assigned to Dr. Victor S. Clark. Dr. Clark traveled extensively in the summer of 1917, interviewing the men who work in train and yard service and the officials of the road who come in contact with the men. His special report will be found in Appendix VII. He describes the entrance requirements,

the promotion and discipline, seniority rights, and the regularity of employment in the occupations affected by the eight-hour law. Similar facts with respect to the hours of labor and of the living conditions of train operatives at home and on the road are presented. Dr. Clark's report may be characterized as a careful summary of the views of employees and officials whom he interviewed in the course of his investigation.

Practicability of an Actual Eight-Hour Day in Train Service

Although the distinction is elsewhere noted in this report, it is well to emphasize the fact that while the law requires eight hours to be the measure or standard of a day's work for the purpose of reckoning the compensation for services of train employees, it does not limit the actual working time to eight hours. As explained above, overtime does not begin at the expiration of eight hours if the run is more than 100 miles and is made at the rate of 12½ miles per hour or better. For runs at 100 miles, the actual eight-hour day as ordinarily understood is the same as the speed basis of 12½ miles per hour. Very generally in the freight service this average speed is not attained. The engine and train crews as shown in other sections of this report average considerably more than eight hours per day, or less than 12½ miles per hour. In the discussion preceding the enactment of the law it was contended for the railroads that they could not, to any large extent, eliminate this overtime by increasing the average speed of trains to the 12½-mile-per-hour basis without exorbitant cost.

In response to the question whether the railroads would run their trains any faster if they had to pay time and a half for overtime Elsie Lee, speaking for the roads, said:

We formed a committee subordinate to the national conference committee, or what we called the "Studies committee." I think there are about 12 or 15 men in the East and 3 or 4 from the West and 3 or 4 from the South—the three criterions—to study the proposition and see in what manner the operation could be changed to meet this burden if it was imposed upon us.

The witness further stated that the conclusion they all came to after making these studies of different portions of the road was that the most economical thing to do was to operate in the same way as they are operating to-day and pay for the overtime. S. Doc. 549, 64th Cong., 1st sess., p. 50.

On the other hand, it was contended for the brotherhoods that "if you touch the pocketbooks of these operators, these operating officers, they will so regulate their business that the men will not make the long hours that we are making now." Statement of W. G. Lee, *id.*, p. 68.

As a result of the law, even with pro rata overtime, there have been numerous instances of changes in operation of trains in road service shortening the time of runs, as shown in a previous section, but generally speaking, no marked change in operation in road service is observable. As elsewhere explained this is not true of yard service, in which an actual eight-hour day has been generally introduced. To what extent it would be practicable ultimately to limit the hours of road train employees to eight per day it is impossible to say.

The commission was urged by representatives of both the brotherhoods and of the railroads to make some study of this matter. It was found that an exhaustive field study of representative operating divisions would be an undertaking far beyond our time and appropriation. It was thought, however, that some light could be thrown on the question at issue by a critical examination of available material. Charles P. Howard, an experienced engineer in the Bureau of Valuation of the Interstate Commerce Commission, was

appointed to make this examination and to secure a special report which will be filed in full at Assembly VIII. The basic plans given at the preliminary conference relative to speed and train crew will continue part of the individual consideration following the present.

The railroad representatives named by Mr. Howard's report are according to some received by others. In the course of review of these studies he gives commendation to the various possible plans of operation, but in so operating, he is confronted with the requirements of time and a half for overtime at home.

1. Pay the time and a half only during methods in operation.

2. Cut the tonnage and increase the speed.

3. Cut the tonnage and increase both the speed and track facilities.

4. Increase the tonnage by means of heavier engines without increasing the speed.

5. Increase the speed by expenditure for additional facilities.

6. Shorten the time on duty by releasing train crews the engines going through.

7. Plan No. 7 applies to good hostlers and head freight service and contemplate rearrangement of shifts or runs.

All of these plans were not studied on every division. Generally speaking, in spite of many errors and inconsistencies found in the studies, plan No. 1 is shown to be the cheapest in road freight service. Mr. Howard concludes that the roads cannot speed up all of their freight trains to 12½ miles per hour, including delays by any universal method. But a close attention to the problem of re-arranging duty and with sufficient incentive conditions as to secure some road train service can be improved to varying degrees and by varying methods according to local conditions.

The commission expresses its appreciation of the cooperation which it has received from its secretary, Dr. M. O. Lawrence.

ENGLISH RAILWAYMEN ASK THE FLOOR.—The National Union of Railwaymen has accepted the government's invitation to send a delegation of railwaymen to the Western front. The delegation will comprise 35 members representing the executive, elected delegates to the annual general meeting, general officers, and four representatives from among the 60 union groups. Each representative will travel at his personal risk. The executive committee of the Society of Locomotive Engineers and Firemen has declined the government's invitation that 35 of the members go to the front. This is the first refusal from the various labor bodies' obligations of which have recently visited the world wide. A resolution adopted by the committee says that owing to the long hours of duty in force and the absence of working men from work, it would be unfair to the others to accept the invitation.

ZONE SYSTEM FOR SPANISH FREIGHT.—The great increase in the cost of sea freight between Spanish ports has resulted in throwing upon the railroads an accumulation of freight that they are unable to cope with. In order to remove the congestion, the coast of Spain has been divided into three zones, and a special tariff proposed for business transacted in different parts of each zone. Private operating companies metric ton is usually not to be accepted by the railroads from port to port, with the exception of iron ores, iron pyrites, fruit, and vegetables. Roadways are prescribed as to the kinds of freight to be transported by the national trade in the various zones taking into consideration the products of each zone and sea shipping available. The same zones are contained some mineral coals and the products of these zones may only be shipped from the ports at which the railroads connect, particularly iron terminals. —*Commerce Report*

The Trans-Continental Railway of Australia*

Water Supply the First and Last Thought of the Builders of This 1,053-Mile Standard Gage Line

IN THE SPARING words of its engineer-in-chief: "The construction of the Port Augusta-Kalgoorlie Railway was a work of great magnitude and beset with unusual difficulties." The world has many transcontinental railroads. Some of them are longer than this first project of communications undertaken by the federal government of Australia. Many of them have involved greater engineering problems. The piercing of the Rockies; the traversing of the Andes; the penetration of the primeval forests of Central Africa alike have called for the daring and ingenuity of the surveyor and the engineer. But in none of them were there to be faced the same difficulties as those which had to be surmounted in throwing a single track from east to west across the heart of the Australian continent. The line was part of the federal

toral country with fresh water in wells for 200 miles. There are copper outcrops in plenty. Gold has been, and is being, successfully mined on the range at Tarcoola, 262 miles west of Port Augusta. From Tarcoola westward, the country becomes gently undulating, somewhat sandy, developing at about 380 miles west into a region of parallel sand ridges, as many as five to a mile, covered with "black oak," "mulga" and "mallee scrub," which, although there is no surface water, gives to the eye sweeping views of tossing greenness, and nullifies the careless term of "desert." At 428 miles from Augusta the route debouches suddenly on to the famous "Nullarbor," an absolutely level and treeless plain—a plain as big as France, averaging 600 ft. above the sea-level. It is of limestone formation, covered with a good red soil, growing luxuriantly the salt-bush and blue-bush, most valuable food for stock. For 330 miles on the "Nullarbor" the line runs without a curve—the longest tangent in the world. There is no surface water, but extensive boring is producing fresh water in large quantities. The Western Australian border is reached at about 592 miles west in latitude 30 deg. 45 min. south. At 850 miles from Augusta the plain ceases as suddenly as it began, and lightly timbered country accompanies the line right into Kalgoorlie. The greatest elevation reached on the route is 1,354 ft. This is at a point 107 miles from Kalgoorlie, which itself stands at a height of 1,240 ft. above sea-level.

On the whole route there are no steep ranges to be tunneled. There are few deiles necessitating deviation. The grades are therefore simple. In the Eastern Division (*i. e.*, that portion of the line within South Australia) the ruling curve is 1 ft. in 88 ft., compensated for curvature, with a maximum curvature of 4 deg. 20 min. The ruling grade in the Western Division (in Western Australia) is 1 ft. in 80 ft., compensated for curvature. This grade occurs only in the first 105 miles, after which there is no steeper gradient than 1 ft. in 100 ft. The maximum curve of 4 deg. 20 min. occurs only twice, and that within the town area of Kalgoorlie. At 400 miles west from Port Augusta the dreaded Sandhill Country, with its persistent swelling ridges, slightly transverse to the line of route, necessitated heavy earth works and considerable banking, when access from one valley to another had to be negotiated.

Organization for Construction

Let it be admitted, therefore, that the proposition was not an excessive one from the point of view of the surveyor. But let it also be remembered that in the "inside" of the Australian continent "life" is spelt with more letters than in Europe. For life needs water, and of natural surface water there was none in the whole stretch of 1,050 miles. Given water on the route, and this description would have been written decades since: Water—and the soil, rich alike in minerals and fertility, would today be supporting a close population. But when construction commenced, at least 800 miles of the route was entirely uninhabited. Over the whole route there was no local population from which labor might be utilized, or food produced for man or beast. Organization was therefore necessary of a kind quite unusual in ordinary railroad enterprise. It was less like an engineering job than the organization of a campaign. The Commonwealth government built it as a direct government enterprise. What few contracts there were were subsidiary. Labor—practically all white—had to be brought hundreds, sometimes thousands of miles, and maintained per-



The Railways of Australia and the New Transcontinental

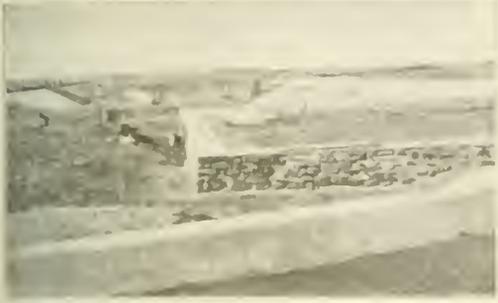
compact under which Western Australia entered the Australian Commonwealth. It was to connect the Eastern railway system, ending at Port Augusta, in South Australia, with the Western system, whose "furthest east" was Kalgoorlie, flanking the famed Golden Mile of Boulder City. It was to be a line of high standard; the federal government set its face against any perpetuation of the tragic system of "broken" gages by which the various state railways are divided into traffic-tight compartments. It decided to have neither the 3-ft. 6-in. narrow gage of Western Australia nor the 5-ft. 3-in. widest gage of Victoria, but to adhere to the 4 ft. 8½-in. world's standard, and to use its influence, and that of the Transcontinental, to convert the 3-ft. 6-in. trunks of Queensland and Western Australia, and the 5-ft. 3-in. of Victoria and South Australia, to the desired standard.

The Terrain

The whole distance to be covered was 1,053 miles, not a great distance in a continent larger than the United States. The terrain varied considerably. Starting from Port Augusta the line crosses the head of Spencer's Gulf at Yorkeys Crossing. It then contours the rising ground to the westward, running through sand rises and gypsum banks, until a sparsely-timbered plateau gives occupied pas-

* From Engineering, London. This will supplement the article in the *Railway Age Gazette* of December 28, telling of the recent completion of the line.

manently on the line. Construction had to embrace not only a highly developed system of transportation of material, water, and other supplies, the government had to provide stores and personal necessities for the workmen and their families, boarding houses, huts and food rations for the housing of employees, postal, telegraph and banking facilities.



Wirrappa Reservoir, South Australia

ties; medical and field hospital units, libraries and other necessities which, in other countries and under ordinary circumstances, are the care of private enterprise or other intermediaries.

Water and Food Supply

Water was the first and last thought of the engineers. Over the greater part of the route there are no watercourses of any size; an indication that the streams carrying off the rainfall are so little concentrated that opportunities of holding up volumes of water by the construction of dams was reduced to a minimum. The annual rainfall over the whole area does not average more than probably 7 in. There are occasionally intervals of years during which rainfalls are too scanty for collection. At Port Augusta an indifferent town supply existed at the outset. Another scheme had therefore to be added to the engineering programme. To the uninhabited, a more hopeless place in which to seek a water catchment never existed than the dry lands of Spencer Gulf. The surveyors and the well-borers of the overland line deserve well of their country. With their camel teams and petrol engines they have punched holes in the most arid proposition to be found in Australia. The camel is bred in thousands in South Australia, and was used on the line for everything—hulage, riding, water carrying; he was, in short, "General Utility." For the Eastern Division, at 26 miles from Port Augusta, they laid toll to the one possible supply. An intake weir of 278,000 gal capacity was constructed at Depot Creek. Five catchment reservoirs of a total capacity of 50,000,000 gal were constructed at intervals for 250 miles west from Port Augusta. Wirrappa, with its massive concrete revetments, its asphalt-lined tanks of 5,000,000 gal. capacity, was one of the pioneers. In the Western Division the line possessed the advantage of the Murrumbidgee paper line supply at Kalgoorlie. The water had already made a journey of over 500 miles before it reached the Golden City. It had now to be carried by rail further west for the maintenance of the construction gangs. The Western Division is off the artesian belt. In the quest for water the boring parties went forward for hundreds of miles into the Nullarbor Plain. With the miracle and the Willy (i.e., a fast traveling spiral dust whirl) for company, backed by the ever present sun, chilled with the sweep of night winds across the waste, they wrestled with the living rock, dragged from its depths water which often reached the surface warm. The bores reached a maximum depth of 1,570 ft. The daily

flow varied from 7,000 gal to 70,000 gal. The engineers thus provided adequate water supplies, not merely for construction, but permanently for their operations. But an immense amount of hulage for construction trains was required. During the first six weeks, 1,000,000 rails were consumed to 795,108 miles, and vehicle hulage to 2,745,000.

Next to water supplies came the problem of food. For both over 2,000 employees scattered over sections 200 miles in length, the question of maintenance was serious. Added to which the men were of 1 race accustomed to international life well. They demanded food necessities. The government opened provision and general stores for their needs. The stores had to be self-supporting. Bread and meat supplies were organized by the department of Public Works. The authorities did their utmost to prevent the sale of animals. In the Western Division part clubs, "hot" "trattorias" (i.e., restaurants) were set up, run directly by government, moving always with the gangs, and furnishing them with substantial food at cost prices.

New Construction Methods

The construction work was commenced in 1910, 1912, by Henry Deane Commonwealth government consulting engineer. In April, 1914 Colonel Norton Peel was appointed engineer in chief. He drove the last spike in October of last year. The line was built from both ends. It is of the standard 4 ft. 8 1/2 in. gage, 80-lb. rails were utilized. They are flat-topped, as is the custom in Australia, deep-spoked directly to ties. The preliminary supplies were imported from America and England; the latter half from the local steel mills of New South Wales. The ties were of course obtained in Australia. Two and a half million tons were utilized. Even engineers would have been immediately struck with their extreme length. For Australia "has timber to burn" and it was argued that the larger ties ensured a good road bed, even before ballasting could be completed.

Again one had to note that the material of transportation



The American Track Layer at Work

had been utilized. The engineers completely followed the specifications of the preliminary trial survey of 1905. In the case of stone and concrete material, great care was taken to secure the best quality of material. In the case, however, of steel, the best quality was not obtained from the same sources as utilized. Mechanical methods were applied to the greatest. On the basis of the experience of the construction work, the design of the road bed, ballast and concrete, and the ballast was laid out in the middle. With compass and line and good tools, the road bed was quickly formed. A "Cutter" machine was utilized for setting in the Eastern Division, except that rollers and tampers of boxes of iron bars were used. In the Western Division the construction team had to be supplied with "timber" from America. The

track layer was to become the "tank" of the overland route. It was rather a labor-aider than a labor-saver. Its swinging derricks operated by steam power from the locomotive, waved like the antennae of a giant lobster over the prepared road-bed. From alternate flat-topped bogie wagons, ties and rails were delivered into trough conveyors hung to each side of the construction train, mechanically operated rollers passing them forward, to be gripped by the derricks, swung out in front to where a rushing gang of navvies slammed them down, to be hastily linked and dog-spiked into position on the earth cushion. It was arranged that the derricks on one side should be longer than the other. The ties were conveyed on the longer side, having to be delivered ahead of the rails. Every few minutes the train moved forward on the new-laid track; every few minutes the converging railheads in

line of 3-ft. 6-in. gage, so that sidings of combined gages had to be constructed to carry the alternative wagons; while at Port Augusta the material was received from ships' slings, after a long sea haulage up the narrowing waters of Spencer Gulf.

The government took every possible step to safeguard the health of the men engaged on the line. The utmost care was taken to ensure good food. Hospital cars with proper dispensary and operating accommodation were provided in both sections. Medical attention and hospital accommodation were provided by the government for all employees, who contributed a general sum of 6d. (12 cents) each per week. The total number of accidents on the whole work was well under 1,000, causing a total loss of life of about 20.

Rolling Stock and Equipment

It was the aim of the Commonwealth government to build a line capable of carrying traffic at high speeds. The line is of the best workmanship, and, so far as passenger accommodation is concerned, the engineers of the Commonwealth have been scouring the world for the latest ideas in traveling luxury.

Huge day-and-night coaches, of a size undreamed of in England, saddled with its legacies of tunnels and bridges of a past railway age, will leave no device unexplored that will minister to the enjoyment of passengers. The Australians are inveterate travelers. They do not mind being in the train for a week, but they demand comfort. Ice in the hot weather, heating in the winter, and baths whenever possible. It is safe to say that they will make their great "through" expresses *trains de luxe*. Most of the construction rolling-stock, practically all of the locomotives and coaches for the new line, will have been built by Australians in Australia.

Results Achieved

Such, briefly, is the history of a great undertaking. It has been accomplished at a cost of millions of national money, provided out of a consolidated revenue by the Australian taxpayer. It renders possible one of the longest railway runs in the world. From tropical Townsville, sheltered behind the Barrier Reef, the traveler may soon run by way of Brisbane, Sydney, Melbourne and Adelaide, to Perth, on the surf-beaten shores of the Indian Ocean—a run of 4,000 miles. He may do this in the running time of 150 hours. Every foot of the track is owned by the State. The line joins the Eastern system of 15,000 miles to its isolated daughter system of 3,000 miles in the west. It is a visible pledge of federation. It is the pioneer of many great similar projects which are aimed at the internal development of a continent. It provides for the military defence of the country on interior lines. The voyage from west to east of the continent has been halved in point of time. And the tenacity of Australian engineers has tamed the wilderness. Out in the former "unknown" settlements have already sprung up along the line. The optimism of their population is expressed in names like that of "Golden Ridge," but it is an optimism that has subdued deserts, and is making the Australian Nation.

THRIFT, THE INDISPENSABLE PREREQUISITE OF VICTORY. — It is the duty of every man, woman and child in the United States to produce more and consume less, and then to pass over to Uncle Sam through the purchase of Liberty bonds the savings which he has effected in this two-fold manner. The next sale of Liberty bonds can be of no value to the government unless those savings of goods and labor are now being made for which the money which the government borrows can be exchanged. In a war which is taxing the capacity of every nation engaged thrift becomes the indispensable prerequisite of victory.



A Wayside Station and Inspection Train

east and west moved closer together. Behind the track layers the line was pulled in, packed, and otherwise completed, by the felling gangs and the *olla podrida* of a railroad camp. A temporary station was formed at each railhead, including a loop, and two "dead-ends."

Base Organizations

A fair rate of progress of a mile a day was the object of the engineers, though it can hardly be said to have been attained. Yet every day the railheads moved forward inexorably in obedience to the capabilities of communication in the rear. Every 20 days there was something like an exodus. For the hutments and workshops of a thousand employees, the camp trains of the engineering and surveying staffs, the hospital cars of the medical section, recreation rooms, churches, cooks, camels, the miscellaneous paraphernalia of the railhead, moved also onwards to the new front. And in the Nullarbor, they said, a man might go to sleep on the morning of such a trek, wake on the site of the new encampment, and never know, from his surroundings, that the location of his camp had been moved.

With railhead and construction camps totally dependent upon the line for daily existence, both Eastern and Western Divisions had necessarily to be progressively complete and self-contained. What bridging work had to be done—for the most part the negotiating of dry, though sometimes wide, dongas—could never be allowed to hold up through communication. At such places, by means of slight deviations, the rails were led down into the bed of these depressions. The concrete piers and bridge girders were constructed later, and the line subsequently pulled into permanent position. Nor could conventional methods be followed even at the great base depots at Port Augusta and Kalgoorlie, whence were distributed the hundreds of thousands of tons of rails and fishplates, and the millions of ties required for construction. For to Kalgoorlie the material was dragged over a

Form to Be Taken By New Railroad Financing

Recommended That a Bondholders' Committee Be Established While Company Is Solvent

THE REPORT OF COMMITTEE on railroad securities of the Investment Bankers' Association was divided into three parts, the first part dealing with the causes of the decline in railroad credit was published in a recent issue of the *Kansas City Gazette*. The second part of the report is given below.

As many of the mortgages formerly available for railroad financing are virtually exhausted in usefulness, or actually used, resort must be had to the issuance of new general refunding mortgages covering all of the property of the railroad, and so drawn as to provide means for financing requirements through the sale of bonds issued under these mortgages as long as the credit of the road warrants. One of the chief financial problems of the railroad companies and their bankers today is that of raising money through the sale of bonds issued under such mortgages. It is undoubtedly true that such bonds have not recently been popular with the investor. If any suggestion which we make should lead to the adoption of means by which these issues can be made more attractive, we feel that the financial position of the railroads will be immeasurably bettered.

We recommend that general refunding mortgages should provide that bonds issued thereunder be in series, in such form as may be determined by the board of directors, each series to have such special features in reference to date of maturity, rate of interest, place of payment, redemption, convertibility, sinking fund, registration and exchange as may be determined as necessary at the time of issue; that all series should be equally secured by the mortgage, and the rate of interest should be fixed at the time of issue of any series without any maximum limitation. There should be no fixed limit as to the amount of bonds which can be issued under a general refunding mortgage. The provision of the New York state savings bank law to the effect that the maturity of refunding bonds must extend beyond that of any bonds to be refunded appears to us unwise, and we believe steps should be taken to modify this provision to the end that failure to comply with it will not have the effect of eliminating the railroad bonds so issued as legal investments.

There is another provision of the New York state savings bank law that we think should also be repealed, namely: that which pertains to the limitation that the authorized amount of bonds to be issued under a refunding mortgage shall never exceed three times the outstanding stock. This provision in our opinion is unwise and if, as seems likely, stocks should in the future be issued without par value, it would lead to great confusion. We recommend that the only provision in the mortgage should be one similar to that in many public utility and industrial mortgages, providing that additional bonds may only be issued—either than for the refunding of underlying bonds, or the acquisition of securities—for a certain percentage of the cost of new construction, betterment, etc., and for a certain percentage of the cost of new equipment, but only provided that the net income for the preceding twelve months (after deducting taxes) exceeds one and a half (or two) times the total fixed charges, including rentals, hire of equipment and other prior charges and interest on the bonds to be issued.

The issuance of bonds for the acquisition of stocks or bonds to be deposited under the mortgage should be limited to a comparatively small proportion of the total bonds outstanding at any one time.

One of the weak features of railroad mortgages brought to light by recent experience is that the bondholders had no redress until they are in default under the mortgage and the property goes into the hands of a receiver. We do not believe it is practicable to attempt to remedy this weakness by giving the trustee more authority. Experience owing to the exigencies of the situation, the trustee has to bid competitively for the business without an opportunity to examine the indenture, therefore before making an offer, and the small payment it receives for its services does not warrant it in taking much responsibility.

To remedy this situation we suggest two suggestions which we believe are worthy of careful consideration. We do not here present them in detail, as we desire to have an impression of opinion only on the benefits recommended by these suggestions.

A Bondholders' Protective Committee

The first suggestion is that provision be made for the election by the bondholders of a permanent bondholders' committee, composed of men who are not officers of the railroad; this committee to have power to call meetings of the bondholders for the consideration of their interests whenever it sees fit to employ an expert who would or of course keep in touch with the property and whenever necessary call the attention of the committee to any evils which he considers should be remedied. A provision should be placed in the mortgage providing for annual meetings of the bondholders, at which meetings they would have the right to make changes in the permanent committee through an election; to consent to something not provided for in the mortgage, or to waive default and to delegate powers to the committee as their representative sufficient in scope to enable such committee to take any action that might in its judgment be calculated to preserve the interests of the bondholders.

The second suggestion is to split up the functions which the trust company is now supposed to perform, but in the course of which it generally avoids any action requiring the exercise of discretion and consequently fails to perform into two sets of powers. The first set of powers would be the real functions of the trustee, namely, taking notice of defaults and enforcing the right of bondholder, dealing with release of property and securities and substitution of securities, and calling the bondholders together in a meeting whenever a certain percentage of stipulated amount of the bonds is rendered necessary or desirable by reason of something out of the ordinary. The second set of powers would relate to the custody of securities and money and the collection of dividends. The first set of powers in the one which involve the exercise of discretion and a certain amount of interested supervision, and should be vested in substantially as trustee in the second set of powers involving no discretion, but simply mere attendance to the affairs of the company, and should be vested in a trust company or trustee, because the bondholders desire a responsible financial organization as the representative of such matters.

To carry out the permanent bondholders' committee of the additional trustee proposed to represent the bondholders during the time of receivership control. They might be allowed as all business among their number, subject to the right of the trustee to call a meeting when a meeting is called for that purpose. This organization would ex-

penses, and those of the expert would be determined as part of the original bargain of the railroad.

Trustees Are Not a Protective Committee

The present unsatisfactory situation is due to the fact that the trust companies are now supposed to exercise supervisory and discretionary power, although they are not compensated sufficiently to warrant them in taking any risk. Individuals who really represent the bondholders would exercise the kind of supervision and discretion that the bondholder considers that he has a right to expect from those whose special function would be that of guarding the integrity of his security.

In the event of either of these suggestions being adopted, it would seem desirable that mortgages should provide the machinery for calling meetings of bondholders and for the authorization or ratification of acts which the trustees recommend, by a vote of a stipulated proportion of the bonds, which vote shall be binding upon the minority. Most of the existing mortgages create difficulties by reason of the existence of provisions in them which stipulate that the unanimous consent of the bondholders is required for any departure from their strict terms, yet all of us know of things which it would have been very desirable to do, both in the interests of the railroad company and of the bondholders, and also know of foreclosures and expenses of reorganizations which might have been avoided if there had been any machinery by which a given proportion of the bonds could bind the minority in consenting to something not provided for in the mortgage, or in waiving some default.

No Equipment Trust Certificates

The committee on railroad securities, in its report to the fifth annual convention recommended that all equipment purchased or already owned should be placed under the general refunding mortgage, and that the present method of issuing serial bonds, payable in one to ten years, secured by equipment alone, be discontinued as rapidly as practicable. We heartily agree in this recommendation. In the event of a receivership it is always well for the bondholder to own the equipment as well as the track or line of road, otherwise he is in the position of a workman without tools.

Where general refunding bonds are issued for the purchase of new equipment, we recommend that carefully drawn restrictions or safeguards be placed in the mortgage. In connection with rolling stock and floating equipment pledged under the mortgage and owned by the railroad company at the date of the creation of the mortgage, the mortgage itself should specifically enumerate the total number and capacity of the locomotives, passenger-train cars, freight-train cars, floating and other equipment, and the net book value of the same (after deducting accrued depreciation and outstanding equipment trust obligations, if any) and the aggregate capacity of every class of equipment should always be maintained. Bonds reserved under the mortgage for the construction or acquisition by the railroad company of new rolling stock or floating equipment for use upon or in connection with any of its lines of railroads at any time subject to indenture, should not be issued for more than 90 per cent of the cash cost of such equipment, and no bonds should be issued in respect of equipment acquired subject to or through any equipment trust or other lien. The face amount of all bonds issued for new equipment, or cash paid for the acquisition of new equipment, should be added to the net book value of the equipment specified, as mentioned above, in the granting clause of the mortgage for the purpose of fixing the value of the equipment to be maintained by the railroad company or replaced when destroyed. The railroad company should be required, either annually or semi-annually, to furnish a report to the trustee showing the total number and capacity of each class of equipment, to-

gether with the net book value of all the equipment after deducting accrued depreciation, etc.

The previous committee on railroad securities recommended the issue under the general refunding mortgage of a special series of bonds to cover new equipment purchased, which series should be paid off serially in from one to twenty years. We have found strong objections to this issue on the part of the railroad managers, as they feel that such series would command a better price and would tend to make the sale of other series under the same mortgage difficult because of their longer maturity. Certain recent mortgages contain new provisions in regard to bonds reserved for the purchase of new equipment; we recommend that these provisions be embodied in all new general refunding mortgages, especially in view of the fact that the previous committee on railroad securities has gone on record that the railroads should make ample provision for adequate charges on account of the depreciation on equipment.

One of these provisions is that the company will maintain in good order, and when destroyed replace by other equipment of equal value, all equipment under the mortgage, and that in each case where bonds are issued against new equipment or additions and betterments to old equipment, the railroad shall pay to the trustee at or before the end of each year for a period of 25 years from and after the authorization or delivery of the bonds, a sum in cash equal to the difference, if any, between five per cent of the principal amount of bonds so issued and the actual amount which the company shall in such year have charged to operating expenses, to cover the depreciation of the equipment, for the purchase of which or for additions and betterments thereto the bonds have been issued; that is, if the railroad company should charge into operating expenses, say, three per cent of the cost of equipment or of betterments thereto in any one year against which bonds have been issued, the company must pay in cash to the trustee the difference between three per cent and five per cent, or two per cent, in that year, and so on for 25 years. All moneys received by the trustee under this covenant must be held by the trustee for improvements and betterments, acquisition of new equipment or the purchase of new securities, etc.

Railroads generally prefer to purchase equipment through equipment trusts, on account of the lower interest rates required. Another trouble is that underlying closed mortgages generally attach, by virtue of their "after-acquired-property" clauses, equipment purchased by bonds under refunding mortgages. A further trouble is that underlying mortgages which are not closed generally do not permit the issue of bonds for the purchase of equipment, although their "after-acquired-property" clauses automatically cover all equipment bought with bonds of junior issues. Only in comparatively recent general refunding mortgages are adequate provisions made for the issuance of bonds to buy equipment. Thus the situation is that on the one hand the railroad cannot buy equipment with the underlying bonds which command the best price, but must use a junior bond commanding an inferior price, and on the other hand the junior mortgage, which buys the equipment, cannot get an exclusive purchase money lien upon it. Therefore, if it is impossible to persuade the railroad companies to purchase equipment through the issue of general refunding mortgages containing such adequate provisions as have been recited above, and they insist upon issuing equipment trust obligations, there should be a provision in the general refunding mortgage that no bonds shall be issued on account of equipment acquired subject to any equipment trust. In this way, as the equipment trust obligations mature, the equipment comes under the general refunding mortgage or some prior mortgage.

There is no question on which there is a greater difference of opinion than the desirability of sinking funds in railroad bond mortgages, and while the conditions under which such mortgages are issued vary greatly, there is no doubt that the general principle of amortization of debts is a sound one, and today is more popular than ever among investors. The Interstate Commerce Commission requires the railroads to include in their operating expenses an annual charge for depreciation of equipment, but does not specify what its application is proper nor does it require the railroads to depreciate any other class of property. Only a few of the straight roads depreciate any class of property other than equipment, and many of them charge off ridiculously low rates of depreciation, even on equipment.

Sinking Funds

There are some classes of railroad property, such as passenger terminal stations, subject to continuous depreciation which cannot be taken care of even by the full physical maintenance of the property. This depreciation is due chiefly to the normal growth of traffic, which, sooner or later, results in almost any terminal, however well designed, becoming inadequate and obsolete. Even though the building remains in as good physical condition as when constructed, its usefulness disappears, and by the time this occurs the debt issued to provide the cost of the property should be retired, except in so far as the value of the unimproved real estate is concerned. This same criticism applies to a certain extent to bridges, and also to branches or lines serving mines or other industries, the traffic from which is not permanent. Bonds issued against property of this nature should be protected by an adequate sinking fund provision sufficient to retire the bonds during the estimated life of the property or industry.

A large number of long-term railroad bonds are secured to some extent by lien on railroad equipment. The usual provisions for replacement and repair are not adequate to preserve the security, as it is not reasonable to suppose that equipment purchased today will be adequate to perform the service which will be required twenty years later, even though such equipment has been maintained at 100 per cent of its original condition. Railroad property of this kind becomes obsolete, and when this occurs its use by the road becomes wasteful. Bonds issued for the purchase of such property should be completely retired during the probable usefulness of such property.

Good management, proper maintenance and adequate depreciation charged to operating expenses unfortunately cannot always be relied upon. It is therefore necessary to adopt some method of safe-guarding bond issues—by which is meant providing annually out of income for their payment, in whole or in large part, at maturity. This is probably best accomplished by creating a small annual sinking fund. An annual payment of one-half of 1 per cent of the amount of bonds outstanding, compounded annually at 4 per cent, will provide for the entire issue in about 57 years and, if compounded at 5 per cent, in about 50 years. Such an annual payment is so small as to be almost negligible.

Strong objection is made to sinking funds on bonds secured by a mortgage on main track, exclusive of equipment or terminals. This objection, which is based on the necessity of the maintenance of such property and its freedom to a large extent from obsolescence, is valid and could not be answered were it not for certain other factors which are not always considered. In the first place, property of this character is not always maintained as it should be; therefore, sinking funds on bonds issued seem to be the only sure way of providing against a gradual deterioration of the property. We admit that this applies only to a limited percentage of railroad properties, but the fact remains that

investors have lost large sums of money through such inadequate maintenance. In most cases, if the charge for money that would have been spent on maintenance of the property had been applied to dividend payments. A forced sinking fund, while not ensuring the maintenance of the property at full value at later periods, certainly provides a cushion and acts as a deterrent against the payment of dividends at the expense of the property.

One of the objections raised against the sinking fund by the railroads is that they are retaining funds out of earnings through the operation of sinking funds, even at the same time they are having other lands probably secured on some mortgage at a lower price for necessary additional capital. In this connection it has been suggested that the idea of a sinking fund might be varied by having it applied to the making of improvements instead of the retirement of bonds.

This method would probably be more advantageous from the standpoint of the railroad, and, if properly carried out would maintain the equity behind the bonds. It would, however, result in losing one of the points in favor of sinking funds which is not sufficiently considered by the railroads; namely, the favorable effect on the market price of bonds on account of purchases for the sinking fund. It not only inures to the benefit of the bondholder, but enables the railroad to obtain better prices for subsequent issues.

Preventable Waste of Coal*

By David Moffat Myers

AS A MEANS of far-reaching economy the Government of the United States should at this time apply intelligent and direct acting efforts to the conservation of fuel at the industrial plants which are responsible for its greatest consumption. Coal is wasted in vast quantities in the boiler furnaces of our plants, to feed which it is mined and distributed at a high and ever-increasing cost of labor and material.

The mining and distribution of the coal have been placed under the supervision of the War Coal Board in order more nearly to meet the crying needs in these directions, to use the railroad facilities more efficiently so that the present car shortage may be minimized to the greatest possible extent and to apportion the coal in quantity and to uses deemed most expedient. While this organized effort to bring about efficiency in the production and distribution of coal is being made, no parallel measures have been adopted to bring about a normal and practicable efficiency in its use. The hundreds of large plants which are consuming fuel wastefully, in many cases more wastefully and carelessly than ever before, are directly and needlessly causing a large fraction of the existing car shortage. They are overloading the already strained capacity of the railroads; they are rendering slower and more difficult the transportation of food and other vital commodities, and in short they are simply counteracting the measures of efficiency in production and distribution which have elsewhere been established.

Preventable Waste of Fuel

The preventable waste of fuel in the boiler furnace of one steel mill which I investigated amounted to 4,000 tons per year which at \$5 a ton would cost \$20,000. This was a comparatively modern plant. The efficiency of boilers and furnaces in a 14 day test was 55 per cent. The load factor was unusually favorable to high efficiency and could readily be raised to 70 per cent or over. This is only one example and there are many more extreme cases. In one

*Published by the War Coal Board, U. S. War Department, Office of the American Supply, 1000 Pennsylvania Avenue, Washington, D. C.

hand-fired plant the evaporation was raised from 6 to 9 lb. in a few days of instruction and continuously kept close to this higher mark with the help of coal and water measurements which were inaugurated. The saving was due exclusively to instruction and consequent better operation.

The saving or wasting of one-fourth of the coal consumption of any industrial plant, depends entirely upon the efficiency of its operating management. Let me emphasize that this fraction of the consumption relates exclusively to the boiler plants, i.e., the production of steam; and does not include the large economies possible in connection with its distribution and use.

Under present conditions a plant which carelessly operates at an efficiency of 40 to 50 per cent, receives from the government the same consideration in the delivery of coal as the one whose efficiency is 70 to 75 per cent. This obviously is unfair and wasteful. The government hands over, say, 200,000 tons of coal a year to a plant owner, but asks for no accounting as regards its consumption, nor any questions as to the amount of steam it is made to produce. There is nevertheless an equivalent amount of steam this fuel is capable of generating and it can and should be made to produce that quantity.

There is no doubt that very important economies in the use of food have already been effected by the educational campaign with which we are familiar. These economies are largely the result of educating the ultimate consumer. The requisite propaganda spreads practical information concerning the efficient use of foods and their respective values and methods of preparation in such simple and convincing manner as to be understood and practiced by the women all over the United States. It places this information where it will be applied.

Conservation Methods

In general, there are, I think, two plans of operation worthy at least of consideration. The one might be termed the autocratic method. This would involve the use of authority to compel coal consumers to execute such measures of economy as the proper authorities might prescribe for any given case, limits to be set as to expense to the user. Such limits might be in terms of a percentage of his present yearly coal bill. Alterations should be directed chiefly, as previously implied, to purely operating improvements. Many objections would probably be made by consumers against this plan, but once in effect the majority would no doubt realize its pecuniary advantage to themselves. But its tendency may be too strongly opposed to democratic principles.

The other plan would be largely an educational one, in which patriotism and efficiency would furnish the motive forces required. The teaching must be accomplished with the utmost simplicity and directness. Above all, it must be in such form as to be readily comprehended and applied.

The United States Bureau of Mines has for a number of years engaged in obtaining and disseminating scientific information regarding the mining and consumption of coal, and the results of the work have been of great value to technical engineers who are able to use and apply it. It is evident that we now require an extension of the idea of education, but in such form as directly to affect the men who run the boiler plants of our country, for in their hands is the saving or wasting of one-fourth of the fuel which they consume.

Save One Million Tons of Coal

Six hundred million tons of coal were mined in the United States in 1916. It is predicted that 700,000,000 tons will be mined in 1917, and the production in 1918 will likely be still greater. Of this quantity approximately 67 per cent, or 469,000,000 tons, will be burned for steam-making purposes on land, assuming the same percentage consumption

for the steam production as existed in the year 1915.

The saving or wasting of one-quarter of this coal, that is, over 117,000,000 tons, depends upon the efficiency with which we operate our boiler furnaces. If we actually saved by proper methods only 50,000,000 tons per year, this economy would result in freeing for other important service the use of 1,000,000 fifty-ton freight cars during the year. The significance of such an economy may be realized when it is stated that the number of cars thus released for other service would be equivalent to 15 per cent more than the combined yearly coal-carrying capacity* of the Baltimore & Ohio and Southern Railway systems; approximately equal to that of the Pennsylvania Railroad system on lines east of Pittsburgh, or 1 2/3 times the number of coal cars hauled by the Norfolk & Western. The direct saving to our industries would be \$250,000,000 worth of coal per year, if figured at \$5 per ton.

This saving would be 10.65 per cent of the coal now burned for steam production. It is impossible to state the present average efficiency of boilers and furnaces, but I have personally spent sixteen years of concentrated study in the investigation and improvement of steam and fuel conditions in factory power plants, and I have never visited a plant of this class where a saving in coal of at least 10 to 12 per cent could not easily be made. The poorer the conditions found the easier it is to make an attractive saving in fuel.

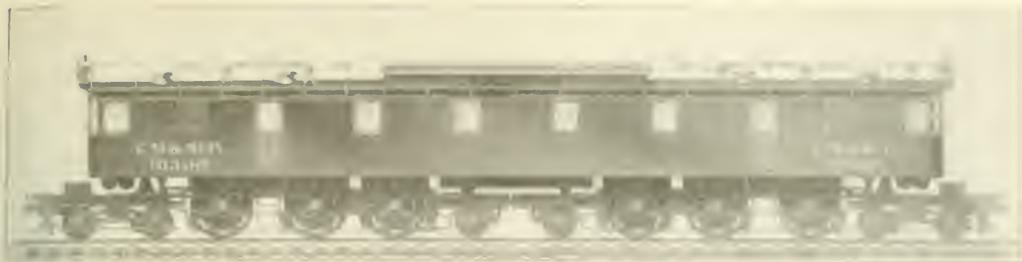
If we do not limit our field of action to coal used merely for steam generation, but extend it to include a consideration of the economy with which the steam itself is utilized and applied, there is no doubt in my mind that the above-predicted saving could be doubled, so that we might save 2,000,000 fifty-ton carloads of coal per year. There is, for instance, widespread ignorance to a surprising degree in regard to the value of exhaust steam in heating and process work. No account has thus far been taken of other primary uses of coal such as coke production, which consumes about 14 per cent of the output of our mines, and coal-gas manufacture, domestic purposes and miscellaneous. Additional economies could undoubtedly be effected in these applications.

Our steam plants are under the immediate management of chief operating engineers. The examination requirements for licenses in this profession call for practically no knowledge of steam and fuel economics. These examinations deal chiefly with matters of safety, repair and maintenance of equipment and neglect almost entirely the subject of coal economy. This is a very serious defect in our present system and is directly responsible for a large preventable waste of fuel.

The mining and distribution of our coal supply, the regulation of prices and the adjustment of financial and labor problems have already been placed under official administrative attention. But no parallel measures have been adopted looking toward reduction of waste in connection with the utilization of this coal. The work involved in a general program such as I have very briefly suggested will undoubtedly be undertaken. Its success or failure will depend chiefly upon the kind of men who may be selected for its planning and execution.

INCREASED OPERATING COSTS IN NEW SOUTH WALES.—During the year ended June 30 last, the awards of wage boards on the New South Wales Railways led to an additional outlay of £297,536 (\$1,446,125), while the higher price of fuel cost an additional sum of £57,534 (\$279,615), and of materials other than coal £89,388 (\$434,426). The transportation of troops and of military stores at reduced rates, and the transfer of starving cattle cost £104,647 (\$508,584).

*Based on statistics for the year 1916.



Family Group Electric Locomotive (Model 1) Locomotive, Chicago, Milwaukee & St. Paul

Most Powerful Electric Passenger Locomotives

New Power of 112,000 lb. Tractive Effort and 3,200 H.P.
for the Chicago, Milwaukee & St. Paul

THE CONTINUATION of the Chicago, Milwaukee & St. Paul's electrification program to the Cascade Range includes the electrification of a new section from Othello, Washington, east of the mountains to Seattle and Tacoma.

With this completed there will be 611 miles of transcontinental electrified railroad in operation. The original 440 miles of electrification will eventually have all the passenger trains hauled by Baldwin-Westinghouse electric locomotives. These locomotives embody many novel features.

The complete locomotive with a total length over couplings of 90 ft. weigh, ready for service, 266 tons, and has an adhesive weight of 550,000 lb. These new locomotives will be single-cab units, although the horsepower capacity is much greater than for any double-cab electric locomotive now in service. There are two main running gears, each having a four-wheel guiding truck, three driving axles with a 16-ft. 9-in. rigid wheel base, and a two-wheel trailing truck. It thus corresponds to two Pacific type running gears coupled with a link and having two-wheel trucks on the adjacent ends.

The cab is supported on center pins located midway between the first and second driving axles of each running gear. On one running gear the center pin is designed to restrain the cab both longitudinally and laterally, while on the other running gear the center pin restrains the cab only laterally, permitting free longitudinal movement. This arrangement of riding and floating pins relieves the cab of all pulling and buffing strains due to train load, as these strains are taken directly through the running gear side frames and bumpers. The driving wheels are 68 in. in diameter, and carry 55,000 lb. per axle. Guiding trucks have 56 in. wheels. The two-wheel trucks each have a load of 38,500 lb. at the rail, with approximately 62,000 lb. distributed on each of the four-wheel trucks.

On any single driving wheel, the non-spring supported weight is that of wheels, axles and driving boxes only.

With the flexible type of quill drive used the motors are located well above the railhead and the axle with its wheels is free to follow the rail independently. This drive secures all the advantages of a flexible gear in cushioning the torque and avoids the shock to the rail that is obtained with the common flexible gear construction and mounting.

Each main running gear has three-point equalization with a single point toward the end of the locomotive, in accordance with accepted steam locomotive practice. The four-wheel guiding truck center pin and cross-equalized leading pair of driving wheels are equalized together on the longitudinal center line of the locomotive. This arrangement

combines all the advantages of the standard construction of the American and Consolidation type of steam locomotives. The two remaining pair of driving wheels and the two trailing wheels of the main running gear are equalized in accordance with accepted steam locomotive practice.

The center of gravity of the main running gear including motors, is 41 in. above the rail, and the height of the center of gravity of the complete locomotive is 67 1/2 in. above the rail.

Among the novel features which will be found on these locomotives are: Large capacity in single-cab unit, flexibility of running speeds with small rheostatic losses, turn motor design with quill drive; low-voltage auxiliary simplifying inspection, maintenance and operation; simple and effective regeneration; improved equalization to minimize weight transfer in trucks, and auxiliary train-heating plant.

Capacity.—These will be the most powerful locomotives running in passenger service. A single unit is able to haul a 950-ton train (12 coaches) over the entire mountain section at the same speeds as called for by the present schedules. The one-hour rating for one of these locomotives is 3,000 hp. and its continuous rating is 2,500 hp. with a starting tractive effort of 112,000 lb. The normal speed on level track is 60 m.p.h.; on a 2 per cent grade about 35 m.p.h.

Flexibility.—One of the noteworthy characteristics of these units, which is very desirable in passenger service, but which has not heretofore been attained with this type of electric locomotive, except at the expense of heavy rheostatic losses, is the flexibility of running speeds. There are nine running positions without rheostatic loss. This is accomplished by the use of six 1,500 volt turn motors on the locomotive, arranged for three speed combinations as follows:

Position No. 1. 1 set 6 motors in series.

Position No. 2. 2 sets 3 motors in series.

Position No. 3. 3 sets 2 motors in series.

During the change from one speed combination to another, tractive effort is maintained.

Two additional running speeds are obtained by single speed combination by means of inductive reactance between motor fields, which is used in cutting down current (and) as well as saving rheostatic losses, and enabling the power obtained over the varying profile to be kept near constant. The speed range is from 8 to 36 m.p.h., dependent on the load.

Motor Motor.—The use of 100 inch diameter diameter quill drive motor permits the most effective use of the space between the driving wheels, but enables the use of two structures built around for 750 volt direct current and geared to

the same quill. This also makes possible the advantage of better commutating characteristics inherent in the lower voltage motors.

Auxiliaries.—Low voltage auxiliaries considerably reduce the complication and hazard of high voltage on these locomotives. The only high voltage apparatus among the auxiliaries is the motor of the small motor-generator which is used for train lighting and charging the storage battery. The resultant simplification secured by the use of low voltage appliances decreases the complication of installation, maintenance and operation. Ordinary inspection can be carried on, including the functioning of switches and auxiliaries, with the complete absence of 3,000-volt power on the locomotive.

Regeneration.—The type of regenerative control for holding trains on descending grades used in these locomotives is of particular interest. Special arrangements have been perfected to secure positive operation of this feature over widely varying speeds. The same main motor combinations for "motoring" are used for "regenerating" except that the fields of the main motors are separately excited over a wide range by axle-driven generators. These are so connected with balancing resistance that inherent stability in the motor characteristics during regeneration is assured, irrespective of whether the changes in line voltage are sudden or gradual.

While the regenerative braking of trains lessens the duty on the air-brake equipment, further safety in braking with electric locomotives is introduced with the axle-driven generators. These machines are mounted on the pony trucks of the locomotive, and in addition to exciting the motors during regeneration, furnish the power for operating the air compressors and blower motors when the locomotive is hauling. This method insures a current supply to the air compressor motors irrespective of the overhead trolley supply, and provides that compressed air will always be available for use of the air brakes.

Weight Transfer.—In electric locomotives without connected wheels, weight transfer due to tractive effort, is an important point of interest. This is caused by the drawbar pull being exerted at the coupler height, which with the reaction at the rail, tends to lift the leading end and depress the trailing end. This changes the weight distribution and increases the tendency of the wheels to slip. The method of equalization described above reduces the weight variation on the driving wheels to only 6 per cent from normal when pulling at 30 per cent adhesion.

Train Heating.—The question of passenger train heating is of vital importance due to extreme weather conditions encountered in that section of the country. Heat must be assured under all conditions of failure of equipment, and delays of trains. The heating plant, therefore, must be entirely independent of the electrification. Each locomotive is equipped with an oil fired steam boiler, designed to burn ordinary fuel oil used by the railway company. Provision is made for a storage of 7,500 gal. of water and 750 gal. of oil in each engine.

The careful attention given to improve the details of design and operation insures that these new locomotives will mark an epoch in the development of the electric locomotive for steam railroad passenger service.

SELECTED ROUTES FOR BRITISH FREIGHT.—The Railway Executive Committee of England has given notice that on and after December 1, 1917, traffic for conveyance by freight train between England and Scotland, and Wales and Scotland, will only be accepted and conveyed by selected railway routes. Information as to the route by which traffic for places served by more than one railway should be forwarded, can be had an application to the railway companies' agents.

Store-Door Delivery

Proposed in New York

THE DIRECTORS of the Merchants' Association of New York City have published a plan, prepared by J. C. Lincoln, manager of the association's traffic bureau, providing for store-door delivery of freight in New York City, combined with pick-up service; and the plan has been referred to the committee of commissioners who are investigating traffic conditions in New York City—Messrs. J. S. Harlan, of the Interstate Commerce Commission; T. H. Whitney, of the New York State Public Service Commission, and W. E. Donges, of the Public Utilities Commission of New Jersey. This committee has it now under consideration and is expected soon to recommend it to Mr. McAdoo. The plan involves some radical changes which, in ordinary times, could not be carried out without new legislation; and therefore the Merchants' Association seeks the approval not only of this committee, but also of the director-general of railroads. In the absence of legislation the plenary powers of the director-general would be needed to set the scheme in operation.

The report opens with a brief description of the extreme and unusual conditions in New York, especially on Manhattan Island; very inadequate team tracks and consequently large quantities of carload freight to be moved through the freight stations on the piers, and the enormous volume of business of all kinds, resulting in blockades of trucks loaded with outgoing freight very frequently even in normal times. Consignees, as a rule, call for freight only after they have received notice of arrival, and for the great bulk of the merchandise received in the city, this means a delay of at least 24 hours.

Store-door delivery—the trucking of freight away from stations as soon as practicable after its arrival, instead of awaiting the decisions of hundreds or thousands of consignees—is, of course, the ideal arrangement. The present report considers the question of getting each railroad to form a trucking company, and also another proposal that all of the roads should combine to form a company; but recommends, finally, the pooling of present equipment, which is owned by several hundred concerns.

With facilities consolidated the trucking company could have lined up on the pier batteries of trucks serving particular zones in the early hours of the morning and the delivery of freight would begin with the opening of business hours. The same method could be continued during the day. The pier station would thereby be kept free of incoming freight and more adequate facilities would be provided for out-bound business. By this method deliveries would be made before the consignee, under present methods, receives notice of arrival.

Continuing, the report says:

"The same trucks should also be employed in picking up freight for outbound shipments. By proper co-operation on the part of shippers, a more even delivery of freight to the pier stations throughout the day could be accomplished and the frightful line-up and delays to trucks which take place in the late afternoon would be avoided. Trucks would be substantially assured of full loading in one direction and probably in both.

"At first the agreement, as a regulation, to be confined to the handling of less than carload merchandise.

"Carload receivers usually maintain their own trucks or have an arrangement with a trucking company to do their hauling; carload consignments could be kept intact and assigned a space on the pier floor where it would be accessible to the consignee. With the removal of the large number of trucks now handling less than carload freight from the

pier, the carload receiver could remove his freight more expeditiously.

The following regulations would have to be prescribed and made enforceable:

No trucks for the handling of less than carload merchandise other than the trucks of the company formed for the purpose of effecting store-door delivery to be allowed on the pier.

Tender of the property to the consignee at his store door or usual place for the receipt of his property to be a legal tender of such freight, and upon such tender the consignee to pay freight and cartage charges before delivery. (Unless by prior arrangement he shall have arranged for credit.)

If the property is refused by the consignee or payment is refused, then such freight may be placed in public warehouse.

When delivery of merchandise is desired by consignee at other than his usual place of business, instructions shall be placed with the cartage company prior to the arrival of the goods.

Schedules of reasonable cartage charges to be prescribed, which charges shall be strictly adhered to.

Arrangements should also be made for the arrangement of reasonable and non-discriminatory storage and handling charges for merchandise placed in public storage.

Method of Procedure

In order to relieve congestion at stations and to delay to trucks the carrier should be required to make delivery of the property transported, subject to a reasonable charge for the additional service rendered. (The duty of the carrier being recognized the authority of the district general on the premises should be unimpaired.)

The trucking service to be accomplished under government authority and direction trucking companies and operations to be permitted to pool their equipment, so as to operate as one company for the handling of freight to and from railroad piers and stations. The city to be divided by zones as to piers and places of business to be served—and trucking equipment to be so regulated as to serve these particular zones. The trucking company to have priority rights on the pier.

Where consignee desires to perform trucking, such truck to be permitted on the pier in such restricted hours as will not interfere with the operation of the general plan. * * *

Wood Preserver's Association Studies War Conditions

The Shortages of Material and Labor Important Topics at the Fourteenth Annual Convention

THE CONVENTION of the American Wood Preservers' Association was held at the Hotel Sherman, Chicago, on January 22 to 24, inclusive. Although some doubt was expressed regarding the attendance previous to the meeting, the number present compared favorably with that of previous years. Approximately 75 members were in the hall at the opening session on Thursday morning.

The officers of this association for the past year were: John Foley, president, forester Pennsylvania Railroad, Philadelphia, Pa.; M. K. Trumbull, first vice-president, vice-president National Lumber and Creosoting Company, Kansas City, Mo.; J. B. Card, second vice-president, president Central Creosoting Co., Chicago, and F. J. Angier, secretary-treasurer, superintendent timber preservation, Baltimore & Ohio, Baltimore, Md.

The convention was called to order by President Foley at 10 o'clock on Tuesday morning, and was opened with prayer by J. H. Waterman, a past president. The report of the secretary-treasurer showed a balance of \$149.77 in the treasury. The membership on December 31, 1917, was 291, including 75 members from 36 railways. Fifteen members were reported in the military or naval service of the United States government.

In his opening address President Foley referred to the unusual problems of the past year arising from shortages in oil, fuel, labor and lumber which are requiring extensive readjustment in the wood preserving industry. He referred to the recognition of this condition in the program for the meeting and urged the members to participate in the discussion of these problems in order that the wood preserving industry might do its full part in helping our government to win the war. He described the great inroads which are now being made on European forests, particularly those of the belligerent nations and referred to the large contribution which this country has made to the lumber demands of its allies. Owing to the depletion of the forests of Europe, the United States, Canada and Russia will be called upon to

supply the timber needs of the world. President Foley also referred to the fact that 5,000 American foresters and lumbermen are already in France and emphasized the effect which this will have on the conservation of American timber resources after the war when these men return from Europe.

The War's Effect on Labor Supply

E. T. Howson, engineering editor of the *Railway Age* spoke of the effect of the war on the labor supply. Although the labor problem is universal at the present time, no definite statistics are available showing the extent of the shortage of men. Such data as are available however, indicate that the shortage is indeed serious. The causes of the situation are the increase in the demand for labor and the decrease in the available supply. The army draft increased the number of men who had already been withdrawn from industries through voluntary enlistments and the rapid growth of war industries also proved a heavy drain on the labor supply. On the other hand, the flow of alien labor into the country through immigration has almost ceased. Whereas in the 10 years previous to the war an average of 1,012,000 men available as unskilled laborers migrated from other lands to the United States every year, now hardly 250,000 enter the country annually and this number is nearly equalled by the exodus of alien reservists to fight in the armies of Europe. The two largest classes of immigrants are unskilled laborers and agricultural workers. Of the former class, 90,000 entered the country last year and 191,000 left.

Considerable attention has been directed to the Mexican labor supply, particularly in the Southwest. It is significant however, that 80% of the supply is unskilled and in a year have more than 20,000 Mexican men migrated to this country and more the passage of the alien labor law on May 1, 1917, almost a negligible number have entered. The only other source of labor is Asiatic and although thousands upon thousands of Oriental workers have passed through Canada to short cuts to France to take over the unskilled

labor of that country, the United States Department of Labor has consistently opposed letting down the bars to permit the influx of that class of labor into this country, and not a single bill has so far been introduced into Congress to that end. The Department of Labor has, however, arranged to import 110,000 Porto Ricans for employment in this country. The big problem in this connection is to secure boats to transport these laborers. Up to date, bottoms have been supplied for about 50,000, who will be placed in the South, where climatic conditions are similar to those in their native land.

The Department of Labor has recently been given wide powers, among which is the authority to give certain industries, considered most essential to the prosecution of the war, priority in bidding for labor. Under present conditions some companies making large profits have not only outbid others for labor, but have followed the policy of keeping a surplus of labor on hand to provide for maximum needs, with the result that, from the standpoint of the country at large, there has been a considerable waste of man power. The Department also operates 100 labor agencies throughout the country which co-operate closely with 134 state agencies and give particular attention to the prevention of unnecessary movements of labor from place to place, and particularly, the transportation of men for long distances.

The employment of women is not a solution of the labor problem from the standpoint of the wood preserver, except in so far as they can be used in office work. Much more can be done, however, in utilizing the service of boys for light labor.

A remaining remedy for the labor situation is the further use of labor-saving equipment. Considerable success has been experienced in the use of locomotive cranes for the handling of ties. The further development of other labor-saving devices in this field is highly desirable at the present time.

Not only is it difficult to secure laborers at the present time, but it is hard to keep them. Commercial timber men have been able to bid higher than railroads for labor with the result that there has been a demoralization of the market. The degree in which the keen competition for labor has raised the standard wage of unskilled workers is indicated by the fact that in the recent storm in Chicago one or two railroads were forced to pay as much as \$1 an hour to snow shovelers.

There is one way of keeping labor without further increasing wages and that is further attention to the comforts of the men. Comfortable quarters, sanitation and good food at labor camps are strong inducements for the men to stick to their jobs. In considering the labor problem it should be remembered that the present labor shortage may continue indefinitely after the war and that improvements introduced now may justify themselves as permanent qualities.

Discussion

C. M. Taylor (P. & R.) discussed the possibilities of the Hilke tie stacker, stating that lack of capital had hindered the development of this stacker. The Delaware, Lackawanna & Western, he said, had one of these machines in its yards which had not been perfected sufficiently to do satisfactory work. With reference to the labor situation, Mr. Taylor stated that the speaker had omitted mention of one source of supply, namely, the Portuguese, Spanish and Finnish sailors who spend considerable time at our ports waiting for their ships to sail. He said his labor was largely made up of these transient aliens. With reference to the negro supply of labor, he stated that the importation of blacks to the North should be discouraged as opposed to the economic and social welfare of that section of the country.

J. H. Waterman (C. B. & Q.) disagreed with Mr. Taylor's views on negro labor, asserting that under present conditions

any one who could handle a tie was in demand and that the South should not have a monopoly on the negro supply of labor. On the subject of labor-saving devices, he said that while locomotive cranes were invaluable in a tie yard and he found them capable of loading from eight to nine stock cars a day through the side door, the price of cranes had risen from about \$8,000 to \$20,000 since the beginning of the war. In other words, both the cost of labor and machinery is high.

William A. Fisher (Michigan Wood Preserving Co.) described the operation of a monorail crane used by his company which is capable of handling a trainload of ties every two or three minutes. George E. Rex (A. T. & S. F.) said that he was using five cranes at the present time and wished he had five more. Cranes, he said, cut the cost of handling ties in two; in fact, without them he would not be operating today. A. L. Kuehn (American Creosoting Company) stated that his company had found that the cost of handling black ties could not be reduced materially by the use of locomotive cranes. Ties are received by his firm in closed top equipment, necessitating the use of practically the same number of men to move the ties from the interior of the car to the door and to arrange them in piles in the yards, as when cranes are not used. The only advantage of the crane rests in doing the heavy lifting work, thereby enabling the company to make use of a somewhat lower class of labor than when all the heavy work must be done by the men.

A. R. Joyce (Joyce-Watkins Company) related experiences of his company on tie operations where organizers from outside unionized the laborers with the result that the companies were compelled to recognize the union and raise wages. While he felt that the raise in pay was entirely justifiable the unions had produced unfavorable results in other ways. There was evidence of indolence and carelessness on the part of the men resulting in an increase in the number of accidents. President Foley called attention to the urgent need of the nationalization of any foreign workmen employed. He outlined the efforts made to teach new men the principles and ideals of our government, which led to the suggestion by M. K. Trumbull (National Lumber and Creosoting Company) that material assistance could be obtained by those concerned with this problem through co-operation with the American Committee on Nationalization, New York.

Bonus systems as a means of holding men were also discussed, especially the tendency for the men to leave as soon as the bonus was paid. Mr. Howson suggested that this could be overcome by paying the men a small increase in rates after a certain period rather than a lump sum bonus.

Conditions in the Tie Market

A general review of the tie situation was presented by M. T. Shanesey, general tie inspector, New York Central. He was followed by P. R. Walsh (Walsh-Griffith Tie and Timber Company), who gave an account of the conditions imposed upon the tie producer under the current shortage of labor and the high prices of all materials used. The shortage of ties is increased through a demand for lumber of small sizes for which tie timber is entirely suitable. As a consequence the portable saw mills are now being used largely in the production of this lumber.

W. H. Clifton (B. & O.) said that there were not enough ties in the east to meet the requirements and that he was now compelled to cover a much wider area in order to secure the necessary ties. F. S. Pooler (C. M. & St. P.) said that the railroads could help the tie situation materially by reducing their requirements and cited his own road which had reduced the tie renewals for 1917 by 450,000 from the estimates originally made. A. R. Joyce (Joyce-Watkins Company) said that the tie production in upper Michigan, Wisconsin and Minnesota, was less than 50 per cent of

norous and that practically all of the ties produced in this region are now being consumed by the railroad passing through it and as a result roads outside of the territory cannot get them.

Fire Insurance at Creosoting Plants

J. G. Harbottle, manager, National Inspection Company, gave an excellent talk on the measures which can be taken to prevent fires. Carefulness and thoroughness are especially emphasized. Aids must be kept free from all rubbish, chips, etc. The lumber must be kept well piled and, where hot it is to be used, from the standpoint of seasoning, should be piled solid.

Attention was directed to the fact that creosote was highly inflammable when heated and that the same was true of creosoted wood under a like condition. For this reason it is paramount to prevent accumulations of the oil on the floor around machinery, etc., and also to provide thorough ventilation to prevent accumulation of volatile gases. The boiler room requires special treatment. Sufficient head room must be provided over the tops of the boilers and special care is required where refuse is burned. The stacks should be screened and enough space be kept clear in front of the fire doors to do away with any danger of fires from that source. Machinery and shaft bearings must be kept clean. Many fires have been caused by the ignition of refuse in contact with heated bearings. Where artificial heat is necessary steam heat is far superior to any other from the standpoint of the fire risk, but even with steam heat precautions are necessary. Refuse must be kept away from the steam pipes and the racks on which the pipes are placed should be made of iron and not wood.

The last part of the talk was devoted to apparatus for fighting fires, including the water works system, pipes, hydrants, hose, etc. In the case of a creosoting plant a pile of sand should be kept convenient to the operating buildings for fighting oil fires.

In the discussion of this paper J. H. Waterman (C. B. & Q.) described the measures taken at the Burlington plant at Galesburg, Ill., to decrease the fire hazard and where, with the existing conditions the insurance company fixed a rate of \$1.18, after the improvements and rearrangements had been made, a rate of 50 cents was obtained. Dr. Hermann Von Schrenk (consulting timber engineer) called attention to the important bearing of the moral hazard, stating as his opinion that carelessness, indifference and ignorance had far more to do with fires at creosoting plants than the materials.

The Creosote Situation

R. L. Ess (Larrett Company) gave a short talk on the available supply of creosote. Insofar as the domestic supply is concerned the chief difficulty at the present time is that the coal shortage has resulted in the extensive use of coke-oven tar as a fuel, it being estimated that 1,250,000 bbl. per annum are being consumed at the present time in connection with steel manufacture, so that refiners are unable to obtain an adequate supply. Three or four years ago it was the custom of these companies with the coal tar products industry that the great volume of the supply of this material would be a serious problem to the producer and manufacturer because of the difficulty of securing an adequate market. The present conditions present an absolute reverse of this situation. The shortage is acute, as a forecast it was believed that the production of creosote for 1918 would be less than 1917.

F. E. Fulk (American Tar Products Company) confirmed Mr. Ess's statement in that the best to be expected was a production in 1918 practically equalling that of 1917

with the difference that with the beginning of this year a surplus of 12,000,000 to 15,000,000 gal. of creosote was in stock whereas there is no such surplus at the present time.

G. A. Fensholt (Fensholt, Van Heppert, Company) gave the preliminary concerning the supply of creosote treated wood from the wood prepared by the British government as the requirement of this material, and for a wood being used for a pile in England from the construction of the new air navy under way. Fensholt said that the use of this with a large supply of creosote should be systematic, from England and other countries will be an important question, since the supply of shipping stocks will be increased.

Cause and Prevention of Failures in Creosoted Wood Block Factory Floors

By L. T. Jackson,

Contracting Engineer, The Jackson-White Company, Chicago.

This paper touched on the points with which these floors have been used in all manner of construction, but stated that occasional failures are encountered and that the problem confronting this industry at the present time is to study these occasional failures with a view to a discontinuation of the practices which are found to cause them. The principal problem arises from the need of providing for both expansion and contraction, the former causing a floor to buckle and the latter to make it rough and uneven in finish. Absolute expansion joints are required around the edges of the floor and also between the individual blocks through the use of fillers. Special attention was called to the necessity for differentiation in the treatment of blocks in forming them on the job and in laying the floor, to prevent adaptation for the great difference in the behavior of blocks laid in dry surroundings and those situated in wet or humid conditions.

Air seasoned lumber, stove insulation and a wooden filler were named as the primary reasons for success in any case. For the foundation, reference to the last and the practice of providing a level or uniform surface was recommended as doing away with the possibility for the usual cushion which serves no other purpose than to provide a level surface for the laying of the blocks. A minimum job is required to take up variations. The most difficult job of all is the placing of the filler. Good workmanship and adequate supervision are necessary. Correct results are to be secured.

Discussion

Walter Biddle (Larrett Company) suggested still further measures to be taken between creosote wood block floors subjected to excessive loads or impact and that the blocks to be used in dry locations need be treated entirely different from those which will be placed in wetting or high humidity areas. See p. 144.

Other Reports

D. Van S. Jenks (chief engineer on the subject of the use of the supply of lumber of various sizes) discussed the use of spruce for the construction of piles in this country, and refers to an experience made. The construction of the cross-sections of the building, masonry and shipping of lumber at great economical cost and with this more interested in a considerable amount with available stocks of lumber for other purposes, the situation was not so serious as it was produced by the masonry activities which caused the use of all available stocks and more.

Because of the need for a large amount of material of various sizes and quantities have been placed on the different

of yellow pine and fir in the larger sizes for other purposes than ship building. However, in any case where the use of material for special purposes can be shown as a definite need, it has been found possible to secure the release of the necessary material by application to the special branch of the Council of National Defense, or through the lumber associations.

The annual report of the committee on service tests was presented by P. R. Hicks (Forest Products Laboratory). This consisted of a statement of the progress being made in the selection, compilation and tabulation of data on the life of untreated ties and those treated according to various processes.

The condition of creosoted wood block pavements in Mobile, Ala., Shreveport, La., and a number of Texas cities was the subject of a paper presented by C. H. Teesdale (Forest Products Laboratory) who had been commissioned to investigate certain failures of pavements in these cities. His conclusion is that poor workmanship, particularly as to laying and application of fillers, was primarily responsible.

Volume Temperature Correction for Creosote Oil Measurements, a paper by S. R. Church (Barrett Company) and J. M. Weiss was presented by the former. The report of the Committee on Terminology was presented by the secretary and consisted of a glossary of the technical terms used in the wood preserving industry. It was suggested that criticisms or additions to this glossary be submitted to the chairman of the committee.

Other Business

At the closing session on Thursday, the following officers were elected for the ensuing year: President, M. K. Trumbull, vice-president, National Lumber & Creosoting Company, Kansas City, Mo.; first vice-president, J. B. Card, president, Central Creosoting Company, Chicago; second vice-president, A. R. Joyce, Joyce-Watkins Company, Chicago; secretary-treasurer, F. J. Angier, superintendent of timber preservation, Baltimore & Ohio, Baltimore, Md.; members of the executive committee, E. B. Fulks, vice-president, American Tar Products Company, Chicago, and E. T. Howson, engineering editor, *Railway Age*, Chicago. It was voted to hold the next annual convention at St. Louis. The annual dinner was held on Wednesday evening.

BRITISH WAGE DISPUTE SETTLED.—The delegate meeting of the National Union of Railwaymen of England on November 29 agreed to accept a revised offer of the Railway Executive for a flat rate advance of 6s. (\$1.44) per week to men and 3s. (\$.72) a week to women and youths under 18.

INTERNATIONAL TRADE OF 1917 will show a larger total than in any earlier year, says a bulletin of the National City Bank of New York. In the case of the United States the total trade of the year is estimated at approximately nine billion dollars, against less than four billions in 1913.

TANKS TRAVEL BY TRAIN.—Some interesting details regarding the "railification" of the British front in France were recently given by a special correspondent of the London World. Some of the existing lines, he writes, have been double-tracked and others quadrupled, and "in places the sidings remind one of the big railway junctions in England, as they would look were all the permanent buildings removed and only the lines left." The British Army has added to and improved the rolling stock, and British locomotives from all lines, all painted black, are to be seen everywhere. The trains are described as "interminably long," traveling at a very slow pace, due to the innumerable stops, and the number of mixed consignments handled. The writer adds, "How many people are aware that tanks travel to the front by train?"

Increased Efficiency by Use of Train-Order Form Nineteen

By T. H. Meeks

General Agent of the The American Railway Association, Camp Logan, Texas

NOTWITHSTANDING the wonderful progress that has been made towards more efficient and economical operation of the railroads since the beginning of the world war, the volume of traffic has increased so rapidly and to such extent that innumerable difficulties are still being met in handling it with the degree of promptness and regularity necessary to the successful conduct of the war; and every road must therefore be organized and systematized so as to develop the maximum of efficiency; this in order that it may be utilized to the limit of its possible usefulness. The increase in efficiency that has been accomplished thus far is principally the result of better utilization of motive power, reduction of delays to cars, and better car-loading. The railroads and the people have responded willingly and promptly to this emergency. But a much greater concentration of effort in this direction is necessary to help make the available supply of cars and engines carry the present increased traffic; no road can secure new rolling stock in sufficient quantities to meet the demand.

The greatest item of unnecessary expense, and hindrance to traffic on a busy railroad (I say busy railroad because the loss is more noticeable on trunk lines where the traffic is dense) that apparently has not been dealt with in any far-reaching way is the stopping of trains for dispatchers' orders. This expense and delay could be greatly reduced by curtailing or eliminating the use of train order form 31 (which requires the stopping of trains for the signature of the conductor). The only time it is necessary, from a point of safety, to stop a train for an order is *when execution is required at or in the vicinity of the station at which it is issued.*

The majority of railroads, particularly single track lines, continue the use of form 31 for restricting the superiority of trains. The reason usually advanced is that it is safer than form 19 (which does not require the stopping of trains for the signature of the conductor), although the unrestricted use of form 19 is authorized in the standard code of train rules of The American Railway Association. Its use has proved successful on several railroads which are using it almost exclusively; furthermore, the railroads that are using form 19 for restricting purposes consider it superior to form 31 for the reason that it obviates the following undesirable features in the movement of trains by train order:

- (1) Need of protecting the rear end when trains are stopped (see rule 99);
- (2) Delay in stopping and starting;
- (3) Cost of fuel and water in starting;
- (4) Wear and tear to equipment by stopping and starting;
- (5) The inferior requirements with respect to the delivery of form 31.

Not only is form 31 undesirable in the five particulars just enumerated, but it also causes serious delay to inferior trains at meeting points with superior trains on account of dispatchers (on many railroads) not being permitted to stop through passenger or freight trains, when only a few minutes late, to deliver a 31 order, whereas, a 19 order could be delivered to a superior train without stopping it, and the delay to the inferior train thereby reduced. Reducing delay at meeting points would, in a great many cases, prevent trains from freezing in cold weather, and it would prevent numerous sixteen-hour-law tie-ups which are extremely expensive. Dispatchers have frequently been known to violate

the rules under which they were working, and use form 19 for restricting the superiority of trains, or they would instruct operators to sign the conductor's name to orders (which amounts to the same thing), to avoid excessive delays. Division officers wink at these practices. All of this is conclusive evidence that the procedure under form 19 is preferable for general use.

It is doubtful if a correct calculation of the unnecessary expense and delay incurred through the use of form 31 could be made, but it is obviously enormous, and the needed step should be directed to its elimination.

Issuance of Train Orders

The principal features in the issuance of a train order are the correct receipt and repetition by the operator, and correct check by the dispatcher while it is being repeated to him. In these respects there is no difference between form 19 and form 31.

Delivery of Train Orders

The principal features in the delivery of train orders are:

- (1) The proper display of the train order signal.
- (2) Recognition of the signal by trainmen and engine-men.
- (3) Receipt of the order by trainmen and engine-men.

As to point 1 there is no difference between form 19 and form 31. As to the second there is this difference; the operator, in the case of form 31, remains in his office, leaving the recognition of the signal entirely to the men on the train; he is not required to do anything but wait until the conductor reports; while in the case of form 19, he is out on the platform to make personal delivery of the order. He is required to have with him hand signals for the purpose of signaling the approaching train in case the train-order signal should fail or not be properly observed. As to point 3, the operator is an active agent in the delivery of the 19 order and, therefore, there is a greater assurance of delivery. If the order is legibly written and if delivery is made, it is as certain of execution under one form as under the other.

In making delivery of a restricting order to a train at a non-train-order station, or train-order station at which the operator is not on duty, in care of another train, either of the following methods could be adopted for taking receipt for orders thus delivered:

- (1) Form 31 could be used for this purpose.
- (2) A receipt could be taken on the face of form 19 without this form being modified.
- (3) A universal form of order could be adopted to take the place of forms 19 and 31 for all purposes, the procedure in making delivery to be the same as with present form 19 except to provide a space for the signature of the conductor or engine-man of trains receiving restricting orders at places other than open train-order stations.

Under the second or third method only one form would be required where two are now required. This would make a saving in stationery and would simplify the handling of trains by train order. Under any of the three methods, the receipt would be turned in at the next train-order office for transmission to the dispatcher, so that the order could be delivered to the inferior train or trains affected.

Where it is not desirable to revise the rules and revolutionize the train order system, form 31 could be used in cases where execution is required at or in the vicinity of the station at which the order is issued, also for orders sent to a train at a non-train-order station (or train-order station at which the operator is not on duty) in care of another train which restricts its superiority or otherwise imposes an obligation.

Where form 19 is used, the clearance card is indispensable. At the beginning of the use of a form that required the signature of the conductor and engine-man (which was later

modified to require only the signature of the conductor) so as to eliminate part of the delay, the clearance card was not used, nor was it necessary, as the signature on the order was sufficient evidence of delivery. When form 19 was promulgated it was found necessary to provide evidence of delivery, hence the clearance card; the conductor and engine-man were required to check the number of the order, received and initial the number received on the clearance card to ascertain if all had been received.

Relation of Clearance Card to the 19 Order

Some railroads are in the habit of clearing card that require the dispatcher's O. K. before being issued to a train; the operator when asking permission to clear a train, is required to report to the dispatcher the number of the order on the clearance card, and the dispatcher is required to check the number given by the operator against the orders outstanding at that office to insure that none have been omitted; after which he gives the O. K. and the operator then clears the train in the usual manner. It would provide an additional element of safety if clearance cards were numbered by dispatchers, the same as train orders, thereby making it impossible for an operator to properly clear a train without the dispatcher's permission.

This method of handling clearance cards places the responsibility for delivery of orders on both the dispatcher and the operator instead of on the operator only, and deserves careful consideration. If frequent surprise tests were made to keep dispatchers and operators on the alert, the chances for failure to make delivery would be even more remote.

Mexican Railroad Properties in a Ruinous Condition

THAT THE RAILROADS in Mexico are going to rack and ruin is the opinion of an observer sent by the New York Sun into Mexico from Vera Cruz. The first special dispatch sent by this observer from Havana, printed and copyrighted by the Sun in its issue of January last, paints a picture of Mexico that is thus summarized in the leading paragraph: "Mexico is starving and bleeding to exhaustion. There seems no present help for it, at least, is she with the idea, encouraged by tireless German propagandists, that the United States is her natural enemy, her neglect, because Germany is sure to win the war and will thereafter be Mexico's great and good friend."

The Sun's observer dismisses the situation in Mexico from all angles. Concerning the railroads he reports:

"The railroads are in bad shape, none of the rolling stock has been painted since the revolution, and from the looks of the cars no repairs have been attempted. The Vera Cruz & Pacific is not a profitable traffic, yet the Federal Government owns it, now as it does from Vera Cruz to Puerto Mexico."

"The International Iceberg-based steam line, from the Lightning and no one knows in what use it was, the line to The Mexican Central line from San Luis to Tampico has been abandoned, it being impossible to get even a military train over it. From Mexico City to Oaxaca via the Mexican Central it is possible the Mexican National Railway has received the most complete reorganization in history, and the right of way, ties and rails have been extensively repaired."

"From Vera Cruz to Orizaba via the 'Queen' line, and from the right of way to Orizaba via the 'Lumber' line, they operate this line in daylight only, the territory from Vera Cruz to Orizaba being subject to the attacks of raiding bands. The passenger train is crowded by a pilot train of

three box cars and an engine, with 150 soldiers. The train itself carries three more cars of soldiers and there are small garrison posts along the line some fifteen miles apart. In spite of these precautions the train is raided about every ten days.

"The passenger train from Mexico to Laredo carries three box cars of military escort. At Queretaro, in which Gen. Coss and Gen. Luis Gutierrez, with his brother, Gen. Eulalio Gutierrez, one time President of Mexico, recently set up their own revolutionary standard, they add a pilot train with soldiers. At San Luis Potosi they increase the escort and attach an armored train to the rear of the passenger. Thus the train proceeds in to Monterey. That is it does with any kind of luck and if no one has taken up the rails. At present writing some three kilometers of rails have been removed by the revolutionists beyond Saltillo.

"The line from Monterey to Tampico is kept open most of the time. Over this line the fuel oil for the Central Railways is hauled. It is subject to raids by Gen. Juan Andrew Alminzen between Linares and Victoria. Trains run heavily guarded, but the right of way is strewn with wrecked and burned car bodies.

"The railroad shops in Monterey have a small force of men working, but the yards are filled with rusting locomotives, while on sidings in the freight yards stand the gaunt frames of over 800 cars all burned at one time by one of the revolutionary generals. . . ."

"There are one or two commission houses and a mining company that have been carrying on business by owning their own trains, locomotives and cars and employing their own crews. In this manner they have succeeded in bringing in supplies over roads on which the national government could not operate trains.

"Early in December one of these privately owned trains was held up near Queretaro by an independent band of bandits. While going through their regular performance of looting the train the bandits came to one car which was securely locked. One of them with an automatic pistol fired into the lock. The car had contained forty tons of dynamite. When the smoke and dust cleared away and things ceased falling the train and some 120 bandits had gone away from there, only a large hole indicating where they had been.

"In spite of such casual losses as this the firms operating their own trains are said to be making money and the bandits continue to flourish."

Work of the Railway Engineers

IN HIS TESTIMONY before the Senate Committee on Military Affairs on Monday, January 28, Secretary of War Baker described in a general way the work of the railway engineer regiments now in France. Secretary Baker said in part:

"In a very short time we had organized engineering regiments of railroad men and sent them over there and were rebuilding railroads which were being carried forward with their advance; reconstructing their broken engines and cars, building new railroads, both back of the French and British lines, and those regiments were of such quality that at the Cambrai assault, carried on by General Byng, when the Germans made their counter attack, our engineer regiments threw down their picks and spades and carried their rifles into the battle and distinguished themselves by gallant action in the war itself.

"It was suggested that further groups of mechanics might be needed. We began to see that we were going to be over there in large force, and the question that then had to be answered was, How will we maintain an army in France? Special studies had to be made of that problem, and this is what they showed: They showed that the railroads and the

facilities of France had during this war been kept in an excellent condition; far better than any supposed possible under war conditions; and yet that those railroads were used to the maximum to take care of the needs of the French and the British themselves, and that when our army became a great army it would be necessary for us to build back of our own line an independent line of communication.

"For instance, the French had naturally reserved the best ports in France for their own supply. The Channel ports have been reserved for the British. When we came in it was necessary for us to have independent ports of entry in order that there might not be confusion and admixture of our supplies, going through these ports of disembarkation with those of other nations. We were given several ports. As you perhaps recall, the ports of France are tidal ports, ports with deep water and tidal basins at high tides, with insufficient water for landing at the docks when the tide is out.

"As a consequence, the construction of docks and wharves in ports of that kind is very much more difficult than where you have a deep sea harbor, and all you need to do is to erect a pile wharf. We have had to build docks, we have had to fabricate in this country and send over dock handling machinery; we have had to send from this country even the piles to build the docks. We have had to have gantry cranes, manufactured in this country, sent over to be erected on those docks; we have had to erect over there warehouses at the ports of disembarkation in order that these vast accumulations of stores and supplies which go over, can be properly housed and cared for, until they can be distributed into the interior.

"We have had to take over and are in process of rebuilding and amplifying a railroad 600 miles long in order to carry our products from our ports of disembarkation to our general bases of operation. And all of that has to be done, not only studied out, as a necessary thing to do, but when so studied out and reported here, the manufactories for those things have to be carried on in this country and the things shipped over there—nails, crossties, spikes, fishplates, engines, cars, buildings.

"That great staff under General Pershing's direction, containing so many men from the American army enriched by captains of industry and masters of technical performance in this country, all of these large industrial operations under general direction, such as the railroad and dock buildings, under a former vice-president and now a vice-president perhaps of the Pennsylvania Railroad. Atterbury and men of that quality and experience, summoned in to aid him—those are the men who are carrying forward these operations, which are quite as expensive as those which are carried on over here, and of far greater difficulty, because it means getting material by cable as to sizes and specifications, having it fabricated here and sent across through those infested 3,000 miles of ocean and then set up on that side."

WHERE U. S. COAL WENT IN 1917.—Of the 52 million tons of coal passing out of the United States in the fiscal year 1917, over 17 millions went to Canada, while another 8 millions passed into the bunkers of vessels engaged in foreign trade. This 17½ millions exported to Canada is the largest in the history of our trade with that country, and is valued at \$58,000,000, about one-fourth of the quantity being anthracite. Italy ranks second in the list of countries to which we export, the total to Italy in 1916 being nearly 3 million tons. Cuba ranks third, the exports to that island being about 1½ million tons in 1917; Panama about one-half million tons, most of which, however, is for the coaling station at that point; Argentina and Brazil about three-fourths of a million tons each, and Uruguay 100 thousand tons.—*Bulletin of the National City Bank of New York.*

REVENUES AND EXPENSES OF RAILWAYS

SEVEN MONTHS CALENDAR YEAR 1917

Table with columns: Name of road, Average mileage operated during period, Operating revenues (Freight, Passenger, Total), Maintenance of way and equipment, Traffic, Trans-shipment, General, Operating ratio, N.Y. railway, Operating income (tax accruals), Operating income (loss), Increase (or decrease) last year.

The Winter Is Half Through

F. D. Underwood, president of the Erie Railroad Company, last week issued an appeal to officers and employees, in which he said:

"Weather and other conditions on the Erie Railroad have resulted in conditions that inflict hardships on officers and employees of every grade. By comparison, however, the hardest lot of any man on the railroad is light compared with that of your fellows in the army abroad. We are less than manly when we grumble at conditions here. Let us anew apply ourselves to the work before us, regardless of any personal discomfort. The winter is half through. Do not lie down for a minute. Conditions must be better in a short time.

"Especially guard against the error that has found voice that, now that the Government has taken over the railroads, a lesser effort on the part of employees will go. The direction of railroads remains in the hands of its officers, and they have the right to demand from every loyal employee full support. Your responsibilities to them and to the Erie Railroad are in no way lessened.

"If we allow the work to lag we are not only unworthy American citizens, but are doing a direct injury to our brothers abroad. * * *

Inductive Interference by Parallel Power Circuits

This is a subject on which very little exact data is available, but which is of considerable importance to men who have to lay out power circuits which parallel communication circuits, and conversely to men who have to lay out communication circuits which parallel power circuits.

Since December, 1912, the California Railroad Commission, through the joint committee on Inductive Interference, has carried on an exhaustive investigation of the problem of inductive interference to communication circuits by parallel power circuits; and after five years' work the joint committee has completed its task at a cost of over \$100,000, this expenditure having been borne jointly by the commission and the interested power and communication utilities. The subject is of particular interest to the signal, telephone and telegraph departments of railroads. There have been many requests for copies of the report, and the commission is considering the publication in book form of the most important data. It will go ahead with the work if a sufficient number of subscriptions can be obtained in advance to warrant the necessary outlay. Information can be obtained from Richard Sachse, chief engineer, California Railroad Commission, 833 Market street, San Francisco, Cal.

Railway Business Association

The dinner of the Railway Business Association, which was to have been held on January 25, and the postponement of which has already been announced, has been definitely cancelled by the General Executive Committee and subscriptions have been refunded. It was decided to hold a business convention, without public dinner, on a date yet to be fixed.

Engineering Institute of Canada

This is now the name of the former Canadian Society of Civil Engineers, the change having been made at the annual meeting in Montreal, January 24. The president for the ensuing year is H. H. Vaughan, vice president and managing director of the Dominion Bridge Company.

Meetings and Conventions

The following gives names of secretaries, dates of next or regular meetings and places of meetings of those associations which will meet during the next three months.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next annual meeting, March 20-22, 1918, Chicago.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, 149 Peoples Gas Bldg., Chicago. Annual exhibition, March 18-21, 1918, Coliseum and Annex, Chicago.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Next meeting, March 18, Chicago.

Traffic News

J. A. Middleton, formerly freight traffic manager of the Missouri Pacific, has been appointed in charge of the oil traffic of the United States Food Administration.

The enlarged Erie Canal is expected to be open for traffic from Lake Erie to the Hudson river on May 15, next. Frank M. Williams, state engineer of New York, in his annual report, says that it is urgently necessary that the government take action looking to the construction of barges for use on the canal. A large amount of work still remains to be done on the canal in the vicinity of Rochester.

To induce farm settlement in the Dakotas and Montana and thereby increase agricultural production next season, the St. Paul will make low homeseekers' rates to those states, beginning in March and continuing until November. These fares will be in effect every Tuesday. In past years the homeseekers' rates have been in effect only on the first and third Tuesdays of each month, and last year did not become effective before May.

The Interstate Commerce Commission Wednesday announced its decision in the Transcontinental Commodity Rate cases, allowing increases in rates to Pacific Coast terminals. Because of the temporary absence of water competition the order issued is substitute for the order of June 30 last year, which was suspended pending investigation of tariffs filed by railroads, which are now approved in some particulars, but ordered modified in others.

The volume of parcel post business in the month of December was greater than in the same month of 1916 by 1,173,000 sacks. The Post Office Department reports that in order to relieve the railroads, parcels are being sent from New York to Norfolk, Va., by steamer. The time is 19½ hours, but, it is said, this time, under present conditions, is faster than by railroad. Throughout the United States the parcel post traffic has been greatly increased because of delays to freight by embargoes and by adverse weather conditions.

The Pennsylvania Railroad reports that the reductions in passenger train service put into effect on its lines on January 6,—104 trains week days and 51 on Sundays—amount to an aggregate of 2,708,212 train miles annually. The number of enginemen thus released equals 55 men each day, and of firemen the same; and a corresponding number of conductors and brakemen. Of the 29 locomotives released, only a part are available for use in the freight service as some of the company's passenger engines were urgently in need of repairs. Thirty-five lines of parlor and sleeping cars were discontinued.

In an article in this column on January 18 regarding the discontinuance of freight solicitation, it was stated that the Texas & Pacific, the International & Great Northern and the St. Louis Southwestern closed their traffic offices in Chicago. As a matter of fact, these roads did not close their offices but merely discontinued solicitation for a short time. Their agents are again "doing business as usual." The Buffalo, Rochester & Pittsburgh announces that its freight agencies at Cincinnati, Ohio, and Detroit, Mich., have been closed. The Missouri & North Arkansas has closed its traffic offices at Joplin, Mo., Helena, Ark., and Wichita, Kan., New Orleans, La., and Chicago.

An Appeal to Work on Mondays

In order to encourage the loading and unloading of freight cars in the Chicago terminal district on the coalless holidays the following advertisement was published in Chicago newspapers on January 27:

"Shippers and receivers of freight in the Chicago district and adjacent towns can assist railroad transportation by using every man who can be employed to unload and free freight cars on next Monday and on following Monday holidays. This in accordance with the wishes of the Fuel Administration. If these

ments must necessarily be considered in making the assessment, other benefits resulting to the company or its property because of the improved conditions of land adjacent to the district or because of any other resulting advantages which it enjoys in common with the general public are too remote and intangible to be made a basis of levying assessments.—*C. & N. W. v. Board of Supervisors (Iowa)* 165 N. W. 390. Decided December 18, 1917.

Switchman's Assumption of Risk at Curves

A foreman switchman sued for injuries received while moving a car on a spur track. The track ran alongside a coal bin and was some four feet away from it, though at one point there was a 30-degree curve, where the middle part of the car swung much closer to it. The plaintiff was standing at such a spot that, in spite of the efforts of the trainmen when they saw his danger, he was caught between the car and the bin. The Missouri Supreme Court held that as there was nothing in the evidence to indicate that the railroad did not do its best consistently with successful operation in the location and construction of the spur track in question, it would be presumed that it did. A railroad is not required so to construct a track in relation to the physical features of the industry served that switching would be absolutely safe even to careless employees. A switchman of 19 years' experience would be held to know that, in a case like this, the body of a car moves towards the inside of a curve. The plaintiff was held negligent in assuming the position of danger and unnecessarily remaining after his reason for taking it had ceased; he owed the railroad the duty to suggest a change in the track if one was necessary, and if he did not he assumed the risk.—*Morris v. Fryor (Mo.)*, 198 S. W., 817. Decided November 17, 1917. Rehearing denied December 1, 1917.

Contracts as to Fencing and Cattle Guards

The deed of a right of way to a railroad provided that the grantor should erect and maintain all necessary fencing and the railroad should make proper crossings and cow gaps. Under the Kentucky statute the landowner would have had to construct and maintain the fence on one-half of the division line, and cattle guards were required to be maintained by the railroad company "at all terminal points of fences constructed along the lines," except that where there was a private passage across the right of way, the landowner should bear one-half of the expense. The Kentucky Court of Appeals holds that the fencing required to be constructed under the contract was such as both parties would have been required to construct and maintain by statute, except for the contract, and the cattle guards which the railroad obligated itself to maintain were such as the statute put on it the duty to provide. The company was under no duty to construct or maintain cattle guards until the landowner had constructed a fence on each side of the right of way. The construction and maintenance of fences and cattle guards went together.—*Louisville & Nashville v. Durbin (Ky.)*, 198 S. W., 908. Decided December 11, 1917.

Validity of Leases by Railroads

A lease from a railroad company of a portion of land to be used for storing ties provided as part of the consideration that the lessee released all claim for damages on account of fire caused by the operation of the railroad on or near the premises, whether the damage occurred on the premises leased or on premises adjacent thereto. A spark from a locomotive on a spur track closely adjacent to the track extending into the leased land set fire to and destroyed certain ties. The Illinois Supreme Court holds that the lease was not invalid as against public policy; the use of the land leased for storage purposes not being a public utility. A "public utility" must be such a use as is common and has the same terms, however few the number who avail themselves of it, though it may be limited to the inhabitants of a small locality. And the act of a railroad company in leasing land used as part of its right of way cannot be attacked as ultra vires on the ground that the land cannot be held by it for such purpose by any party except the state, whether the real estate has been acquired for the authorized uses or not. Judgment for defendant was affirmed.—*Bartee Tie Co. v.*

Jackson (C. & E. I.) 117 N. E. 1007. Decided December 19, 1917.

Carrying State Officers Free

In an action involving consideration of the constitutionality of a New Jersey statute of 1915, requiring railroad companies to carry certain state officers and employees free, the New Jersey Court of Errors and Appeals holds that even though the state, in the railroad's charter reserved the right to amend, alter, or repeal the charter, it cannot by virtue of such right impose on the railroad company the burden of carrying free of charge state officers; for that works a deprivation of the railroad's property without due process of law.—*Napier v. D. L. & W. (N. J.)* 102 Atl. 444. Decided November 19, 1917.

Warning of Low Bridge

In an action for the death of a freight brakeman, there was evidence to show that he was found dead on the coal heap of the engine, and it was alleged his head had been crushed by an overhead bridge, five of which the train had passed under. The first four bridges were eliminated on account of their height, and it was a question for the jury whether the last bridge struck the deceased. It appeared that the middle span of the last bridge was considerably lower than the two side spans, and because of its blackened condition, that fact could not be seen until an observer was very close. It was held that an instruction that if the brakeman was struck and killed by the bridge, then the question for determination was whether he was warned by the company of his danger, and that the warning did not have to be in writing, or any formal warning by this or that officer, it being sufficient if he was given all the knowledge that the company could give him, properly submitted the question of warning to the jury. It was also held that though the company had provided telltales, it could not as a matter of law be declared that such safeguards were in themselves sufficient notice and warning.—*Marland v. P. & R.* 246 Fed., 91. Decided November 7, 1917.

Reparation for Unreasonable Freight Rates

In consolidated actions by a shipper of live stock against several railroads to recover from each of them the amount awarded the plaintiff by an order of reparation made by the Interstate Commerce Commission awarding damages for exaction of unreasonable freight rates, the Circuit Court of Appeals, Eighth Circuit, in reversing a judgment for the plaintiff in the Federal District Court for the Western District of Missouri, made the following rulings:

While the commission in making investigations should not be too narrowly constrained by the technical rules as to the admissibility of proof, nor hampered by those narrow rules which prevail in trials at common law, yet, by reason of the liberality of practice in admitting testimony, it is more imperative to preserve the essential rules of evidence by which rights are asserted or defended, and the commissions cannot act on their own information, but the parties must be fully apprised of the evidence submitted and be given an opportunity to cross-examine witnesses, inspect documents, and offer evidence in explanation. Administrative orders, quasi judicial in character, are void if hearing was denied, if that granted was inadequate or manifestly unfair; if the finding was contrary to the indisputable character of the evidence or if the facts do not support the order. An order of the commission based on a finding unsupported by evidence is contrary to law and must be set aside by a court of competent jurisdiction. An order of reparation, awarding damages for unreasonable rates, requires a finding disclosing the relation of the parties as shipper and carrier, the character and amount of traffic out of which the claims arose, the rates paid, whether they were unreasonable, and whether the shipper was injured, and if so the amount of his damage. Testimony that the witness had obtained from commission houses to which cattle had been consigned and from individuals not shown to be the owners of cattle is the worst kind of hearsay.

Under section 15, it is held improper for the commission, having ordered reduced rates for a period of two years, to order reparation solely on account of the previous exaction of higher

rates during a previous period of two years for the grant of reparation, being based entirely on the difference in rates, was tantamount to the establishment of a rate for over four years and without giving notice as to when it should go into effect. Where a rate subsequently condemned by the commission as unreasonable was, when exacted a legal rate, the shipper could not sue in a court of law and recover back any portion of such rate. The reparation order was therefore declared by the court to be improper.

Where unreasonable rates were exacted for the transportation of cattle to markets, the difference between the unreasonable rates exacted and reasonable rates subsequently established cannot be made the only basis for a reparation order for damages under section 16 of the act. There was no showing that the shippers were actually damaged from the exacting of such rates. *A. T. & S. L. v. Spiller*, 249 Fed. 1. Decided October 26, 1917.

Discrimination in Laying Side Tracks

Concerning that a contract with a logging company, by which a railroad used the track of the logging company on condition that it should haul no pine logs for any rival was void as to the condition, the Alabama Supreme Court holds that the contract afforded no basis for requiring the carrier to haul pine logs for another person, since, if the contract were void, the carrier had no rights whatever, and could not enter and use the rails, and if it were void it could not be interfered with. A carrier, owning or leasing a line of road, may be compelled by the Public Service Commission to give equal facilities to all persons of the same class, and cannot by contract with some customers exempt itself from treating all alike. And if a common carrier, having a mere license to use the rails of a logging company, has by its contract agreed not to give equal service to competitors of the logging company, it cannot be compelled to do so, though the contract is void, the Public Service Commission not being empowered to make a new contract for the parties. The commission had no power to compel the railroad to lay a side track to serve a competitor of the logging company, since such an order would make the railroad a trespasser, nor could the commission legalize the trespass and so exempt the railroad from liability. *Alabama Central v. Commission (Ala.) 76 So. 892* Decided November 15, 1917.

United States Supreme Court

Reparation for Excessive Rates

Suit was brought to recover alleged excessive charges on hardwood lumber. The Interstate Commerce Commission had found the rate to be excessive and had made an order for reduction from 85 to 75 cents, which was obeyed, and also one for reparation to the extent of the excess, which was not obeyed. 131 F. C. 608. A remurrer to the declaration was sustained by the Circuit Court on the ground that it was not alleged that the plaintiffs had paid the excessive rates or that they were damaged thereby. 190 Fed. 659. The declaration was amended, but at the trial the judge directed a verdict for the defendants, presumably on the ground that it did not appear that the plaintiffs were damaged. The judgment was reversed by the Circuit Court of Appeals—221 Fed. 890, 137 C. C. A. 460. At a new trial the jury were instructed that if they found the rate charged to be one that prescribed by the commission reasonable, they could find for the plaintiffs, in accordance with the commission's award. The jury found for the plaintiffs and their judgment was affirmed by the Circuit Court of Appeals—229 Fed. 1022, 143 C. C. A. 693.

On appeal to the Supreme Court of the United States the only question before the court was whether the fact that the plaintiffs were able to pass on the lumber they purchased in the first instance, a fact that resulted from the plaintiffs' prevention their recovery of the overpayment from the carriers, affected the judgment for the plaintiffs the court distinguished the case like *Pennsylvania v. International Coal Marine Co.*, 230 U. S. 184, where a party that has paid only the reasonable rate but on a discrimination became some other loss and had, where the damage depended on recovery of the overpayment. *Southern Lumber v. Darnel Tannery Lumber Co.* Decided January 21, 1918.

Equipment and Supplies

Locomotives

The **MONTGOMERY, KANSAS & TEXAS RAILROAD** (D. P. Taylor, Gen'l Mgr.) has ordered 20 **30-ton** locomotives from the American Locomotive Company.

The **INDIANAPOLIS & HOUSTON** has ordered 20 **30-ton** locomotives from the American Locomotive Company.

The **MOUNT CARMEL** has ordered 17 **30-ton** and 4 **40-ton** switcher locomotives from the American Locomotive Company.

The **MEMPHIS & THE LOUISIANA** has ordered 10 **30-ton** and 1 **40-ton** type locomotives from the American Locomotive Company.

The **MISSISSIPPI VALLEY** is reported as ordering four **30-ton** engines, which will be delivered from the American Locomotive Company.

The **MISSOURI CANTONMENT DISTRICT** (H. C. Lee, Gen'l Mgr.) has ordered four **48-ton** and 30 **35-ton** locomotives, which will be delivered from the American Locomotive Company.

The **INDIANAPOLIS & HOUSTON** has ordered 20 **30-ton** and 2 **40-ton** locomotives from the American Locomotive Company. The locomotives will weigh 45,000 lb. and will be equipped with superheaters.

The **CINCINNATI & CANTON** has ordered 17 **30-ton** and 10 **40-ton** switcher locomotives from the American Locomotive Company. The **30-ton** type locomotives will weigh 40,000 lb. the **40-ton** locomotives 295,000 lb., and all will be equipped with superheaters.

Freight Cars

The **C. PETERSON & CO.** (Chicago) are building 10 **10-ton** and 20 **10,000-gal.** capacity tank cars.

The **KANSAS CITY STEEL** (KANSAS CITY, MO.) is building 100 **10,000-gal.** tank cars.

The **MONTGOMERY, KANSAS & TEXAS RAILROAD** (D. P. Taylor, Gen'l Mgr.) is building 100 **12,500-lb.** 8,000-gal. capacity tank cars.

The **PANHANDLE** has ordered 20 **10-ton** and 44 **shell** cars from the American Car & Foundry Company.

The **PENNSYLVANIA** (HARRISBURG, PA.) has ordered 100 **10-ton** and 10 **40-ton** tank cars from the American Car & Foundry Company.

The **BALTIMORE, HAWKINS & SONS** (Gen'l Mgr.) is reported as ordering 100 **10-ton** and 10 **40-ton** freight cars from the American Car & Foundry Company, and 10 **10-ton** and 10 **40-ton** tank cars from the American Car & Foundry Company and 10 **10-ton** and 10 **40-ton** tank cars from the American Car & Foundry Company.

Signaling

The **AMERICAN** has received from the General Railway Signal Company 100 **10-ton** and 10 **40-ton** freight cars from the American Car & Foundry Company.

The **INDIANAPOLIS & HOUSTON** has ordered 10 **10-ton** and 10 **40-ton** freight cars from the American Car & Foundry Company, and 10 **10-ton** and 10 **40-ton** tank cars from the American Car & Foundry Company.

The **INDIANAPOLIS & HOUSTON** has ordered from the General Railway Signal Company 100 **10-ton** and 10 **40-ton** freight cars from the American Car & Foundry Company, and 10 **10-ton** and 10 **40-ton** tank cars from the American Car & Foundry Company.

Supply Trade News

P. M. Wagstaff has been appointed railroad representative for the Onondaga Steel Company, Inc., Syracuse, N. Y.

Charles S. Bilyeu, who recently became associated with the Gulick-Henderson Company, New York, has been appointed assistant to the president.

F. A. Driver, for many years a director of the Driver-Harris Wire Company and identified with the company since its inception, died January 21 at the age of 82 years.

R. P. Lamont, president of the American Steel Foundries, with office at Chicago, Ill., has been commissioned a lieutenant-colonel by the War Department and appointed assistant chief of the procurement division of the ordnance department and has reported to Washington for duty.

Ralph F. Tillman has been elected vice-president of the Wine Railway Appliance Company, Toledo, Ohio, in charge of western sales with headquarters in Chicago, effective February 1. **W. F. Creman** has been appointed assistant to the president of the company in charge of eastern sales with headquarters in Wilkes-Barre, Pa., also effective February 1.

At the meeting of the board of directors of the Union Steel Casting Company, Pittsburgh, Pa., **C. C. Smith**, formerly president of the company, was elected chairman of the board of directors. **J. P. Allen**, formerly vice-president, was elected president. The remaining officers of the company were re-elected as follows: **S. H. Church**, vice-president; **G. W. Eisenbeis**, treasurer; **W. C. Eichenlaub**, secretary, and **J. B. Henry**, general superintendent.

Charles D. Jenks, who has been the active business executive of Edwin S. Woods & Co., Chicago, has severed his connection with that concern, effective January 31, having been elected president and a director of the Damascus Brake Beam Company, with headquarters in Cleveland, Ohio. He was formerly in the operating and sales department of the Pressed Steel Car Company at Pittsburgh, Pa., and Chicago, and western sales manager for the Standard Coupler Company, leaving the latter concern in 1912 to go with Edwin S. Woods & Co. In his new position as president of the Damascus Brake Beam Company he will assume the active management of the operation and sales department.

Cameron C. Smith, chairman of the board of the Union Steel Casting Company, Pittsburgh, was on January 15 appointed Major Ordnance Reserve Corps, and has been assigned to the Production Department, Carriage Division of the Ordnance Department of the U. S. Army, with headquarters in Washington. Mr. Smith was born in Clinton Township, Butler County, Pa., April 2, 1861. His first position was as stenographer in the office of Wilson Walker & Co., iron and steel manufacturers of Pittsburgh, Pa. He was with them ten years, during which time it was merged into the Carnegie, Phipps & Co., and then into the Carnegie Steel Company. He left the employ of the Carnegie Steel Company in 1893, and accepted a position with the Reliance Steel Casting Co., of Pittsburgh, being with them six years, when in 1899 he withdrew to organize the Union Steel Casting

Company, of Pittsburgh, Pa. He was secretary and general manager during the first year of the existence of the Union Steel Casting Company, and in 1900 was elected president, which position he has held until January 26, 1918, when he was elected chairman of the board of directors.

W. H. Lovekin has been appointed assistant to the president of the Locomotive Feed Water Heater Company, effective January 1, 1918. Mr. Lovekin has been with the company since June, 1916. He was born in Philadelphia, Pa., and received his education in the public schools of that place, Haverford Preparatory School and Princeton University. He started his business career in the banking house of the Logan Trust Company, of Philadelphia. Later he accepted a position on the staff of the Bureau of Municipal Research of Philadelphia. On leaving the Bureau of Municipal Research he entered the sales department of R. J. Crozier & Co., of Philadelphia, where because of special qualifications he was shortly assigned to the railroad field. This position as sales representative in the railroad field brought him into intimate contact with railroad men. On June 1, 1916, he entered the service of the Locomotive Feed Water Heater Company as special representative. In this capacity he was intimately connected with the development of feed water heaters for locomotives and ships. In April of this year he was made assistant to vice president from which position he is now promoted.



W. H. Lovekin

Waldo H. Marshall to Assist Colonel Tripp in Ordnance Department

Waldo H. Marshall, formerly president of the American Locomotive Company, and now associated with J. P. Morgan & Co., has been appointed assistant chief of the Division of Production of the Ordnance Department.

Colonel Guy E. Tripp, chief of that department, in announcing the appointment Tuesday, said:

"Mr. Marshall's wide experience in manufacturing and recognized ability to solve various production problems will be, it is felt, of great advantage to that division. His appointment marks another step forward in the recently adopted policy of appointing civilians to important posts in the War Department."

Mr. Marshall was on the staff of Edward R. Stettinius (now Surveyor General of Supplies in the War Department) in the munitions department of J. P. Morgan & Co. Born in 1864, Mr. Marshall began his business life as a railroad man. He became assistant superintendent of motive power for the Chicago & North Western in 1897; was appointed superintendent of motive power for the Lake Shore & Michigan Southern in 1899; was made general superintendent of that road in 1902, and general manager in 1903, his jurisdiction extending also over the Lake Erie & Western and the Indiana, Illinois and Iowa. In 1906, he was elected president of the American Locomotive Company.

U. S. FOREIGN TRADE RECORD OF 1917.—In foreign commerce the year 1917, says a bulletin of the National City Bank of New York, far exceeds in value of merchandise imported or exported that of any earlier year. Total imports for the full calendar year 1917, according to the bank's statement, are 60 per cent greater in value than in 1913 and exports of domestic products 150 per cent, greater in value than those of 1913. The total foreign trade of the country is estimated in very round terms at 9 billion dollars in 1917 against 4¼ billion dollars in 1913, the total of imports and exports combined being thus more than double in 1917 that of 1913.



C. D. Jenks

Financial and Construction

Railway Financial News

BALT MORE & O'NE—This company has placed a six-month loan of \$800,000. Kuhn, Loeb & Co. and Speyer & Co. are the bankers in the transactions. The loan has been placed privately among banks and trust companies and there will be no public offering of securities.

DENVER & RIO GRANDE—Judge Walter H. Sanborn, in the United District Court at Denver, Colo., on January 26, named Alexander R. Baldwin, vice president of the Western Pacific, and Edward L. Brown, president of the Denver & Rio Grande, receivers for the latter road.

PITTSBURGH, FORT WAYNE & CINCINNATI—This company has increased its capital stock from \$72,150,000 to \$100,000,000. This stock will be issued, it is understood, to reimburse the Pennsylvania Company for additional and betterment expenditures.

ST. LOUIS & MISSOURI SOUTHERN—M. J. Conran, receiver, will offer this road for sale on February 9, at New Madrid, Mo.

Railway Construction

BLACK MOUNTAIN RAILROAD—A contract has been given to J. H. Bailey, engineer, to construct a line from Hulan, Ky., on the Cumberland branch of the Louisville & Nashville up Parkers creek. Work is now under way and will be pushed to completion. The maximum grade will be 2 per cent and the maximum curvature 10 per cent; there will be 6 bridges and the line will traverse coal lands. The plans also include double tracking to one at an early date. The company was incorporated in Kentucky with offices at Fredonia, N. Y., and Pineville, Ky. W. H. Frost, president; J. S. Lambert, vice-president, Fredonia; M. E. S. Pusey, chief engineer, Pineville.

GREAT NORTHERN—This company is building an extension to its dock at Seattle, Wash., at a cost of about \$50,000. Grant Smith & Co., St. Paul, Minn., have the contract for the work.

GULF, COLORADO & SANTA FE—This company will sink a well and make other improvements to its water facilities at Kirbyville, Tex., at an estimated cost of about \$6,000.

MANATEE RIVER RAILWAY—This company is building a line north from near Verma, Fla., on the East & West Coast near Bradenton, about 8 miles has been completed. It is expected that the line will eventually be extended to Wimauma on the Seaboard Air Line in Hillsborough county about 25 miles from Verma. A number of branch lines may also be built. W. D. Wilson, president, Citizens' Bank building, Tampa, Fla.

DANISH TRANSPORTATION DIFFICULTIES—Denmark, like practically every other country in the world, whether belligerent or neutral, is suffering from a rolling-stock shortage due to the war. As far back as the autumn of 1915 merchandise awaiting transportation had accumulated to such an extent that it was impossible even to find sufficient warehouse accommodation, and this year the difficulty has become still further accentuated. The problem is serious, as may be seen from the fact that 12 months ago the State Railways Administration was unable to supply the port of Copenhagen with more than 25 per cent of the cars required, with the result that merchandise which could not be despatched accumulated daily. Hopes were entertained that there would be an improvement after the harvesting of the last best crop, but these expectations have not been realized, owing to the continued effects of intense and prolonged cold weather and the coal shortage. Passenger traffic was restricted at the beginning of the year, since when further and more drastic restrictions have had to be introduced. No noticeable improvement is expected until it is possible to add to the rolling stock—*Kirkens Tidning, London.*

Railway Officers

Executive, Financial, Legal and Accounting

G. C. Hand, secretary of the Illinois & Michigan, with headquarters at New York, has been named, upon retirement succeeding J. Sorenson, resigned, as general manager.

P. Richardson, assistant superintendent of the Detroit & Mackinac with office at Ann Arbor, has been appointed auditor, assistant to the chief clerk, succeeding as yet vacant **George M. Crocker**, deceased.

Stephen Birch vice president of the Western Union & Telegraph western and the Atlantic Telegraph Company, with headquarters at New York, has been elected president of the latter companies, succeeding **S. W. Eccles**, deceased.

B. I. Spock, general manager of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., has resigned, effective February 1. **J. C. Sweeney**, general attorney with office at New Haven, has been appointed general solicitor to succeed Mr. Spock. **N. W. Smith**, general attorney counsel with office at Hartford, has been appointed general attorney with office at New Haven, succeeding the deceased, **W. L. Barnett**, chief clerk of the latter, with annual pay \$10,000. **Henry H. Barnett**, chief clerk of the latter, with office at New Haven, has been appointed vice-president, with office at New Haven, with annual pay \$10,000. **A. P. Russell**, operating counsel with office at New York, and assistant in his present duties, and vice president of the latter, general

Operating

E. H. Campbell, general freight and passenger manager of the Kansas City Northern, eastern at Southern Ind., has been appointed superintendent, succeeding **O. S. Lamb**, resigned, effective January 24, with the same headquarters.

F. L. Birdsall, superintendent of the Missouri, Denver & Western, will be appointed at Hutchinson, Kas., Mo., has been appointed transmitter at the Northern Pacific, with headquarters at Minneapolis, Minn., succeeding **J. H. Johnson**, promoted.

J. B. Parrish, superintendent of freight transportation of the Chesapeake & Ohio, with office at Cincinnati, Ohio, has been appointed general superintendent of the Western general division, with headquarters at Hamilton, W. Va., and **F. L. Poindexter**, assistant transmitter with office at Evans, Ind., has been appointed superintendent of freight transportation, with headquarters at Cincinnati.

Thomas M. McLaughlin, vice superintendent of superintendent of the Eastern division of the Maine Central, with headquarters at Bangor, Me., has already been mentioned in these columns, was born in April 1869 at Greenfield, N. H., and was educated at Middlebury Academy, Vermont, Maine. He began his career with the Boston & Maine, a freight brakeman on the Maine Central. He became freight clerk and chief of freight cars on the general freight service. For his long and successful career, he has received numerous medals and honors. He was elected to the position of superintendent of the Maine Central in 1911, and was re-elected in 1914. He is a member of the American Railway Union, the American Railway Association, the American Railway Brotherhood, the American Railway Club, and the American Railway Club. He is also a member of the American Railway Club, and the American Railway Club.

Maurice Bailey, general superintendent of general transportation of the Missouri, Denver & Western, with headquarters at Minneapolis, Minn., was born in 1864 at Greenfield, N. H., and was educated at Greenfield, N. H. He received his education at the University of Vermont, and in 1888 he was appointed general superintendent of the latter road. He was re-elected in 1911, and in 1914. He is a member of the American Railway Union, the American Railway Association, the American Railway Brotherhood, the American Railway Club, and the American Railway Club. He is also a member of the American Railway Club, and the American Railway Club.

catine, Burlington & Southern with office at Muscatine, Iowa, and was later made president and general manager, which position he resigned to take the position noted above.

E. L. Bock, superintendent of the Huntington division of the Chesapeake & Ohio, with office at Huntington, W. Va., has been appointed assistant general superintendent of the Western general division and the C. & O. Northern, with headquarters at Huntington; **F. L. Fletcher**, superintendent of terminals at Louisville, Ky., has been appointed superintendent of the Huntington division, with office at Huntington, W. Va., vice Mr. Bock; **H. T. Brown**, trainmaster at Huntington, has been appointed assistant superintendent of the Cincinnati division and the C. & O. Northern, with headquarters at Russell, Ky. **C. A. Pennington**, assistant superintendent, with office at Huntington, W. Va., has been appointed superintendent of the Louisville & Jeffersonville Bridge & Railroad Company, with office at Louisville, Ky., vice **F. L. Fletcher**, and the office of assistant superintendent of the Huntington division has been discontinued.

J. A. Shepherd, whose appointment as superintendent of the Green river division of the Denver & Rio Grande with headquarters at Helper, Utah, was announced in these columns on January 18, was born at Homer, Ill., on April 21, 1874. He entered railway service in August, 1893, with the Wabash, serving as operator, dispatcher and chief dispatcher until December, 1901. From January, 1902, until March, 1904, he was superintendent on the Western Maryland at Hagerstown, Md.; and from March, 1904, to January, 1905, assistant superintendent of the Terminal Railroad Association at St. Louis, Mo. On the latter date he was appointed superintendent on the Western Maryland at Baltimore, Md., and in April, 1911, he was promoted to general manager, in which capacity he remained until January, 1913, when he became superintendent of terminals on the Missouri Pacific at Kansas City, Mo. In November, 1916, he went to New Orleans, La., to become general manager of the Trans-Mississippi Terminal. In November, 1917, he entered the service of the Denver & Rio Grande as assistant superintendent at Helper, Utah, which position he held until January 1, when his appointment as noted above became effective.

Austin Edward Wallace, Jr., who has been appointed general superintendent of the Chicago and Marion divisions of the Erie, with headquarters at Chicago, as has already been announced in these columns, was born March 3, 1879, at Nashua, N. H., and was educated at Harvard University. He began railway work in November, 1902, and served consecutively as clerk and timekeeper on the Great Northern at Larimore, N. D., until January, 1904, when he became yard clerk on the Chicago, Rock Island & Pacific, and subsequently served first as timekeeper and then as chief clerk to superintendent at Cedar Rapids, Iowa, on the same road. In January, 1907, he went to the Chicago, Burlington & Quincy as special inspector at Alliance, Neb., and from September, 1909, to February, 1911, he served successively as assistant extra gang foreman, foreman, assistant roadmaster, assistant trainmaster and trainmaster. From February to September, 1911, he was special inspector, with headquarters at Chicago. He then served on the staff of the second vice-president at Chicago, and later as assistant superintendent, with office at St. Paul, Minn., on the same road. In July, 1912, he returned to the service of the Chicago, Rock Island & Pacific as superintendent, with office at Cedar Rapids, Iowa, and in February, 1913, he was transferred in the same capacity to Manly, Iowa, which position he held until his recent appointment as general superintendent of the Chicago and Marion divisions of the Erie as above noted.

Traffic

J. J. Lane, local freight agent of the Delaware, Lackawanna & Western at Newark, N. J., has been appointed division freight agent, with headquarters at Newark.

R. L. Gohmert has been appointed assistant general freight agent of the San Antonio, Uvalde & Gulf with office at San Antonio, Texas, vice **J. L. McDonald**, resigned.

Edward T. Campbell, general traffic manager of the Erie, with office at Chicago, has been assigned to special duty, reporting to the president, with headquarters at New York.

J. F. Gavin was appointed general freight and passenger agent of the Kansas City Northwestern with headquarters at Kansas City, Kan., succeeding **E. H. Campbell**, promoted, effective January 24.

W. H. Ward, chief of Tariff Bureau of the Indiana Harbor Belt at Chicago has been promoted to general freight agent, succeeding **J. W. Bingham**, resigned to become traffic manager of the Corn Products Refining Company, Chicago, with headquarters at Chicago.

Engineering and Rolling Stock

C. U. Irvine has been appointed division engineer of the Southern Railway in Mississippi, with headquarters at Columbus, Miss., vice, **W. F. McDade**, resigned.

L. B. Allen, general superintendent of the Chesapeake & Ohio, at Huntington, W. Va., has been appointed superintendent maintenance of way, with office at Huntington.

H. Stringfellow, assistant engineer of the Southern Railway, with office at Eutaw, Ala., has been promoted to district engineer, with headquarters at Lexington, Ky., succeeding **H. P. Mehler**, assigned to other duties.

William Snell, district general car foreman of the Chicago, Milwaukee & St. Paul, with headquarters at Minneapolis, Minn., has been transferred to the newly created position of the same rank at the Chicago terminal, effective February 1.

W. E. Burkhalter has been appointed acting division engineer of the St. Louis division of the Mobile & Ohio, with headquarters at Murphysboro, Ill., vice, **J. L. Cummings** who has been appointed acting bridge engineer with office at Mobile, Ala., vice **H. Austill** furloughed to enter military service and **S. F. Ryan** has been appointed acting assistant engineer with office at Mobile, vice **L. P. O. Exley** assigned to other duties.

L. K. Sillcox, mechanical engineer of the Illinois Central in charge of car work, has been appointed master car builder of the Chicago, Milwaukee & St. Paul, with headquarters at Milwaukee, Wis., effective February 1. He was born at Germantown, Pa., on April 30, 1886, and was educated at Trinity School, New York, and the Mechanical & Electrical Institute of Brussels. He entered railway service in 1903 as an apprentice in the High Bridge shops of the New York Central, leaving there in 1906 to go with the McSherry Manufacturing Company at Middletown, Ohio. He resigned from that company as assistant shop superintendent in 1909 to become shop engineer of the Canadian Car & Foundry Company at Montreal. He left his position with the latter company in 1912 to become mechanical engineer of the Canadian Northern. In 1916 he was appointed to a similar position with the Illinois Central in charge of car work, from which he resigned to accept the appointment as noted above.

Railway Officers in Military Service

W. H. Wharton, commercial agent of the Nashville, Chattanooga & St. Louis at Chicago, has been commissioned first lieutenant in the ordnance department of the United States army for transportation work.

Obituary

W. A. Newell, commercial agent of the St. Louis Southwestern at Chicago, Ill., died in that city on January 23.

Carlton Hillyer, formerly from 1870 to 1914, auditor of the Georgia Railroad, died at Augusta, Ga., on January 17, at the age of 74.

C. A. McLeod, vice-dean of the faculty of applied science of McGill University at Montreal, Que., died in that city on December 26. He was professor of geodesy and surveying and had charge of McGill Observatory. He was born at Strathorn, Cape Breton, N. B., in 1851, and his first engineering work was done while in charge of section construction on the Intercolonial, following which he was resident engineer on construction of the Prince Edward Island. He was charter member of the Canadian Society of Civil Engineers and served as secretary for twenty-five years, holding that position at the time of his death.

EDITORIAL

Railway Age

EDITORIAL

By way of expressing their disappointment that the Railroad Wage Commission apparently does not intend to consider their "request" or "demand" or "proposition" for increased wages entirely as an ex parte proceeding, W. G. Lee, president of the Brotherhood of Railroad Trainmen, and A. B. Garretson, president of the Order of Railway Conductors, at the hearing Tuesday charged railroad officers with "laying down" and deliberate inefficiency in an effort to make a failure of government control of railroads and to increase the overtime payments to discredit the Adamson eight hour law. It is easy to make such general charges unsubstantiated by any facts and they would not be taken seriously for a moment if it were not for the effect they may have on those who are as uninformed about the railway situation as they are about the character of the men who make such charges. If they were intended as a barrage fire to protect the charge being made by the brotherhoods on the Government's treasury they had an effect. They kept most of the newspapers from reporting the fact that Mr. Lee and Mr. Garretson are showing their patriotic desire to co-operate with the government by increasing the demands they had previously presented to the railroads by a new demand for time and one-half for overtime, just as it was predicted they would do when they withdrew a similar demand at the request of the President at the time of the eight-hour controversy. Without attributing to railroad officers any more than their fair share of patriotism it is perfectly evident that any effort on their part to discredit government control by any failure to do their best would be the most short-sighted kind of policy, sure to react on railroads themselves, and the Adamson law is not now an issue. Mr. Garretson said that employees are "not engaged in giving a demonstration of what a failure government operation is," but some of their leaders are giving demonstrations that loyal employees ought to resent and they doubtless will do so until the charges are either proved or retracted.

The opportunities of the railroads for getting good deliveries on new freight cars was called attention to in the January 4 issue of the *Railway Age*. During the past month no cars have been ordered by the railroads and of inquiries for about 2,500 cars only 1,125 have come from railroads. While at present every

Order Cars Now for the Future

railroad man's attention is taken up with the severe congestion due to a lack of sufficient motive power, thought must be given to the car situation eight or ten months hence. There are about 2,600,000 freight cars in service on the railroads today. Assuming 15 years to be the average life of a car, there will be required about 173,000 cars for replacements alone, to say nothing of increased business requirements. During the past 17 years, over which period records have been kept, the number of cars ordered amounted to 2,784,662 or 163,803 cars per year. During the past five years the average number ordered amounted to 117,242 or 46,561 less than the average. This shows that our railways have for five years been short of new cars. Something must be done, and be done quickly, to make up this deficit. The car builders were never in a better condition to supply equipment than at the present. At the first of the year there

were about 40,000 cars on order for completion. Working at maximum capacity, this number should be completed within the next two or three weeks. Under ordinary conditions it takes about three months before deliveries are made after the order is placed. At present it might take longer, so that cars ordered now probably cannot be delivered before the early summer. If they are not ordered now and all road delay taking action until summer the demands will be greater than the car builders can meet. It is far better from a purely economic standpoint—and the economic situation is vital to the country at the present time—to place the orders now, so that the builders will be permitted to regulate their output and systematize their forces so that an even, efficient production can be made. The matter cannot safely be overlooked. The power situation bids fair to improve materially within the next three months because of new locomotives being received. If the railroads are not careful, a car shortage will be as serious next fall and winter as the locomotive shortage is today. Order the cars now and do not let it be said nine months hence that a lack of foresight precipitated a great car shortage.

A note in the *Railway Age* of January 4 announced that four Spanish railways, the Northern, The Madrid, Saragossa & Alicante, and the Andalusian, and the Madrid-Cateres had joined in a venture to make locomotives. There is more behind this announcement than was at first apparent. These four com-

Spain Has a Locomotive Shortage

panies will help raise about \$5,000,000 for the extension of a large machine shop in Barcelona, "La Maquinista Terrestre y Marítima" to enable it to build locomotives now very badly needed in Spain. The Spanish railway situation is exceedingly bad. The locomotives and cars of many of the roads, and particularly those of the Northern Railway, were considerably damaged in the two recent severe strikes and ill-usage has further added to their deterioration. Material for repairs are next to impossible to obtain, it has become exceedingly difficult to get good coal, and to cap the climax there is a much greater traffic to handle than usual. The last is the result of the withdrawal of coastwise shipping for other purposes and an increased traffic in Spanish mined coal. The difficulty of obtaining coal from England has made it necessary to rely on the inferior Spanish coal, but even that has not been sufficient, and there is now a severe coal shortage. None of the railways has a month's supply on hand, and shipping rates are so high that coal is to be obtained from England only at a price in Spain of no less than \$85 a ton. The Madrid, Saragossa & Alicante, which owns its own mines, is unable to produce a sufficient supply and its average price for coal in 1917 approached \$25 a ton. Naturally, passenger service has been reduced wherever possible, but that has not been sufficient. The new plant mentioned above is expected to be able to supply the entire demands of the Spanish railways. Some years ago the same interests embarked on a similar project but had completed only 15 locomotives—the only locomotives ever produced in Spain—when German competition put an end to further progress. In fact, the Northern and the Madrid, Saragossa & Alicante roads imported 915 German engines from 1910 to 1913 and German locomotives held control over the market. The progress of this new locomotive building venture

will be watched with interest in America. We, too, have essayed to sell locomotives in Spain and have received orders for 87 since the beginning of the war, the principal orders including 25 twelve-wheel locomotives for the Madrid, Saragossa & Alicante in 1915; 15 Mikados for the Northern Railway in 1916 and 40 Mikados also for the latter road in 1917. Spain has about 2,500 locomotives and 50,000 freight cars. American railway supply houses can undoubtedly look forward to doing a business in this market in the future, but they will not be able to make the most of their opportunities there until the shipping situation improves.

The Screw Spike Situation

THE PUBLICATIONS of the American Railway Engineering Association contain two very interesting and instructive articles on the use of screw spikes in track construction. In bulletin No. 175, dated March, 1915, G. J. Ray, chief engineer of the Delaware, Lackawanna & Western, described the experience of that road with screw spikes after observing the results with over 12,000,000 screw spikes in service for periods up to five years, and stated that "as a whole, the screw spike installation has proved very satisfactory, and no conditions have developed such as to cause any doubt about the ultimate success of the undertaking." In bulletin No. 200, dated October, 1917, and issued within the last month, W. C. Cushing, chief engineer maintenance of way of the Southwest System, Pennsylvania Lines, outlined the results of experiments which have been conducted by the Pennsylvania under the direction of a committee of the chief engineers of the constituent lines of the system. In this bulletin the committee reports that "screw spikes have no advantage over nail spikes."

This marked conflict in ideas regarding as important an item of track construction as screw spikes deserves careful consideration. In the first report the conclusions were drawn after extensive service with large numbers of spikes in tracks carrying a heavy traffic. The more recent report of the Pennsylvania is based on studies of limited installations, but it carries much weight because of the long established reputation of this road for the thoroughness of its tests.

Before undertaking to discuss the conflict in these conclusions, it is well to note the results which are being secured on the roads which are using screw spikes in the largest numbers. The Lackawanna is the largest user of screw spikes, having employed them exclusively on new construction as well as on maintenance work for several years and now has approximately 17,000,000 of them in service in connection with about 7,000,000 flat bottom tieplates. With three years additional service since the original report was written, no defects have come to light which would lead the officers of that road to change in any way the conclusions published in 1915. The New York, New Haven & Hartford started with an experimental mile of screw spike track in 1907, and has since extended the use of this fastening on the four and six-track main line between New York and New Haven until over 300 track miles are now laid with this form of construction, with tieplates and creosoted ties. A report from this road states that "so far the screw spikes have been entirely satisfactory." The Atchison, Topeka & Santa Fe is another road which has had an extensive mileage of screw spike track in service for periods up to ten years, and while the officers of this road do not feel that their use has progressed far enough to warrant a final conclusion, it is stated that up to the present time none of this track has developed the results shown by the Pennsylvania. The experience of these three roads, which have used screw spikes in the largest numbers, does not therefore bear out the conclusions reached by the Pennsylvania in its tests.

Railway engineers have had two objects in mind in considering screw spikes—their service as track fastenings, and

their effect in reducing the destruction of the ties. While their function as track fastenings is of primary importance, their economy comes about primarily because of their protection of the ties from the destructive action of the ordinary cut or nail spikes. The Pennsylvania appears not to have considered this advantage of the screw spike as it confined its report almost entirely to the service secured as a track fastening in spite of the fact that it is the other object which has led to the introduction of the screw spike in most instances. The Santa Fe has been a pioneer in the use of screw spikes and in the treatment of ties in this country, and has a larger number of treated ties in the track than any other road. It has likewise given more careful study to the causes leading to the destruction of ties. In common with other roads it soon found that ties can be treated against decay to give them a life far beyond their ordinary mechanical life, which is limited by the deterioration about the rail seat caused by nail spikes and the cutting of the rail. The screw spike and the flat bottom tie plate of ample dimensions have been developed to arrest this deterioration and to give to the tie a mechanical life equal to its resistance to decay. By ignoring this condition, which led to the original introduction of the screw spike, it is not surprising that the Pennsylvania arrived at the conclusion presented in the recent report. In fact, it is doubtful if the screw spike would ever have received serious attention on any road if its efficiency as a track fastening was the only consideration involved.

We hold no brief for the screw spike, but we do not believe that it should be discarded on the strength of the tests made on the Pennsylvania which, while conducted with care, were limited in scope as compared with the extensive service which the screw spike has rendered on other roads. The continually increasing cost of ties makes necessary the adoption of all practical means for increasing their life, because of the reduction which can be effected in the outlay for ties, the duty of the railways to assist in conserving the supply of timber, and the saving in labor which results from less frequent tie renewals. The screw spike requires a more expensive form of track construction than the cut spike. For this reason, its use is probably limited at present to those lines of heavy traffic where the destruction of the track is the greatest and the cost of maintenance correspondingly heavy. It is entirely possible that the further development of track construction may lead to important modifications of the screw spike, or to its entire replacement with some more suitable device. At the present time, however, it possesses certain advantages which warrant serious consideration by railroads of the class just mentioned.

Making a Revolution While You Wait

DO ANY MAN ever completely change, his mental attitude and the habits of a life-time on a day's notice? Books dealing with religious experience tell us of such cases. But they are very rare. Converts often revert to their original condition of weakness and sin, simply because habit in most adult folks is so strong that it is almost impossible to overcome it.

All the officers of all the railways of these United States are now being asked to do this thing which most people find impossible. They have been taught and forced throughout their business lives to compete. They have been taught to compete by those who have trained them and directed their work, and forced to do it by the laws and the courts of the land. They have had to struggle hour after hour, day after day, year after year, to hold business for their own companies and to get it away from their companies' competitors. Getting business has been the sure road to promotion; losing it, the sure road to separation from the pay-rol.

Wearied of the struggle, they have sometimes tried to mitigate the fury of competition by agreements and combina-

tions, and then they have been stirred to renewed energy in the competitive struggle by the threat of fines, jail sentences and other pleasant things. Competition in consequence, has become with railway men a point of view, a mental attitude, an ingrained habit. They have competed in making showings of efficiency in the operation of the various lines, competed in soliciting business, competed in rendering service, competed at all hours of the day, and often into the hours of the night, competed by taking thought until finally most of them got so they competed automatically.

And now suddenly all is changed. They are told by superior authority that they must utterly desist from competing. They are no longer working for individual companies, but for a single consolidated railway system. Their duty now is not to hold or get business, but to direct it over the lines and through the gateways most able to handle it. They must forget entirely that they are on the payroll of some individual road, and by the utmost "cooperation" and "coordination" move the largest possible volume of traffic over all the railways of the United States.

It is not only desirable, but absolutely necessary, that railway men should be asked and required to make this sudden revolution in their mental attitude and habits. The demands upon railway service, especially in Eastern territory, have become so vast that, even with the most efficient management and operation of the railways the supply of transportation cannot be made sufficient. In order to make it as near sufficient as possible it is necessary to operate the railroads as a single system. Only in this way can all lines and facilities be utilized to their utmost capacity. The old time competition is absolutely inconsistent with the operation of all railways as a single system.

Can the railway officers of the country accomplish the feat of changing their mental attitude and breaking the habits of a life time on such short notice? Can they cease trying to make good showings for their individual lines, and suddenly devote themselves exclusively to making the best possible showing for the railways of the United States, regardless of the effect on their individual lines? This they must do if the present plan of operating all the railways as a single system is to be a success. If it is not an entire success railway officers, whether justly or not, will get most of the blame. Their own welfare, the future welfare of the railways, the future welfare of the nation, demand that they shall break with all their business predilections, prejudices and habits and do all they can to make it a success, and a great success.

A good many years ago a very young man asked a very wise man: "What is the chief qualification of a man for practical success in life?" The wise man replied, "Adaptability." There are a lot of other qualities that are important; but there is none which it is more important for railway officers to show in the present crisis in railway and national affairs. They are confronted by new conditions of unprecedented complexity and difficulty. Also, they have a new boss. He is the Director-General of Railroads, and he represents the government of the United States. He is a boss with a tremendous power. But he has not shown any disposition to abuse it. He has shown a disposition to treat everybody decently, to give everybody a fair chance, and to avail himself of all the energy, experience and brains in the railroad business. But he has some very decided opinions as to how the railroads should be run while he is in charge. He has not got his experience in the hard school of railroad competition, and he thinks of the railroads as a single system and expects others to thus think of them and act accordingly. As applied to the present crisis the fundamental idea of the new boss is sound; and he should receive unstinted support in carrying it out.

Meantime, the new boss and the public should be patient. They are asking a great deal of railway officers when they ask them to change the mental attitude, the habits, the

practice of a lifetime. If there has been too much competition in the railroad business the public, with its Sherman law and anti-trust law, has been unable to blame. No other class of men is more sincerely anxious to serve the government in this crisis than railway officers. But they are being asked to revolutionize their business habits and methods under conditions of the greatest pressure and turmoil. They will accomplish the revolution just as quickly as any other class of men could. But if they don't accomplish it in a few days or even a few weeks, people shouldn't find fault.

Some charge that railway officers are deliberate "long down," that they are not trying to make the present government control a success. Those who are making this charge haven't tried to ascertain the facts, or they deliberately lie. Railway officers are as patriotic as any class of American citizens; and every patriotic citizen recognizes that any man, who, under present conditions, could even hope that government control would be a failure, ought to be in the East House, worth. But it isn't easy for a whole class of men suddenly to change business habits and methods which have become almost as natural to them as breathing and eating.

Making of Rates Under Government Control

THERE HAS BEEN a good deal of discussion before the congressional committees at Washington as to whether under government control rates should be regulated by the Interstate Commerce Commission or by the President through his deputy, the Director General of Railroads.

Who shall fix the rates is not so important as how they shall be fixed. Some witnesses who have appeared before the committees have contended that rates should not be increased to cover advances made in the wages of employees to offset increases in the cost of living due to the war. This raises a very important question of public policy. It is possible that the present freight and passenger rates will prove high enough to enable the railways during the war to earn enough to pay their operating expenses and taxes and the government guarantees to the railway owners. But this does not seem probable.

The advances in wages asked by the various classes of employees would run into hundreds of millions of dollars. Furthermore, the current high prices of railway equipment and supplies will have a greater and greater effect on operating expenses as equipment and supplies bought at the old prices are replaced to a larger and larger extent by those bought at the present high prices. It is not probable that government control will be able to effect sufficient increases to offset the increases in expenses which will result from these causes. Therefore, unless passenger or freight rates be high as advanced while the government is in control, the earnings may not be sufficient to pay operating expenses, taxes and the guarantees to the owners.

If present rates do prove inadequate to cover expenses, taxes and other items, should they be raised or should they be allowed to be increased at a point which would have to be borne by the transportation public? The main argument which has been advanced in some circles rather freely tended to prevent a decision that the government, however it might be controlled, should not be required to pay expenses incurred in carrying on the war.

If this argument is sound as applied to the railroad business, why should it not be used in reference to other businesses? War conditions have increased the cost of operating the firms. On the theory under consideration, instead of the prices of firm products being increased in order to offset the high cost of firm costs, the prices of firm products should

be held down and the farmers should be reimbursed for their increased expenses through taxes levied upon the public. Similarly, there have been large increases in the cost of mining coal and of producing iron and steel. On the theory under consideration instead of the coal operators and the iron and steel manufacturers being allowed to charge higher prices than before the war to offset their increased expenses, they should be required to reduce their prices to the pre-war basis and then the public should be taxed to reimburse them for their increased expenses.

Everyone would say at once that it was absurd to suggest that instead of prices in the various industries of the country being raised to offset increased expenses the public should be taxed to reimburse concerns of all kinds for these increased expenses. But if it would be absurd to propose that the public should be taxed rather than that prices should be raised to offset increases in the cost of production in other lines of business, why is it not absurd to contend that the public should be taxed rather than that rates should be raised to offset the increased cost of producing transportation?

Either those who would have to pay increases in rates to offset increases in railway expenses are the same persons who would have to pay taxes levied for the same purpose, or they are not the same persons. If they are the same persons, then it would make no difference whether rates or taxes were increased. If, on the other hand, the ratepayers and the taxpayers would be different persons, the argument in favor of raising rates rather than taxes is conclusive. If the rates were raised those who use the service of the railways would pay the increased expenses in proportion to the amount and value of the services which they receive. On the other hand, if taxes were increased there would be no equitable relationship between the amount and value of the railway service rendered to individuals and concerns and the increased taxes they would have to pay because of the increased cost of rendering the service.

As a practical matter, it is equally desirable from the standpoint of the railways and of the government that during the period of government control rates shall be made high enough to cover all operating expenses, taxes and fixed charges. The difficulty of solving the railroad problem after the war will be far greater if there is a wide difference at that time between earnings, on the one hand, and expenses, taxes and fixed charges, on the other, than if there is no such difference. If the railways are to be returned to the management of their owners, the problem of readjustment after the war will be much simpler if income and outgo are practically the same than if there is a wide difference between them. If government ownership should be adopted, government management would be undertaken under much more favorable auspices if it began with earnings which were adequate than if it began with a deficit to face. Even though there were surplus earnings when government ownership and actual government management commenced, there would be grave danger that the surplus would speedily be converted into a deficit; and if government ownership and management should begin with a deficit, the chances are that there would always continue to be a deficit for taxpayers to pay.

The only sound policy to adopt either now or later, whether under government control or government ownership, will be that of making the rates and earnings sufficient to cover all expenses and fixed charges. Under existing law, however, the Interstate Commerce Commission is not required to regulate rates on this principle. All it is required to do is to fix "maximum reasonable rates." This requirement is susceptible of different interpretations. If the power of rate regulation is to be reserved to the commission it should be allowed to fix the relations between different rates as it deems fair, but at the same time it should be required to make rates as a whole high enough to cover all expenses, taxes paid from earnings and guarantees to the companies.

The Executive Versus the Judiciary

IT IS A NICE QUESTION as to what portions of the assets of the Denver & Rio Grande are actually in the hands of receivers. Judge Sanborn on January 26 appointed A. R. Baldwin, vice-president of the Western Pacific, and E. L. Brown, president of the Denver & Rio Grande, receivers, but he in substance left it up to the director-general of railroads' office to say what they were receivers of. The President's proclamation of December 26 contains the following:

"Except with the prior written assent of said director, no attachment by mesne process or on execution shall be levied on or against any of the property used by any of said transportation systems in the conduct of their business as common carriers, but suits may be brought by and against said carriers and judgments rendered as hitherto until and except so far as said director may, by general or special orders, otherwise determine."

The Equitable Trust Company as trustee for the first mortgage of the Western Pacific, which is guaranteed principal and interest by the Denver & Rio Grande and on which interest is in default, having brought suit against the Denver & Rio Grande as provided in the mortgage, asked for the appointment of a receiver. When the case came before Judge Sanborn in Denver last week the director-general of railroads' office sent a telegram which was read in court, which said in substance that in view of the President's proclamation, the director-general's office thought it was not necessary to be represented before Judge Sanborn, assuming that the only attachment granted would be on such assets as were not used in the business of transportation and that the attachment would not cover revenue or income received since January 1. Obviously this left an opening for the court to define what assets were covered and what were not covered by the President's proclamation, but whether or not the director-general's office hoped that this burden would be assumed by the court it is impossible to say. Whatever the hopes may have been, however, the court promptly passed the question back to the director-general's office in accordance with the well established traditions of American courts. Judge Sanborn made a comprehensive order differing in some respects from the usual order made when a railroad is placed in the hands of receivers, but in the main much like the usual order which if it had not contained a final proviso would have apparently placed an attachment on the whole property. This final clause in substance said that the above order applied to such property as the director-general's authority did not prevent an attachment from applying to. And there you are, as the saying is.

Time and again in this country the legislative branch of the government has tried to pass some law or other in such form as to shift to the shoulders of the Supreme Court the responsibility for making effective the intentions of one or other of two contending factors, neither of which was willing to take the responsibility of drawing a bill which would make their intention unmistakably clear. The commodities clause of the act to regulate commerce was such a law. The Supreme Court in cases like these has nearly always refused to assume the responsibility which belongs to the legislature. Judge Sanborn's receivership order similarly refuses to assume responsibility which apparently he believed attaches to an executive order. There is a touch of humor to the whole thing, serious and delicate as are the questions involved.

The Denver & Rio Grande-Western Pacific tangle is just about as complicated a legal and financial situation as could be found, or in fact as has occurred in the history of American railroads. It seems just a bit tough on the director-general's new organization to throw that kind of a situation at it; still we have learned to accept the fact that courts deal in justice, not mercy.

Letters to the Editor

Reducing Loss in the Transportation of Perishable Freight

CINCINNATI, Ohio.

TO THE EDITOR:

There is much said relative to the agricultural end of perishable freight—farming methods, the centralization of packing houses, loading, marketing, etc.—but little recognition is given to the important factor of refrigeration and ventilation of perishables when shipped. The wastage in food products in transportation is attributable to three causes:

1. The failure of originating shippers to give definite instructions concerning icing, non-icing, ventilation, etc., which properly would protect the shipments.

2. Delay caused by reconsignment and the failure of the shipper to advise what protective service is to be given beyond the reconsigning points and during the time the car is held.

3. Failure of the carriers to furnish protection in accordance with specific instructions, or to furnish sufficient protection when shippers do not request definite service.

To offset these various causes which result in wastage, it is necessary to have transportation specialists who are thoroughly familiar with the fundamental principles of protective service. To attain the maximum results each employee concerned must be trained and recognized as an expert in his particular line, and able to perform such accessorial protective service as directed through the main office. Every trainmaster, agent, yard clerk and trainman must be a student of the principles of protective service, as all share in the responsibility for the safe movement of food products. On the Cleveland, Cincinnati, Chicago & St. Louis, such employees receive instruction at periodical terminal meetings and classes, written bulletins being issued from time to time, defining their respective duties. Our efforts in the prevention of perishable freight wastage have been confined largely to the application of an analysis of the following factors governing damage to food products in transit:

- (a) Inherent depreciation
- (b) Refrigeration
- (c) Ventilation
- (d) Heating
- (e) Movement
- (f) Loading, stowing and unloading

An absolute record is taken at all terminals and junction points of every car of perishable freight passing over Big Four rails, showing full information as to refrigeration and ventilation, etc., and what accessorial service is given. Such records are checked through at the central headquarters to take the necessary action to eliminate negligence and errors. Our results so far have been very gratifying. Proof of the elimination of wastage is indicated by the fact that freight claims for damaged perishable freight on account of improper refrigeration and ventilation alone were 53 per cent less in 1917 than they were in 1916. We are enabled through these methods to handle long distance shipments and place them on markets in first class salable condition.

Constant changes in operating forces of railroads, especially under the present stress of circumstances, paves the way for increasing failures, but what we have accomplished through united effort, for economic reasons, we shall make every effort to continue for the all-important reason of patriotism.

C. W. HICKS,

Senior Assistant, Refrigeration Service,
Cleveland, Cincinnati, Chicago & St. Louis

Standardization of Buildings

LOCKPORT, Ill.

TO THE EDITOR:

Does the commercial building unit offer a solution for speeding up railroad building construction? Small railroad buildings, and to some extent more recently large ones, have been standardized. The object is to standardize the construction as it applies to essential details, leaving the question of arrangement to be decided for each building. For instance, such a plan permits pre-fabrication of the steel roof trusses, girders, columns and lights. The doors and washes may be bought on an annual contract, and the lumber and roofing may be held in stock. Such a plan also permits enclosing a building in the minimum time after which almost any interior arrangement and finish may be installed to suit the local conditions.

The larger railroads have highly organized building departments competent to design their structures, but unfortunately these departments operate on the same basis as a consulting engineer or an architect, and endeavor to design and construct a building to suit the department that is to use it. After all, building design for shop or warehouse purposes is largely a question of floor space and daylight lighting. How the result is obtained is non-essential as long as the cost is within practical limits and the type of construction and workmanship give long life at low maintenance. A standardized design based on the best practice will, of course, produce that result just as well as a special design.

Several standard building units will undoubtedly be necessary for railroad purposes but when they are adopted the principal part of the designing is done and the essential materials may be ordered immediately. On the other hand, if a special building is used the designing department must finish its part before the plans can be approved and the material ordered. This requires time and costs money, both of which are saved with a standard building unit. Special designs also entail construction delays, higher priced materials, and waste, all of which add to the building cost. The railroad building problem would be greatly simplified if the engineering department could submit several standard building units from which one might be selected. The finished structure could be visualized quickly and frequently in concrete form, where structures of the kind in question had been built.

An investigation of a large number of railroad buildings designed for different services shows that with a few notable exceptions, their width and type could be standardized. For instance, outboard freight houses are almost uniformly 30 ft. wide inside. Combined inboard and outboard houses are for the most part 50 ft. wide. This is also the width generally used for storehouses and a number of other buildings. In connection with any of these buildings there does not seem to be any objection to a 20 ft. column spacing. With these factors fixed, the roof trusses and framing can be standardized. The question of load room can be decided at the time a building is decided upon as fabricating the columns is a relatively simple proposition which can be done quickly.

The roof construction is important but a standard can readily be adopted which will give the best service for the money involved. To a certain extent the type of roof used will depend on the slope, length of the trusses. Slaters and doors should be of standard sizes, and of either wood or steel preferred. A readily obtainable one can be purchased under an annual contract. These and other matters that need not be fixed until the building operation is completed if a standard is adopted. Platforms and canopies for the end clearances should be left until after the main walls. They will save the building a certain amount of flexibility in

overall width in meeting track and driveway clearances. In other words, a foot or two in the platform width will affect the building cost but little, and may mean much in track clearances. Floor and platform heights above rail and drive-ways vary with localities but this should not affect the standard. The design of the foundations must necessarily vary with soil bearing power conditions.

So much for a standard freight house unit and its essential details. These, it appears, can be standardized and used in most locations. With a standard design the usual benefits follow, such as a standard bill of material, much of which can be stocked where the annual building program is sufficiently large to warrant such a policy. Standard design also permits improvements in the workmanship without sacrificing speed in the various operations. When mechanics are familiar with building details, supervision is simplified and the work of the man in charge may be confined largely to inspection. In other words all building operations may be standardized. With the design and specifications prepared in advance this time and cost is saved. Contractors familiar with the standards are prepared to furnish bids on short notice, and if competition is keen, a low price will be obtained, because the prices can be based on actual experience. Similarly, if a structural shop has its shop details prepared in advance it is in a position to make a close figure. This, in turn, means scheduling the job in the shop when it has been placed, rather than awaiting such time as may be necessary to prepare a design as is frequently required, and later working out the shop details.

In scheduling a building operation alone, the standard building unit is a great asset. With the material and labor quantities pre-determined and the contingencies provided for, the building can be definitely scheduled and finished on or ahead of time. This means much to a railroad and everything to a reputable contractor. In expediting the movement of materials to the building site, every one who has anything to do with it is on a railroad basis, where time is the essence of the operation. Literally thousands of details take care of themselves automatically, or may be left to the subordinates.

A 50-ft. building unit undoubtedly could be substituted for a number of smaller shop buildings. In the latter, however, a change in the column height would be necessary, and in many instances, provision would have to be made for traveling cranes. In general, other shop buildings, such as wood mill, wheel, machine, forge and boiler shop buildings vary in width from 60 ft. to 80 ft. In some cases clear spans are adopted and in others a row of columns is not found objectionable. Frequently the objections are theoretical rather than practical and the increased cost of a clear span over a line of columns is not warranted. An erecting shop, or a locomotive repair shop presents a different problem which must be treated in a special way. Even in these, much time and money can be saved by using standard material sizes in the design. Waste is reduced to a minimum and much labor saved in assembling and erecting.

In the final analysis, the present railroad building problem is one of speeding up production. Railway organizations have been depleted so that the time is fast arriving when their entire attention must be directed toward keeping the railroad in operation. Traffic, transportation and mechanical facilities must be expanded to cope with the emergency situation. Construction must be speeded up, and standardized building designs and operations will afford one means of accomplishing that result. Another is to contract both the design and construction to specialists who are able to shift their forces from one railroad to another, thus using the labor available for building operations, most economically and efficiently.

E. M. HAAS,

Sales Engineer, The Austin Company

The Valuation of Ties

NEW YORK CITY.

TO THE EDITOR:

The docility of figures, caught young and skilfully broken, has been often noted, but in the letter on "Average Life of Ties" published in your issue of January 11, we must admire more the ingenious illustrations that such figures are brought to support. Take the last example: two kinds of ties, having lives of 5 years and 15 years, respectively. Assume that 15 ties of each kind are placed in track. At the end of 5 years the first set, having furnished 75 tie-years, must be replaced, and in 15 years the second set, with 225 tie-years to their credit, go likewise. Thus the 30 ties yielded 300 tie-years, or an average of 10 years per tie—the average total service age being, as might be expected, the same as the average of the lives at first assumed.

As a railroad man the writer believes that in railroad valuation we should press our valid claims and avoid hypotheses that cannot be justified or demonstrated. We should strive for a fair and adequate allowance for overhead costs. We should also by all means uphold the truth that if a property is maintained in good operating condition capable of affording proper service to its patrons its value as a basis for rate making cannot be diminished on the plea that there is some accrued loss of service life in its elements. Its value for this purpose must in justice always remain the full value of the investment the concededly fair measure of which is the reproduction cost new. This cannot be decreased or impaired on account of the natural physical changes in such a property.

It is a strange mental aberration of many courts and commissions, and I regret to say also of some engineers, that because the wearing life of ties in a piece of track will, after a time, average 50 per cent of the original life, and will continue so indefinitely with proper maintenance, therefore a fund or its equivalent equal to the 50 per cent of expired life, which fund could never be used on the ties, should have been provided, or that 50 per cent of the investment in the ties should be struck off, in arriving at a value for rate making. The only justification for the creation of a reserve fund or its equivalent for renewals, in the case of an indefinitely continuing property, is where it is necessary to equalize the annual expenditures for maintenance and renewals. If earnings in the past were sufficient to have provided a fund equal to this 50 per cent. value, but such earnings were paid out in dividends, which was a perfectly sound economic and legal thing to do, it is not just or fair to penalize present security holders for the benefit of present rate payers because other rate payers in the past possibly paid too much.

It is encouraging to note that at least one state commission (Massachusetts Public Service) has seen the light and come out squarely for the right, and also that some of the courts are waking up and refusing to follow the vicious precedent of the Knoxville Water Case. We may confidently expect that ultimately the U. S. Supreme Court will reverse itself on this subject as it has reversed itself on some other matters.

J. W. BURKE.

SIAMSE STATE RAILWAY RETURNS.—According to a recently issued report of the operations of the southern line of the Siamese Government Railways for the fiscal twelve-month ended March 31, 1917, there was an addition of 178 miles to the length of the main line and of 33 miles in sidings, completing a total length of 642 miles of railway open to traffic at the end of this period, with through connection from Bangkok to Trang, Nakawn, Sritamarat and Singora. During the period under review the gross earnings amounted to \$770,908, or \$206,129 more than in 1915-16, yielding a dividend of 1.51 per cent, against 1.27 for the previous year. The total number of passengers carried was 1,661,111, an increase of 310,872.—*Commerce Report.*

Activities of the Railroad Administration

A Traffic Investigation Committee Appointed; the Congestion Continues; Other Developments

ON FEBRUARY 12, Director General McAdoo appointed a traffic investigation committee consisting of H. F. Windell, traffic director of the Union Pacific, G. F. Randolph, commissioner of the lines in official classification territory, and T. C. Powell, vice president of the Southern Railway. This committee is to make a study of the great traffic currents of the country with a view to seeing what steps profitably be taken in order to shift the traffic from the most seriously congested gateways to less congested gateways and from more congested ports to less congested ports.

The director general has explained to the committee that by reason of government possession and control the situation should be viewed from the standpoint of a national railway system consisting of all railroads, instead of as heretofore from separate standpoints of separate railroad companies. The committee is to deal with the larger questions affecting movements of traffic between the three regions and will not interfere with similar studies which will be conducted under each of three regional directors with reference to traffic moving within his part of the country. The members of the committee have been in conference with Edward Chambers, Mr. McAdoo's traffic adviser.

Severe Weather Conditions Hamper Railroads

The railroad administration and the railroads still continue to struggle with unprecedented winter weather conditions which have made it difficult to bring about much improvement in the eastern district, although the western and southern lines have generally reported conditions better than normal.

For the purpose of assisting to clear up congestion on the Pennsylvania east of Pittsburgh, the eastern roads have been ordered to contribute pro rata 34 locomotives to the Pennsylvania for a time.

The conditions in the eastern district during the latest cold wave are described in an article on another page.

Owing to the shortage and crippled condition of lighters and tugs and the physical condition in New York harbor, and for the purpose of speeding up the loading of ships, Director General McAdoo has ordered certain roads to assign their piers for the loading of ships. Details are given in our article on "Export Freight in Trunkland" in this issue.

R. H. Ashton, regional director for the western lines, reported on February 4 from Chicago: "Extremely cold weather last night which continues to day, has very seriously interfered with movement of both passenger and freight traffic. While there was no new snow, a very strong wind killed all this fall of snow and stalled a number of freight trains during night. Conditions in a part of territory had been so severe that it was necessary to annual passenger service where it could be done without great inconvenience to public and this will continue for a period of three or four days. It will be necessary to the regular service. This situation is necessary to take care of the annual passenger. Western business is being taken in very fair shape by western lines and extra efforts being made to move all cargo that are being received here through another territory. Generally fair and warmer weather reported for Kansas and Nebraska over a greater part of this forecast district. 74% increase in coal for loading and in principal coal carrying lines out of Chicago today—747 cars and loaded Saturday."

Mr. Ashton also forwarded a report as to operations of the Pacific Coast from William S. Smith, president of the

Southern Pacific, covering the movement of trains made in all harbor and without transients. There is some congestion of the Southern Pacific in the harbor.

Coal Production Curtailed

The National Coal Association on January 11 issued a statement declaring that year shortage and conditions primarily and aggravated by extremely severe weather conditions during virtually the entire month of January had curtailed production of bituminous coal throughout the country to an extent unequalled in many years and that this serious condition emphasizes the need of the embargoes already laid by the railroads to insure better movement of fuel and coal. Unless conditions improve it was stated it may be necessary to have an extension of these embargoes. A credit to the statement the lost production for the month was estimated at not less than 10,000,000 tons.

Grain and Corn Situation

A delegation of grain dealers and elevator owners called on Director General McAdoo to discuss methods of moving the western grain crop to the seaboard. They told him that there is no danger of a shortage in grain but that there are millions of bushels of wheat, corn and oats ready for shipment to the Atlantic seaboard if transportation can be provided and that if the wheat and oats now stored in elevators and warehouses along the western railroads could be moved out the soft corn, now in danger could be put into the elevators. Mr. McAdoo told them that if the way were cleared for acceptance at the seaboard the railroads could move at least a million and a quarter bushels of grain daily. He suggested the issuance of a priority order for soft corn but that was not what the grain dealers wanted.

Railroad Executives Not "Laying Down"

Mr. McAdoo has not permitted railway executives to "lay down" such as those made by W. G. Lee of the Brotherhood of Railroad Trainmen, that railroad executives are laying down in an effort to discredit government control of the railroads. He not only repudiates the interpretation of Lee but also the words are confronted with his long list of own acts of ascertaining what is going on and he knows that it would be the most shortsighted kind of policy on the part of a railroad man to disregard the fact he has with the aid of discrediting the government. Success of world wide the result is the national ownership. Mr. McAdoo refers to this country's ownership government control of railroad operation, the appropriate ownership of the railroads and he has repeatedly told Congress, men that with respect to the railroads and operations are abundant the subject of matter. He has covered every rail road and McAdoo's actions. He has covered the railroads of the country. They are being in public under the government ownership. He has been in the United States has been using the same words as those he has used and has been given with the demand of 1919.

Order No. 6 Not Clear

The railroad industry's greatest order has a serious interpretation and beyond question requires the immediate general compliance, attention and cooperation of every rail carrier. Government ownership has caused a great deal of preparation, and it is not clear what is to be done.

assumed that the traffic associations at least would have to be continued and these and various others have filed formal requests for permission with the director general which have been under consideration by his assistants.

The Director General's Organization

More or less uncertainty has also been caused by the delay in the announcement of Mr. McAdoo's permanent organization. Since the government took over the roads an increasing number of complaints and requests for cars or relief from embargoes, etc., have been sent to congressmen, who have had difficulty in finding out whom to see about them. Many requests and complaints of this kind that formerly went to the Railroads' Commission on Car Service or the Bureau of Car Service of the Interstate Commerce Commission are now sent to Mr. McAdoo, although the commission and the bureau have been merged and are working together much as they did when they were separate bodies co-operating with each other.

New members of Mr. McAdoo's staff have arrived almost daily and have gone to work, while the announcement of their appointment has been withheld until the organization was completed. Edward Chambers, Mr. McAdoo's traffic adviser, has been working out a plan for having an assistant for co-operation with each government department so that the traffic needs of the government may be co-ordinated. H. M. Adams, director of inland traffic for the quartermaster's department, was appointed by General Goethals, but J. F. Holden, is an assistant to Mr. Chambers in charge of relations with the Shipping Board. C. B. Buxton, who was Mr. Chambers' assistant in the traffic department of the Food Administration, is working with him in his new office. Gerrit Fort, passenger traffic manager of the Union Pacific System, is in charge of passenger traffic matters and R. C. Wright, traffic manager of the Pennsylvania, is also assisting Mr. Chambers.

H. T. Bentley, general superintendent of motive power of the Chicago & North Western, is assistant to C. R. Gray in charge of mechanical matters and an engineering assistant is also to be appointed.

Deposit Balances and Salaries

At the request of the director general the Interstate Commerce Commission has requested the roads to furnish promptly information as to the deposit balances to the credit of each company and of all subsidiary companies, and also as to cash on hand. Railroads have been asked also to file information as to the salaries of their officers, which Mr. McAdoo promised to furnish the Senate committee at the request of Senator Cummins.

Traffic to the Seaboard in January

IN THE FIRST MONTH OF OPERATION of railroads by the government the number of carloads of freight waiting at North Atlantic ports for export has been reduced by 7,508; or from 41,101 on January 1, to 33,593 on February 1. This and other interesting facts are found in a report prepared for A. H. Smith, regional director of railroads for the Eastern States, by the Freight Traffic Committee for North Atlantic ports, George D. Ogden, chairman, New York City. The report covers the six ports named in the table below:

The reduction in the accumulation of supplies for the Allies at the North Atlantic ports is due to two factors—first, the improvement in the coaling of ships and their consequent faster despatch; and second, the smaller arrivals by rail, because of adverse weather conditions and embargoes.

Railroad yard and pier congestion have been relieved and the ships have released more than 4,000 cars for active use.

The following table shows the number of carloads waiting on January 1 and February 1:

Ports	Jan. 1	Feb. 1	Dec.	P. C.
Boston	1,190	998	192	16.14
New York	24,971	19,723	5,248	24.02
Philadelphia	3,531	3,307	224	6.34
Baltimore	7,164	5,878	1,286	17.95
Newport News	1,653	1,284	369	22.32
Norfolk	2,592	2,403	189	7.29
All ports	41,101	33,593	7,508	18.27

The consignees of this export freight are classified as follows:

	Jan. 1	Feb. 1
United States Government	3,369	3,329
British Government	4,682	3,270
French Government	13,615	11,750
Russian Government	4,823	4,864
Italian Government	4,093	3,090
Commercial	10,519	7,290

More than half the freight held at the ports was lying on the ground, as shown below (February 1):

Consignee.	In Cars	On Piers	On Ground	Total
United States Government	1,387	495	1,247	3,329
British Government	1,504	1,168	598	3,270
French Government	857	916	9,977	11,750
Russian Government	56	263	4,545	4,864
Italian Government	619	557	1,914	3,090
Commercial	2,292	3,477	1,521	7,290
Total	6,915	6,876	19,802	33,593

The 9,977 carloads of freight on hand February 1 for the French Government listed as on the ground included munitions of war, which became out of date by the progress of modern warfare before they could be carried across the ocean. Permits have been issued for about 30,000 carloads of freight for the Allies to be brought forward to the seaboard as soon as room can be found for it.



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One of the Oldest Relics of the War

This engine was about to start for France late in August, 1914, with a number of cars, when a German shell broke one of the wheels. The cars could be taken through a side track, but the engine had to be abandoned. It has remained so for three years and a half standing near No. Man's Land at the entrance of what used to be Nieuport Gare. Note the camouflage curtain.

Hearings Before Railroad Wage Commission

Nearly All Classes of Employees Ask Higher Pay.
Forty Per Cent a Popular Figure

REPRESENTATIVE of practically all classes of railway employees have either presented requests for higher wages to the Railroad Wage Commission or have asked for a hearing for that purpose. In some cases they have referred to the commission the demands previously made on the railroads but in some they have asked from the government more than they had asked of the roads, while representatives of employees that had not asked the roads for an increase have appeared before the commission to present their case. In many cases the increase asked varies according to the requests made by individual groups of employees and there is no general request, while in some no definite request is made except for higher pay and shorter hours. Where a percentage increase is asked for 40 per cent seems to be a popular figure.

A. B. Garretson, president of the Order of Railway Conductors, and W. G. Lee, president of the Brotherhood of Railroad Trainmen, testified before the commission on February 5 on the joint demand of the two organizations for increased wages which was presented to the railroads on December 1, and which has now been referred to the commission. The hearing was set for Monday but Mr. Lee was delayed by a late train and Mr. Garretson said that as it was a joint movement he did not feel justified in proceeding alone.

The hearing soon brought out the fact that the trainmen, like the telegraphers, are already considering the possibility that the government would be a more benevolent paymaster than the railroads, when it was announced that the request to the government includes a proposition for time and a half for overtime which was not included in the demands presented to the roads. Mr. Lee said that because of the previous attitude of the railroad managers it had been considered useless to do so.

The joint request provides for increases ranging from 20 to 40 per cent. The desired rates are stated in what is known as proposition No. 65 as minimum rates per mile, per day or per month for the various classes of service. The proposed rates were published in the *Railroad Wage Gazette* of December 7.

Objects to Presence of Railroad Men

The controversial atmosphere which has usually surrounded wage negotiations in the past became evident at the outset, when Mr. Garretson remarked on the presence of numerous railroad officers who have taken an active part in wage negotiations in the past, including J. W. Higgins, chairman of the Association of Western Railways, and J. G. Walber, of the Bureau of Information of the Eastern Railroads. He said he had understood from the President and

the Director General that the Brotherhood was to deal only with the government and that there was to be no "other side." We do not intend to take the position of discussing this question with our former employer," he said.

He was informed by Chairman Lee of the commission that he had not understood that in a private proceeding was contemplated and that the railroad men had been invited to be present and to give such information as they could. Mr.

Garretson objected to information being presented by the railroad, without an opportunity to question it and Mr. Lee said that after the administration had asked for their cooperation and had recognized in principle the increased cost of living as a justification for higher wages they had abandoned their efforts to compile data as for an arbitration proceeding and had thought that government statistics showing the increased cost of living would be sufficient. Judge Covington said that the railroad officers had not been invited to appear as a committee or to antagonize anyone but to supplement the information presented and that if the brotherhoods find anything in the record to correct they will have an opportunity to do so. Mr. Lee asked the commission to excuse him for being suspicious but that he had been dealing with railroad officers for half a century and he charged that many of them are "laying down" and deliberately trying to make a failure of government control. He mentioned particu-

An Atrocious Charge

Eighteen months ago four social bandits, at the head of four railway men's organizations, threatened to paralyze the whole industrial life of the country by calling a general strike of railway men. It was a hold-up of a nation, by promising what President Wilson characterized as "an unspeakable calamity."

Yesterday one of these four men, Warren G. Lee, president of the Brotherhood of Trainmen, made the charge before the Railroad Wage Commission that in this hour of a nation's deep need four bankers of New York had ordered engines to be left to freeze while millions suffered for lack of coal.

The hiss of loyal labor, millions strong, should follow the exit from Washington and from public notice of this vile traitor, this poisoner of more ignorant minds.—New York Tribune.

larly the New York Central Railroad and the Pennsylvania Railroad.

Trainmen Are Piece Workers

Mr. Lee read a prepared statement regarding the wages and conditions of employment in train service, saying the men have never been paid what they were worth but only the least they could be got to work for. He read comparative statistics of wages in other industries, principally the steel industry, and apologized for the conservatism of his organization as compared with that of trade unions, saying that so much machinery was required to obtain an expression of the wages of the men that they often spent a year in discussion before their strike. He explained the extra living expenses which trainmen pay because they are away from home and read some letters from men earning \$80 to \$100 a month giving their living expenses, with comparisons of 1917 with 1914. There has been no increase in wages since that time, he asserted, except in a few instances, and he demanded the American Way as a factor in respect to laying the double effort had been to increase overtime payments during a year of unusually heavy traffic. A piece of \$3.07 a day for a fireman in 1917, he said, was

only equivalent in real purchasing power to \$1.39 in 1913.

In urging the time and one-half for overtime Mr. Lee said it was necessary to prevent unreasonable hours of work and he paid his respects to the practice of running long trains.

Chairman Lane and Judge Covington of the commission interrupted a discussion of the complicated wage schedules to ask how the men would consider abandonment of the mileage system of payment and the substitution of payment by the day.

"You could do nothing that would stir up such a hornet's nest," replied Mr. Lee. "You can't afford even to consider it if you want to promote harmony and the co-operation of the men. That would upset the whole plate of beans."

"I understand that to be your attitude," said Chairman Lane, "but, why should that be so, if you are assured adequate wages?"

"If the men got a substantial increase would they be captious about the method?" asked Judge Covington.

Mr. Lee replied that they would, that the mileage basis was the foundation of the schedules, and that as the railroads are paid by the mile for their service the men were entitled to the same principle. The roads might try to run a man 200 or 300 miles in a day, he said, or might even try to make a man work a full eight hour day in case he completed his run earlier.

"I am merely suggesting it," said Judge Covington. "I don't know that it would be wise at this time to try to interfere with your highly complicated schedules, but why isn't it in the public interest to make as many miles as possible provided you get adequate pay on the time basis?"

"We are piece-workers," said Mr. Lee, "and you would find the men in the munitions plants if you ever tried it."

Station Agents and Station Employees

E. H. Norton, representing the Order of Railway Station Agents, asked for a basic eight-hour day with time and a half for overtime and increases in wages. He described the conditions of work of a station agent, saying that 50,000 of them are practically strangers to their families because they have to work such long hours. He said a station agent has to be a business man, a diplomat and an expert accountant and that he should be considered on a par with the postmaster in his town, who, he said, usually has a much larger force than the station agent, works only eight hours a day and receives higher pay. The station agent devotes one-third more time to the business of earning a living than the average business man or government employee, he said.

P. J. Coyle, grand president of the Brotherhood of Railway Station Employees, representing baggagemen, station cleaners, freight handlers, checkers, etc., asked for a general 40 per cent increase and a higher percentage for the lower paid men. He said that at one station employing 90 to 110 men the "turnover" was so great, caused by the men leaving for other work, that in two months 1,400 men had been on the payrolls.

D. W. Holt, grand chief of the Brotherhood of Railroad Signalmen, spoke on behalf of the men who install, maintain and repair signal apparatus, reading letters from men in various parts of the country outlining their conditions. He presented the requests that had been filed with various roads.

Train Dispatchers

On January 29, G. S. Sandlin, of the Southern Railway, appeared on behalf of train dispatchers and asked for the increases named in a petition to Director General McAdoo which has recently been circulated among the various roads. The petition asked a monthly salary of \$235 for chief dispatchers, \$225 for assistant chief dispatchers, and \$215 for trick dispatchers.

A. J. Tatlow, of the Independent Order of Railway Employees, appeared on behalf of station agents, telegraphers, clerks and other employees.

Maintenance of Way Employees

T. J. Garvey, president, and E. S. Begg, general secretary of the Maintenance of Way Employees' Association, testified on January 30. Mr. Begg told the commission that the trackmen perform the hardest and most disagreeable work on a railroad and that they have very little chance for promotion. He said a track laborer can get higher wages as a common laborer than he could get as a section foreman after five to seven years of experience. Section foremen, he said, receive \$50 to \$95 a month and are subject to call 24 hours a day. The average track laborer, he said, is paid \$1.15 a day. "Why doesn't he go and get a better job?" asked Chairman Lane. Mr. Begg replied that there is a fascination about track work and railroad work of all kinds that seems to hold them until they are worn out, and he introduced a man who had been engaged in track work for 52 years. Few stay long enough to become foremen, he said. Out of a membership of 23,000 in the organization, over 3,000 have enlisted in the army or navy.

How the Investigation Is Being Conducted

In most cases the organizations presenting requests seek to represent all employees in their classes of employment and it is understood that the commission is prepared to accept this plan in general, but among many classes of employees that are not well organized there are overlaps, as where the employees in one section of the country belong to an organization of their own but those of the same class in another section belong to an organization that represents various classes. Many of the station agents, for example, are members of the Order of Railway Telegraphers, while some are members of the Order of Railway Station Agents, and others are not members of any union.

The investigation is being conducted along entirely different lines from an arbitration proceeding and the commission is by no means depending upon the facts laid before it by witnesses at the hearings. Its boards of statisticians and examiners are studying all the available statistics that have already been compiled by government and other agencies, both with a view to reaching a conclusion as speedily as practicable, and for the purpose of studying the relations between wages in various classes. This will offset to some extent the disadvantage of the unorganized employees who have not the means for presenting their case in a forceful way that have been employed by the brotherhoods, with their lawyers and statisticians.

Other Hearings

Thomas McNeill, representing car repairers, was to testify on February 8; W. S. Stone, grand chief of the Brotherhood of Locomotive Engineers, W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, and A. O. Wharton, representing mechanical department employees, on February 11; J. B. Parsons, representing construction, maintenance of way employees, and E. T. Thompson, representing colored employees, on February 12.

THE PRINCIPAL COAL EXPORTS OF THE WORLD IN 1913, including that used for bunker purposes, were Great Britain, 93 million tons; Germany, 40 millions; United States, 29 millions; Austria-Hungary, 9 millions; Belgium and Canada, about 5½ millions each; Netherlands, slightly less than 5 millions; Japan, nearly 4 millions; British South Africa, 2½ millions, and Australia, 2 millions. A compilation by the National City Bank of New York shows that the United States now holds second rank as a coal exporter.



Photograph from *Engineering & Technology*, N. Y.

The Car Conservation Problem Solved in China

"Free-time" of Only 12 Hours, High Storage Rates and Charges
Based on Capacity of Car Secure Results

By John Earl Baker,

Adviser to the Chinese Ministry of Communications

EVERY MAN FROM AMERICA brings some story of a desperate car shortage. From a shortage of cars there's a shortage of coal. From a shortage of coal there's a shortage of steel. From a shortage of steel there's a shortage of ship and shells. And from a shortage of these the war may be lost, "all for the want of a horseshoe nail." Under such conditions it may not be considered impertinent to call the attention of the foremost railway nation of the world to the car performance in China.—China one of the newest countries in point of railway history, a land considered backward in everything that pertains to efficiency.

So far China has no car mileage statistics. But on the Government Railways, the equipment and its capacity have been inventoried, and tonnage statistics of goods handled are compiled according to uniform rules prescribed by the Ministry of Communications. Thus there may be computed the number of tons carried per ton of carrying capacity. In 1915 each ton of carrying capacity transported on the average 69 tons of goods. Compared with this, American cars in 1913 (the latest figures available here) transported some 33 tons of freight per ton of carrying capacity. What would it not be worth to tread the carrying record of American freight cars?

But the comparison must not be allowed to stand just as it is. While the Chinese car carried three tons to the American car's one, it did not carry them so far. The average haul per car in the United States was about 145 miles; in China, it was only 89 miles, —56 miles less. There are two ways of looking at this comparison. One way is to consider that the American haul is 63 per cent longer than the Chinese haul and consider the discrepancy in ton-miles accounted for by that much. The other way is to remember that after a car is loaded and on its way it does not take long to run an additional 56 miles. Even if the American car circumvented a

terminal in the course of that additional 56 miles a delay of more than one day to a loaded car is something to be explained. The Chinese car gets a fresh full load about every five days. The American car requires a cut 15 days to accomplish this feat. Something more than 56 miles of haul and a terminal delay must be used to account for this difference of ten days.

Chinese Cars Keep in Motion

There are other factors, partly statistical which render the full validity of the comparison just given, but they may be disregarded for the sake of more important facts. Freight cars are classed among "rolling stock," but every car distributor in America knows that his car stands still a great deal longer than it rolls. Freight cars are assumed to carry goods, but when they do roll they are absolutely empty about one-third of the time, and even the average monthly full empty miles of the loaded time. There are no figures of average car mileage, or of tons per loaded car on Chinese railways for the fact is that Chinese cars are out of motion for a practically equal time and when they are in motion they are loaded only about 10 to 15 per cent of their carrying capacity.

On the Peking-Mantchou line for example, the longest and best served of the Chinese railways heavy loading is made certain by the fact that freight charges are assessed according to the capacity of the car, not on the actual weight of the load, per centage. This obvious tendency to grossly overvalue the loading, all the cars are empty, other than at 100 miles before the next Chinese car inspection. The excessive cost of the railway must therefore be limited to providing necessary rolling stock that is normally full loaded. This is grossly undervalued in most instances. In the case of heavy services the full car is loaded only to half capacity. So shipments will not move unless 100 per cent of such trains carry full loads.

as a protection against the weather, and are articles of commerce at destination. The load limit is fixed by a loading gage, placed on the lead to the loading tracks, and under which the car must pass. In the case of heavy commodities, frequent weighings of suspected cars detect loads in excess of 110 per cent. of marked capacity, while a penalty of triple rates for excess loads supplies the deterrent.

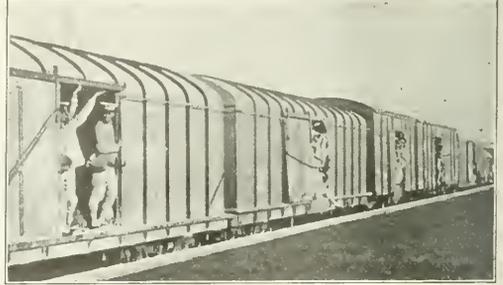
Heavy Demurrage Rules

No matter how important heavy loading may be, it is equally important to get the car under its *next* load promptly. Car records, reports, and supervision are all important factors in promoting that result, but there are handicaps suffered by the American car which must be removed before it can aspire to the Chinese record. The Chinese car is aided immensely by the demurrage rules. The prevailing "free-time" allowed is 12 hours of daylight. Contrast this with the American "48 hours after the first 7.00 a. m., etc.", and it is apparent how the Chinese car saves from four to five days right there. On one line, the Shanghai-Nanking, free time allowed is only six hours. But if unloading has not been commenced within four hours after placement, the car is "shunted" (switched) to the "go-down" (warehouse) and unloaded by station forces, costs being added to freight charges. Right is reserved to add, still, a storage charge of 5 cents per ton per day on these goods in the "go-down." This may seem like heroic treatment, but it frees the cars.

The demurrage charge perhaps is secondary in importance to the brevity of "free-time allowance." However, when it is contrasted with the cost of labor, it appears much higher than when mere rates are named. The rate varies among the several lines, and is based as a rule on the capacity of the car. The rate per ton per day ranges from 15 cents (Mex.) per ton capacity to 50 cents. Thus at the lowest rate, a 40-ton car would take a penalty of \$6,—enough to

of the scandals, little and big, local and international, grow out of this condition. But, nevertheless, this shortage helps produce a great record of car performance. It carries the freight offered at a minimum of investment cost. But how much does it repress commerce? That's another question.

To the American shipper under peace conditions these rules of the Chinese railways would seem intolerable. But the Chinese merchant has known no different, and he contrives to get along very well. It is true, of course, that the



Press Illustrating Service, Inc.

A Troop Train at Tien-Tsin

wants of Chinese villagers are still so elementary that most localities come very close to being self-sustaining. This fact favors carload business—not more than two per cent of the total tonnage being less than carload. So also does it leave a large proportion of the total tonnage to such goods as coal, salt, bricks and grain—heavy commodities. Of the total tonnage handled in 1915, 45 per cent was mineral



Photograph, Underwood & Underwood, N. Y.

A Chinese Railway Shop

hire ten coolies all day,—and on the Peking-Mukden it is \$20 per day. It is customary to make some allowance for particularly bad weather, but, in spite of devoted missionary effort these many years, commercial China knows little about Sunday. It is evident therefore that Chinese cars are not likely to be used for warehouses.

No Surplus Equipment

It should not be overlooked also, that the car supply of Chinese railroads has not been designed to meet "peak load" conditions. Hence the average performance is not dragged down by an extravagant surplus of idle cars during long slack seasons. In fact there is a car shortage in China. It attracts little attention for it is the normal condition. Many

products. This is a lower percentage than in the United States. But the Chinese shipper has developed great capacity for co-operation so as to make up a full car-load. A common method is for the innkeeper at a shipping point to consolidate several small shipments and consign them to the innkeeper at destination, who in turn acts as distributor according to instructions sent him. On some of the lines regular forwarding and receiving companies have developed to perform this service.

Then, too, there has been a concession to the small shipper in the form of a four-wheel truck of 10, 12, or 15 tons capacity. It has draft gear equal in strength to that of larger cars. Its dead weight is about five and a half tons,—not much more in proportion to capacity than in the case of

cars whose capacity is 20 tons. Cars of 30 and 40 ton capacity however, weigh but little more than the 20-ton cars, and so the use of four ten-ton trucks instead of one 40-ton capacity car would involve the hauling of considerable extra dead weight—but certainly no more than in the case of the large American cars hauled on the average with only about half a load. The ten-ton car helps the average result.

America Can Profit from Chinese Experience

Undoubtedly circumstances and Chinese railroads to obtain high car performance records, but the principal aid is the Chinese shipper. It should be evident to American shippers that the number of cars on American railroads cannot be increased much during the war. The alternative



Photograph from "Illustration & Newsweek, N. Y."

A Scene at Hankow on the Pekin-Hankow Railroad

is to get maximum service from the supply at hand. Chinese experience shows that greater service can be obtained. The methods are not inapplicable to American conditions if shippers will make up their minds to it. To change will involve some hard-ship, but all will share alike. It would appear that American shippers are now suffering hardships. They have merely a choice of them. Leisurely free-time, low demurrage rates, and minimum loads have brought a crippling car shortage. Free-time limited to one working day, prohibitive demurrage rates and charges based on maximum loads, will increase the present car effectiveness 50 per cent, and perhaps more. It's up to the shippers. Which will they take?

And if the new rules should make more labor necessary for loading and unloading—well, China can furnish that

PARAGUAYAN RAILWAY CONCESSION.—In January, 1916, a concession was granted to the Azucarera Paraguaya Co., with sugar factories at Iobocuary, 120 kilometers (75 miles) from Asuncion, for the construction of a branch railway 22 kilometers (14 miles) in length, with a gage of one meter. The first section of 13 kilometers (9 miles) must be completed within two years and the remainder within six years. For a period of 25 years no taxes are to be levied on this concession and all materials, including machinery, tools and spare parts required for the construction and maintenance of the line are to be free from customs duties. In event of sale the government has the option of taking over the railway by paying 20 per cent more than the cost of construction.—*Commerce Report.*

Who Wastes the Fuel?

By Master Mechanic

When the locomotive men are asked to judge the train articles by technical journals, the reports of conventions and even from the remarks of a large number of mechanical experts, the engine crews are almost wholly responsible. But are they?

When the engineer and fireman have been entreated to save coal and cautioned and criticized and sometimes even threatened with discipline if they do not, it is sometimes felt that a disagreeable duty has been performed, and the result should be shown by a great improvement in the fuel record.

I do not wish to relieve the engine men from their responsibility, no one will deny that the proper interest in, and the study of fuel economy on their part will result in enormous savings when put into practice. But the failure to note the shortcomings of others and continually placing all of the responsibility on these men is not only wrong but it is decidedly detrimental to the service.

Enginemmen, firemen and mechanics, in the majority of cases today, are as well read, intelligent and keen, as the officers under whom they serve, and to criticize them because of the amount of fuel burned when they have an engine that should be in the shop, or they have been delayed on the road five or six hours on account of poor meeting points, is not likely to be productive of very good result.

There is hardly anyone in the employ of the railroad, from the president to the water boy, who is not responsible for waste of fuel, and for good measure we might also add a few patrons of the road. How about the higher officers? There is probably no single thing more responsible for the unnecessary consumption of fuel than lack of adequate locomotive terminal facilities. At the present time it may be impossible to procure the necessary money to provide them, but how much thought has been given to this matter in the past, when money was used for less essential purposes? What investment would pay better dividends in northern climates? One only needs to note the number of engines kept fired up outside in zero weather on account of lack of stall room to be convinced of the magnitude of the loss thus sustained, not only in waste of fuel but also in the condition of the power. If officers gave more thought to this matter possibly repairs and improvements would be made in seasonable weather and the applying of new roofs on round-houses, installation of new turntables, etc., would be done at some other time than between November and April, when in the northern parts of the country the temperature is anywhere from zero to 35 deg. below.

Good water is a great factor in fuel consumption and every additional one-sixteenth inch of scale on the heating surfaces makes its effect felt very quickly on the coal pile. How often is the quality of the water supply given adequate consideration along with the question of availability?

Does the superintendent always see that the running time of trains is equalized as much as possible on time cards so that the day's work that we have to go as fast as we can turn a wheel from A to B and the time from B to C is so slow that you are afraid of getting hot spots on the wheels? Is not fuel wasted? Sometimes there is a good excuse for this variation in speed, but not always. High speed means increased fuel consumption.

On the necessity of the roads, the improvement of engines, crews and the reduction of fuel cost, in years with unusual demand of traffic, and time is usually one where there should be some or from not little thought is usually given to the possibility of having him assigned to this work, when he is engaged to ride an official train or for some other

job outside of his regular duty. Fuel economy will not be a great success when left to itself.

Superintendents do not consider enough the proper distribution of power to obtain the maximum fuel economy consistent with good service. Where coal is under the supervision of the superintendent he does not always take sufficient interest in seeing that it is picked up around coal chutes and yards; or that the coal burned in way cars, flag houses, etc., is charged to proper accounts. While this may not save fuel it at least gives the locomotive some credit.

While not as large a factor as some others, the division engineer can help out in fuel economy by giving proper thought to it when locating side tracks, etc. The reduction of curves and grades is an important factor, and the removal of slow flags as soon as consistent also means the saving of coal. Sawing by on account of short side tracks wastes fuel and every time an engine or train is stopped or slowed down the coal pile is decreased.

Fuel economy propaganda cannot be presented to engineers very successfully when the master mechanic fails to keep his engines in such condition that they will perform their work successfully and economically. Lame engines, blowing valves and pistons, leaking steam pipes, etc., not only in themselves do not tend to fuel economy but they destroy what little interest in the subject the crew may have felt.

No one person wastes as much coal as the train despatcher, more especially in a single track district. How many despatchers make a study of the profile of the road and are thoroughly acquainted with the grades and curvature at important points on the line? Many a ton of coal has been burned and many a drawbar has been pulled out in doubling out of stations at the bottom of sags, after stopping for orders or to answer messages that could just as well have been delivered or answered at stations where grade conditions were favorable. Frequently messages are sent to trains at unimportant stations, requiring immediate explanation of the cause of a few minutes' delay to a passenger train, when more time is lost in answering than in the original delay. To make up the time thus lost costs fuel. Such messages should either be held for delivery at the terminal or sent to a station where the work to be done will allow sufficient time to answer the message without additional delay to the train.

How much attention does the despatcher give to fuel economy when he knows that a train has a large enough engine to make up any time that may be lost? The train is laid out on any pretext, and then messages sent requiring an explanation of the delay. This refers particularly to single track districts.

Trainmasters can save coal by insisting upon co-operation between engine and train crews, in reporting improper train despatching and in seeing that proper switching is done at terminals so that cars are placed in trains in station order as far as consistent. Every time an unnecessary engine movement or switch is made fuel is being wasted.

Next to the engineer and fireman the road foreman of engines is usually considered the person most responsible for the economical use of fuel, where there is no organized fuel department, and if allowed the necessary time properly to supervise the work of the crews, he should be able to obtain results. To do this he must be able personally to demonstrate the truth of his teachings and be possessed of such a personality that he may secure the good will and co-operation of the men.

The roundhouse foreman's part in fuel conservation is almost second to none and the care and supervision given by him to see that repairs to engines are properly made, that superheater and other flues are cleaned every trip, boilers washed, flues expanded, grates cleaned, and engines fired up at the proper time, will not only save many tons of coal but avoid engine failures. Roundhouse foremen, especially

the night foremen, should be given every possible help and encouragement and no unnecessary criticism.

The list could be continued to show that the mechanic who does an improper job, the agent who causes an unnecessary switch, the switching crew that works on a switch and must make a reverse movement every time a switch is made, the track force who leaves out an unnecessary slow flag and the car repairer that allows a car to go out with dragging brakes or an improperly packed journal box is guilty of fuel waste as well as the fireman who shovels coal into the firebox unnecessarily.

What can be done to better these conditions? The following suggestions will help, if complied with.

Every effort should be made to get the best water available. This will not only save fuel but the boilers as well. Money spent in this manner is like "bread cast upon the waters" but instead of waiting many days the returns will begin to accrue at once.

If a large amount of coal is to be stored, proper measures should be taken to prevent its deterioration either by submergence or other means. Coal records will suffer when coal is used that has been allowed to lie out of doors and deteriorate for two years or more.

Adequate locomotive terminal facilities should be provided and construction of buildings or their repair should not be undertaken in extremely cold weather.

More attention should be given to train movements, the time equalized as much as possible, and unnecessary stops eliminated. The cross-hauling of cars should be checked.

Power should be given repairs when needed and sufficient roundhouse forces provided to keep it in the best serviceable condition.

Enough supervision should be provided properly to check the use of coal by engine crews and to instruct them in the principles of combustion.

The distribution of fuel should be closely checked and coal burned in other ways than by the locomotive should be charged to the service in which it is used.

Coal should be checked both for quality and weight. While possibly there may be no such thing as poor coal, yet no one will deny that some coal is better than other coal.

All concerned in the waste of fuel should be held as responsible as the men actually using and handling it. The work of train despatchers, roundhouse forces, yard and station men and even of car repairers should be checked as closely as that of enginemen.

Tying up power at outside points where there are no housing facilities should be discontinued, especially during cold weather. This practice wastes coal and usually ends in an engine failure the next trip, due to the dirty fire.

Regular engines should be maintained where it can be done consistently.

Cars and engine tanks should not be overloaded. A pound of coal burned in the firebox will do more work than 10 pounds spilled on the right of way.

Passing tracks should be of sufficient length to accommodate the greatest length of train which is run in the district and grades reduced where possible to do so.

The actual weight of the coal placed on engine tanks should be given. It is hard to convince an engineman that he has burned an unreasonable amount of coal when there is only a guess made as to the amount of coal delivered.

Trains should be given thorough inspection for air leaks and dragging brakes, and the packing in journal boxes given attention.

A periodical check made by some disinterested officer or outsider with no bias either for or against any department or class of labor should be beneficial.

Parties held responsible for the economical use of fuel should be given the necessary authority, as authority and responsibility cannot be separated.

Pennsylvania System Rejects Screw Spikes

Action Taken After Exhaustive Experiments at Two Points for a Period of Eight Years

THE PENNSYLVANIA SYSTEM has been conducting an exhaustive series of tests of screw spikes and tie plates under heavy traffic for the past eight years. The details of these experiments and the conclusions which have been reached have been made public in a report prepared by W. C. Cushing, chief engineer maintenance of way, Southwest System, Pennsylvania Lines, published in bulletin No. 200 of the American Railway Engineering Association from which the following data have been abstracted. These experiments were made under the direction of a committee of engineers from the various lines of the Pennsylvania System.

The committee, at its first meeting, June 16, 1908, decided that, in view of the fact that the screw spike experiments must be made on curves where tie plates are used and also on softwood ties requiring tie plates, it would be desirable to experiment with the various forms of tie plates in conducting the screw spike test.

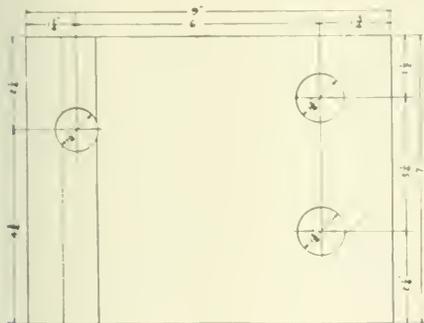
The locations selected for the experimental track were in No. 1 eastward passenger and freight track east and west of Birmingham, Pa., on the Middle division of the Pennsylvania Railroad, and in No. 1 westward passenger and freight

track for the screw spikes, using steel ties, to mark their positions accurately. The ties were laid one each deeper than the previous one in the screw spikes. In order that the diameter of the hole for the screw spike at the end of the tie was not up-laid when the tie was placed, the diameter was 1/32 in. less than that at the center. A brass washer was provided for the seat for the tie plate in the first test track. These tie plates, which were used in the tie by screw spikes independent of those regarding the rail, were closely fastened to the tie with the outside screw spike turned loose. The other screw spikes or clips were then turned to different positions at what was most desirable. No brass washers were for the standard cut spikes. Screw spikes were not permitted to be driven into the ties but it was required that they be placed in the case of the proper wrench.

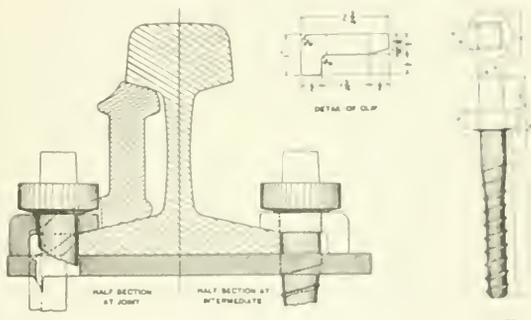
Performance of Each Type at Birmingham

TYPE 1A—Standard track with standard 7 in. by 9 in. by 7-16 in. tie plates and standard rail spikes and ties.

No deterioration of any kind was evident for one year and eight months, when the ties began to show galling under



Tie Plate, Screw Spikes and Clips for 100-lb. P. S. Rail



track east of Wooster, Ohio, on the Eastern division, of the Northwest System, Pennsylvania Lines West.

After a very thorough investigation of the experience of foreign railroads with screw spikes, plans were prepared for seven types of rail fastenings, four of which were to be used on oak and pine ties, and two (without tie plates) to be used on oak ties only. One type was eliminated. All ties were to be cross-tied, and one-half of each section was to be laid with box-car pads. Detailed instructions for the installation and inspection of the experimental track, and blanks for reports were also prepared.

During November and December, 1909, and January, 1910, the track at the adopted location east and west of Birmingham, Pa., was prepared by putting in fresh ballast, preparing for thorough drainage, etc., and 10 sections of experimental track each 1,000 ft. long, were installed. During the last eight months of 1910 the same was done east of Wooster, Ohio. In less than a month after installation the box-car pads began to be squeezed out from under the tie plates in the Birmingham track and in six months they were nearly all out.

Previous to installing the test sections holes were bored in

the outer edge of the tie plates on the inner side of curves. This cutting continued and one year later it was found necessary in some places to chisel the ties under the base rail. On 52 of the ties the plates were so that they extended 1/2 in. or more, and after 2 years and 7 months 69 ties were out to this extent or more. After four months and three months' service, 87 of the ties were out to have been nearly all of the ties on the curve had been out, and 10 ties were in places in a worse condition. On 100 ties the track was in good condition until its deterioration began to show in November, 1911, on a section of the rail from Chatham from 100 ft. to 1 1/2 ft. from a high, washed Hampton line to the west.

TYPE 1B—Standard track with standard 7 in. by 9 in. by 7-16 in. tie plates and standard rail spikes and ties.

After six months' service the ties were in a condition probably the same as before, but that the 7 in. by 9 in. tie plates were too weak for softwood ties and, as cutting was practically prevented under the outer edge of the tie plates, it was decided that the tie plates should have some half length over the ties. Accordingly the standard ties in question on the Green Pass was changed in January, 1911, increasing the length by 1/2 in. at the outer end. A similar change

had previously been made on the Lines West, the increase being $\frac{1}{2}$ in. It was apparent that a 7 in. by 9 in. tie plate was utterly inadequate for pine ties or even for oak ties under the heavy traffic at this point and that pine ties would not be suitable for such locations, even with very large tie plates. After a service of 2 years and 11 months 232 of the ties (about 40 per cent) were cut $\frac{3}{8}$ in. or more, and in 3 years and 7 months, 267 ties were cut this amount. After four years' and three months' service nearly all the ties on the curve had been adzed under the low rail, 175 had been removed on account of wear and 196 others were cut $\frac{3}{8}$ in. or more. After 5 years and 5 months 359 ties were cut that amount. In May, 1915, 92 ties were renewed on account of being cut by plates, making a total of 267 renewed for this cause; 48 other ties were renewed in June, 1912, on account of damage from derailed equipment, at which time 257 other ties were cut. Otherwise the track continued in good condition until the conclusion of the experiment, July 31, 1915.

TYPE 2—Standard track, standard nail spikes, no tie plates; oak ties.

After five months the cutting of the ties by the rail was noticeable, but the penetration was only about 3/16 in. after 1 year and 7 months' service, and $\frac{1}{4}$ in. to $\frac{3}{8}$ in. after 2 years and 4 months. After 2 years and 10 months, 72 ties were cut $\frac{1}{2}$ in. or more, and 161 ties were cut $\frac{3}{8}$ in. to $\frac{1}{2}$ in. after a service of 3 years and 4 months, when (April, 1913) this section was eliminated from the experiment owing to the failure of Type 3 with which it was being compared. The canting of the rail was slight, the gage widening only 3/16 in.

TYPE 3—Screw spikes with rolled clips; no tie plates; oak ties.

The rail cut into the ties in the same manner, but not quite as fast as in the case of Type 2. After one year about a dozen of the clips were loose. In two years and four months 29 ties were cut $\frac{1}{4}$ in. to 5/16 in., 293 clips and 41 spikes were loose, and after 3 years 4 months 451 clips and 114 spikes were loose. At this time (April, 1913) the rail had penetrated the ties at distance equal to the thickness of the base of the rail at its edge, which permitted the rail to slip under the clips, thus widening the gage. This type was therefore eliminated from the experiment.

TYPE 4A—Screw spikes, rolled clips, standard 7 in. by 9 in. by 7/16 in. tie plates; oak ties.

During the first three months of service 132 of the clips became loose, and in spite of frequent tightening of the spikes, the loosening of the clips increased, and their rattling was quite perceptible in riding over this section of track. After one year the cutting of the tie plates into the ties at the outer edge was noted. After one year and seven months 500 clips and 30 of the screw spikes were loose and could not be tightened. In October, 1911, this type was eliminated, there being 993 loose clips and 60 loose spikes at that time. The tie plates cut into the ties at the outer edge on the inner side of the curve to a slight extent, there being no noticeable difference in this respect between this type and Type 1a.

TYPE 4B—Screw spikes, rolled clips, standard 7 in. by 9 in. by 7/16 in. tie plates; pine ties.

The behavior of this type was precisely similar to that of Type 4a except that the plates cut more rapidly into the ties and the screw spikes loosened more quickly. This type was eliminated at the same time as Type 4a (October, 1911), there being 986 loose clips and 181 loose spikes at that time and 185 of the ties being cut by plates $\frac{3}{8}$ in. or more.

In July, 1911, photos were taken of ties taken from Birmingham experimental track types 4a and 4b, and split at the spike holes. These photos showed that while the holes had been bored one inch below the bottom of the spike, the screw threads in the wood were entirely destroyed, there being no appreciable difference between the oak and pine ties.

TYPE 6A—Screw spikes with malleable iron tie plate chairs 7 in. by 13 in. by 2 in.; bolts and clips; oak ties.

After 3 months' service 35 of the screw spikes were found

to be slightly loose, and after 18 months the cutting of the plates into the ties became perceptible at the outer edge of the plates under the inner rail on curves. This type of track shows a higher cost for lining than the others because the bolts must be loosened and retightened after the track is thrown to line. It was noted that the feet of the rail anchors bore against these tie plates and it was thought that special rail anchors should be designed for types 6a and 6b that will bear against the tie. After a service of 2 years and 3 months 20 ties were cut about $\frac{1}{4}$ in. on the outer edge of tie plates under the low rail, and 32 of the screw spikes were loose. In 3 years and 5 months 166 ties were cut $\frac{3}{8}$ in. or more and 416 spikes and 24 clips were loose. In February, 1914 (4 years and 1 month service), the cutting of the ties at the outer edge of the plates and the resultant canting of the rail was found to have widened the gage to 4 ft. 9 $\frac{1}{4}$ in. at some points with full section rail. It was evident that this particular design was not properly balanced to resist the overturning forces which caused the canting of the rail and cutting of the outer edge of the tie plates into the ties and it was thought that nothing could be gained by further experiment with it on sharp curves and that a new tie plate of similar style or type, with more bearing area outside of the rail than inside, should be designed. It was accordingly decided that where the rail was canted sufficiently to make the gage 4 ft. 9 $\frac{1}{4}$ in. with full section rail these tie plates should be replaced with standard tie plates, which was done on 200 ties; 965 of the spikes and 64 of the clips were loose at this time (February, 1914). The whole section was eliminated in May, 1914.

TYPE 6B—Screw spikes, with malleable iron tie plate chairs 7 in. by 13 in. by 2 in.; bolts and clips; pine ties.

The same conditions of cutting of ties and canting of rail as noted under Type 6a prevailed on this section except that the cutting was more rapid into the pine ties of this type of track. After a service of 2 years and 3 months 135 of the ties were cut $\frac{1}{4}$ in. or more, and a few as much as $\frac{1}{2}$ in., and 11 spikes were slightly loose. In 3 years and 5 months 301 ties were cut $\frac{3}{8}$ in. or more and 89 spikes and 28 clips were loose, and in 4 years and 1 month 374 ties were cut $\frac{3}{8}$ in. or more and 423 spikes and 96 clips were loose. The same comment applies as under Type 6a regarding the higher cost of lining and rail anchors bearing against tie plates. This section was eliminated from the experiment at the same time as the other (May, 1914). Another effect of the widening of the gage was that the rail wore out about twice as fast on the 6 deg. curves with Types 6a and 6b, as on the 6 deg. curves on Types 1a and 1b (standard tie plates). When this excessive rapidity of wear was observed, samples of the rail were analyzed and found to be of normal composition, hence the excessive wear was evidently due to wide gage. A total of 423 spikes and 96 clips were loose on Type 6b in February, 1914.

TYPE 7A—Screw spikes with rolled steel tie plates 7 in. by 13 $\frac{1}{2}$ in. by $\frac{5}{8}$ in.; oak ties.

After eight months' service a few of the screw spikes (both plate spikes and rail spikes) were found to be loose, and after 2 years and 4 months the tie plates were observed to be cutting into the ties, eight ties being cut about $\frac{1}{4}$ in. Nineteen of the spikes were loose at that time. Six months later (October, 1912) 36 of the spikes were slightly loose and 19 ties were cut $\frac{1}{4}$ in. to $\frac{1}{2}$ in. but, as on Type 7b (pine ties) some of the spikes were so loose that they could be extracted with the fingers, the committee decided to try the Lakhovsky split lining. The application of these linings cost 9 cents each in oak ties and 7 cents each in pine ties. A total of 459 of these devices were applied on Section 7a and 207 on Section 7b during 1913; but they did not prove effective, and the spikes equipped with them soon became loose again. After a service of 4 years and 2 months 139 of these ties were cut $\frac{3}{8}$ in. or more and 430 spikes were loose (including 12 of the 459 that had been equipped with

Lakhovsky linings.) It was noted that the cutting of the outer edges of the plates into the ties was canting the rail and widening the gage in the same manner, though not to the same extent, as on Type 6a, owing to the lesser thickness of the tie-plate ($\frac{1}{8}$ in. as against 1.15, 1.6 in.), but as this form of track can be repaired without difficulty it was decided to continue it, adding the ties when necessary. All the ties on the curve were added under the low rail in September, 1914. It was not found necessary to do any adding under the high rail. At this time 22 of the 459 spikes which had been equipped with Lakhovsky linings were again found loose and there were 275 other loose spikes. Seven months later, after 5 years and 4 months' service (April, 1915) 281 ties were cut $\frac{1}{8}$ in. or more and 482 spikes were loose, including a number with Lakhovsky linings, and in June, 1915, 281 ties were cut and 492 spikes were loose.

In June, 1915, the wooden plug method of re-setting spikes which is extensively used abroad was tried. Locust plugs 1 in. by 1.3, 1.6 in. at the top, $\frac{1}{8}$ in. by 1 in. at the bottom, and 5 in. long were used for the rail spike holes and smaller plugs $\frac{3}{4}$ in. by $\frac{7}{8}$ in. at the top, $\frac{1}{8}$ in. by 1.1, 1.6 in. at the bottom and 3 $\frac{1}{2}$ in. long, for the plate spike holes, these dimensions bearing the same relation to those of the spikes as the measurements of the wooden plugs used in France bear to the spikes in connection with which they are used. These plugs were driven into the spike holes in ten ties where the spikes had come loose, the holes were re-bored and the spikes re-set. The spikes soon became loose again and a laboratory test was made which showed that the resistance to extraction offered by the screw-spike in the plugged hole was not greater than that of an ordinary nail spike. This type of track was accordingly eliminated in August, 1915, at which time there were 358 loose spikes and 264 ties cut by plates. The ties on the curve were adzed under the low rail in September, 1914, to restore the canted rail to its normal perpendicular position. Seven ties were renewed on this section, four of them on account of original defect and three on account of wear.

Type 7n—Screw spikes with rolled steel tie plates 7 in. by 1.1, 1.2 in. by $\frac{5}{8}$ in.; pine ties.

The service afforded by this type was similar to that of Type 7a except that the softer ties naturally offered less resistance to cutting by plates and loosening of spikes. After a service of 2 years and 4 months 17 of the ties were cut $\frac{1}{4}$ in. or more and 16 of the spikes were loose. After 2 years 14 and 10 months 63 ties were cut from $\frac{1}{8}$ in. to $\frac{5}{8}$ in. and 49 spikes were loose, several of the latter, particularly at the joints, being so loose that they could be extracted with the fingers.

At this time the committee considered several methods of resetting the loose spikes, as follows: (1) The square plug was discarded at this time for the reason that it could afford only temporary relief, as the same forces which loosened the spike in the tie would loosen it in the plug. (2) The Thillier helical lining was not adopted because it cannot be applied to track in service. (3) The Collect rail possessed the same objection as the square plug, though it might hold the spike somewhat longer, but it has the additional objection that it has a very large diameter and would therefore inflict too much injury on the tie. (4) The Lakhovsky split lining was adopted and 207 spikes were equipped, but in February, 1914, 15 of them were again found loose. At that time 198 ties were cut $\frac{1}{8}$ in. or more. In April, 1915, there were 450 ties and 582 loose spikes, and in June 541 cut ties and 475 loose spikes. In August, 1915, this type was eliminated. At that time there were 685 loose spikes and 451 ties cut by plates. Five ties were renewed on this section on account of wear.

In the Spring of 1911 the rail on the 6 deg. curves on Types 1a, 1b, 4a, 4b, 6a and 6b was renewed, when the gage returned precisely to that first reported after the track was installed, thus proving that there had been no lateral

movement of the tie plates under normal use.

During the first 10 months there were 114 joint bar failures on the Birmingham track, of which 100 were Kevette insulated, five were standard No. 36 bars, seven had semi-circular clips for cross-plates and 103 had rectangular clips for clips. An analysis showed conclusively that the deep rectangular slotting for the clips was contributory to the fracture of the bar, the design of clips for Types 3, 4 and 6 was revised to prevent the slot to be semi-circular.

In view of the fact that the removal of the rectangular iron tie plates (Type 6) necessitated the cutting of 70 ties on Section 6a and 48 on Cb about 1.5 in. longer than the other ties, and as these ties were scattered throughout the portions of these sections remaining in track, giving the track a very ragged appearance, and also that all the curved portions of the tie sections were eliminated from the experiment in February, 1914, on account of the widening of the gage, the remainder of the two sections (Types 6a and 6b) were eliminated from the experiment in May, 1914.

Wooster Service Tests

TYPE 1a—Standard track with standard 7 in. by 9 in. by $\frac{1}{4}$ in. Goldie tie plates and standard nail spikes, oak ties.

After a service of 2 years and 11 months, the cutting of the tie-plates at the outer edge was quite marked, 10 of the ties being cut $\frac{1}{8}$ in. One year and 3 months later 46 ties were cut $\frac{5}{8}$ in. or more and in November, 1914, when this type was eliminated on account of the elimination of the corresponding type at Birmingham 52 ties had been cut $\frac{3}{4}$ in. or more.

TYPE 1b—Standard track with standard 7 in. by 9 in. by $\frac{1}{4}$ in. Goldie tie plates and standard nail spikes, pine ties.

After a service of 2 years and 3 months, the cutting of tie-plates, at outer edge, into the ties was quite marked, 15 of the ties being cut from $\frac{1}{2}$ in. to $\frac{3}{4}$ in. Six months later 210 of the ties were cut $\frac{3}{4}$ in. or more, and after 4 years' service 355 of the ties were cut $\frac{3}{4}$ in. or more and two spikes were found broken. In August, 1915, when the experiment was concluded 440 of the ties were cut $\frac{1}{2}$ in. or more and 4 spikes were loose.

TYPE 2—Standard track, standard nail spikes, oak tie plates; oak ties.

After 1 year and 9 months' service the cutting of the rail into the ties became perceptible, but none of them were cut as much as $\frac{1}{2}$ in. At two points it was noted at this time, that the rail had pushed the spikes back a little, apparently due to irregularity of surface. The cutting of the rails into the ties continued, but the gage was not seriously affected, the maximum being 4 ft. 8.11, 16 in. after a service of 7 years and 3 months. In April, 1915, when this type was eliminated after a service of 2 years and 9 months on account of the failure of Type 1 in the experimental track at Birmingham, the track was in good condition, none of the ties being cut as much as $\frac{3}{4}$ in. and only one spike found found standing above the base of rail.

TYPE 3—Semi-circular clips, rolled steel tie plates, oak ties.

After one year's service none of the ties were found loose, and 9 months later there were 359 clips and 47 loose spikes. After 2 years and 4 months there were 274 loose clips and 77 loose spikes, and in April, 1914, 16 months later, when this type was eliminated on account of the failure of the corresponding type at Birmingham there were 421 loose clips and 82 loose spikes. None of the rails were cut as much as $\frac{1}{2}$ in. at any time.

TYPE 4c—Standard 7 in. by 9 in. by $\frac{1}{4}$ in. Goldie tie plates, semi-circular clips; pine ties.

This track was installed a year later than the corresponding type at Birmingham, starting with the tie-plates of the corresponding type, none was retained and a clip of different design having a shoulder to fit against the base of the rail was used. After 7 months' service 50 clips were found loose,

and 3 months later there were 365 loose clips and 28 loose spikes; no cut ties. At this time this type was eliminated on account of the failure of Type 4a at Birmingham.

TYPE 4B—Standard 7 in. by 9 in. by $\frac{3}{8}$ in. Goldie tie plates, screw spikes and clips; pine ties.

After 7 months' service 175 clips and 7 spikes were found loose. The improved clip was used on this type as well as on Type 4a. After 10 months' service there were 405 loose clips and 35 loose spikes but no cut ties. This type was then (October, 1911) eliminated on account of elimination of corresponding type at Birmingham.

TYPE 6A—Screw spikes; malleable iron tie plate chairs 7 in. by 13 in. by 2 in. bolts and clips; oak ties.

After a service of 1 year 11 months the tie-plates were observed to be cutting slightly into the ties and 4 screw spikes were found loose. Six months later there were 16

cluded, 208 of the ties were cut $\frac{3}{8}$ in. or more and 124 of the spikes were loose.

The table below shows that both the annual cost and the cost per million tons traffic are less for the nail spike than for the screw spike. In comparing the costs of Types 2 and 3 with the others, it must be remembered that these two types are on straight track and oak ties and would not be suitable for curves or softwood ties.

Conclusions

1. Screw spikes have no advantage over nail spikes. When used with clips without tie plates, the cutting of the rail into the tie permits the rail to slip under the clip, thus widening the gage.

2. No satisfactory device is known for resetting screw spikes after the thread in the wood has been destroyed. When some of the screw spikes in the Birmingham experi-

Type	First Cost			Annual Cost			Cost per million tons traffic		
	Birmingham	Watr.	Avg.	Birmingham	Watr.	Avg.	Birmingham	Watr.	Avg.
1a.....	\$806	\$1,151	\$1,023	\$316	\$333	\$324	\$5.48	\$15.64	\$10.56
1b.....	912	1,218	1,065	355	350	352	6.31	16.38	11.39
2.....	765	860	812	344	274	309	6.00	12.56	9.28
3.....	1,018	1,156	1,087	443	350	396	8.05	16.60	12.32
4a.....	1,286	1,627	1,456	940	452	596	17.96	21.67	19.81
4b.....	1,381	1,676	1,428	876	466	671	16.90	22.26	19.58
6a.....	2,384	2,457	2,420	757	607	682	14.74	31.74	23.24
6b.....	2,361	2,450	2,405	759	592	675	14.80	30.98	22.89
7a.....	1,556	1,477	1,516	460	388	424	8.25	19.23	13.74
7b.....	1,473	1,462	1,467	435	390	412	7.84	19.35	13.59
Total.....	\$13,832	\$15,536	\$14,684	\$5,685	\$4,202	\$4,943	\$106.33	\$206.41	\$156.37
Average.....	\$1,383	\$1,554	\$1,468	\$569	\$420	\$494	\$10.63	\$20.64	\$15.64

*Interest at 6 per cent and taxes at 1 per cent (both on first cost in track), plus cost of maintenance, plus annuity, which, at 6 per cent compound interest will amount at end of life to first cost in track less salvage.

†Including installation and maintenance.

loose spikes and 8 loose clips. After a service of 3 years and 1 month 14 of the ties were cut $\frac{3}{8}$ in. or more and 195 spikes and 40 clips were loose. In May, 1914, when this type, after 4 years' service was eliminated on account of the failure of corresponding type at Birmingham there were 161 loose spikes and 31 cut ties.

TYPE 6B—Screw spikes, malleable iron tie plate chairs 7 in. by 13 in. by 2 in.; bolts and clips; pine ties.

After a service of 1 year and 5 months the cutting of the tie plates into the ties was noted, but although considerably more than on Type 6a (which had been in service 7 months longer) it was not over $\frac{1}{4}$ in. Six months later 7 spikes and one clip were loose. After a service of 2 years and 7 months 89 ties were cut $\frac{3}{8}$ in. or more and 168 spikes and 20 clips were loose. In May, 1914, when, after 4 years' service, this type was eliminated, on account of the failure of the corresponding type at Birmingham, there were 32 loose spikes and 240 cut ties.

TYPE 7A—Screw spikes; rolled steel tie plates 7 in. by 13 $\frac{1}{2}$ in. by $\frac{5}{8}$ in.; oak ties.

After a service of 1 year and 10 months the cutting of the tie-plates, at outer edge, into the ties was noted and 5 spikes were loose. Six months later 19 spikes were found loose. After a service of 3 years only one tie was cut as much as $\frac{3}{8}$ in. At this time 182 spikes were loose. After 4 years' service there were 16 ties cut $\frac{3}{8}$ in. or more and 75 spikes were loose. In August, 1915, when the experiment was concluded, 21 of the ties were cut $\frac{3}{8}$ in. or more and 203 spikes were loose.

TYPE 7B—Screw spikes; rolled steel tie plates 7 in. by 13 $\frac{1}{2}$ in. by $\frac{5}{8}$ in.; oak ties.

After a service of 1 year 5 months the cutting of the tie plates, at the outer edge, into the ties was noted and 8 spikes were found loose. Six months later 7 of the ties were cut over $\frac{1}{4}$ in. and 8 spikes were found loose. After a service of 2 years and 7 months 52 of the ties were cut $\frac{3}{8}$ in. or more and 50 spikes were loose, and 1 year and 1 month later 149 of the ties were cut $\frac{3}{8}$ in. or more and 37 spikes were loose. In August, 1915, when the experiment was con-

cluded, 208 of the ties were cut $\frac{3}{8}$ in. or more and 124 of the spikes were loose.

ment became so loose that they could be extracted with the fingers, the committee, after considering the several devices for securing screw spikes, selected the Lakhovsky split lining and 666 of these devices were applied to loose screw spikes, at a cost of 6.82c. each for material and 9c. for labor in oak ties or 7c. in pine ties. This device did not prove effective, as the spikes soon became loose again by turning back. It seems evident that there is not sufficient friction between the metal surfaces of the screw and the lining to prevent the spike from turning. The hardwood plug method, which is extensively used abroad, was next tried, using locust plugs of the same shape and size with relation to spike as the wooden plugs used in France. This method was also unsuccessful, the spikes soon becoming loose again. A laboratory test of 32 screw spikes in plugged holes, and 12 standard nail spikes driven in oak ties in the ordinary way, showed that the average resistance to extraction was the same for the screw spikes as for the nail spikes, viz., 5,000 lb. At least a part of the plug was always extracted with the spike. The Collet trenail, which consists of a large hardwood plug threaded on the outside and screwed into the tie, was not considered advisable on account of the injury to the tie by boring holes of such large diameter as is necessary. The Tenax lining was discarded as it is similar to the Lakhovsky and has the same objections. The Thiollier helical lining was considered but not adopted for the reason that it cannot be applied to track in service. It was also thought to have the same objection as the Lakhovsky, viz., that the metal surfaces would not possess sufficient friction to prevent the screw from turning back.

3. The first cost and the maintenance cost of track equipped with screw-spikes are both considerably in excess of those of track equipped with nail-spikes, as shown in detail in statement of annual cost of maintenance of Birmingham and Wooster experiments. The average first cost, at Birmingham and Wooster, of ties and rail fastenings for 1,000 ft. of track with tie plates and nail spikes was \$1,044, while that of similar track with screw-spikes was \$1,782, or an increase of 71 per cent. The universally admitted higher

first cost of screw-spike track can only be justified by a corresponding decrease in the cost of maintenance. Such a decrease was not elicited in this experiment. On the contrary, the average annual maintenance cost of the nail-spike track was \$588, and that of the screw-spike track \$592, or an increase of 72 per cent. Where tie plates were not used (which in heavy service tracks it is of course practically only on straight track on account of the rapid cutting of the rail into the ties on curves) the same relation obtained, though in lesser ratio, the first cost of the nail-spike track being \$817 and that of the screw-spike track \$1,087, an increase of 32 per cent, the maintenance of the former \$309 and that of the latter \$396, an increase of 29 per cent. While derailed equipment has not at any time during the experiment damaged the track sufficiently to throw it out of service, thereby necessitating quick repairs, our record of installation of the screw-spike track indicates that in such a case the time required to repair screw-spike track would be more than 60 per cent greater than would be required for nail-spike track, with the same number of spikes and tie plates of similar pattern, even if ties already bored for the screw-spikes were at hand. In the event of an accident destroying any considerable stretch of track, the avoidance of the delay to traffic which would be occasioned by the excess time required to make repairs with screw spikes would justify the use of nail spikes for temporary repairs, and the subsequent application of screw fastenings, with the waste of material involved, would greatly increase the cost of repairing track after wrecks.

4. Cow hair pads as applied in this test have no value as a protection for the tie, as they were quickly squeezed out from under the tie plates where the traffic was heavy.

5. The 7 in. by 9 in. by 7/16 in. plate is inadequate for pine ties, or even for oak ties, under the heaviest traffic on the Pennsylvania Railroad, and loblolly or sap pine ties are not suitable for such traffic even with very large tie-plates. The maximum load sustained by a tie plate under 100-lb. rail is about 45 per cent of the load imposed by the wheel and under our heaviest equipment (including dynamic augment and impact), is about 26,000 lb. on tangents and the outer rail of curves, and 36,000 lb. on the inner rail of sharp curves.

6. While the 7 in. by 9 in. by 7/16 in. tie plates were found too small under heavy traffic, it is not determined whether the 7 in. by 13 1/2 in. by 5/8 in. tie plates or the specially designed wrought- and cast-iron tie plates of greater area and thickness, for the more uniform distribution of the load, will prove economical and save enough in the loss cutting of the tie to pay for the additional cost. The cost of maintenance with screw spike fastenings and 7 in. by 13 1/2 in. by 5/8 in. tie-plates is greater than with nail fastenings and 7 in. by 9 in. by 7/16 in. tie-plates.

7. Tie plates when flat and symmetrical cut more rapidly into the tie at the outer edge, thus canting the rail. They therefore should be so designed as to bring the line of contact as near the center of the plate as practicable.

8. When necessary to slot joint bars to permit the use of clips the slots should be semi-circular in shape, as large rectangular slots weaken the joint bars, causing breakage.

When the committee inspected the screw spike track on the Delaware, Lackawanna & Western and the New York, New Haven & Hartford, the maintenance of 100 officers of these roads stated that screw spikes were giving entire satisfaction and had been adopted as standard. It should be born in mind, however, that new screw spike track was compared with ordinary nail-spike track, and it is probable that if a section of the latter had been laid new at the time of the installation of the screw spike track, its performance would have been as satisfactory as, and its maintenance cost less than, that of the screw spike track, as was the case at Birmingham and Wooster.

We are advised that the direct traffic over the screw spike track on the Delaware, Lackawanna & Western is about 71,000 tons, and on the New York, New Haven & Hartford about 8,000 tons. The traffic on the experimental track at Birmingham averaged 140,000 tons per day, and at Wooster 31,000 tons per day. At the instance of Birmingham it should be borne in mind that on the Delaware and New Haven roads it is generally held that when the business on the latter roads reaches the total carried on the Birmingham experimental track, their results will not be any more desirable than they are to the screw spike.

The screw spike track at Greenwich, Conn., New York, New Haven & Hartford, is now in place, the same installation as when inspected by the committee in November, 1914, except that the cutting of the tie plates under the tie has increased slightly. The installation does not exceed 1/2 in. some of the ties show evidence of being dented, but they all seem good for at least three years' additional service. Most of the screw spikes are standing up from 1/2 to 3/4 in. above the top of the rail and a few are up an inch or more. Inspections did not indicate any superiority of the screw over the nail spike. No cases were found where the screw failed to do the best work destroyed.

The Delaware, Lackawanna & Western is now experimenting with a new fastening in which the tie plate is secured by bolts extending through the tie and a metal plate underneath the tie. This would seem to indicate that screw spikes have not proved altogether satisfactory.

In conclusion, it may be said that throughout this experiment as elsewhere, it has been evident that there is no cause for traffic from failure of ordinary nail spikes either by charring or extraction, and the question of securing greater holding power by the use of screw spikes is solely a matter of economy, so that in order to justify its use, the screw spike must accomplish a reduction in cost of track maintenance sufficient to offset its higher first cost. This result has not been accomplished—in fact, the screw spike has not only been more costly to maintain, but also less reliable than the nail spike, and while it holds better at first, owing to its greater initial resistance to extraction, it becomes entirely loose under continued raising by the wheeling action of the rail. The nail-spike upon stronger construction still retains a very considerable portion of its holding power.

A "Solemn Rite of Circumlocution"

WITH A GRACEFUL AND ACCENTED "Solemn Rite of Circumlocution" to a joint session, the Senate Committee on Interstate Commerce has introduced the Administration Railroad Bill to convert the President of the board of management, leaving that function with the Interstate Commerce Commission and the state railroad commissioners, which has proved to be a rite.

One of the outstanding projects by the Interstate Commerce Commission is the proposed consolidation of government by commission. Many of the state boards have long operated on commission basis. The Interstate Commission has gone through various changes since its organization in 1887. It had been divided into the five sections of commodity administration by an amendment of the Interstate Commerce Act passed in 1910, and it has been reorganized in 1912. The bill now introduced would provide for the consolidation of the Interstate Commerce Commission and the state railroad commissioners, which has proved to be a rite.

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Transcontinental Rates to Be Increased

THE INTERSTATE COMMERCE COMMISSION on January 30 issued its opinion and order in the Transcontinental Commodity Rate Cases, approving in part and denying in part the applications filed by the carriers for permission to increase rates to the Pacific Coast terminals on account of the commission's decision of June 30, 1917, that water competition does not now justify lower rates to the coast terminals than to intermediate points.

In *Transcontinental Rates*, 46 I. C. C., 236, the commission found that existing water competition between the east and west coasts of the United States did not justify the maintenance by the rail carriers or water-and-rail carriers of lower rates on commodities from eastern defined territories to Pacific coast points than were contemporaneously maintained on like traffic to intermediate points.

It also found that the maintenance of lower rates via rail-and-water routes through Galveston on barley, beans, canned goods, asphaltum, dried fruits, and wine from California-Pacific coast ports to the Atlantic seaboard than on like traffic from or to intermediate points was not justified. Orders were entered requiring the carriers on or before October 15, 1917, to realign the commodity rates from eastern defined territories to Pacific coast and intermediate points, and the rates via rail-and-water routes through Galveston on the commodities above named from California ports to the Atlantic seaboard to accord with the long-and-short-haul rule of the fourth section of the act.

By amendment to section 15 of the act approved August 9, 1917, it is provided that until January 1, 1920, it shall be unlawful to file increased interstate rates without having first secured from the commission approval thereof.

Under this requirement, the carriers filed on September 21, 1917, Fifteenth Section Application No. 324, and on October 22, 1917, Fifteenth Section Application No. 1399, requesting authority to file certain increased commodity rates from eastern defined territories to the Pacific coast, and, in some instances, to intermediate points. On November 16, 1917, Fifteenth Section Application No. 1822 was filed asking authority to file increased rates on barley, beans, canned goods, asphaltum, dried fruits, and wine from California ports to the Atlantic seaboard via rail-and-water routes through Galveston. By Fifteenth Section Applications Nos. 1077 and 1083, filed October 8, 1917, authority is sought to file increased export rates from various points in the United States to Pacific coast ports on traffic destined to points in Australia, New Zealand, Japan, China, the Philippine and Fiji Islands and in specific instances to Central and South American and Mexican points. By fifteenth Section Application No. 1084, filed October 8, 1917, authority is sought to file increased rates from Pacific coast ports to points in the United States and Canada applicable on traffic originating in Asia, Australia, and, in specific instances, in Central and South America, Mexico, and the Hawaiian Islands.

Hearings respecting the propriety of the proposed increases have been held at New York, N. Y., Chicago, Ill., Portland, Oreg., and Washington, D. C.

The commission does not discuss its reasons, but after considering the evidence offered, both of a general and of a specific character, its conclusion is given as follows:

1. The carriers should be authorized to file the increased rates proposed by the all-rail lines on all the carload commodities embraced in applications Nos. 324 and 1399.
2. The water-and-rail lines via Galveston should be authorized to file the increased carload rates proposed on articles as to which through all-rail rates are not published from group A to the Pacific coast and intermediate points.
3. The Southern Pacific Company should be denied authority to file rates on the 24 items mentioned in the re-

port which are lower than the rates proposed by the all-rail lines, unless corresponding rates are published by that company on all commodities which are adapted to water transportation.

4. The authority sought by the all-rail lines to cancel all of the less-than-carload commodity rates from eastern defined territories to the Pacific coast and intermediate points should be denied, but they should be authorized to file increased rates on less-than-carload commodities to Pacific coast points not higher than the present rates on such commodities to the highest rated intermediate points.

5. The carriers should be authorized to file the increased export rates proposed in their applications Nos. 1077 and 1083 from eastern defined territories to the Pacific coast.

6. The carriers should be authorized to file increased import rates as described in application No. 1084 from Pacific coast ports to eastern defined territories.

7. The water-and-rail lines through Galveston should be authorized to establish commodity rates on barley, beans, canned goods, asphaltum, dried fruits, and wine from all California ports to the Atlantic seaboard not higher than the present all-rail rates.

8. The all-rail lines and the water-and-rail lines through Norfolk seeking authority to depart from the provisions of the fourth section in order to meet the competition of the Southern Pacific Company via its water-and-rail route through Galveston have not shown that they are at such disadvantage in respect to this traffic as to justify fourth section relief and these applications should be denied.

Commissioner Aitchison, dissenting in part, said:

The order of the commission entered June 30, 1917, which denied authority to maintain rates on commodities from eastern defined territory to Pacific coast ports lower than the rates contemporaneously in effect on like traffic, to intermediate points, could manifestly have been met by the filing of tariffs reducing the rates to intermediate points to the Pacific coast port level as well as by increasing the coast terminal rates. The carriers have followed the latter course. I am unable to agree with the majority of the commission in the interpretation it placed upon the amended fourth section of the act in *Transcontinental Rates*, 46 I. C. C., 236, 252, which followed its decision *Reopening Fourth Section Applications*, 40 I. C. C., 35. The adjustment proposed in the tariffs now before the commission can be justified only by ignoring the last paragraph of the amended fourth section, and this in my judgment can not lawfully be done.

I can not find that as to the commodity rates proposed in schedules B and C, where advances are made either to the intermountain country or to the Pacific coast ports, the carriers have justified the advanced rates as reasonable. In cases before the commission in which certain rates were prescribed as reasonable in and of themselves to various intermountain points, the whole traffic of this section was not before the commission as is now the case, and it by no means follows that rates which might then have been prescribed as reasonable would have been made if the whole Pacific slope traffic instead of a limited portion thereof had been under consideration.

THE AMERICAN MERCHANT MARINE on January 1, 1917, comprised 37,894 vessels of five tons net register or over and had a total gross tonnage of 12,250,000 tons, according to a report of the Census Bureau. The geographical distribution of this gross tonnage was as follows: Atlantic Coast and Gulf of Mexico, 6,509,000; Mississippi River and its tributaries, 1,621,000; Pacific Coast, including Alaska, 1,186,000; Great Lakes and St. Lawrence River, 2,738,000; canals and other inland waters, 196,000. The distribution according to method of propulsion was as follows: Steam and other power, 6,098,000; sail, 1,089,000; unrigged, 5,063,000.



Norfolk & Western Hopper Car of 100 Tons Capacity

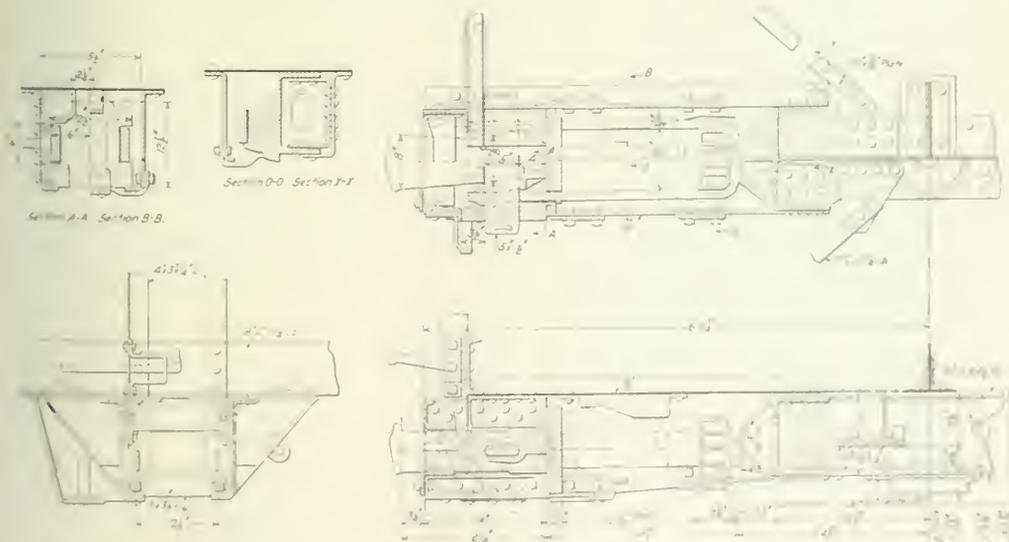
The Maximum Revenue Load Is 77 Per Cent of Gross Weight;
Single Member H-Section Center Sills

By B. W. Kadel

The Norfolk & Western recently built at its Roanoke shops and put into service a 100-ton self-cleaning hopper car, of all-steel construction, using six-wheel trucks. This car, known as the Class HR, has been built as a sample from which the advisability of providing larger quantities of this type of car may be determined.

The design of the car follows previous designs of Norfolk

and the center sill of the car is composed of a Bethlehem 12-in., 841-lb. H-section and extends slightly beyond the bolsters at each end of the car, where it is milled off to exact length and a true surface. Pressed-steel draft sills are spliced to the center sill by means of a steel back stop casting and top and bottom cover plates. The draft gear stops against this casting in buffing and the back stop casting is



Details of the Draft Gear and Draft Sill Construction

& Western hopper-bottom cars in that the drop doors are arranged in pairs extending across the car from side to side. Six pairs of doors are used, giving a door opening approximately 19 ft. 6 in. long. Each pair of doors may be dropped independently of the others.

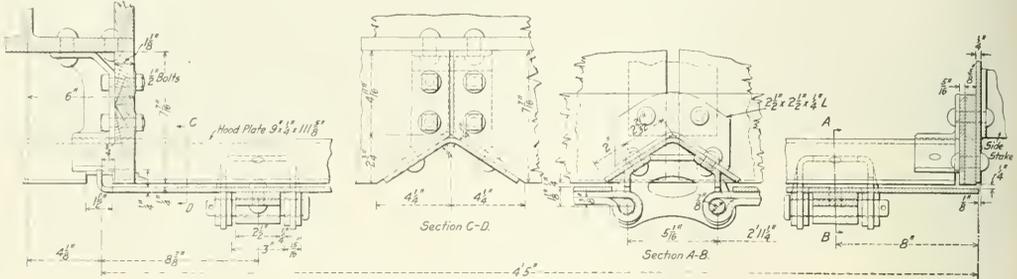
arranged so directly under the end of the H-section so that all the bearing load is delivered to the center sill without depending on the draft gear.

The draft gear consists of 7 1/2-in. steel plates, forged, and one tapered steel 17-in. diameter cast-iron gear to 17-in. in

depth at the front end and are spaced $15\frac{1}{2}$ in. between the webs.

The Farlow one-key draft attachments are used. The cheek plates are riveted to the inside faces of the draft sills and form the stops for the front follower in pulling. The yoke is laid horizontally and is continuous. The buffing load is transmitted through the rear end of the yoke directly to

type "D," with a shank $2\frac{1}{4}$ -in. long. For a carrier iron a 5-in. by $3\frac{1}{2}$ -in. by $7/16$ -in. angle is used. This is supported upon flanges cast from the cheek plates and is held in place by two bolts through the vertical flange of the angle. The weight of the coupler is carried directly on the cheek plate shelves, upon which rests the horizontal flange of the carrier, and the bolts merely keep it in place. The coupler

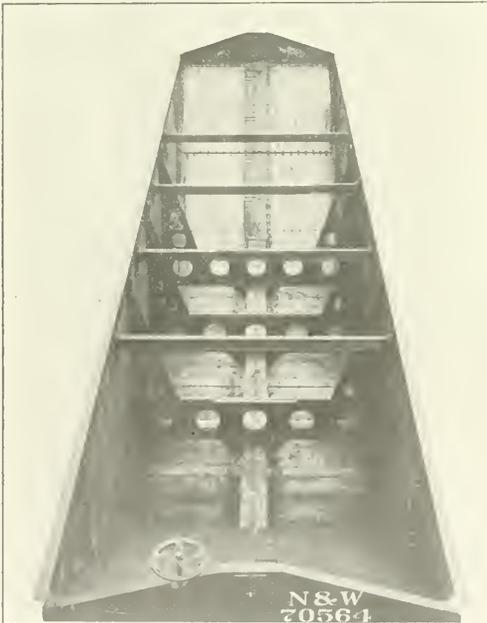


Details of the Door Construction

the back stop casting. A $1\frac{1}{2}$ -in. by 5-in. key is used for connecting the coupler to the yoke, and it will be seen from the draft gear layout that an exceptionally large bearing surface has been provided between the key and the yoke and between the key and the coupler. The key has been relieved

limit stops are formed by turning up the horizontal leg of the angle iron at the ends. By this arrangement removing the carrier iron also removes the limit stops and the yoke can then be drawn out of the end of the coupler pocket.

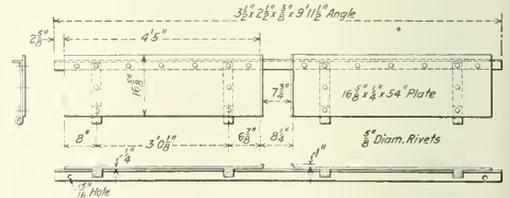
The car is built up of plates and structural shapes, the minimum plate thickness being $\frac{1}{4}$ in. Three diaphragms or transverse plate girders are placed across the car to support the center sill and transfer the weight of the lading to the sides of the car. At these diaphragms are placed inside side stakes and wing plates are also carried up from the diaphragms to a point near the top coping angle to stiffen the sides of the car. Midway between the diaphragms are placed outside side stakes of Carnegie M-24 cross-tie sec-



Interior View of the Car Showing the Transverse Diaphragm Members

of all bending stresses by allowing the outward extensions of the back key bearing on the coupler to overlap the inside extensions of the front yoke bearing.

The car is equipped with Sessions type "K" friction draft gear, and the coupler used is the M. C. B. 6-in. by 8-in.,



Drop Door Used on the Norfolk & Western Hopper Car

tion. The splices in the side sheets are made at these stakes. Cross-ties of 5-in. I-beam section are placed across the coal-space near the top of the car in the same transverse planes as the side stakes. The side stakes support the car against the cradle of the car dumper, over which the car must be handled at times.

The top coping angle is a Carnegie bulb angle of 4-in. by $3\frac{1}{2}$ -in. by $\frac{3}{8}$ -in. section, which extends the full length of the car. For a bottom flange member a 5-in. by $\frac{5}{8}$ -in. flat bar is used; this member is in tension only. Where the load requires it, near the center of the car, this bar is reinforced with a 5-in. by $5/16$ -in. flat bar.

The slope of the hopper is 33 deg. and between each pair of doors is a small hood to make the car entirely self-cleaning. These hoods are likewise constructed at angles of 33 deg.

The ends of the car are formed into plate girders and are carried up to form end coal boards, thus encouraging filling out the ends of the car at the tipples and insuring a good heap. The outer ends of the draft sills are supported from

Attitude of Security Owners

S. DAVIES WARFIELD, president of the National Association of Owners of Railroad Securities, recently sent a circular to members of the association regarding their attitude toward the action of the government in taking control of the railroads, in which he said in part:

The action of the government in taking over the operation of the railroads of the United States is the most far reaching recorded in our industrial history.

This association has followed the developments leading to this action and in reply to many inquiries now calls to the attention of its members the conditions under which their properties have been taken. The questions involved are of vital concern to every bondholder and every stockholder of all the railroads, and their adjustment should not be left to their operating executives. Indeed the results of any mistake here may not be confined to the holders of railroad securities—so large a part of the basis of all credit—but may be fraught with serious influence upon all enterprise for a generation to come.

The great question of permanent operation or ownership by the government, we will not discuss at this time. Its discussion involves questions of great moment, not alone to the fifty million people of the country who own, directly or indirectly, the securities of the railroads, but to all the people as a whole. It is an economic question which should be settled in time of peace; it has no place in these times of war and when there is to be discussed and determined the immediate necessities of the moment. Nor will we now discuss the details of the methods to be adopted by the government for the temporary use of the properties and for their return to their lawful owners after the war.

The exigencies of war and the conditions under which the railroads of the country were being operated made it imperative that their operation during the period of war should have the backing of the government.

We are, therefore, to assume that the bill is distinctly a measure of war, to give the necessary power to the President, and to protect the owners of the securities of the railroads during their operation by the government "at this time"—for the war period—and that such operation is for that period only.

May not the owners of the railroads, therefore, very properly make the request that the bill be framed to carry out the declared intention of taking the railroads for war purposes only and not for indefinite and continuous operation after the war, or for experimental purposes in connection with their operation or control. It should not be a requirement of the bill that the owners of the railroads, whose properties have been taken as a measure of war, must appeal to Congress to restore them at the expiration of the period for which they were taken. We may well ask that their restoration shall automatically take place at a fixed period at the close of the war.

It is not sufficient to say that we do not know under what conditions the railroads shall be returned to their owners—under what form of governmental control or regulation—or what may be the requirements for their future operation under plans of greater centralization of railroad control and for greater co-operation in operating methods, which may take place. Such reasons do not alter the fact that the government's tenancy is for the purposes explicitly stated by the President, and, therefore, can only be temporary.

Our purpose in addressing you at this time is that you may be informed as to the effect of the most important sections of the bill now before Congress and which greatly concern the owners of the securities of the properties. Provisions of less importance and certain ambiguities in the bill we need not discuss herein. As largely representing

such owners we should give co-operation to the government; we have assured them of such and we should gladly accept such rental for our properties as may be just. In fact, there are no security owners, we assume, who are not willing to make sacrifices as their patriotic duty and in their desire to help win the war. But, on the other hand, we should expect that the government will act when the rental shall cease and will operate and conduct our properties during their tenancy, forced upon them and upon us through the exigencies of war, with as little disturbance to the organizations of the several properties, which have cost millions in their development, as the demands of war conditions justify,—"nothing will be altered or disturbed which it is not necessary to disturb," the President has stated. We assume it is in this spirit that the railroads have been taken over and will be operated; in any other spirit, war conditions would be utilized as an expediency for depriving the owners of these properties of their lawful as well as moral rights. A great moral question is involved here and we are confident we can leave its settlement in the hands of our President who was specific in his reasons and purposes in taking over the temporary operation of the railroads.

This association has now the greatest responsibility of its existence, because during the period of governmental operation, and when the war closes, the position of the owners of the railroads should be clearly defined, and questions vital to such owners will arise.

Whether the great areas of unoccupied millions of acres of land of our country can be successfully and intensively developed by means better than through individual initiative and railroad operation, with the advantages incident to the full play of individual human endeavor; whether the full development of the industrial life of the nation can be accomplished better than through the competition involved in the building of railroads by private capital and the competitive system for securing and for the establishment of industries thereon, and through the proper and efficient operation of privately owned railroads under government control and regulation, wisely conducted; whether shippers in competition with other shippers, and whether the public, can secure better service than through the service they have been accustomed in times of peace to have offered them under the stimulus of individually operated enterprise; and whether employees can be given through other means the latitude for the enjoyment of personal liberty free from political restraint—all these are questions which are not at issue at this time, and should not be made an issue by an indefinite provision of an act of Congress permitting that to be done in a serious situation outside of and beyond what the President very pointedly stated was his purpose in the premises. As previously pointed out these are economic questions too vital to the country to bring up at a period other than during the time of the peaceful pursuits of the people and the conduct of our government in times of peace.

Nevertheless, if there is the intention to permit a situation to be created the result of which will make it impossible for you to get back your properties with the value attached to them at the time they are taken as going concerns, and which will fasten permanent government railroad operation on the nation, without adjusting the terms of payment for the principal of the properties, it is essential to the protection of your securities and only fair to you that such intention should be made known now.

THE QUANTITY OF COAL EXPORTED from the United States in 1917 was larger in both quantity and value than in any earlier year in the trade, the total quantity being about 32 million tons, including bunker coal, and the total value \$113,000,000.—*Bulletin of the National City Bank of New York.*

Export Freight in Trainloads

TO EXPEDITE THE MOVEMENT of food and other supplies for the British, French and Italian governments—about 30,000 carloads of which are waiting to be shipped from western points—A. H. Smith, regional director of the eastern railroads, has issued a circular prescribing regulations under which this freight is to be concentrated at Chicago, East St. Louis, Buffalo and Pittsburgh so as to be sent forward, so far as practicable, in train loads; and it is hoped to get the freight through in considerably better time than heretofore. This order was issued on January 29, but the continued severe weather—low temperature, snow and wind combined—have since that day delayed freight throughout the Eastern states even more seriously than before; so that the benefits of the new plan have not yet been realized. The Lehigh Valley delivered a train load of flour (from Buffalo) at Constable Hook, New York harbor, on Monday, February 4; but the ship which was to receive it could not be brought to the dock. Floating ice baffled for a whole day the three tugs which were assigned to the task of placing the ship.

The regulations are under five heads and are in substance as follows:

1. Concentrate at Chicago all shipments originating at Chicago or tributary to the Chicago gateway; at East St. Louis, all tributary to that gateway; at Buffalo shipments from Canada, Michigan and other points tributary to Niagara Frontier; on roads leading into Pittsburgh, shipments from South of Ohio river or Central Freight territory tributary to Pittsburgh.

2. Make solid trains or groups at concentration points for each road to each port, holding cars accordingly, and advise this office daily by wire how many cars for each port and route are being held at each concentration point and how long the oldest car has been held. Initial road east of Chicago, East St. Louis, etc., will wire this office date and time each train or group of cars starts, stating number of loads, routing and delivery road at port.

3. These trains will be known as G. O. C. New York C No. 1, G. O. C. Boston S No. 1, etc. Chicago will use, as shown, the prefix "C"; East St. Louis prefix "S"; Buffalo "B"; and Pittsburgh "P."

4. G. O. C. prefix of permit numbers must be carried on waybills and running slips.

5. Routing can be changed to obtain full trains or full groups of cars, provided always that the delivery road and the port must be protected and cars must be delivered to the road that will insure this delivery. These trains and groups of cars will be routed to the ports by roads best able to move

the traffic promptly, and for this purpose deliveries should be made as far as possible as follows:

For port delivery by	Consolidate at Chicago on	Consolidate at East St. Louis on
Boston & Albany.....	Mich. Central.....	C. C. C. & St. L.
Boston & Maine.....	Grand Trunk.....	C. C. C. & St. L.
Balt. & Ohio.....	Balt. & Ohio.....	Balt. & Ohio S. W.
Central of N. Y.....	N. Y. Central.....	C. C. C. & St. L.
Delaware, B. & W.....	N. Y. C. & St. L.....	Toledo, St. L. & W.
Erie.....	Erie.....	Toledo, St. L. & W.
Lehigh Valley.....	Mich. Central.....	Wabash.
N. Y. Central.....	N. Y. Central.....	C. C. C. & St. L.
N. Y. O. & W.....	Grand Trunk.....	C. C. C. & St. L.
Pennsylvania.....	Pennsylvania.....	Vandalia.
Phila. & Reading.....	N. Y. Central.....	C. C. C. & St. L.
W. Maryland.....	Balt. & Ohio.....	Balt. & Ohio S. W.
Chesapeake & Ohio.....	C. & O. Ry. of Ind.....	Balt. & Ohio S. W.
Norfolk & Western.....	Pennsylvania.....	Vandalia.

Owing to shortage and crippled condition of lighters and tugs, and adverse conditions in New York harbor, the ships of the Allies are to be sent for loads to the piers at the railroad terminals, and for this purpose each of the roads has, so far as practicable, assigned such piers as it can spare, without demoralizing its other traffic. This arrangement will do away with the necessity for a large amount of lightering and should save a great deal of time. The assignments of piers are as follows:

New York Central—Weehawken, four piers accommodating nine or ten steamers.

Erie—Weehawken, four piers, three of which are allocated to Belgian relief steamers; the fourth pier will accommodate one steamer.

Delaware, Lackawanna & Western—Hoboken, two piers with accommodations for three steamers.

Lehigh Valley—Constable Hook, one pier which will accommodate four steamers.

Central of New Jersey—One pier which will accommodate two steamers; but some dredging must be done.

Baltimore & Ohio—Will berth some steamers at American docks, St. George, Staten Island.

Pennsylvania—Has no piers available where there is sufficient depth of water for ocean-going vessels.

This arrangement is in addition to the regular arrangements for berthing of ships at railroad elevators for bulk grain.

Maturing Securities in 1918

L. F. LORÉE, president of the Delaware & Hudson, has prepared the following statement showing the securities of railroads, public utilities, industrials and municipals maturing from January 1, 1918, to December 31, 1918:

	United States only				Companies in Canada		Grand total
	Railroads	Public utilities	Industrials	State, city and municipal bonds	Total	Cuba and Mexico	
1918	\$17,318,877	\$7,663,688	\$15,792,773	\$8,149,987	\$69,059,753	\$6,831,500	\$75,899,775
1919	9,221,197	59,301,065	5,279,775	3,491,191	97,157,330	643,000	97,796,198
1920	4,679,246	9,247,750	22,554,222	6,489,620	42,889,935	719,500	43,604,435
1921	22,675,879	11,875,400	17,436,692	6,535,934	93,053,946	434,000	93,487,946
1922	30,070,488	7,879,150	1,114,097	11,189,888	87,851,778	696,000	88,547,778
1923	9,767,781	11,406,250	10,037,942	11,752,481	42,299,454	90,000	42,389,454
1924	4,289,813	79,061,900	89,444,000	1,000,000	181,191,333	7,561,530	188,752,863
1925	4,299,706	7,147,400	10,072,344	7,371,991	21,578,344	1,503,000	23,081,344
1926	7,468,711	4,450,750	6,670,297	6,688,711	36,770,556	10,590,500	47,361,056
1927	3,119,344	7,788,900	388,444	1,645,061	23,519,747	10,690,000	34,210,747
1928	4,177,418	1,979,750	7,124,676	3,967,229	37,072,088	10,910,000	41,057,088
1929	3,767,781	2,304,280	30,441,562	11,575,301	48,084,924	3,497,500	51,582,424
Total	\$114,191,246	\$214,128,683	\$181,657,760	\$121,773,991	\$741,631,853	\$58,215,530	\$799,847,383

These figures were obtained from Moody's Manual of Securities. The figures for 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, and 1929 are preliminary and subject to change. The figures for 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, and 1929 are preliminary and subject to change. The figures for 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, and 1929 are preliminary and subject to change.



British Ambulance Train for American Wounded

The Midland Railway of England Has Built a Sixteen-Car Train for Our Forces in France

IF THERE WERE ANY DOUBTS as to whether wounded American soldiers would be properly taken care of on their journeys by rail to the hospitals behind the lines in France, they have all been dispelled by the announcement made by Surgeon General Bradley with the American Army in France on January 6 that 15 complete hospital trains have been ordered in England and two in France for this purpose.



Sick Officers' Day Saloon

The announcement followed the placing of the orders some time, for on December 29 the American ambassador, a number of United States Army and Navy officers and prominent Americans and Englishmen were able to inspect at the St Pancras station in London, the first of the completed trains—one built in the car shops of the Midland Railway of England. In the Patriotic War Number of the *Railway Gazette* there appeared a description of one of the ambulance trains built for the British Government by the Great Eastern Railway, and emphasis was placed on the extreme care that the British have taken to make the railway journeys for their wounded as pleasant and restful as possible under the circumstances. The American train, illustrations of which are given herewith likewise shows evidence of this British skill and care.

The complete train consists of 16 cars with accommodations for about 450 persons, there being 300 cots for wounded and facilities for the staff and personnel. Each car is 51 ft long, mounted on four-wheeled bogie trucks, and equipped with Westinghouse brakes. The couplings, draw hooks, steam connections and side chains are to the international standard. The total length of the train, without engine and tender, is 915 ft, and its weight (unloaded) 485 tons.

Each car is built of well-seasoned timber and painted khaki color, with two large red crosses on a white ground on either side. For identification purposes, the number of each car and the distinguishing letter are conspicuous on each side, and the train number with the distinguishing letters U. S. A. T. is painted on the extreme ends of the train.

The train is vestibuled, and fitted throughout with electric lights and fans. The roofs are semi-elliptical, with high and airy ceilings. Every care has been taken to admit of the interior of the cars being kept clean with the least effort. The floors are covered with linoleum or hhd., and have rounded corners. The gangways between the cots are wide enough to pass the army stretcher. An abundant supply of



American Officers Inspecting the Accommodations

water (2 8x5 gal) and first-aid supplies are carried in tanks built in the roof.

In addition to the equipment for use on the train, the steam from the engine, the Staff Car, and the Personnel Car (also used to supply the wounded) furnish hot water, capacities for use from the engine to the Personnel Car.

- The order of cars in the train is as follows:
- A—Engine and tender
 - B—Staff car
 - C—Personnel car (used for carrying wounded)
 - D—First Aid car
 - E—Personnel car

A-5, A-6, A-7, A-8, A-9—Ward cars (five).
D-2—Kitchen car (with N. C. O's and men's compartment).

C—Personnel car.

E—Brake and stores car.

The brake and lying infectious ward car (A-10) contains four wards, each fitted with six beds, an attendant's com-



The Kitchen Car

partment with lavatory and toilet accommodation, and a guard's compartment with bed, folding table and seat, lavatory, etc., in addition to the usual brake equipment.

Staff car B contains dining room and sleeping compartments for the medical officers and nurses and lavatory and toilet accommodation, including side sprays. This car is also furnished with wardrobes, cabinets and book racks, and is finished and panelled throughout in polished mahogany.

Kitchen car D-1 contains an officers' pantry and cook's

room is also provided in this car, containing a 4 ft., 6 in. bath, which is fitted with hot and cold water and shower bath.

The nine ward cars are open throughout, with a lavatory compartment at one end. Each car contains 36 folding cots, in three tiers, the cots in the middle tier being so arranged that they can be folded down to form backs for sitting cases on the lower tier. An ample supply of drinking water and conveniences such as paper racks, ash trays, etc., is provided for each patient. The sides and roofs of these cars are painted in glossy white enamel.

Pharmacy car F comprises a dispensary, and treatment medical officer's office, linen room, and a pantry for medical comforts, and an emergency compartment. The corridor on this car is wide enough to pass a stretcher into the treatment room. The dispensary is fitted with cupboards and racks for bottles, surgical dressings, etc. Part of this car is partitioned off and provided with eight berths, in which bad cases can be treated.

Kitchen and men's mess car D-2 contains a large kit store, wash basin, and kitchen similar to that on car D-1, a mess room, with folding table for the men, and a smaller mess for the non-commissioned officers, the latter having two



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War Car Arranged for Sitting Cases

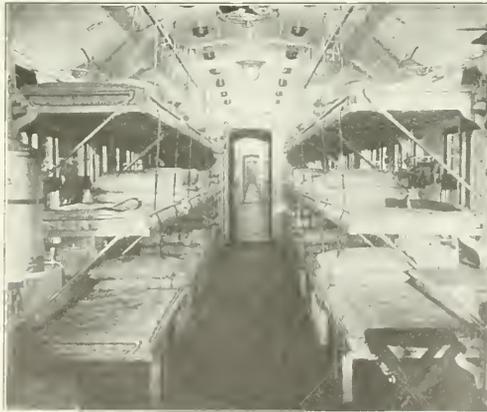
beds, so that the senior N. C. O's may sleep there if desired.

Personnel car C is arranged similarly to the ward cars, except that the mattresses of the beds are covered with American cloth, so that the beds can be used as seats by the staff during the day. Kit racks are provided, and also small lockers under the beds.

Brake and store car E contains a large linen store and a compartment provided with shelves for carrying the general provisions required on the train, a kit store and compartment for perishables and a meat safe. A brake compartment similar to that on car A-10 completes the car.

JAPANESE IMPORTS OF RAILWAY EQUIPMENT.—Among the principal imports into Japan during 1915 and 1916 were railway cars and parts valued at \$308,312 in 1915 and at \$149,039 in 1916; locomotives and tenders valued at \$113,710 in 1915 and at \$60,091 in 1916.

STEAM LOCOMOTIVES EXPORTED from the port of New York during December, 1917, were valued at \$873,377. Steel rails exported in that month were valued at \$680,127. The total exports for the month of December, says a recently issued bulletin of the National City Bank of New York, amounted to \$86,304,580.



Central News Photo

One of the Nine War Cars

room, with three sleeping berths, dining table, seats, etc. The kitchen, which is a spacious compartment is fitted with an army "Dixie" range with hot water supply, and a "Soyer" stove. A comfortably furnished sitting sick officers' compartment forms part of the kitchen car, having wood linings and tables of polished mahogany, and the seat coverings of moquette, with a lavatory compartment adjoining. A bath

New Priority Regulations

THE PRIORITIES DIVISION of the War Industries Board on February 4 made public Priority Circular No. 3 defining the regulations which the Priorities Division now has in effect for determining precedence in orders and work and describing the methods of administering them. The regulations are subscribed to by the Secretary of War, Secretary of the Navy, the chairman of the Shipping Board and the president of the Emergency Fleet Corporation, and the chairman of the Council of National Defense. The circular discloses a much wider field of operations than that defined in the first circular issued in September of last year. The priority regulations apply to all individuals, firms, associations and corporations engaged in the production of copper, iron and steel and in the manufacture of their products; of chemicals, cotton duck and woolen cloth, and all such other raw materials and manufactured products as the committee may deem necessary from time to time.

Under the new regulations, all orders and work are divided into four general classes instead of three as heretofore: Class AA, Class A, Class B, and Class C, with such subdivisions as AA-1, Class AA-2, etc., Class A-1, Class B-1, etc. Class AA comprises only emergency war work of a special or urgent nature. Class A comprises all other war work; that is to say, orders and work necessary to carry on the war such as arms, ammunition, destroyers, submarines, airplanes, locomotives, etc., and the materials or commodities required in their production or manufacture. Class B comprises orders and work which, while not primarily designed for the prosecution of the war, yet are of public interest and essential to the national welfare or otherwise of special importance. Class C comprises all orders and work not embraced in the other three classifications and no certificate will be issued therefor. All orders, work or materials not covered by priority certificates will fall within Class C. The new regulations in no way change or modify any priority orders previously issued. The rule of procedure from now on is that orders and work in Class AA shall take precedence of those in all other classes; orders and work in Class A preceding those in Class B and those, in turn, orders and work in Class C, irrespective of the dates the orders were placed.

"The classification of an order," the circular states, "simply means that it shall be given such precedence over orders of a lower classification as may be necessary (and only such as may be necessary) to insure delivery on the date specified in the order. It does not mean that work should cease on orders of a lower classification or that the order should be completed and delivery made in advance of orders taking a lower classification if this is not necessary to effect delivery within the date specified. The one to whom a priority certificate is directed should make his own production plans so as to get the maximum of efficiency out of his operations, making all deliveries at the times contracted for, if possible, and where this is not possible, giving precedence to those orders which take the highest classification."

As a general rule, where an application for priority certificate is necessary, it should be made by the one placing the order on which the application is based, in the name of the department or official for whose account the order has been placed, whether of the United States government or one of the allied governments. In the latter case, the application must be made through and with the written approval of the war mission, which is representing that particular government in this country. Government contractors or subcontractors, however, may make application for priority direct to the committee if their need is urgent.

The committee does not administer priority on coal and

coke, or foods and feed, which are handled by the Fuel and Food Administrations. The committee will, however, consider applications for priority assistance to procure tools, equipment, or supplies for the production of these commodities. The committee's work does not cover transportation and it does not attempt to expedite transportation.

No industry, plant, material, or commodity will be classified as such. Only specific orders for materials, commodities, or work are classified according to their importance in war preparation or in work necessary to the public interest and essential to the national welfare, or otherwise of exceptional importance.

"The paramount purpose of priorities," the circular says, "is the selective mobilization of the products of the soil, the mines, and the factories for direct and indirect war needs in such a way as will most effectually contribute toward winning the war. In requesting priority the petitioner should join with the committee in applying the test: To What Extent, if at All, Will the Granting of this Application Contribute, Directly or Indirectly, Toward Winning the War; and if at All, How Urgent Is the Need?"

Questionnaire on New Equipment, Additions and Betterments

DIRECTOR GENERAL OF RAILROADS McADOO has addressed a circular letter to the railroads under date of February 2, calling for complete information on accompanying blank forms as to new equipment, additions, betterments, extensions, etc., already contracted for or which are considered necessary for 1918. The roads are asked to send one copy of the answers with all possible despatch to the Regional Directors to whose jurisdiction they are subject and the other to the Interstate Commerce Commission.

In determining what additions and betterments, including equipment, and what road extensions should be treated as necessary, and what work already entered upon should be suspended, the roads are asked to be guided by the following general principles:

"From the financial standpoint it is highly important to avoid the necessity for raising any new capital which is not absolutely necessary for the protection and development of the required transportation facilities to meet the present and prospective needs of the country's business under war conditions. From the standpoint of the available supply of labor and material, it is likewise highly important that this supply shall not be absorbed except for the necessary purposes mentioned in the preceding sentence.

"Please also bear in mind that it may frequently happen that projects which might be regarded as highly meritorious and necessary when viewed from the separate standpoint of a particular company, may not be equally meritorious or necessary under existing conditions when the government has possession and control of railroads generally and therefore when facilities heretofore subject to the exclusive control of the separate companies are now available for common use whenever such common use will promote the movement of traffic.

"While the questions and blanks group together additions and betterments designed to improve capacity, efficiency and economy, this is done because of the difficulty of drawing sharp lines between these objects. It is important to emphasize, however, that under existing conditions the primary thing to accomplish is increased capacity to handle the traffic of the country.

"Please send as soon as possible the information called for in parts I and II of the questions and send the information called for in part III as soon as the accounts for December,

1917, shall be completed to the point where it is possible to send the information." The questions are as follows:

I.

Submit statement of equipment authorized or contracted for, or the contracting for which during the calendar year 1918 is believed by the management to be necessary for the proper conduct of the business.

Show the number of units, listing separately locomotives, cars, and other equipment in accordance with the descriptions relating to type and design carried on the blank form; where and by whom constructed; probable time of delivery; estimated probable cost of each unit; and estimated probable cost of aggregate.

Show in corresponding detail units of equipment which it is anticipated will be retired from service during the calendar year 1918, with the ledger value thereof, and approximately the way in which such ledger value will be disposed of in the accounts.

II.

Show additions and betterments (exclusive of equipment) and road extensions authorized or contracted for since December 27, 1917, or which in the judgment of the management it is necessary should be authorized or contracted for during the calendar year 1918, as follows:

(1) Total cost of additions and betterments (excluding road extensions) to existing roadway and structures which are primarily and principally calculated to increase the carrier's capacity, efficiency, or economy in respect of traffic which it expects will be offered and which could not be expeditiously and efficiently handled without such additions and betterments. In dealing with this class of expenditures, bear in mind that under existing conditions railroad facilities can and ought to be used in common so far as such common use will increase capacity, efficiency or economy. Hence, even if an expenditure would be calculated to promote these objects as to a particular railroad if viewed as a separate proposition, it would not be included under this heading where under existing conditions approximately the same objects could be accomplished by the greater common use of existing facilities of other railroads, or where the desired result could be better obtained by some joint expenditure for common use.

Give brief description of character and location of each project grouped under this heading where the cost charged to investment account aggregates \$50,000 or more, and show in addition cost chargeable to operating expenses. As to each project of \$50,000 or more thus separately listed, show probable time the addition or betterment will be completed and put into operation. As to each such project of \$50,000 or more give explanation of benefit anticipated through enlargement of capacity or increase of efficiency or economy, giving as far as possible estimate in figures of annual amount of anticipated increase in net revenue from railway operations likely to result therefrom.

(2) Additions and betterments (excluding road extensions) to existing roadway and structures, which the management thinks should be made during the present calendar year, even though not primarily and principally for the objects stated in No. 1. Describe separately each such project involving an investment cost of \$25,000 or more; show also amount chargeable to operating expenses, and give reasons why such projects should be entered upon at this time, bearing in mind the consideration stated in the next succeeding paragraph in opposition to entering at this time upon any expenditures which are not absolutely necessary. As to each such item of \$25,000 or more, state benefit anticipated therefrom and give where possible estimate in figures of anticipated annual increase in net revenue from railway operations likely to result therefrom.

(3) Extensions of existing lines (i. e., additional road

mileage), construction of new branches or new lines. Show mileage and estimated cost. Describe each extension. Say whether the construction is designed to serve a territory or locality which is already served by some other transportation system, naming such system, or is designed exclusively to develop territory not now served in a practicable way by some transportation line. Give fully the reasons why such construction should be entered upon at this time when it is of the highest importance to conserve capital, material and labor for the undertakings which are absolutely necessary and which cannot be postponed. Where practicable give an estimate in figures of annual net revenue from railway operations to be derived from such new construction.

Indicate the probable time required for completion and putting into operation.

III.

As to additions and betterments (exclusive of equipment) and road extensions which were inaugurated prior to December 28, 1917, and which have not been completed:

(1) Show amount authorized and amount already expended, showing separately (a) amounts chargeable to operating expenses, and (b) amounts chargeable to investment account. (See 5 below.)

(2) Show what part of this work in the judgment of the management, without detriment to the carrier's capacity, efficiency and economy, can and will be suspended in order to carry out the general policy herein outlined of postponing expenditures which could be avoided by joint use of facilities of other carriers and which ought to be postponed so as to conserve capital, material and labor.

(3) As to projects which the management believes should not be suspended, (a) as to each project whose investment cost is \$50,000 or more, falling in the class described in paragraph 1 of II and (b) as to each project whose investment cost is \$25,000 or more and falling in class described in paragraph 2 of II, give description and show separately investment cost and amount chargeable to operating expenses, and percentage of completion. As to projects falling in class described in paragraph 2 of II, i. e., those which are not primarily and principally to increase efficiency, economy or capacity, give the reasons why the management believes the work should be completed.

(4) As to all extensions of existing lines, and construction of new branches or new lines, show same information as is called for in paragraph 3 of II above and show also percentage completed. Show which of these projects can and ought to be suspended in order to avoid unnecessary expenditure of capital, material and labor at present.

(5) As to all items under III show the information as of December 31, 1917.

SCOTTISH RAILWAY STOCKHOLDERS' PROTECTION.—At a meeting of shareholders of Scottish railways held on December 19 in Glasgow, the following resolution was passed: "That an association to be called 'The Scottish Railway Stockholders' Protection Association' be and is hereby constituted, its objects being to take all necessary steps to safeguard and protect the interests of Scottish railway stockholders at the conclusion of the war, and that an executive committee consisting of 20 stockholders, with power to add to their numbers, be appointed, five to be a quorum, with full powers to carry into effect the formation of the association, to fix its constitution, and to take all such necessary steps and measures and incur such expense as may be deemed necessary by the executive committee to carry out the objects of the association and manage its business." Thereafter the meeting elected 20 representative stockholders to act as an executive committee, with powers to add to their number. A circular is shortly to be sent out to all stockholders of the Scottish railways inviting them to join the association.

The Relation of the Railroad to the Farmer*

Inauguration and Development of Farm Bureaus in New York State Has Had Far Reaching Results

By George A. Cullen

Passenger Traffic Manager, Delaware, Lackawanna & Western

IN AMERICA ALONE, broadly speaking, was the policy adopted from the start of pushing the railroads out ahead of the population, not only into the far and middle West, but also into unsettled sections of the East. In all these cases the railroad projectors built upon hope and with a vision and a financial courage unequalled probably in all the history of mankind.

Coupled with the marvelous achievements in securing the capital, solving the engineering problems and marshalling and directing the forces of men and material, there was another phase of this pioneer work that some of us not yet in middle life can well remember as boys. I refer, of course, to the gigantic colonization agencies of the Union Pacific, the Burlington, the Santa Fe, the Rock Island, the Missouri Pacific, the Northern Pacific and other great systems of the West, which, not content with posting quarter sheet cards on every telegraph pole, fence and barn in staid New England, sent its emissaries by the thousands across the sea and there preached the gospel of prosperity and happiness in the land of freedom to the daring or the disappointed of Europe. We know how whole states such as Kansas, Nebraska, Minnesota, and the Dakotas were peopled thus.

We often forget, however, that the government did not do this and that the people of the United States as a whole did not do it, but that we owe this, which has probably been one of the most important factors in our present national greatness almost, if not quite wholly, to our railroads.

The activities of the different railroads in contributing to the agricultural development of the territory served by their lines vary not only with the different sections and localities and with the character of the products raised, but also in a marked degree, with the individual judgments, opinions or preferences of the different railroad managements concerned. This is but natural when you realize that the work is done by railroad men who do not claim to be farmers, but who are obliged to select from the many plans put forth by agricultural experts those best suited to their conditions and to the degree of effort, personal and financial, they feel they can profitably expend upon it.

About the year 1910, W. H. Truesdale, the president of the Delaware, Lackawanna & Western, himself a western man and before coming east the general manager of one of the largest of the western granger roads, became impressed with the way in which our national food production was being overtaken by domestic consumption, so that not only was the margin for export rapidly reaching the vanishing point, but the unprecedented condition apparently approaching when America would not produce enough foodstuffs for her growing population.

It was manifest that the printed bulletins of the agricultural department fell far short of accomplishing their theoretical purpose, by reason of the inability of the average man in any line of business to interest himself in the printed page without accompanying demonstration and personal contact.

The advice of the United States Department of Agriculture was sought, and Professor W. J. Spillman, chief of the division of farm management of the U. S. department, and

the creator of the idea of the county agency, proved most enthusiastic in laying before us the principles which had already crystallized in his mind, and upon which the County Farm Bureau of today is founded. Professor Spillman's experience with county agents in the South, where they had originally been sent to exterminate the boll weevil and had gradually developed into general agricultural advisers and had led to the introduction in that section of diversified farming, inspired him with the thought that the ideal unit of scientific, agricultural instruction was the county. He saw that the opportunities which an agricultural expert had in working in a restricted area, gave him an advantage over any other possible method, by reason of the fact that it enabled him to get into personal relationships with each farmer and to add to the mere cold, hard, scientific instruction, the persuasive power of personal contact, and by persistent application upon the individual farmer induce him to try the methods which science had proved were good and practicable.

Professor Spillman welcomed the opportunity to experiment in a section such as that of the southern tier of New York, where he believed the conditions ideal to demonstrate the practicability of his plan, and when he found the Lackawanna ready to contribute the funds necessary for at least one half of the support of the bureau the first year, and the Binghamton Chamber of Commerce one fourth, he found funds available in the U. S. department for the remainder, and in March, 1911, the Broome County Farm Bureau was organized.

The first year of the Broome County Farm Bureau was a very trying one, owing to a variety of causes, such as the unfamiliarity of the farmers in that particular region with scientific methods, skepticism as to the practicability of anything particularly new or progressive, and we must admit, a certain hesitancy to accept anything so freely offered by a railroad corporation and a chamber of commerce. The work did not become really successful until an association of farmers was with some little difficulty formed and financial support obtained therefrom. I never saw a better illustration of the fact that where your treasure is, there will your heart be also, than in this work, and I am now a firmer believer than ever in the fact that if you want to get a man's interest, you had better first get his capital.

This was soon followed by a contribution from the county itself through its board of supervisors, so that today these two agencies, the Farm Bureau Association and the board of supervisors, contribute over two thirds of the total expense. Of course, with the development of the farm bureau throughout the nation, and under the provisions of the Smith-Lever act, the United States government and the state governments contribute to such farm bureaus, I think \$500 each per annum for their support, in addition to furnishing through the state colleges all of the assistance and direction necessary to make the county agent successful.

Following the Broome County Bureau and, in 1912, the formation of the Farm Bureau of Cortland County was brought about by the Lackawanna on lines similar to those already described. Shortly following that came Chemung county and then others in rapid succession.

I have just received a letter from Hon. Raymond A. Pearson, assistant secretary of agriculture at Washington,

*Extracted from an address before the Massachusetts State Board of Agriculture, Worcester, Mass., January 9, 1918.

in which he says: "This work must have been well done, because it has stood the test of six or seven years, and it has been followed by the location of county agents in a very large number of counties. Of the 2850 rural counties in this country, 1900 now have county agents and about 1200 of these have women demonstration agents, an outgrowth, by the way, of the farm bureau plan. I always thought that the interest of your road in this matter came from a genuine appreciation of the fact that the railroad business and the farmer's business, to a large extent, depend upon each other. In the present emergency, the importance of these great industries in their intimate relations are being emphasized as never before."

The county farm bureau under competent management is, in our opinion, unquestionably the best medium not only for disseminating scientific information, but for bringing about among the farmers co-operative action along many lines where until recently they have been suffering seriously from too great a degree of individualism. This feature manifests itself in a variety of ways. On the one hand, we find farmers through the farm bureaus purchasing their supplies, agricultural implements, fertilizers and what not, at very much more favorable terms than would otherwise be possible and with a much better prospect of prompt delivery by reason of the quantity of the shipments. On the other hand, they are in many cases making possible the sale and shipment of farm products under much more favorable terms than heretofore, the farm bureau agent being located generally in one of the principal cities of the county and in contact with the general consuming public, either directly or through the agency of some railroad, and thus finding markets of superior attractiveness and securing improved treatment at the hands of the distributors in those markets. The possibilities along the latter line are very great, and we look to see counties acting as units of distribution with very promising results, both to the farmer and to the consumer.

In several other respects, the farm bureaus have, particularly during the past year, proved of a high degree of usefulness. An interesting illustration of this is had in the meeting called by the Lackawanna at Binghamton, N. Y., on April 7, 1917, at which the farm bureau managers of 13 counties were present, accompanied each by four of his Farm Bureau Association directors. These 65 representative authorities on farm needs and opportunities were gathered together with some 40 of the leading business men and bankers of Binghamton, Cortland, Norwich and Elmira and one or two other cities, and an entire day was spent in the discussion of ways and means to increase the production of the counties represented to meet the demand for foodstuffs growing out of the entrance of this country into war.

The effects of that meeting have been continuous throughout the subsequent period, and have resulted in a number of important, and, in some cases, original movements. Through the impetus flowing from this meeting and by the instrumentality of the railroad company, over 30 car loads of seed potatoes, which apparently could not otherwise have been obtained, were brought into the section involved. The use of tractors for plowing has been successfully experimented with, and will undoubtedly be largely increased in the coming season. Perhaps the most notable of all has been the response to the request of the farmers for labor. In this matter the farm bureau agents have acted as a medium for the temporary transfer of employees of manufacturers in Binghamton, Cortland, Norwich and Elmira to the farms of Broome, Cortland, Chenango and Chemung counties. This has been made possible by the unprecedented action of the large employers of labor in those cities, in releasing a considerable number of their men for periods of from one to four weeks in the planting and harvesting seasons for general farm labor, to which also the railroad company has contributed a number of its section men for such rough work

as plowing. In all cases, the city employers have paid their employees the difference between the ruling price of farm labor and the wages which they were receiving in the city. Several hundred men have worked on the farms under this arrangement, and all reports are that it has been of real value to the farmers in the emergency existing, and has contributed materially to the increase of acreage under cultivation. All of this would have been entirely impossible, but for the agency of the farm bureau.

The possibilities of these farm bureaus, aided by the ever willing service of the railroad company, in the matter of improved methods for securing labor, the introduction of farm machinery, and particularly, in the yet undeveloped field of better marketing conditions, are, in our opinion, most attractive, and, in fact, hold the promise of greater usefulness than anything yet accomplished.

Carbocoal—A New Fuel

A NEW COMMERCIAL PROCESS for converting bituminous coal into a fuel which is smokeless and has the characteristics of anthracite coal, has been invented and perfected by C. H. Smith, who has been working on this new process for some time in conjunction with Blair & Company, of New York. The bituminous coal is taken in its raw state and subjected to a distillation process at relatively low temperatures which distills off vapors and permanent gases, leaving what is called Carbocoal to be made into briquettes. An important feature is that valuable by-products are obtained from the gases, the revenue from the sale of which largely compensates for the cost of the process.

The residue from the distillation is pressed into hard and durable briquettes. These briquettes are practically pure carbon, having only one to four per cent volatile matter. They provide an intense fire and are adaptable for use on locomotives where high steaming rates are required. The adaptability of this fuel for locomotive use has been determined by actual locomotive tests, at which high rates of combustion were obtained with practically no smoke. It has been found particularly suitable for use where limited grate area is obtained and restricted boiler capacity requires an efficient fuel. It is easily handled; the briquettes do not readily disintegrate.

The accompanying table shows the products obtained from the raw bituminous coal by the distillation process. The

Raw Bituminous Coal—2,000 lb.	
Carbocoal Briquettes—1,440 lb.	
Gases and Vapors—560 lb.	
Vapors—360 lb.	
Tar Oils—Benzol, Toluol, Naphthas, Motor Spirit, Crescote, Oils, Tar Acids, Lubricating and Fuel Oils, Anthracene, Pitch and other tar oil products.	
Ammonical Liquor—Ammonia (Concentrated), Sulphate of Ammonia, Cyanogen, Pyridene bases and other nitrogen compounds.	
Permanent Gases—200 lb.	
These are used to provide heat for the distillation process, or may be used for commercial purposes.	

coal tar products are recovered in their primary stage, there being available some 20 gallons of tar oils for the market as compared with four or five gallons from the same grades of coal in the ordinary carbonization process. Many of the by-products which are obtained by this process are in great demand for use in the manufacture of explosives.

Such a fuel will find a field on railroads, for domestic use, in stationary and marine plants where smokeless operation is desired, and for kilns and gas producers. This process is being handled by the International Coal Products Corporation, of which Mr. Smith, the inventor of the process, is president. An experimental plant has been in operation at Irvington, N. J., and plans are now under way for the construction of new plants.

The Railroad Control Bill Is Reported

Committee Amendments Provide for Termination of Government Control After Fixed Period

WITH AMENDMENTS providing for the termination of the government's control of the railroads at a fixed period after the close of the war, and restricting the President's authority to fix rates by a provision for a review by the Interstate Commerce Commission on appeal, the administration railroad control bill was reported by the Senate committee on Monday and is expected to be reported by the House committee later in the week. In the Senate bill the period of government control is limited to 18 months after the close of the war with discretion in the President to terminate it sooner. In the House bill a two-year period is provided. No change was made in the provision for the compensation of the roads based on their net operating income for the three years ending June 30, 1917, but the Senate committee inserted an amendment to prevent any increase in compensation based on earnings or surplus accruing and invested in the property during the period of federal control.

Because of the nature of the changes the bill was introduced in the Senate as a new bill S. 3713, and on Tuesday it was reintroduced as S. 3752 on account of an omission. It was referred back to the committee for a report later in the week. Chairman Smith said he would ask for its early consideration. Senators La Follette and Cummins will file minority reports.

The expressed wish of the administration that the period of government control should be left indefinite, in order that Congress might not be circumscribed as to time in reaching its determination as to the future status of the roads after the war, was disregarded by a considerable majority in both committees. Although most of the Democrats voted to leave the period indefinite and most of the Republicans voted for a time limit, the votes were not entirely controlled by party considerations and the well-known advocates of government ownership, such as Senators Cummins and La Follette and Representative Sims, were against any limitation.

The House Committee on Interstate and Foreign Commerce on Saturday adopted an amendment providing for a two-year period after the war by a vote of 15 to 6. All of the Republicans voted for it and also Representatives Rayburn, Montague, Coady, Dewalt, Snook and Sanders from among the Democrats. The amendment was proposed by Representative Montague, who had originally held out for a one-year limit. Amendments proposing a 3-year limitation offered by Representative Barkley, an 18-months limitation offered by Representative Parker, and a one-year limit offered by Representative Esch were defeated. The amendments voted by the House committee include one to provide that the proposed guarantee shall be "not in excess" of the three-year average. Another provides that a report shall be made on January 1 of each year of the expenditures from the \$500,000,000 appropriation.

The House committee on Tuesday agreed by a vote of ten to eight to give the President unrestricted control over rates. The Senate provision regarding rates provides that whenever in his opinion public interest requires, the President may initiate rates by filing same with the Commission. The rates shall be fair, reasonable and just and shall take effect at such time and upon such notice as he may direct, but the Commission shall upon complaint enter upon hearing and consider all facts and circumstances. After full hearing it may make such findings and orders as are authorized by the commerce law.

The Senate committee held executive sessions on the bill

throughout last week. The first result of its deliberations was a test vote of 7 to 6 for an amendment limiting the period of government control to one year after the close of the war. On the following day the committee also voted 7 to 6, but by a different amendment, against allowing the President unlimited authority to fix rates. Those who voted for Presidential rate making were Senators Smith, Myers, Robinson, Thompson, James and Poindexter, while those who favored retaining full power in the hands of the Interstate Commerce Commission were Pomerene, Gore, Underwood, Cummins, Townsend, McLean and Kellogg.

An effort to reconsider the votes was also defeated 7 to 6. The test votes were taken without the specific language of the amendments having been drafted. After a conference by members of the committee with President Wilson a compromise on a limitation of 18 months after the war and giving the President power to control rates subject to the right of the commission to review his action was adopted by a vote of 11 to 4, those opposing being Senators Gore, Cummins, Poindexter and La Follette. Senator Cummins proposed an amendment providing that during the period of readjustment after the war until Congress determines on the future status of the roads they should be controlled by a board of five consisting of an engineer, a financier, a representative of shippers, a railroad man and a lawyer.

He also offered an amendment providing for a reduction of the proposed guarantee. In specifying the period for the termination of government control after the war the Senate committee authorized the President to relinquish control over all roads before that time. It also inserted a provision for the benefit of the short lines giving the President discretion to determine, up to July 1, 1918, what roads are to be included in the plan, but providing that control of a railroad may not be relinquished after that time and before the relinquishment of control of all roads except by its consent.

Instead of passing on petitions of railroads for general increases in rates, as in the past, the Interstate Commerce Commission may have imposed upon it in the near future the interesting function of passing upon the application of the President of the United States for permission to advance rates to offset rising costs of operation and higher wages, if the bill becomes a law in the form it was reported by the Senate committee. This, of course, does not mean that Woodrow Wilson would appear personally before the commission in the way that the railroad executives have appeared with indifferent success on numerous occasions, to explain why the last partial increase had proved insufficient or to be told to cheer up and wait to see if the increased traffic of the next few months would not suffice to keep him out of the bankruptcy court. Nor does it mean that he would be subjected to cross-examination by Clifford Thorne and others as to the details of maintenance charges or the "thousand million" surplus which has re-echoed through Washington since the word billion became commonplace. What would happen in most cases in which the President desired an increased rate may probably be described by the formula used by the Interstate Commerce Commission in announcing the latest change in demurrage rates: "The Director General of Railroads having requested the commission's approval for filing of tariffs by the following-named carriers, viz.: It is ordered, that the rules, regulations and charges above specified be, and they are hereby, approved for filing by said

carriers, without formal hearing, which approval shall not affect any subsequent proceeding relative thereto. It is further ordered that said tariffs may be filed, effective on, upon not less than one (1) day's notice. * * * In the case of ordinary changes in rates in which the President and the Director General are not particularly interested doubtless the carriers would file fiftieth section applications in the usual manner, which would be approved or denied as in the past.

But, assuming that the wages of railway employees are increased by several hundred million dollars, and that other expenses continue to increase as they have during the past year or even remain stationary, it is conceivable that the President or Mr. McAdoo, or both, having in mind their responsibility for a "thousand million" dollar guarantee, to use round figures again, might propose that the expenses of the railroads be borne directly by those who use the railroads, rather than that a part of them should be defrayed by those who pay taxes. In other words, the President or Mr. McAdoo, or both, might find themselves in the position of a railroad president faced with increasing expenses on the one hand and fixed interest charges and a dividend rate that cannot be reduced without serious consequences on the other, and might attempt to remedy the situation in the same way that the railroad presidents have tried.

Quite likely other remedies would occur to other people, just as they have on similar occasions in the past, but it is at least within the domain of not too violent assumption that the President or Director General of the Unified Scrambled Railroad under such circumstances might follow the precedent so often set by the president of the X. Y. Z. Railroad and ask for a general increase in freight rates. Under the terms of the bill it is not strictly accurate to say that he would "ask" for the increase, or that he would even "demand" it. He would initiate it and the Interstate Commerce Commission would guide it to its ultimate destination. Mr. McAdoo, in his testimony before the House committee, indicated that such a possibility had occurred to him and that in an event of such importance he would naturally suppose that the commission would hold hearings in the usual way and make a recommendation. He made that assertion under his assumption that the Interstate Commerce Commission could not regulate the President of the United States. If Congress changes that assumption by declaring that it can delegate legislative power to a commission by giving it explicit instructions that all rates shall be "just and reasonable," but that such power cannot, or at least will not, be delegated to the President, Mr. McAdoo's proposed method would be reversed and he or the President or both would recommend and the Interstate Commerce Commission would have the ultimate decision.

A general advance in freight rates might be no more popular with shippers if initiated by the President, or by the Director General, than if initiated by railroad officers, but it might be less popular and quite probably it would be less effective to say so. If increased wages should threaten to create a deficit after payment of the guarantee to the railroad companies an administration which already has found some difficulty in picking out new sources of taxation might naturally prefer to make the railroads pay as they go, rather than to make up a deficit by taxation afterward.

BRITISH RAILWAYMEN'S WAR RECORD.—One hundred thousand members of the National Union of Railwaymen of England are serving with the forces. Over 3,500 have been killed.

IMPORTS OF MACHINERY INTO HANKOW.—The value of railway machinery imported into Hankow, China, in 1914, amounted to \$46,551; in 1915, \$34,091, and in 1916, \$34,166.

Rulings on Excess Profits Tax

REGULATIONS for the interpretation of the excess profits law, drafted by a board of experts in the treasury department with the aid of an advisory committee of business men, economists and accountants, have been approved by the Secretary of the Treasury and are now in the press. A statement giving a digest of the regulations has been issued by the Bureau of Internal Revenue.

The provisions which are of most general interest are those which deal with the definition of invested capital of corporations and partnerships and with the treatment under Section 210 of cases in which the capital cannot be satisfactorily determined and under Section 209 of cases of nominal capital.

The provisions of Section 210, which permit the deduction to be computed by reference to the deductions as determined in the ordinary way in the case of representative concerns engaged in the same trade or business, are held to apply to a number of classes of exceptional cases, among which are the following:

(1) Where on account of defective accounting it is impossible to accurately compute the invested capital.

(2) In the case of a foreign taxpayer, where the Secretary finds upon application that the expense of securing the necessary data is unreasonable in view of the amount of tax involved or that it is impracticable to determine either the entire invested capital or the entire net income.

(3) Long-established business concerns which by reason of conservative accounting or the form and manner of their organization would, through the operation of Section 207, be placed at a disadvantage in competition with representative concerns doing a similar business.

(4) Where the invested capital is seriously disproportionate to the taxable income, as for example because of the realization in one year of the earnings of capital unproductively invested through a period of years, or of the fruits of activities antedating the taxable year, or because of inability to recognize or properly allow for amortization, obsolescence, or exceptional depreciation due to the present war.

The provision which is probably of the greatest general interest is that which lays down the rule for the computation of the invested capital of corporations and partnerships. The law provides that the invested capital shall consist of the actual capital paid in and of the paid in or earned surplus and undivided profits, exclusive of the undivided profits of the taxable year. The law also prescribes certain limitations upon the valuation of assets and other items. The regulations provide that the total of the capital, surplus and undivided profits as shown on the books, adjusted as required by the limitations just referred to and as permitted by certain other provisions of the regulations, shall constitute the invested capital. In the few cases, however, where this total exceeds the adjusted value of the admissible assets (the law expressly excludes assets the income from which is tax free), the invested capital must be reduced so as not to exceed the total value of the admissible assets. If there has been any change in the invested capital during the taxable year, the monthly average shall be taken.

In addition to the express provisions of the law relating to invested capital, several of the provisions of the regulations supplementing those of the law are of the greatest importance. If, because of failure to provide for depletion, depreciation, obsolescence, or other expenses of losses, the books of the corporation or partnership do not show its true surplus or undivided profits, the necessary corrections must be made. But on the other hand, amounts which have been expended in the past for plant, equipment, or other tangible property still owned and in active use by the corpora-

tion or partnership, and which have been charged as current expense, may, unless such expense has been claimed as a deduction under the income tax acts of 1913 or 1916, be added to the surplus account, proper allowance being made for depletion or obsolescence. Amounts so expended for good will, trade-marks, trade-brands, franchises, and other like intangible assets may be added only if bona fide payment was made therefor specifically as such in cash or tangible property. No readjustment can be allowed, however, for expenditures made for the general development of intangible assets, but such cases may, to some extent, be provided for under Section 210, to which reference has already been made.

Another important provision relating to the invested capital of a corporation or partnership is that, when it can be shown by satisfactory evidence that tangible property has been conveyed to it by gift or at a value clearly and substantially in excess of the cash or par value of the stock exchanged therefor, then the amount of the excess shall be included as paid-in surplus.

One other important provision relating to corporations is that every corporation must describe in its return all its relation with other affiliated corporations, and that in certain cases the Commissioner of Internal Revenue may require such affiliated corporations to make a consolidated return of net income and invested capital. Further provision is also made for the assessment of the tax on the basis of such consolidated returns in certain cases.

Unparalleled Delays by Storms

THE RAILROADS IN "EASTERN TERRITORY," which term now covers all the States east of Chicago and St. Louis and north of the Potomac and Ohio rivers, were just getting freight traffic to moving with some approach to normal conditions on Sunday last, when the fifth spell of zero and below-zero temperatures, accompanied by high winds, put a stop to the movement of heavy trains—and at many places stalled all trains—more serious than at any previous time. Severe weather has now hampered railroad operation in central and northern New York for sixty days, and the same is true in a less degree of northern Ohio, Indiana and Illinois.

By Sunday, February 3, the number of freight cars above normal—number waiting to be moved, both eastbound and westbound, loaded and empty—had increased in eastern territory by several thousand over the numbers one week previous, but on that day trains were moving on nearly all lines, and the New York Central sent east from Syracuse about 2,000 cars. The Pennsylvania, which suffered severely in the storms of January 26-28, had got its main lines and most of its branches in fair condition. But on Sunday night the temperature fell rapidly, and with high winds, filling cuts faster than plows could clear them, stopped freight traffic almost completely on the main line of the New York Central west of Albany, and the difficulties on the other trunk lines and in the anthracite region were scarcely less severe. On Tuesday morning Regional Director A. H. Smith reported serious difficulties on account of weather "all the way from Albany to Elkhart" (101 miles east of Chicago). From data gathered in his office on Tuesday it was estimated that throughout the entire eastern district the reduction of freight tonnage, because of severe weather conditions, was from 20 to 50 per cent.

In New York harbor navigation was impeded seriously, making delivery of coal increasingly difficult. Several tugs with loaded tows of coal were caught in ice in Long Island Sound. Shortage of labor at tidewater piers, due to extreme cold, seriously retarded the unloading of coal, and the coal was badly frozen.

All lines reported freight trains stalled in drifts, and a

number of minor derailments due to ice in flanges and switches.

At Cincinnati on Tuesday conditions were improving, low temperature having caused the river to drop quite rapidly, but interchange tracks were still under water. About 50 per cent of the lines were still blocked by flood conditions.

Placing of empties in the Somerset coal region was discontinued on Monday at 3 p. m., due to severe blizzards, with drifting snow and derailments of through trains and empties.

The Lake Shore Limited due to arrive in New York Monday was held in a drift 24 hours. A train of stock had been stalled in the snow in northern New York since early Monday evening. Many men were having their faces, feet and hands frozen so that the releasing of stalled trains was carried on under great difficulty.

Trains were being delayed at all important terminals waiting for engines from round-houses, due to inability to get men to work. Four eastbound freight trains were stalled in snow west of Syracuse Monday and not shoveled out until Tuesday, though 20 engines and a large gang of men were kept at work Monday and Monday night as long as they would work. It was so cold that the men refused to remain, claiming they could not live out of doors. Freight operations in that territory were practically suspended.

The Situation on Wednesday

So much for the situation on Tuesday. On Wednesday Mr. Smith's office summarized traffic and weather conditions as still extremely severe, but in the Central West the temperature was rising rapidly. Freight movement Tuesday was "practically at a standstill." Such roads as did move any freight reported movement from 5 to 25 per cent of normal. Freight trains were stalled in snow and engines were frozen. There was a shortage of water for engines; the water plugs froze as fast as they were thawed out. Deraillments were caused by broken truck frames.

Throughout New England high wind made it impossible to keep tracks open and practically all freight trains that started out were stalled in snow. The snow was so hard and packed in so solid that a large number of serious derailments of plows, engines and cars further blocked operations.

On Wednesday morning there was 6 to 8 inches of new snow in northwestern New York. No freights were being operated in that section. Passenger trains were running from 2 to 4 hours late. South of Corning on the New York Central a northbound freight train was derailed by a broken truck, throwing cars on southbound track directly in front of a southbound freight, which struck the wreckage, derailing the engine and four cars. In northern Indiana Tuesday's blizzard blocked several roads, the cuts filling with snow. In western Pennsylvania it was necessary to limit passenger trains to six cars and then they were barely able to proceed with two engines. In the coal regions the cuts are blocked with from 16 to 20 feet of snow and the placing of empties is still greatly hampered; there is a good supply of cars if they can be placed. Two rotary plows have been sent from the Erie Railroad to assist in clearing branch lines in the Pennsylvania coal regions.

At Cincinnati the river fell, but ice from the flood was still seriously blocking railroad operation. The Ohio roads on Tuesday moved 560 cars of coal north from the coal fields. Placement of coke empties and movement were seriously affected.

Coal moved into Chicago Tuesday, amounted to 1,158 cars, about 70 per cent of normal. The Chicago, Terre Haute & South Eastern was again temporarily shut down by snow drifts. A new spreader was put in service to keep cuts open, but the conditions were so bad that very little was accomplished. Thirty-five cars of anthracite coal were moved through the Pennsylvania tubes to Long Island on Tuesday. Five steamers were bunkered in New York on Wednesday.

Unnecessary Telegraphing

By J. L. Coss

THE SEVERAL ARTICLES which have been published recently concerning this subject might well go farther into the detail of the numerous abuses in this line. A large portion are due to pure laziness on the part of certain employees. For instance all sorts of clerks, including some chief clerks, who are authorized to use the telegraph will write a telegram and send it to the telegraph office—the messenger boy will carry it there and bring the reply back to their desks—in preference to making a mailgram, because they thus save themselves the trouble of enclosing the telegram in an envelope.

Chief clerks who have the assigning of the agents and the operators will order a man to a certain place to relieve another employee and then make no arrangements whatever for transportation for either of them, knowing all the time that they cannot travel on the trains without a pass. Then these men commence to send telegrams for transportation; and after waiting awhile they will come in on the despatcher's circuit to be fixed up with wire transportation. And the despatcher may be busy and may lay out some train while he is preparing the wire passes.

Files of papers are sent out to agents and others and prompt return is required. But no attention is given to this requirement until the general office begins to trace for them and then the division clerks commence to burn up the wires for the return of those papers.

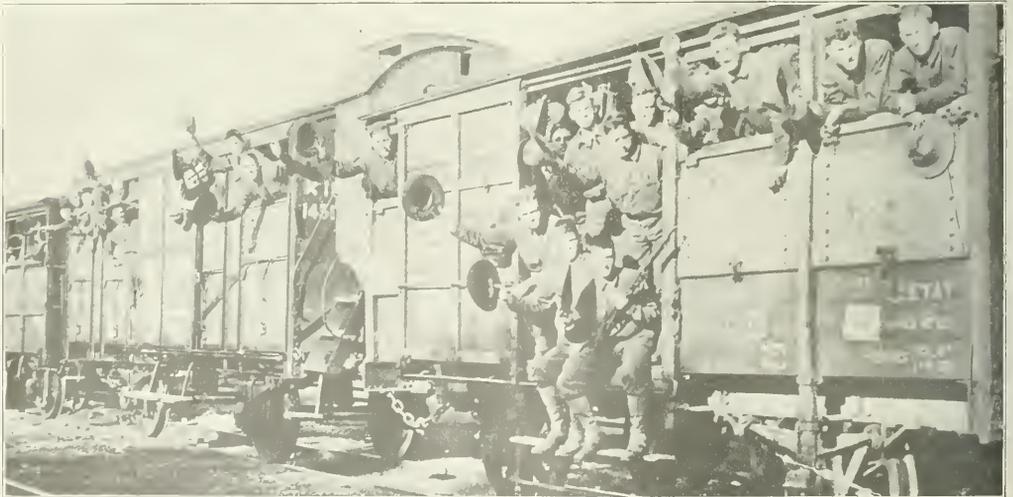
Another flagrant abuse of the wires arises from neglect to apply the necessary discipline against employees who do not follow the instructions contained in bulletins and circulars. For instance a local freight conductor neglects or refuses to move a short load or an empty from some station. The trainmaster may criticize the chief despatcher or the trick despatcher for not seeing that the car was moved (and I have seen just such action) and then the chief despatcher, if he is not able to put over his argument that it is a matter that is strictly up

to the conductor falls into the habit of putting out messages to the local conductors (to do certain work) in a reckless way which is wholly uncalled for. His course only serves to make more telegraphing and simply calls the attention of the conductor to his known duty. After a while the men in charge of trains will become careless, and assume that if anything is wanted, beyond going from one terminal to the other, they will be advised by telegraph. It would be just as logical for the roadmaster, in the evening, to telegraph to all his foremen to be sure and come out on the track the next morning at seven o'clock.

I once worked on a division where there was a heavy interchange of traffic at many junction points and much irregular work all the time; but I do not think there were half a dozen messages about filling out trains, etc., during my stay there, which was about a year. The division officers had their men well instructed, and they went along and handled the trains to the satisfaction of all concerned. Such an arrangement can be carried out on any railroad; and the men would rather work that way than to be receiving a telegram at every station what to do at the next.

There is far too much telegraphing done concerning the furnishing of cars at stations for local loading. If the afternoon form of telegraphic car report were filled out in the proper manner by the agent who orders cars this report would answer every purpose; but this is not done and very little is said to the man who neglects it. Some roads require a separate message sent to the chief despatcher when stock cars are required; but why should not the car report suffice? The daily car report made up by the agents and mailed in to the division office is sufficient for answering many tracers, if the clerk receiving the report would look at it instead of putting it directly into a pigeon hole. The consist of a train should give all the information necessary for the next terminal to handle it; why send a separate message because there is stock and meat in the train? The icing instructions as well as the loading time of the stock, etc., can be put on the consist.

All of these troubles are due to the fact that the persons not doing their part are not held responsible.



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United States Marines on the Second Lap to Berlin

General News Department

The Illinois Central station and hotel at Centralia, Ill., were destroyed by fire on February 5.

The office building of the Maine Central at Portland, Me., was damaged by fire on February 2 to the amount of \$50,000. The train dispatchers had to establish a temporary office in the Boston & Maine building.

H. T. Bentley, superintendent of motive power and machinery, and E. E. Betts, superintendent of transportation, of the Chicago & North Western at Chicago, have been called to Washington, D. C., for an indefinite period to assist the director-general of railroads.

The "terminal" passenger station at Chattanooga, Tenn., according to a press despatch of January 22, is to be used for all of the roads entering that city; and the union station, owned by the Nashville, Chattanooga & St. Louis and its affiliated lines, will be devoted wholly to offices.

Suspension of manufacturing, to conserve coal, has been ordered in Canada for three days, Saturday, Sunday and Monday, February 9, 10, 11. The order, which was recommended by the fuel controller of the Dominion, includes munitions plants, but does not apply to the Maritime provinces or to Western Canada.

W. T. Wolff, superintendent of freight station service of the Pennsylvania Western Lines, Pittsburgh, Pa., addressed the Iowa Commission on Car Service and a large gathering of railroad officers and shippers at the Chamber of Commerce, Des Moines, Iowa, on January 31. He spoke of the intensive loading of freight and the "sailing day" plan.

The Alton & Jacksonville, a 21-mile, standard gage line between Alton, Ill., and Jerseyville, has suspended business and the property will be sold as junk. The State Public Utilities Commission of Illinois, in an order issued last December, authorized the railway line to cease operations, but the company was delayed in doing so by suits brought by the bondholders.

The flood of January 28 in Southwestern Virginia, washed away 15 bridges on that section of the Southern Railway between Bristol and St. Charles, 92 miles. At the natural tunnel, 600 ft. of track was undermined. Between Big Stone Gap and Appalachia, 5 bridges were destroyed, and between Appalachia and St. Charles, 6 others. There were numerous washouts all along the line, and two trestles were destroyed.

Red Cross work rooms, completely equipped, have been opened at the Chicago passenger terminal of the Chicago & North Western. The active membership and organization of this new workshop will include the wives, mothers, sisters and daughters of North Western employees residing in Chicago and suburbs. Mrs. R. H. Aishton, wife of the president of the road, is general chairman of the workshop and work will be carried on under her direction. The rooms will be open from 9.30 a. m. to 4.30 p. m. every day of the week, except Sunday, and the work will include knitting, the preparation of surgical dressings, the making of hospital and refugee garments, etc.

The Grand Trunk Railway, of Canada, is celebrating its sixty-sixth anniversary, and the Montreal "Daily Star" has published a four-page historical sketch, giving many facts of interest both to the public and to railroad men. The Grand Trunk, like other roads in America and England, is now doing a greater business than ever before, and the "Star" finds ample evidence that the task "is being carried out in a more expeditious and efficient manner than on similar American railroads running to the seaboard." Speaking of some of the misfortunes of the railroad, the article says that it is an honorable, patriotic corporation which has been the victim of railway legislation, and

"has been forced to accept the handicap of an ill-considered transcendent road engineered for party and not for patriotic ends." This historical sketch has been reprinted in pamphlet form.

Railway Regiments' Tobacco Fund

One contribution to the Railway Regiments' Tobacco Fund was received during the past week from the Empire Steel & Iron Company, of Catawauqua, Pa., for \$20.

Government Regulation of Fuel Oil

President Wilson, on February 4, issued a proclamation putting under license the manufacture and distribution of fuel oils; and a series of regulations has been issued by the Fuel Administration establishing a preferential list of consumers which is headed by railroads and steamships. Difficulties in transportation are mentioned both in the proclamation and in the Fuel Administration's statement as having made the order necessary.

Equipment Necessary for Engineering Regiments

The scope of the work of equipping the regiments of railway engineers now in France is indicated by the cost of materials ordered up to date, which approximates \$70,000,000. The equipment so far ordered includes several hundred locomotives, more than 100,000 tons of rails, more than 3,000 complete turnouts, 500,000 ties, 12,000 freight cars, 600 ballast cars and 600 miles of telephone wire and apparatus, as well as large quantities of construction and repair equipment.

Snow in the Alleghenies

Climbing from the hatch-holes in the roofs of their cabs, two engine crews released themselves from a snow trap on the loop track at Gallitzin, Wednesday morning, (January 30), following the cave-in of a wall of snow. They had to wait until a shovel gang could release them. The same condition prevailed on Monday morning at Gallitzin. Near New Florence a laborer was walking along in the snow when he stumbled over an object concealed in the white mass. He investigated and found he had tripped upon a brake wheel sticking up from a buried box car on a sidetrack.—*Alleghenia Tribune.*

New Engineering Regiments Authorized

Major Frederick Mears, member of the Alaskan Engineering Commission, has been authorized to recruit a railroad construction regiment for active duty in France. No one will be recruited from the present employes of the Alaskan Engineering Commission without the approval of the chairman. Recruiting offices for the regiment are to be opened at different points in the United States, which will be announced later.

Three additional forestry regiments are also to be organized. The co-operation of the Forestry Service of the Department of Agriculture has been extended in the selection of the personnel and equipment.

Safety Appliance Orders Further Extended

The Interstate Commerce Commission has granted the application of the railroads for a further extension of time from March 1, 1918, to September 1, 1919, in which to make their freight cars in service on July 1, 1911, conform to the standards prescribed by the commission in paragraphs b, c, e and f of the order of March 13, 1911.

Daring Railroad Robbery in Chicago

A daring robbery was committed at the Randolph street suburban station of the Illinois Central, Chicago, at 10.20 p. m., February 1, when bandits shot and killed Dennis Tierney, collector for the road, and carried away with them a bag containing money estimated at about \$2,000, collections Tierney had just made from suburban ticket offices of the Illinois Central.

The attack upon Mr. Tierney and M. J. Quinney, a special agent who accompanied him, was made by four men in the crowded station shortly after the day's receipts had been received from the ticket agent. The robbers made their escape down a stairway leading to a paved court which skirts the west side of the station, entered a taxicab and drove north to Lake street and then west. Although a number of suspects have since been arrested, no real evidence has yet been secured concerning the identity of the robbers.

Additional Railway Honor Men

According to information received from the Fort Smith & Western two employees of that road have received commissions and 44 others have either volunteered or joined the National army. L. P. LeBron, assistant engineer on the road, is now a captain, and W. J. Rider, assistant engineer, is second lieutenant. Returns from the Denver & Salt Lake state that 14 employees joined the colors in various branches up to December 21 and one employee has received a commission, namely, R. H. Mays, train dispatcher, who is a second lieutenant in the infantry. Returns have so far been received from 128 railroads representing 209,968 operated miles.

The 128 roads have furnished a total of 55,363 soliders and sailors for the defense of the country, of whom 1,485 are commissioned officers.

Railway Revenues and Expenses, November, 1917

The net operating income of the railways of the United States for November, 1917, was less than November, 1916, by \$128 per mile, or 28.8 per cent, according to the monthly bulletin of the Bureau of Railway Economics.

Total operating revenues, \$354,960,249, exceeded those for November, 1916, by \$32,250,289. Operating expenses, \$260,150,825, were greater by \$53,372,385. Net operating revenue, \$94,809,424, decreased \$21,122,096. Taxes, \$22,087,690, increased by \$8,242,762. Net operating income was \$72,687,719, which is a decrease of \$39,354,885.

If spread over the mileage represented, operating revenues averaged \$1,535 per mile, an increase over November, 1916, of 9.9 per cent; operating expenses per mile, \$1,125, were greater by 25.7 per cent; net operating revenue per mile, \$410, shows a decrease of 18.3 per cent; while net operating income per mile, \$314, decreased 28.8 per cent. Taxes per mile rose 59.4 per cent.

This summary covers 231,241 miles of operated line, or about 90 per cent of the total steam railway mileage of the United States.

For the eastern railways, operating revenues per mile were greater than those for November, 1916, by 11 per cent; operating expenses rose 27.4 per cent; net operating revenue decreased 26.1 per cent; taxes increased 30.4 per cent; operating income per mile decreased 34.5 per cent.

For the railways of the southern district, operating revenues per mile exceeded those for November, 1916, by 15 per cent; operating expenses rose 27.4 per cent; net operating revenue decreased 5.3 per cent; taxes increased 65.9 per cent. Operating income per mile decreased 14.3 per cent.

For the western railways, operating revenues per mile exceeded those for November, 1916, by 7.3 per cent; operating expenses rose 23.5 per cent; net operating revenue decreased 16.4 per cent; taxes increased 32.9 per cent. Operating income per mile decreased 29.2 per cent.

The eleven months of the current calendar year, compared with the corresponding period of the preceding year, show changes per mile of line as follows: Operating revenues increased 11.6 per cent; operating expenses increased 19.8 per cent; net operating revenue decreased 3.9 per cent; taxes in-

REVENUES AND EXPENSES OF STEAM ROADS—NOVEMBER, 1917.

Account	1917		1916		Increase over 1916, Per cent	WESTERN DISTRICT		SOUTHERN DISTRICT		EASTERN DISTRICT		
	Amount	Per cent	Amount	Per cent		Amount	Per cent	Amount	Per cent	Amount	Per cent	
Total operating revenues.....	\$354,960,249	\$1,535	\$1,397	9.9	\$54,939,040	\$1,282	\$1,114	18.0	\$14,529,069	9.2	\$9,459,206	9.2
Freight.....	252,828,534	1,093	1,023	6.8	39,459,206	270	842	5.4	104,525,133	808	777	4.0
Passenger.....	69,984,709	302	247	22.3	11,700,049	53	102	42.2	29,232,950	225	186	31.4
Mail.....	4,502,279	20	22	11.6	703,023	17	35	17.2	1,957,390	15	19	19.5
Express.....	9,020,234	39	34	13.8	1,433,747	27	35	16.5	3,628,947	28	24	15.4
All other.....	18,724,493	81	72	10.2	1,939,016	45	57	16.5	6,547,809	51	45	12.4
Total operating expenses.....	260,150,625	1,125	695	25.7	37,793,710	802	634	27.4	79,694,417	720	623	23.5
Maintenance of way and structures.....	38,518,095	166	152	9.8	6,204,954	145	132	9.4	15,645,933	121	113	7.2
Maintenance of equipment.....	64,364,523	260	224	25.5	11,324,660	51	42	24.3	23,631,059	184	147	25.6
Traffic.....	5,272,979	23	22	2.5	2,023,405	34	34	2.4	976,957	23	24	2,272,617
Transportation.....	14,116,486	610	459	32.8	67,877,738	1,149	860	33.7	19,376,265	456	35	40.5
All other.....	8,209,526	36	31	13.3	3,633,199	62	57	16.1	1,215,570	28	35	7.6
General.....	2,199,217	10	7	35.7	1,142,660	4	4	30.6	762,069	6	3	61.3
Net operating revenue.....	94,809,424	410	502	18.3	31,398,373	532	720	26.1	17,143,340	40	422	d 8.3
Taxes.....	22,087,690	96	60	59.4	7,189,578	422	94	30.4	3,558,311	79	47	65.9
Uncollectible revenues.....	34,015	1	1	.....	14,446	.....	.....	.....	4,260	.....	.....	.....
Operating income.....	72,687,719	314	442	d 28.8	13,779,359	321	375	d 14.3	34,714,011	268	379	d 29.2
Operating ratio—per cent—												
1917.....		73.29				68.80					68.80	
1916.....		64.08				62.10					62.10	
Average mileage represented—		231,242				42,871					42,871	
1917.....		231,013				42,698					42,698	
1916.....		231,013				42,698					42,698	

d Decrease. * Less than one dollar.

creased 34.9 per cent, mile operating income decreased 9.6 per cent.

Operating income per mile decreased 17.3 per cent in the east, decreased 7 per cent in the south and decreased 4.8 per cent in the west.

November net operating income per mile was 28.8 per cent less in 1917 than 1916, 29.9 per cent less than in 1915 and 29.2 per cent greater than in 1914.

United Engineering Society Elects Officers

At the annual meeting of the trustees of the United Engineering Society, held in New York on January 25, the following officers were elected for the ensuing year: President, Charles F. Rand, member American Institute of Mining Engineers; first vice-president, Calvert Townley, member American Institute of Electrical Engineers; second vice-president, Robert M. Dixon, member American Society of Mechanical Engineers; treasurer, Dr. Joseph Struthers; secretary, Alfred D. Flinn, member American Society of Civil Engineers; chairman finance committee, J. Vipond Davies, member American Society of Civil Engineers.

Binghamton Engineering Society

The annual meeting and banquet of the Binghamton Engineering Society was held on Monday evening, January 21. The following officers were elected for the ensuing year: past president and chairman of executive committee, Robt. B. Hoadley; president, C. A. Dayton, assistant division engineer of the Delaware, Lackawanna & Western; first vice-president, C. E. Anderson; second vice-president, Charles Van Amburgh; third vice-president, Burt E. Nelson; secretary, D. M. Edgerton; treasurer, F. A. Tillman; librarian, Ray Fitzpatrick.

A "Mournful Jest"

[From the Wall Street Journal]

If a jest can be mournful surely that is one which the Senate Committee on Interstate Commerce has played upon the Interstate Commerce Commission. Early last year the commission covertly, and later in the year openly, abdicated its legal function of making the railroad rates of the country. In June it temporized. In December it threw up its hands in the attitude made familiar by the war correspondents and cried "Comrade!" in the direction of the White House. The war was too much for the commissioners. With a world in turmoil, they were unable to shake off the ancient habit of cherishing the shippers' "interest," which had reached its logical conclusion by depriving shippers of adequate transportation. So the commission quit.

No wonder, then, that President Wilson and Director-General McAdoo consider it necessary to take the supreme rate-making authority out of the hands of the commission and put it in those of the federal railroad administration. Very likely it was because they were afraid that if the commission retained its strangle-hold on rates given it by existing law it would remain a mere obstacle instead of an administrative body.

But it is quite as likely that the members of the Senate committee eliminated this transfer of rate authority from the railroad control bill for exactly the same reason. If such an amendment is adopted by Congress, that body will have sent the commission back to its appointed task as relentlessly as any judge ever dismissed a writ of habeas corpus and remanded the prisoner to his cell or the rock pile.

So far as outward appearances indicate, the commission has confined its activities since its despairing outcry of last December to ordering an assuredly temporary disruption of the Pacific coast rate adjustment, and to issuing two or three times a week an ill-digested and misleading report upon freight traffic movement and the condition of eastern terminals and yards. The character of these reports challenges the attention of Mr. McAdoo, if not of the President himself. They come, at least as a formality, from the pen of Commissioner McChord. By insinuation and intimation they convey the idea that the railroads have either wilfully or through sheer incompetence neglected the condition of their motive

power, and that the lamentable condition of the carriers in the eastern section today is the direct result of gross mismanagement.

The fact is, as even Mr. McChord has once or twice inadvertently admitted in his issued statements, that the railroads simply cannot obtain the mechanics to keep their locomotives in good order, under the strain of an unprecedented traffic and the worst winter weather the East has experienced in a generation. Nearly a year ago railroad owners warned the commission of the alarming rate at which they were losing shops under the attractive wage offers of industrial plants. Revenues sufficient to permit liberal increases in wages or the purchase of additional power would have helped. But the commission knew better, as it always had before.

Now the Senate committee proposes that the commission shall fry in its own fat. Though these be war times, the spectators may be permitted a grim smile.

Detailed Instructions for Car-Saving

E. E. Betts, superintendent of transportation of the Chicago & North Western, has issued a circular to agents, conductors and others which "gets right down to business." Along with numerous well known admonitions Mr. Betts promulgates the following:

To Agents, Trainmen and Others:

"There is a shortage of cars everywhere. We are short in excess of 10,000 box-cars, and the same proportion exists as to other classes of equipment. Forty-ton and fifty-ton cars may be loaded to their actual axle-carrying capacity; and do not forget that in the loading of company freight, we should set a good example. Require shippers to give the weight of the load they intend to ship and endeavor to provide a car to fit.

"Have cars spotted on arrival; notify consignee by telephone; urge him to unload at once; call him again if he fails you. Much can be done by a personal call. If no bill, file the billing station. If you cannot get results, wire me. Urge consignees not to use 48 hours to unload a car; the saving of half a car day will be appreciated.

"Switch the car out the same day that it is made empty. Nothing discourages a merchant or chills his enthusiasm so much as to have a car lie around on his side track a day or two, after he has exerted himself to get it unloaded.

"Never permit an empty car to be delayed one hour for want of information as to what to do with it. Always have this information in advance of the time the car is unloaded. If you don't know what to do with it, find out from your train dispatcher when it arrives under load; not after it is made empty. If car is to be reloaded at your station, have it spotted quickly. We will not hold cars for prospective business. Give brief but adequate reasons for detention of cars more than 48 hours. When company material arrives, notify consignee immediately by telephone or telegraph and confirm in writing. If car is not released within 24 hours, telegraph the superintendent.

To Train Conductors:

"Do all the switching. Report cars at blind sidings. If no disposition received, keep after it. Do not set out cars containing small consignments of freight at stations where cars are not required, but unload freight and take car to some station requiring cars. Watch for cross hauling of cars and tell the train dispatcher. An empty car should always be the object of suspicion. . . ."

The Hyman-Michaels Company, of Chicago, has sent to its customers a circular calling attention to the increases in demurrage rates and showing, by a table, the additional cost *per ton of loading* for each day that a car is held; for example, a load of 30 tons held six days beyond the free time pays \$1.10 per ton. Shippers are enjoined to load material which is strictly according to specifications and avoid rejections. "Do not ship cars to your own name or to shipper's order. Ship cars to consignees located at the final destinations and avoid reconsignments. Cars so shipped will not be held by railroads on account of unknown consignees. It is important to specify the railroad reaching destination.

"Mail the invoice the day car is loaded. If unable to do so furnish advance notice promptly, by telephone or messenger, of car number and initials, material, weight, consignee and destination. If the weight is not known before car leaves the loading point furnish all other information in advance and then advise weight promptly.

"Mills should ascertain daily the new cars on hand. If no advice of shipment has been received, the mills should advise shippers promptly the car number and initials, also the kind of material. Advise by telephone or messenger when possible. Mills should inspect and weigh cars immediately on arrival and notify shippers promptly of any discrepancies. Advice by telephone or telegraph is preferred."

Traffic News

The Buffalo, Rochester & Pittsburgh has discontinued two local trains on the Rochester Division, two on the Buffalo Division and (south of Butler) two on the Pittsburgh Division.

Provost Marshal General Crowder has announced that the movement of the last increments of men selected in the first draft for the National Army, about 75,000 men, will begin in February 23, and continue for five days.

The agricultural departments of the Chicago, Burlington & Quincy and the Colorado & Southern are conducting a special campaign to induce growers in dry land sections to put in a large acreage of pinto beans during the coming season.

A campaign to encourage the establishment of manufacturing industries in the Southwest, is proposed by C. E. Schaff, Governor of the Missouri, Kansas & Texas; this in response to a word from Washington that factories for the making of munitions and war materials ought to be established in the Middle West and southwest. Mr. Schaff has issued a circular setting out the advantages to be found, close at hand, in the southwestern territory, and urging all citizens to co-operate.

Erving T. Bush, chief of embarkation for the War Department at New York City, under General Goethals, quartermaster-general, is now assisted by a staff of civilians in the work supervising the shipment of all supplies through the port of New York for the American forces in Europe. W. J. Edwards is in charge of the steamship division; H. G. Simonds in charge of the warehouse division; Charles H. Ketcham, formerly superintendent on the Southern Pacific, and before that on the Delaware, Lackawanna & Western, is in charge of the railroad division, and W. F. Hersey is general superintendent of piers, with P. B. Blanchard as assistant. It is understood that T. V. O'Connor, president of the International Association of Longshoremen, will be put in charge of the employment and labor division. Other assistants in Mr. Bush's office are J. O. Hammit and Lieut. Philip L. Gerhardt.

Emergency Methods Used to Move Coal

Emergency measures for the protection of domestic consumers in Chicago against suffering from the lack of coal were recently taken by the Illinois State Fuel Administration and the railroads. R. H. Aishton, regional director of railroads, directed Illinois roads to sidetrack all freight, including coal and flour, in order to expedite coal shipments. The state fuel administrator ordered mine operators to ship the entire output of Illinois mines on February 5 to domestic consumers, public utilities and other preferred consumers. The Cook county fuel administrator issued an order dividing Chicago into 12 zones for the purpose of hastening deliveries of coal to domestic users. Coal operators and dealers were notified that the Garfield order legally releases them from all contractual obligations with industries not named in the preferred classes of the order.

Embargoes on the North Western

A. C. Johnson, general traffic manager of the Chicago & North Western, announces that henceforth embargoes will be issued daily, but only to agents at stations from which freight frequently moves to eastern territory. Agents not receiving cargo notices are not permitted to accept freight of any kind, either in carloads or less, destined to points east of the Illinois-Indiana state line, without special authority from the office of the general traffic manager. Agents receiving embargo notices are instructed to perfect a system for filing claims, whereby they can be referred to conveniently and the necessary information given to the public without delay or confusion. Agents are warned particularly against permitting cars to be loaded, or signing bills of lading covering cars arbitrarily loaded by shippers, contrary to current embargoes. Empty cars so loaded must be held under demurrage until embargoes are modified to permit their acceptance.

Plan to Relieve New York Port Congestion

At a conference of representatives of the Shipping Board, the railroad administration, the Army and Navy, shipping interests, and of the British government, held at Washington on January 30, a shipping control committee was formed to allocate ship tonnage which will take steps to relieve congestion at the port of New York by diversion of transatlantic traffic to other ports. Not only Philadelphia, Baltimore and Newport News, but especially the southern ports, are to be developed. Edward Chambers, traffic adviser to Director General of Railroads McAdoo, attended the conference and will arrange for the routing of export freight via southern gateways.

Dr. F. H. Dixon, professor of economics at Dartmouth College and chief statistician of the Bureau of Railway Economics, has been appointed a member of a research division appointed by the United States Shipping Board to investigate transportation problems in connection with the work of the Shipping Board.

To Map Out Army Truck Routes

The pathfinder car of the Highways Transport Committee of the Council of National Defense starts this week on a new task of mapping out army truck routes for the government. The committee has already laid out an official route from Detroit to the seaboard and another from Buffalo to the seaboard. It is now proposed to tap every truck manufacturing point in the central West and pick out feeder lines to two great main highways running eastward.

The pathfinder will go as far West as the Mississippi river and will map routes from cities in Wisconsin, Illinois, Michigan, Indiana, and Ohio. The car will be in charge of Raymond Beck, Field Engineer of the Highways Transport Committee. As each state line is reached a representative of the state highway department will join the car and proceed over the roads of his own state.

When this trip is completed the government will have four main highways forming connecting links between the great manufacturing centers of the country and the Atlantic seaboard. Motor transports on their way to France will follow these routes and will carry cargoes to relieve railroad freight congestion. The drivers will secure their training under service conditions and be better fitted for their tasks of driving when they reach the war zone.

Revised Demurrage Rules in Effect February 10

As briefly noted in last week's issue, page 257, the Director General of Railroads has modified the new demurrage rules which were put into effect on January 21, and which were objected to in some particulars by a committee representing the National Industrial Traffic League. The changes are described in General Order No. 7, which becomes effective on February 10, and which contains the new rules in detail in an appendix. The "bunching rule," as it appears in revised form, reads as follows:

"Cars for Unloading or Reconsigning.—When, as the result of the act or neglect of any carrier, cars originating at the same point or at intermediate points moving via the same route and destined for one consignee, at one point, are bunched at originating point, in transit, or at destination, and delivered by the carrier in accumulated numbers in excess of daily shipments, the consignee shall be allowed such free time as he would have been entitled to had the cars been delivered in accordance with the daily rate of shipment. Claim to be presented to carriers' agent within fifteen (15) days."

The demurrage rules do not apply to:

1. Cars loaded with live stock;
2. Empty cars placed for loading coal at mines or mine sidings or coke at coke ovens and cars under load at mines or mine sidings or coke at coke ovens;
3. Foreign export freight awaiting ships at ports;
4. Coal for trans-shipment at tidewater or lake ports;
5. Empty private cars stored on railroad or private tracks, provided such cars have not been placed or tendered for loading on the orders of a shipper.

The Interstate Commerce Commission has approved for filing, at the request of the Director General, tariffs of the eastern railroads containing new demurrage rules and regu-

lations governing cars of anthracite and bituminous coal or coke for trans-shipment by vessel. These rules apply also on cars held for or by consignors or consignees for unloading, forwarding directions, or for any other purpose, except cars re-consigned or reshipped for rail delivery or to another rail destination, when they will be subject to the national car demurrage rules.

An average of three days per car free time will be allowed. A notice of arrival must be sent or given to the consignee in writing or as otherwise agreed to by carrier and consignee upon arrival of cars and billing, and time will be computed from the first 7 a. m. thereafter. Holidays, but not half-holidays, will be excluded. A car is to be considered as released at the time the vessel registers for the coal or coke, or earlier when cars are unloaded before the vessel registers. The day on which shipments are transferred by written order and acceptance to another party is to be considered the date of release of the car for the account of the original consignee, and the detention shall follow the car and be charged in the account of the new consignee.

Average agreement.—Settlement shall be made on basis of the detention to all cars released during each month. The date of arrival notice shall be subtracted from the date of release. From the total days' detention to all cars thus obtained deduct three days free time allowance for each car; the remainder, if any, will be the number of days to be charged at the rate of \$3 per car per day. Excess credit days of any month can not be deducted from excess debit days of another month. At lake ports, however, cars released during April and May are to be considered as May detention and treated as one month. Loaded cars on hand at the close of navigation will be recorded released on that date in computing the average detention; and subsequent detention will be subject to the National car demurrage rules.

Co-operation Between the Railroad and Food Administrators

Plans have been worked out for co-operation between the Railroad Administration and the Food Administration in the matter of car supply for shipments of foodstuffs. Edward Chambers, who is Mr. McAdoo's traffic adviser, was formerly transportation manager of the Food Administration, where he gathered much information concerning conditions in various localities which will be valuable in directing the movement of cars.

Under the plan now prescribed, shippers will apply for cars as usual and if their requisitions are not filled, they are to apply to the Food Administration at Washington, or its local agents. Dealers in grain and grain products, not promptly served by the railroad agent, may, after a reasonable time, apply to the representative, for that zone, of the Food Administration, Grain Division, giving name of consignee, name of commodity and all details. Shippers of sugar, beans, rice, perishable fruits and livestock, if not properly served, may apply directly to the Food Administration in Washington, giving all details. Diversion in transit will not be permitted except for perishable freight. It is hoped that the new arrangement will enable the Food Administration to give to the director-general of railroads definite information so that cars can be distributed to supply the most acute needs.

Relief for the Cotton Situation

In accordance with plans which have been worked out for greater co-operation between the railroad administration and the Shipping Board, Edward Chambers, traffic adviser to Mr. McAdoo, on February 1 sent a telegram to C. H. Markham, regional director for the southeastern railroads, authorizing him to accept and forward at current rates via Brunswick, Savannah or Charleston 50,000 to 100,000 bales of cotton for domestic consumption in New York or vicinity or in New England, stating that the Shipping Board will provide ships which will be operated in the regular lines. Mr. Chambers said that there might be some delay at ports awaiting ships, but nothing serious, and that it might be well to arrange to unload cars at ports on arrival, assuming that sufficient storage capacity was available to accept the cotton should it all accumulate before the ships arrived. The cotton should be

routed, he said, via either of these southern ports in an amount sufficient to make full cargoes for New York or New England ports and any desirable rail route to the southern ports might be used, regardless of tariff obligation, at the rate in effect over any route from the same point of origin. Special authority would be issued if it were necessary to use an unauthorized route.

This action was taken in answer to many requests from the south and southwest for relief of the situation caused by cotton being held up in transit. Most of the mills in New England and New York are working principally on government orders. Arrangements were also made to send additional ships to Galveston to carry the accumulation from Texas and Oklahoma when destined for domestic consumption in New England. Representatives of the National Association of Cotton Manufacturers and of the New England association were in conference with Mr. Chambers the day the order was issued and they were much gratified, as many of the mills were running on part time and some were facing a complete shutdown, due to the inability to get the cotton from the south. With the full co-operation of the Shipping Board it is expected that the plan outlined will relieve the situation.

Pipe Line Traffic in December

The United States Geological Survey has issued a statement showing the movement of crude petroleum in December, 1917, as reported by 180 pipe line and refining companies that handle or receive oil direct from the productive fields east of the Rocky Mountains. This compilation includes statements filed by 44 companies operating in the Appalachian field, 83 in the Oklahoma-Kansas field and 53 in smaller fields.

Crude Petroleum Moved from Field Sources (bbls.)

Field	December, 1917	November, 1917	December, 1916
Appalachian	1,810,578	2,014,190	1,617,734
Lima-Indiana	229,316	281,229	274,628
Illinois	1,694,127	1,235,761	1,413,075
Oklahoma-Kansas	12,543,980	13,289,455	9,940,783
Central and North Texas	993,805	986,144	849,817
North Louisiana	509,510	294,389	782,983
Gulf Coast	1,773,225	1,613,538	1,815,001
Rocky Mountain	852,602	777,906	674,846

The stocks of crude petroleum on hand at the end of December were, in barrels:

Source of oil	Source of oil		
Appalachian	4,042,829	Central and North Texas	7,377,472
Lima-Indiana	1,906,848	North Louisiana	2,613,444
Illinois	3,585,312	Gulf Coast	7,047,337
Oklahoma-Kansas	94,780,528	Rocky Mountain	1,047,001

Statistics of petroleum movement in California are not included because of delays incident to procuring first-hand data. In the Rocky Mountain field unusually moderate weather prevailed during the greater part of December. Demand of consumers for crude petroleum in December, though in excess of current production in all fields except the Appalachian and Rocky Mountain fields, was generally less than in November with respect to light gravity oils, but was greater with respect to petroleum valuable for use as fuel. Except in the Oklahoma-Kansas field, the surface reserve of crude oil at the end of 1917 was appreciably less than at the end of 1916.

WOOD USED AS FUEL IN PORTUGAL.—The most serious problem of the year 1916 in Portugal was the scarcity of fuel. Three and one-half tons of wood were used by the railways, factories and lighting establishments. All the fast-train services were cancelled, with the exception of the express to Madrid three times a week and one between Oporto and Lisbon.

THE BUDGET OF THE SWISS FEDERAL RAILWAYS for the coming year provides, among others, for the following expenditures: For the electrification of tracks, \$3,757,607; for the motive roundhouse near the main station of Zurich, \$96,500; for extension of the station of Schlieren, \$6,850; for the reconstruction of the railway on the left bank of Zurich Lake, \$541,400; for a double track from Thalwil to Richterswil, \$96,500; for the extension of the station of Waedenswil, \$19,300; for the extension of the station at Alstetten, \$35,226. In case there should be an improvement in general conditions an additional \$19,300 is to be expended for the extension of the station at Waedenswil; \$38,600 for the transfer of the station at Horren; and \$19,300 for the extension of the station at Winterthur.—Commerce Report.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has announced further hearings on the tentative valuation of the Kansas City Southern, one at Kansas City on March 5 on all subjects except the "other values and elements of value," and one at Washington on March 14 on that subject.

Private Car Inquiry

The Interstate Commerce Commission, which recently issued an order reopening the inquiry concerning private cars, begun in 1913 but never completed, has issued a questionnaire for the purpose of bringing down to date the data called for on February 27, 1913. The commission intends to hold further hearings at convenient points throughout the United States to give all interested further opportunity to be heard. Forms calling for statistical data are returnable by March 1. The questions asked call for information regarding the organization of the individual company, firm or corporation owning cars, capitalization and stockholders, number and kind of cars, and statistics showing cost of construction, operation, maintenance, etc., mileage made, character of traffic handled, earnings, rental or other charges collected from or through railroads for use of cars, payments to railroads for hauling, etc.

Personnel of Commissions

Seymour VanSantvoord, chairman of the New York State Public Service Commission, second district, whose term of office expired on February 1, sent to the governor his resignation on the day before, suggesting, in a sarcastic letter, that the governor ought to have made known his intention either of reappointing or of naming a successor. Commissioner **James O. Carr**, whose term has two years to run, has also sent in his resignation. **William T. Emmet**, another member of the same commission, died at his home in New York city on February 4 at the age of 49. Of the five members of this commission, two only remain in office, Messrs. **Irvine**, and **Barhite**; and the commission therefore can issue no orders. For two vacancies on the commission for the First District, the Governor nominated two men several weeks ago; but the nominations have been held up in the Senate Committee. It is expected, however, that these two men, **C. B. Hubble** of New York, and **F. J. Kracke** of Brooklyn, will be confirmed this week.

Court News

Admission of Liability—Compromise

The Colorado Supreme Court, in an action for damages for killing a cow, holds that evidence that the defendant's claim agent offered to pay in settlement a sum less than one-half of the amount claimed is inadmissible as an admission of liability, for the offer must be deemed to have been one of compromise.—**C. B. & Q. v. Peppard** (Colo.), 169 Pac., 282. December 2, 1917.

Claims for Damages to Live Stock

The Michigan Supreme Court holds that though a uniform live stock contract filed with the Interstate Commerce Commission declared that no claim for damages should be allowed unless made in writing, verified by affidavit and delivered to the traffic manager of the carrier within five days from the time the stock is removed from the car, a written communication by the railroad company's local agent at the place of destination made within the time limit prescribed, which stated that the animals had been injured and that claim would be made, is a sufficient compliance with the requirements for notice.—**Snyder v. King** (Mich.), 165 N. W., 840. Decided December 27, 1917.

Crossing Accidents

Where a motorist slackened speed on approaching a track and looked for approaching trains, the Michigan Supreme Court holds that he cannot be held guilty of contributory negligence as a matter of law, though he did not stop and was struck by a train slowly backing along the track, the night being so dark that he could not see the approaching train, on which there were no lights as there should have been, and hence the question of the motorist's contributory negligence was for the jury.—**Mills v. Waters** (Mich.), 165 N. W., 740. Decided December 27, 1917.

Workmen's Compensation

A brakeman was killed at about the time when two cars of an interstate milk train were being coupled. He had charge of the coupling. In proceedings under the New York Workmen's Compensation Act it was contended by the railroad that the death was caused by non-compliance with the Federal Safety Appliance Act and therefore the Workmen's Compensation Act did not apply. The Appellate Division holds that under the evidence the State Industrial Commission was justified in finding that there was no violation of the Federal Act and no negligence of the employer; and the fact that the commission was unable to say what was the cause of the death was immaterial, so long as the cars and appliances were within the law. The commission's award under the New York laws was therefore affirmed.—**Zimmerman v. New York Central**, 167 N. Y. Supp., 501. Decided November 14, 1917.

Tariff Provisions

In a tariff rate case it appeared that the defendant railroad, the Chicago, Milwaukee & St. Paul, has a line from Linton, N. D., through Strasburg, N. D., to Minneapolis, Minn. Its freight tariff names 17 cents per 100 lb. for wheat from Strasburg to Minneapolis, and 16 cents from Linton, the next more distant station, to Minneapolis. The tariff also provided: "Between stations on the C. M. & St. P. rates to and from intermediate stations will be the same as shown to or from the next more distant station to or from which rates are named." The Minnesota Supreme Court holds that this provision applies only to shipping points to or from which a specific rate is not named and which are intermediate between stations to or from which a specific rate is named, and does not apply to Strasburg; and that the legal rate for shipments from Strasburg is the specific rate named therefor.—**Reliance Elevator Co. v. C. M. & St. P.** (Minn.), 165 N. W., 867. Decided December 21, 1917.

Irregularity in Foreclosure Sale

In a suit to foreclose a mortgage on railroad property, the court, having decreed a sale, confirmed the order of sale without an order nisi. On application by a creditor, bondholder and stockholder of the company to set aside the sale and the order confirming it, it appeared that the applicant admitted liability to inform the court of any person or corporation which, in his judgment, would reasonably be expected to become holders for the property, should the sale be set aside, and it did not appear that better terms could reasonably be expected in case of resale. The Circuit Court of Appeals, Sixth Circuit, holds that though the sale was confirmed without an order the irregularity did not prejudice the applicant, and was no ground for setting aside the order confirming the sale, for the applicant had the opportunity, and did in fact present his objections to the confirmation, and it did not appear that the result would be advantageous.—**Painter v. Union Trust Co.**, 246 Fed., 240. Decided December 4, 1917.

Injuries to Car Repairer

A train crew moved railroad cars to and from the yard of an oil company; the oil company exercised no control over the crew, except to instruct the conductor when the train entered the yard where to place incoming cars. In an action for the death of a car repairer in the employ of the oil company working on outgoing cars the Connecticut Supreme Court of Error holds that the crew did not become the servants of the oil company, but remained the servants of the railroad company. When the conductor of such train crew was given the list of locations of incoming cars and

the list of outgoing cars, he had a right to assume that he could move such cars in the usual course, and though charged with knowledge that repairs were made on cars on any of the oil company's tracks, the crew were entitled to believe that no repairs were then in progress on the cars on the tracks specified in the list, and, in the absence of notice that an employee was working on any of the cars, were under no duty to look under the cars, and were not negligent in moving them in the usual way.—Campbell v. N. Y., N. H. & H., 102 Atl. 597. Decided Dec. 15.

Workmen's Compensation—Roundhouse Accident

A fireman ran from J. to G. and return, reaching G. at 9:40 a. m. and leaving on the return at 4:10 p. m. On arrival at G. engines were taken in charge by the roundhouse crew, but the firemen while at G. were subject to call and as they left the premises were expected to leave information as to where they could be reached. They were also expected to be ready to take the engine one hour before leaving time, and a rule required them to see that the engine was properly equipped with the necessary tools. There was evidence that there was no set time for performing this duty and some slight evidence of a custom of the firemen to make small repairs. About one o'clock on the day of his death, the fireman in question, after returning from his dinner, put on his working clothes and went to the engine in the roundhouse. About half-past two his dead body was found on the floor of the roundhouse beside the engine and his hands and face were greasy. The Michigan Supreme Court held that the evidence warranted an award by the Industrial Accident Board on the theory that he was on duty when he sustained the fatal injury.—Meyers v. Michigan Central (Mich.), 165 N. W., 703. Decided December 3, 1917.

Attempting to Board Train on Off Side

At a station near a large factory where hundreds of workmen took an afternoon train, one of these, intending to board a six-car train, took his stand with others on the side of the track opposite the station platform, and between the main track and three freight cars. As the train drew in, others between the tracks attempted to board it, and one, swinging out, knocked down others, and finally the one first mentioned, who was fatally injured. The New Jersey Court of Errors and Appeals, in an action for his death, holds that there should have been a non-suit, or a direction of verdict, for the defendant. There was nothing to show that the railroad ought to have anticipated, not only that intending passengers would place themselves in the narrow and dangerous space between the main track and the freight cars—a thing that had not happened before—but that one of them would miss his hold and be the immediate cause of injury to others. And if this were a contingency to be anticipated, it was at least as obvious to the deceased as to the company, and in that case the deceased assumed the risk of injury. If it were conceded for the sake of argument that the men were justified by custom in standing on the off side of the main track, there was ample room at either end of the three freight cars to receive the overflow from the platform. The only reasonable inference was that they wished to be first aboard, and endangered their lives and limbs to accomplish that end.—Kelleberg v. Raritan River (N. J.), 102 Atl., 350. Decided November 19, 1917.

Relief Fund Sustained

The Pennsylvania Supreme Court holds that a regulation of a railroad relief association that should a member or his legal representative bring suit against the railroad for damages for injury or death, payment of benefits from the fund on account thereof should not be made until such suit should be dismissed, and that any judgment in the suit should preclude any claim on the fund, and should operate as a release in satisfaction of all claims against the company, was valid and was a good defense to a widow's action of assumpsit on the certificate after she had recovered a judgment in a suit against the railroad for the death of her husband, which had been fully paid.

Section 5 of the Act of Congress of 1908, relating to injuries in interstate commerce, and providing that any contract or regulation intended to enable any common carrier to exempt itself from any liability created by the act should to that

extent be void, does not intend that there should be both a payment of benefits from a railroad association fund and a recovery of damages for the injury, at least in so far as payments for both are to be made by the same defendant, in view of the provisions of the act that in an action for damages against a common carrier it may set off any sum paid by it to any relief benefit that may have been paid to the injured employee.—Gatton v. Pennsylvania (Pa.) 102 Atl. 506. Decided June 30, 1917.

Railroad Reorganization

The federal district court for the Eastern District of Missouri, in proceedings for the appointment of an additional receiver for the M. K. & T., makes the following rulings: The fact that a receiver of a railroad has expressed his views to those undertaking to formulate a plan of reorganization was not sufficient ground for appointing an additional receiver, where he had not exceeded the limitations or proprieties of his position, or intended to impress his views on those engaged on the plan of reorganization, and had done little more than give his opinion when it was sought, especially where those at work on the plan of reorganization stated that its terms were not based on anything the receiver had said, and the opinions expressed by him related to future conditions about which skilled and competent men might widely differ.

The court will not approve a plan of reorganization of a railroad having no adequate provision for future capital requirements or in which the financing is so close to probabilities that earnings are likely to be absorbed in a lean year or a succession of them by fixed charges, though to avoid such a plan it is necessary to make the interest on junior securities contingent rather than fixed, especially as the public has an interest in every railroad reorganization accomplished by foreclosure; and in practice, when the margin between net income and fixed charges becomes small or disappears under adverse conditions, the insistent demands of contract obligations are always met at the expense of those of a more general, less definite, character.—Central Trust Co. v. M. K. & T., 246 Fed. 154. Decided October 13, 1917.

Keeping Vestibule Doors Fastened

In an action for damages for the death of a passenger, it appeared that he was missed from the train soon after it left Kirksville, Mo., north bound, by his daughter-in-law. Next morning his body was found on the track half a mile south of Kirksville. The train, when it passed that spot, was traveling at about 40 miles an hour. It consisted of two sleeping and one chair cars, all vestibule cars. The deceased had been sitting in the chair car, which was in front. In an action for his death the plaintiff's theory was that the deceased fell from the rear sleeper; that knowing the train was a vestibule train he walked to the rear, for some purpose not known, and on stepping on the rear platform found the gate open, fell through, and met his death. The railroad's theory of the case was that the deceased left the train at Kirksville and walked back half a mile down the track and was wlaylaid and killed. There was no evidence of robbery. The specific negligence charged was failure to keep the openings to the train securely closed and fastened. The railroad introduced evidence tending to show that the rear gate was up and securely fastened at the time. This was sworn to by the conductor and brakeman. The Kansas City Court of Appeals held that the questions whether the railroad negligently left the rear gate open and whether the passenger fell through the open gate were for the jury. The jury found for the plaintiff, but a judgment in her favor was reversed because of an erroneous instruction declaring that it was the railroad's duty to keep both the door and the gate fastened. It was held that, while a passenger on a vestibule train is privileged to go backward and forward through the train, vestibule doors being maintained for his protection, if the railroad keeps the gate on the platform of the rear coach securely fastened it is not bound to keep the door of that coach fastened. By the instruction given, the jury might have found for the plaintiff by reason of the fact that the rear door of the rear car was not locked even though it found the rear gate was fastened.—Daly v. Prynor (Mo.), 198 S. W., 91. Decided November 5, 1917.

Equipment and Supplies

Locomotives

Specifications have recently been determined on orders received by the American Locomotive Company some months ago for the following locomotives:

LONG ISLAND.—4 eight-wheel switching locomotives weighing 203,000 lb.

PORTLAND TERMINAL RAILROAD.—2 six-wheel switching locomotives weighing 166,000 lb.

DELAWARE & HUDSON.—20 Consolidation locomotives weighing 295,000 lb.

CENTRAL VERMONT.—5 Mikado locomotives weighing 276,000 lb.

DELAWARE, LACKAWANNA & WESTERN.—15 Mikado locomotives weighing 321,000 lb.

The first, third and fifth items have been previously reported in the *Railway Age*. Every one of the locomotives in the above list will be equipped with a superheater.

Freight Cars

THE ATLANTIC COAST LINE is reported as having ordered 1,000 40-ton steel underframe ventilator cars from the Standard Steel Car Company.

RUSSIAN GOVERNMENT.—The American Car & Foundry Company has been informed by the Russian Commission to postpone indefinitely the construction of its order for 6,500 1,200 pood four-wheel box cars.

Signaling

THE CINCINNATI, NEW ORLEANS & TEXAS PACIFIC (Southern Railway System) has ordered from the General Railway Signal Company material for an automatic block signal installation between Moreland, Ky., and South Fork, 10 miles, and between Helenwood, Tenn., and Lancing, 26 miles.

THE GREAT NORTHERN is about to make automatic block signal installations between Stryker, Mont., and Rexford, 31 miles, and between Long Lake, Minn., and Delano, 11 miles. These installations will require 75 single arm, upper quadrant, 3-position, top-of-mast, Model 2A signals. The material will be furnished by the General Railway Signal Company and installation will be made by the railroad company's forces.

THE COAL BURNED BY STEAM VESSELS on the oceans aggregates in normal times about \$250,000,000 a year in value out of a total of nearly \$700,000,000 worth passing out of the coal producing countries of the world, according to a bulletin of the National City Bank of New York.

RAILROAD INVESTMENTS OF FRANCE.—In 1923 France will turn over to the Spanish nation all the leading railroads in Spain, which the Republic built and administered under a 99-year lease. It is interesting to note that the roads have cost France more than was expected, and some of the most expensive tunneling in the world was done in northern Spain, where in some sections as many as 20 tunnels within a few miles had to be excavated through the mountains. Many of the lines are antiquated, single track affairs. French investments in Russian railroads have been tragic. For instance, it is estimated that France advanced \$800,000,000 to Russia to construct strategical railroads, particularly in connection with troop moving. Not a dollar of this money, apparently, was spent in railroad building, and it was this lack of transportation which in part led to the military downfall of Russia. Legislative tangles and lack of imperial ukases prevented the French cash from being utilized for what it was intended.—*Wall Street Journal*.

Supply Trade News

A. E. Crone has been elected vice-president and general manager of the Buffalo Brake Beam Company, New York, effective February 1.

The Barco Manufacturing Company, successors to the Barco Brass & Joint Company, Chicago, has recently appointed the Holden Company, Ltd., of Montreal, as its exclusive Canadian agents.

Ben D. Christian and D. B. Graze have been appointed representatives at the Cleveland office of the Crockier-Wheeler Company of Ampere, N. J., succeeding Howard Dingle and W. W. Clark. Effective February 1.

John F. Gilchrist, treasurer of the Federal Sign Company, has been elected president, succeeding J. H. Goehst, deceased. James Gilchrist, at present secretary, has been elected secretary and treasurer and other officers have been re-elected.

Arrangements have recently been completed whereby the business of both the Goldschmidt Detinning Company and the Goldschmidt Thermit Company will hereafter be conducted by the Metal & Thermit Corporation, with general offices at 120 Broadway, New York City.

The Walter A. Zelnicker Supply Company, St. Louis, has established permanent offices at Minneapolis, Minn., 627 Plymouth Bldg., to serve the north central and Canadian trade. Richard K. Papin, formerly St. Louis and Southwestern representative of the Davenport Locomotive Works and for ten years manager of the Zelnicker Company's equipment department, is in charge.

The twenty-fifth anniversary of the organization of the Chicago Railway Equipment Company was celebrated by a dinner given at the Union League Club in Chicago on Tuesday night. The guests included a large number of leading railway manufacturers and other persons interested in the railway supply industry. E. B. Leigh, who has been president of the company throughout its successful career, presided and short addresses were made by officers of the company and a number of the guests.

H. S. Cooper, vice-president of the Independent Pneumatic Tool Company, manufacturers of pneumatic tools and electric drills, who for many years was the manager of the company's eastern branch in New York city, effective February 1, assumed the duties of general sales manager as well as those of vice-president and will have his headquarters at the general offices of the company, Thor building, Chicago. R. T. Scott, the former Pittsburgh branch office manager, has been promoted to the office of eastern manager with headquarters at 170 Broadway, New York. H. F. Finney, who formerly traveled the Chicago and St. Louis territories, has been placed in charge of the company's branch office at Pittsburgh, Pa.

Trade Publications

STANDARDIZED BUILDINGS.—The Trussed Concrete Steel Company, Youngstown, Ohio, has issued a 24 page booklet describing its standardized structures which it carries in stock for quick construction. The book gives in detail the nature of the construction of these buildings and contains a number of illustrations of them in service.

"MY DEAR JIM."—This is the title of a small booklet issued by the Carnegie Steel Company in the form of a letter from a retired steel man to a friend in Medicine Hat. The letter tells in entertaining language of the growth of the Carnegie Steel Company during the last 20 or more years, both as to the extent of its plants and the variety of its products. Following the general outline of the latest Carnegie Shape book, detailed information is given concerning the various sections rolled for structural and industrial purposes, giving the trade reasons for introducing the newer sections.

Financial and Construction

Railway Officers

Railway Financial News

BUFFALO & SUSQUEHANNA.—A. A. Jackson, vice-president of the Grand Trust Company of Philadelphia, has been elected a director to succeed Edward B. Smith, deceased.

CHICAGO, MILWAUKEE & ST. PAUL.—The directors, at the regular meeting on January 31, decided to defer action on the semi-annual dividends on both the preferred and the common stocks. H. E. Byram, president, said that the action of the board did not mean that the dividend has been passed, but he would not say whether or not the dividend question would be taken up at a later meeting of the directors, when a more definite knowledge of the terms under which the Government will take over the roads will be possible. He intimated, however, that if the present program for Government control goes through the St. Paul will receive enough to meet its dividends requirements.

DENVER & RIO GRANDE.—Default has been made in the payment of the interest due February 1 on the first and refunding mortgage 5 per cent gold bonds issued August 1, 1908. The semi-annual payment amounts to \$825,975.

See also editorial comments elsewhere in this issue.

HASTINGS & NORTHWESTERN.—See Union Pacific.

NEW MEXICO CENTRAL.—This company has increased its capital stock from \$500,000 to \$2,500,000.

PHILADELPHIA & WESTERN.—W. Barklie Henry, Edward F. Beale and Charles H. Bean have been elected directors to fill vacancies caused by the death of Edward B. Smith and the resignation of George R. Sheldon and G. Trowbridge Hollister, of New York.

ST. LOUIS & SAN FRANCISCO.—The Federal District Court at St. Louis on January 29, formally dissolved the receivership of this company. The court reserved the right to pass on any claims that hereafter may be made against the company as constituted when it went into receivership.

UNION PACIFIC.—The Hastings & Northwestern which operates that portion of the Union Pacific line from Hastings, Neb., to Kearney, 41 miles, has been taken over by the Union Pacific, becoming a part of the system.

WESTERN PACIFIC.—The Western Pacific Railroad Corporation on February 5 declared an initial dividend of 6 per cent on the \$27,500,000 preferred stock, due in quarterly installments beginning February 20. The second payment of 1½ per cent will be made April 1 and the others of equal amount on July 1 and October 1. The corporation is holding company for the Western Pacific Railroad, owning all of the latter's \$75,000,000 stock. On this stock a dividend of approximately \$2,000,000 was paid last December and from this return into the corporation's treasury the preferred stock dividend will be paid.

Railway Construction

ESSEX TERMINAL RAILWAY.—This company is building a steel bridge with concrete foundations, 75 ft. long, over Turkey creek at Ojilway, Ont.

FINANCES OF DUTCH RAILWAYS.—The gross receipts of the State, Holland, and Netherlands Central Railway companies during the first six months of 1916 were 45,029,014 florins (\$18,101,664). Fares were increased 20 per cent beginning January 1, 1917, but the gross receipts in the first six months of 1917 were increased in much less proportion, being 48,135,614 florins (\$19,350,517). The expenses rose in much greater proportion, from 42,161,235 florins (\$16,948,817) during the first six months of 1916 to 48,340,585 florins (\$19,432,915) in the corresponding period of 1917. Thus the business shows an actual loss in 1917.—*Commerce Report.*

Executive, Financial, Legal and Accounting

J. C. Potter has been appointed auditor and treasurer of the Meridian & Memphis, with headquarters at Meridian, Miss.

Ralph M. Shaw, assistant general counsel of the Chicago Great Western, with headquarters at Chicago has been appointed general counsel, succeeding J. B. Payne, effective January 28.

H. M. Ristley, head of the transfer department of the Illinois Central, at New York, has been appointed assistant treasurer with headquarters at New York, succeeding R. E. Connolly, promoted.

Osgood H. Dowell, assistant counsel of the Eastern Railroad Association, Washington, D. C., has resigned to become a member of the patent law firm of Emery, Booth, Janney & Varney, of New York, Boston and Chicago. Mr. Dowell will be located at the Chicago office.

C. M. Kittle, senior vice-president of the Illinois Central, has been placed in executive charge of that line in the absence of **C. H. Markham**, president who has been appointed assistant to the director general of railroads in charge of south eastern territory with headquarters at Atlanta, Ga.

J. C. Sweeney, who has been appointed general solicitor of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., as has already been announced in these



J. C. Sweeney

columns, was born on November 30, 1874, at New Haven, and graduated from Yale University in the class of 1896. He was in private practice at Providence, R. I. until 1904, when he entered the service of the New York, New Haven & Hartford as trial attorney for the state of Rhode Island, with headquarters at Providence, remaining in that position until 1914, also serving as trial attorney for the Rhode Island Company, which operated the street railways controlled by the New Haven. In 1914 he was

appointed general attorney of the New Haven with headquarters at New Haven, Conn., and on February 1, was appointed general solicitor of the same road as above noted.

Thomas Fletcher Smith, land and tax agent of the Central of Georgia, with office at Savannah, Ga. has been appointed assistant to vice-president and general manager **vice Charles Molony**, resigned to accept service with another company, and **Edwin Burke McCuen** has been appointed land and tax agent **vice Mr. Smith**.

R. B. Walker, auditor of disbursements, of the Seaboard Air Line, with headquarters at Portsmouth, Va., having resigned to accept service with another company, **H. W. MacKenzie**, controller, announces the following appointments and changes in title of the officers of the accounting department effective February 1: **T. W. Mathews**, assistant controller; **L. R. Powell, Jr.**, assistant to the controller; **B. B. McCaa**, auditor freight accounts; **V. T. Boatwright**, assistant auditor freight accounts; **S. D. Locke, Jr.**, auditor passenger accounts; **E. P. Ball**, auditor station accounts; **J. S. Hamilton**, auditor disbursements; and **L. L. Knight**, assistant auditor disbursements.

R. E. Connolly, assistant treasurer of the Illinois Central, has been appointed treasurer, with headquarters at New York, succeeding **A. J. Wykes**, deceased. Mr. Connolly was born on August 11, 1884, in New York City and was educated at New York University. He began railway work in August, 1902, as a clerk in the executive office of the Illinois Central and in 1906 was appointed transfer agent. On October 31, 1916, he was appointed assistant treasurer, with headquarters at New York, which position he held at the time of his recent appointment as treasurer of the same road as above noted.

N. W. Smith whose appointment as general attorney of the New York, New Haven & Hartford with office at New Haven, Conn., has already been announced in these columns, was born on November 18, 1873, at Providence, R. I. He was educated in the public schools of his native town also at Bellows Falls, Vt., and in 1896, graduated from Yale College and two years later from the New York Law School. He was admitted to the bar in New York in 1898 and in Rhode Island the following year. In 1899 he became a junior partner in the firm of Edwards & Angell, Providence, and in 1904, was appointed assistant attorney for Rhode Island of the New York, New Haven & Hartford. In 1907, he was appointed attorney for Rhode Island and in 1914, became Rhode Island counsel, which position he held at the time of his recent appointment as general attorney of the same road as above noted. He also served as general counsel of the Rhode Island Company operating the street railways from about the time the New Haven Company acquired control of that company until it was separated in 1914 from the New Haven Company by the decree in the dissolution suit.

Operating

Henry D. Pollard has been appointed assistant general manager of the Central of Georgia with headquarters at Savannah, Ga.

J. M. Mitchell has been appointed superintendent of the Nezperce & Idaho, with office at Nezperce, Idaho, in charge of traffic and operation, succeeding **C. A. Hawkins**, resigned, effective February 1.

A. R. MacGowan, district superintendent of the Canadian Government Railways, at Edmundston, N. B., has been appointed superintendent of the Pennsylvania division of the Delaware & Hudson, with office at Carbondale, Pa., vice **A. Morgan**.

J. A. MacDonald, superintendent of the LaCrosse division of the Chicago, Milwaukee & St. Paul with office at Milwaukee, Wis., has been appointed superintendent of the Prairie-Chien and Mineral-Point divisions, succeeding **L. T. Johnson** who succeeded **Mr. MacDonald**.

W. F. Eckert, superintendent of the Reading division of the Philadelphia & Reading, with office at Reading, Pa., has been appointed superintendent of the Wilmington and Columbia division, with office at Reading, succeeding **I. T. Tyson** who has been appointed superintendent of the Reading division, with office at Reading.

J. T. Gilmore, roadmaster of the Chicago, Burlington & Quincy, with headquarters at Greysbull, Wyo., has been appointed trainmaster and roadmaster of the McCook division in charge of the line from Orleans, Neb., to St. Francis, Kan.,

and from Republican, Neb., to Oberlin, Kan., with headquarters at Orleans, Neb., succeeding **W. G. Dungan**, transferred.

J. Munday, general superintendent of the Rock Island Southern, with headquarters at Rock Island, Ill., was appointed superintendent of the middle division of the St. Louis Southwestern, with headquarters at Mt. Pleasant, Tex., succeeding **E. Richards**, who has been appointed train rules examiner and safety inspector, with office also at Mt. Pleasant, effective February 1.

J. W. Fitzgerald, superintendent of the Tucson division of the Southern Pacific with office at Tucson, Ariz., has been appointed superintendent of the Shasta division, with headquarters at Dunsmuir, Cal., vice **J. W. Metcalf**, resigned, and **W. Wilson**, superintendent, with office at Portland, Ore., has been appointed superintendent of the Tucson division, with headquarters at Tucson, vice Mr. Fitzgerald.

A. L. Haldeman, division superintendent of the Chicago, Rock Island & Pacific with headquarters at Estherville, Iowa, has been transferred to the Minnesota division with headquarters at Manly, Iowa, succeeding **A. E. Wallace**, resigned to go with another company. **C. E. Green**, trainmaster at Bureau, Ill., has been promoted to superintendent of the Dakota division with headquarters at Estherville, succeeding Mr. Haldeman. **O. O. Hawk**, trainmaster at Eldon, Iowa, has been transferred to Bureau, succeeding Mr. Green.

Patrick Minehan, trainmaster on the Mahoning division of the Erie at Youngstown, Ohio, has been appointed assistant superintendent, with office at Youngstown, vice **John M. Condon**, promoted. **Daniel J. Madden** has been appointed trainmaster, with office at Youngstown, vice Mr. Minehan. **Thomas Fitzgerald** has been appointed terminal trainmaster, with office at Cleveland. **Ezra Chadwick**, chief dispatcher, has been appointed trainmaster with office at Cleveland, and **Rolla A. Smith** has been appointed chief dispatcher, vice Mr. Chadwick.

Victor B. Fisher, trainmaster of the Philadelphia & Reading, with office at Tamaqua, Pa., has been appointed superintendent of the Shamokin division with headquarters at Tamaqua, vice **F. J. Hagner**, assigned to other duties. Mr. Fisher was born on July 8, 1867 at Allenwood, Pa., and received a high school education. He began railway work in the spring of 1882, as a messenger on the Philadelphia & Reading and in the fall of the same year became telegraph operator. In the fall of 1885, he was appointed train dispatcher and in May, 1890, went to the New York Central as yardmaster. The following December he returned to the service of the Philadelphia & Reading as train dispatcher and in September, 1897, was appointed assistant trainmaster with office at Tamaqua. In February, 1913, he was promoted to trainmaster which position he held at the time of his recent appointment as superintendent of the Shamokin division of the same road as above noted.

M. M. Sisson, whose appointment as superintendent of car service of the Detroit, Toledo & Ironton with office at Springfield, Ohio, was mentioned in these columns January 25, entered railway service in December, 1901, as a telegraph operator on the Missouri division of the Atchison, Topeka & Santa Fe. He remained with the Santa Fe until December, 1902, following which he was employed in similar work on the Chicago & North Western. From March, 1904, to January,



N. W. Smith



V. B. Fisher

1906, he was storekeeper for the Victor Fuel Company of Denver, Colo.; on the latter date he returned to the Santa Fe on which line he was an operator and trick despatcher at La Junta, Colo., until November 30, 1908. From December 15, 1908, to February 18, 1909, he was a trick despatcher with the Union Pacific at Evanston, Wyo.; following which he was trick despatcher, night chief despatcher and chief despatcher with the Santa Fe at Amarillo, Tex., La Junta, Colo., Winslow, Ariz. and Pueblo, Colo. On October 10, 1914, he was appointed chief despatcher and trainmaster for the Detroit, Toledo & Ironton, which position he held until the time of his appointment as noted above.

C. H. Buford, trainmaster of the Chicago, Milwaukee & St. Paul, with headquarters at Sioux City, Iowa, has been transferred to the La Crosse division, with headquarters at Milwaukee, Wis., succeeding **B. H. McManey**, who has been transferred to the Northern division, with headquarters at Milwaukee. **R. E. Sizer** has been appointed trainmaster of the Prairie du Chen and Mineral Point divisions, with headquarters at Milwaukee, Wis. **J. E. Hills** has been appointed trainmaster of the Twin City terminals, with headquarters at Minneapolis, Minn. The above changes were effective February 1.

Traffic

H. A. Fidler, general freight agent of the Detroit, Toledo & Ironton at Detroit, Mich., has been appointed traffic manager with same headquarters. Mr. Fidler was born in



H. A. Fidler

Ardensville, Pa., on January 12, 1874. He entered railway service on January 2, 1889, and since that date has been consecutively to April 1, 1893, rate and bill clerk of the Cleveland, Cincinnati, Chicago & St. Louis at Danville, Ill.; from April 1, 1893, to August 1, 1895, yard clerk at the same point; from August 15 to November 24, 1895, night clerk in the freight office at Springfield, Ohio; from November 24 to December 26, 1895, receiving clerk in the local freight office of the Ohio Southern at Springfield; from December 26, 1895, to April 1, 1899, rate clerk in the same office; from April 1 to November 17, 1899, claim clerk in the general freight department; and from November 17, 1899, to August 1, 1900, chief clerk in the same department. He was then assistant general freight and passenger agent until October 1, 1900, and later general freight and passenger agent for the same road to June, 1901. He subsequently served as division freight agent of the Detroit, Toledo & Ironton at Ironton, Ohio, and from August 17, 1913, to August 1, 1914, he was traffic manager of the Big Sandy & Kentucky River at Ashland, Kentucky. From the latter date to May 1, 1915, he was assistant general freight agent of the Detroit, Toledo & Ironton at Ironton, Ohio. From May 1, 1915, to March 1, 1916, he was assistant general freight agent at Springfield, Ohio and from March 1, 1916, to January 1, 1918, he was general freight agent at Detroit, Mich., which position he held at the time of his appointment as noted above. He succeeds **F. H. Osborn**, vice-president in charge of traffic and secretary, who has enlisted in government service.

The authority of **T. D. Geoghegan**, traffic manager of the Gulf, Mobile & Northern, with headquarters at Mobile, Ala., has been extended over the Meridian & Memphis.

W. D. Braddock, advertising agent of the Chicago, Rock Island & Pacific, with headquarters at Little Rock, Ark., was appointed general advertising manager at Chicago, succeed-

ing **H. E. Erickson**, who has resigned to become advertising manager of Morrell & Co., with headquarters at Chicago, effective February 1.

W. H. Ward, whose appointment as general freight agent of the Indiana Harbor Belt, with headquarters at Chicago, was announced in the *Railway Age* of February 1, first entered



W. H. Ward

railway service in the local freight office of the Union Pacific at Omaha, Neb., in 1890. Three years later he went to Chicago to enter the fast freight line department of the Chicago, Burlington & Quincy. In 1896 he entered the employ of the Indiana, Illinois & Iowa, later taken over by the New York Central, with which road he was chief clerk in the traffic department and assistant general freight agent. Approximately 12 years ago he was transferred to the Indiana Harbor Belt, by which company he has been employed ever since. He was chief of the tariff bureau at Chicago during most of that period and at the time of his promotion to general freight agent, succeeding **J. W. Bingham**, resigned.

H. D. Landry, assistant general freight agent of the St. Louis Southwestern, with headquarters at St. Louis, Mo., will have charge of the industrial department in addition to his other duties, effective February 1.

C. E. Veatch, acting general freight and passenger agent of the Missouri & North Arkansas with headquarters at Harrison, Ark., has been appointed general freight and passenger agent with the same headquarters.

J. A. Middleton, formerly freight traffic manager of the St. Louis & San Francisco, is in charge of oil traffic for the Fuel Administration, instead of the Food Administration, as inadvertently stated in last week's issue, page 286.

F. A. Brown, traveling agent of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at Kansas City, Mo., was appointed general agent of the passenger department, with headquarters at St. Paul, Minn., succeeding **H. H. Lankester**, resigned, effective February 1.

Oscar Plunket, traveling freight agent of the Wabash, with office at Birmingham, Ala., has been promoted to general agent at Birmingham, succeeding **E. H. Blair**, resigned to engage in other business. **Lee Pesca**, commercial agent, with office at Memphis, Tenn., having resigned to engage in other business, that agency will be temporarily in charge of **G. W. Terry**, traveling freight agent.

J. H. Cherry, assistant general freight agent of the Illinois Central at Chicago, has been appointed regional director for the Illinois State Food Administration. Mr. Cherry will have charge of a bureau which will facilitate the movement of food products on the roads of the state with a view to conserving their full edible value. **F. H. Law**, assistant general freight agent at St. Louis, has been transferred to Chicago to succeed Mr. Cherry.

Engineering and Rolling Stock

E. M. Lake has been appointed master mechanic of the Meridian & Memphis, with office at Meridian, Miss.

K. G. Williams, assistant engineer of the Chicago, Rock Island & Pacific, with office at Memphis, Tenn., has been appointed resident engineer of the Union Railway at Memphis, he will also continue to serve with the Rock Island, the Ar-

kansas and Memphis Railway Bridge & Terminal Company and the American Bauxite Company.

M. F. Longwell, resident engineer of the Union Railway at Memphis, Tenn., has been appointed engineer maintenance of way of the Wabash, with headquarters at Montpelier, Ohio.

A. A. Matthews was appointed chief engineer of the St. Louis Southwestern of Texas, with office at Tyler, Tex., succeeding **W. T. Eaton**, assigned to other duties, effective January 28.

R. D. Quickel, fuel agent of the Southern Railway, lines west, with office at Cincinnati, Ohio, having entered military service, **N. C. Kieffer** has been appointed fuel agent, with office at Cincinnati.

C. H. Montague, master mechanic of the Quincy, Omaha & Kansas City and the Iowa & St. Louis, with office at Milan, Mo., having resigned, **J. C. Woods** has been appointed acting master mechanic, with office at Milan.

N. F. Thompson, district engineer of the Middle district of the New York Central, with office at Albany, N. Y. has been appointed district engineer of the Western district, with office at Buffalo, succeeding **F. E. Paradis**, resigned. **B. C. Martin**, district engineer of the Hudson River Connecting Railroad, with office at Castleton, has been appointed also district engineer of the Middle district, to succeed Mr. Thompson.

W. O. Galbreath, whose appointment as chief engineer of the Missouri, Oklahoma & Gulf, with office at Muskogee, Okla., was announced in these columns on January 23, was born in Porter County, Ind. He graduated from Kansas University in 1898 and entered railway service on the Mexican Central in 1899 in Mexico. He was later employed on the Mexican National and the National Railways of Mexico on location, construction and maintenance work. In 1912 he left the latter company to become engineer of maintenance of the Missouri & North Arkansas. He resigned this position in 1916 to go with the Chicago Great Western, remaining with that company until he received the appointment, as noted above.

Special Officers

James F. Holden, vice-president in charge of traffic of the Kansas City Southern, has been appointed by Director-General McAdoo, an assistant to Edward Chambers, traffic advisor of the director general. Mr. Holden will have general supervision over the transportation of the supplies and materials for the Shipping Board and relations between the railroads and the Shipping Board, as was announced in the *Railway Age* of February 1, page 257. Mr. Holden was born in 1861, at Prince Albert, Ont. He began railway work in 1877 and served consecutively to 1880, as clerk to the superintendent and traveling auditor of the Whitby, Port Perry & Lindsay, now a part of the Grand Trunk; and from 1880 to 1883 as chief clerk in the traffic manager's office of the Midland Railway of Canada. The next year he was appointed local freight agent of the same road at Toronto. From 1885 to 1886, he was traveling freight agent of the Canadian Pacific, at Toronto; then for three years was in charge of agents' accounts, in the accounting department of the St. Louis-San Francisco, at St. Louis, Mo., and from 1889, to 1891, he was chief rate clerk in the general freight office of the same road. In November, 1891, he went to the Choctaw, Oklahoma & Gulf and served as auditor and



J. F. Holden

traffic manager until May 1898 and then to July, 1901, as traffic manager. He was vice-president of the same road from July, 1901 to April, 1902, and in February, 1903, was appointed freight traffic manager of its successor, the Chicago, Rock Island & Pacific. In January 1906, he was elected vice-president and general manager of the Midland Valley and since February, 1910, has served as vice-president of the Kansas City Southern, with office at Kansas City, Mo.

Railway Officers in Military Service

Paul M. La Bach, assistant engineer of the Chicago, Rock Island & Pacific, has been commissioned a major in the Engineer Reserve Corps and has been assigned to staff duty in France. Mr. La Bach was recently commissioned as an ensign in the Fleet Naval Reserve but resigned to accept the army commission. He served as an ensign in the Spanish-American war.

Obituary

Charles C. Rosenberg, for the past 11 years secretary and treasurer of the Railway Signal Association, died at his home in Bethlehem, Pa., on February 2, at the age of 63. He had been in poor health for about five years but he was of such cheerful and courageous disposition that his friends in the association, though they met him regularly at meetings, saw little or nothing in his conversation to indicate his illness. He had been in a critical condition since he was stricken with kidney disease, while away from home on January 12.

Mr. Rosenberg was born at West Portal, N. J., on February 5, 1855, and left school at the age of 14 to become apprentice to a carpenter. He entered railway service in 1875 on the Lehigh Valley as a carpenter. Two years later he was made foreman, and in 1880 he was appointed supervisor of bridges and buildings. Railroad signaling was then in its infancy and the Lehigh Valley was one of the pioneers. Mr. Rosenberg kept his eyes and ears open and as the first signals, primitive in design, were put under his supervision he grew with the art; and in 1896 he was made signal engineer. Prior to this, however—1890—he had been superintendent of the creosoting plant of the company at Perth Amboy, where he stayed for two years. From 1892 to 1896 he was again supervisor of bridges and buildings, in the territory between Jersey City, N. J., and Mauch Chunk, Pa.; which included important docks at New York harbor. He was one of the earliest members of the Railway Signaling Club, now the Railway Signal Association, and his name is prominent in the proceedings throughout the life of the association. He was its vice-president in 1900 and its president in 1901 and 1902. He retired from railroad service in 1906, having been in the service of the Lehigh Valley continuously for 31 years; and in the same year he was chosen secretary of the Railway Signal Association. His popularity and efficiency as a secretary are everywhere attested.

Mr. Rosenberg is survived by a widow and three daughters, his only son having died a few years ago. He was as popular locally as he was among his railroad acquaintances and was active in civic, religious and political affairs, but not as a politician. He was a member of the Rotary Club of Lehigh University, and although his education was gained, largely, in the hard school of railroad experience, he seemed to be entirely at home among the professors of the university.



C. C. Rosenberg

EDITORIAL

Railway Age

EDITORIAL

In every hearing on an application for an increase in freight rates, railroad executives have consistently and emphatically prophesied disaster in time of emergency if relief were not granted. Shippers, alive only to their own immediate interests, have just as consistently fought any increase in rates on their particular products, or the enactment of regulations which although aimed to increase railroad efficiency or capacity would interfere with the shippers' convenience or special privileges to which they had become accustomed. The predictions of the railway executives have proved true and the shippers are fast awakening to the seriousness of their error. Their industries are suffering and their productive capacity is restricted because of their having crippled not only a faithful servant, but an indispensable one. From a spirit of criticism and fault finding they are rapidly shifting to one of sympathy and support, as is indicated by the article, "Business Papers Advise Shippers," on page 363. While the roads have been taken out of the hands of the regulators who have so willingly and dutifully listened to the shippers in the past, it is to be hoped that these same regulators will not fail to note the change which is now taking place.

The Shoe Now on the Other Foot

There is no new light thrown on the history of the Wabash-Pittsburgh Terminal by the report of the Interstate Commerce Commission, an excerpt from which is published elsewhere in this issue. The report is signed "by the commission" meaning presumably that it was prepared by a more or less "expert"

A Poor Business Venture

hired by the commission and approved of "by the commission." The report characterizes the building of the Wabash-Pittsburgh Terminal as a poor business venture and it was! The Goulds have made rather more than their share of poor business ventures in the railroad field but their entrance into Pittsburgh was about as unfortunate as the worst of them. And yet the Wabash-Pittsburgh was built in order to give Pittsburgh more adequate railroad facilities. Today even the Pennsylvania Railroad directors would acknowledge that Pittsburgh needs more railroad facilities. The Pittsburgh district shippers gained only a fraction of what they would have, had the project been carried out successfully but still they gained something and stand to gain more as time goes on. The investors in this bad business venture lost very heavily. The commission finds in this a proof that it ought to have jurisdiction over railroad security issues. Maybe if the commission had had the power of veto over security issues the independent entrance into Pittsburgh would never have been built. But that is the most that can be said. Is it conceivable that the commission as constituted in 1904 would have done anything constructive? The commissioners could not have done anything constructive. That is not their conception of what they are there for, nor has it been the conception of Congress. The real lesson to be learned by the Wabash-Pittsburgh failure is that an investor must look out for himself. What he can do is to insist on publicity before the investment is made, not ten years after the enterprise has proved a failure.

It takes years to train a skilled mechanic for railroad shop or engine house work. The roads have lost far more skilled

The Problem of Maintaining the Equipment

workers than they can afford, and yet it is of vital importance that the locomotives and cars be kept in the best possible condition. The emergency can be met in one way only and that is by following the British precedent of scientific dilution of labor. The skilled men who still remain in the service must be carefully studied and used as leaders and demonstrators. It is almost a crime under present conditions, for instance, to use a skilled worker on jobs that can be done by unskilled labor, or even by men of a smaller degree of skill or experience. As we have pointed out, time and time again, the railroad shop and engine house forces have struggled along with entirely too little supervision. In the present emergency, and particularly with the large labor turn-over, it is more than ever necessary that adequate supervision be provided. Steps should also be taken by readjustment of wages and conditions to prevent more skilled men from leaving the railroads to go into other industries. Industry and the conduct of the war cannot go forward successfully with a crippled transportation machine. While a certain amount of new equipment may be secured from the builders during the coming months it will be comparatively insignificant in contrast with the equipment now in service which will be called upon to carry the larger part of the burden. Immediate results, and that is what we are after, can best be secured by repairing the cars and locomotives now in service and maintaining them in good serviceable condition.

When last April the Railroads' War Board was established at the national capital Washington became the greatest railroad center in the world. Its importance as a railroad center was increased when on December 28 the government took control of railroad management. The Railroads' War Board was a committee created voluntarily by the railways and possessing only such authority as they gave it. The director general of railroads is a government official possessing the power of a dictator over both regulation and management.

The Biggest Railroad Center

Unified operation of the railways during the war is necessary. Perhaps it was desirable to establish government control of their management, although the *Railway Age* has not changed its opinion that if the laws had been so modified as to give the private managements a fair chance they would have got better results than will be obtained under government control. But of one thing we are sure, and this is that the concentration of control of the railways in Washington is a serious misfortune. Washington is a beautiful city which is very sloppy in winter and very hot in summer, which is inhabited chiefly by government clerks, which has only one industry—politics—and which is therefore the worst place in the United States from which to direct the management of the railways. The story is told of a man who called on Lincoln when he was President, and began to tell him what the public thought. "Wait a minute," said the President. "When did you get here?" "Last night."

the man replied. "All right, then," said the President, "you may proceed; but had you been here a week I wouldn't have listened to you, because nobody who has been in Washington a week knows what the public thinks about anything." The man who stays in Washington without leaving it frequently and coming in contact and talking with people elsewhere not only soon does not know what the public thinks, but he soon loses all touch with what is actually going on in the country.

Washington as a Railroad Center

WASHINGTON has no manufactories, no large wholesale houses, no great financial institutions, only one railroad general office, few literary people except those who camp out there a few months at a time to get "copy." Its only industry, as noted in the preceding paragraph, is politics, the staple of its conversation is political gossip, and almost every man who has been there continuously fancies he has become not merely a great statesman, but also a great administrator capable of telling how any big enterprise, from building a powder mill to running the railroads should be handled.

The other great capitals of the world, London, Paris, Berlin, are capitals of industry, finance, commerce, literature, as well as of politics. In consequence, the public men of England, France and Germany, when they are in the capitals, constantly meet in clubs, offices, hotels, homes, at public meetings, the business, professional and literary leaders of the country. Furthermore, they meet them under normal conditions. In Washington public men seldom meet leaders in the professions, commerce, industry and finance except when they go there as suppliants, protestants, or lobbyists. It makes a great deal of difference in the amount they learn from each other whether public men and business and professional men usually meet on friendly and unconventional terms or as our business and professional men and public men usually meet in Washington. The atmosphere of Washington is made up about equally of grapevine telegrams, complaints, statistics, politics and sworn testimony. Our public men would be much more competent to pass intelligently on the industrial affairs of a great nation with the smoke of Pittsburgh or Chicago in their lungs.

Director General of Railroads McAdoo is an able man. He has surrounded himself with men of experience in railway affairs. But both he and they are going to find it extremely hard to keep in actual touch with conditions on the railroads. Their predecessor, the Railroads' War Board, did. Every operating man knows he cannot keep in touch with what is going on on his railroad and do his work efficiently without spending about one-half his time on the road. Many people think railway officers' inspection trips are junkets. On the contrary, they are indispensable to skillful operation. Mr. McAdoo and his staff will not be able to make frequent inspection trips over the railroads of the United States. There are 260,000 miles of them. Their opportunities for keeping in touch with transportation conditions will be of the worst. They will be kept fully informed about the pathology of the railroad business but will hear little about its psychology and physiology. They are now being deluged by complaints; but few persons are taking any pains to tell them of the tremendous and heroic exertions that railway officers and employees have made during this terrible winter to keep the lines open. If Mr. McAdoo and his staff were located in New York, Chicago, St. Louis, St. Paul-Minneapolis, they would hear both the good things and the bad things about railway operation, but in Washington, where there are the headquarters of only one railway, they will hear little but the bad things.

The *Railway Age* has not made the foregoing remarks merely to indulge in persiflage at the expense of Washington. It has made them to call attention to a very real danger.

There is nothing more pathetic than the ideas regarding railroad control and management, their proper methods and probable results, that are constantly expressed in some official quarters in Washington. There are more people in that city who never made an inspection trip over a railroad, never were in a shop, and never saw a wreck cleared up, but who have learned all about how to run the railroads from statistics, Interstate Commerce Commission reports and newspapers, than in any other place in the world. Furthermore, some of them have influence—so much influence that they have contributed very greatly toward making railroad regulation a failure. People of this kind will also make government control of railroads a failure if given a chance. There is only one way to run railroads. That is by the process familiarly known among railway men as "railroading." The location of the office of the director general in Washington will be a great handicap to government control. The handicap can be prevented from producing its natural results only by recognizing its existence and acting accordingly.

The Government Standard Locomotives as a War Measure

TO RELIEVE the shortage of power on the eastern roads this country needs more locomotives or better facilities and more experienced help for making locomotive repairs. The problem is not so much the number of locomotives as it is the condition of the power now in operation. Coupled with the great demands of transportation during the past year and the extremely severe winter we are now experiencing, the dilution and the depletion of the ranks of the "railroad mechanic," in addition to inadequate facilities for handling and repairing locomotives, have made the proper maintenance of locomotives a practicable impossibility.

The time has come when something must be done and done promptly to relieve the situation at the earliest possible moment. Better facilities for handling locomotives, both at the shops and at the terminals, are sadly needed and must not be overlooked. New locomotives also will help bring relief. The director general of railroads, appreciating this situation, is to buy locomotives for the government.

It is probable that freight locomotives of standard design will be constructed to relieve a shortage of power wherever it may occur. By thus concentrating on a standard, or if more than one type of locomotive is to be built, on a few standards, it is hoped to so speed up production that the builders will be able to make more prompt deliveries and produce the locomotives at a lower unit cost than if but few each of a number of designs were built. This will be true, of course, to a certain extent.

The design of the locomotive or locomotives thus built must be a compromise as they must meet widely varying conditions. To be used indiscriminately over the eastern roads these locomotives must come within the clearance limitations and the permissible axle loading of any of the roads on which it is contemplated using them. This will in many cases provide locomotives to some roads well under the rating usually given the particular type of power in question and thus reduce the standard train loading, which will increase the cost of operation and make a greater number of train movements necessary.

Where a particular road is in need of a large number of locomotives of a certain class—of which designs have been made and locomotives built—which meets its individual needs much better than any standard locomotive the government will build, there appears no good reason for the government not approving their construction. The first cost may perhaps be greater, as undoubtedly the locomotives will

be heavier than those ordered by the government, but the operating economies to be secured from a locomotive designed more particularly to suit local conditions will make the extra cost well worth while. As far as the promptness in deliveries is concerned there is a grave question, provided these special locomotives are ordered in sufficiently large numbers, as to whether or not any serious delay to the output of the builders will be occasioned.

As a war emergency measure, however, the government standard locomotive will provide a certain degree of relief in a large number of cases.

* * *

A standard freight locomotive, to be successful, must as nearly approach the capacity requirements of all the roads on which it is likely to be used as is possible in any compromise arrangement, such as it must be. Judging from the extent to which Mikado type locomotives have been ordered during the past two years and the number of roads on which they are in service, it would seem that this type best meets the average requirements. The Mikado type, together with a switching locomotive of the 0-8-0 type, may be expected to fulfill practically all of the requirements for standard locomotives needed to meet the war emergency.

These locomotives should be so designed and equipped that they may be worked to capacity every minute of the time they are in service; there are few locomotives of the Mikado type that can meet this requirement unless equipped with a mechanical stoker. The importance of efficiency of combustion, evaporation and steam utilization hardly need be mentioned. The economic value of coal has been too thoroughly driven home during the past few weeks to require any elaboration here. In both of the above types the firebox should be fitted with a brick arch; the boiler should contain a combustion chamber and be fitted with a superheater.

There are good reasons other than those directly affecting the performance of the locomotive why every one of these features should be included in any locomotive of the size under consideration. One of the serious difficulties the railroads are contending with in the present crisis is the excessive turnover of employees in the locomotive service, especially among the firemen. For a number of years there has been a growing difficulty in securing high grade men for locomotive firemen, owing to the unattractiveness of the conditions under which they must work. The effect of the features of locomotive equipment specifically mentioned above, together with many others designed purely as labor savers, in improving these adverse conditions is very clearly brought out by the Eight-hour Commission in one of the appendices (see page 373) in its recent report to the President and Congress.

* * *

The problem of standardization is one which requires the exercise of the greatest wisdom in its settlement. Within certain limits standardization possesses undoubted benefits, which, however, may very readily be more than offset by the disadvantages arising from carrying it too far. The locomotive of today is the product of a long and continual process of development. Had a rigid standard been adhered to during any considerable period of this process, we should be depending upon locomotives which we now consider obsolete. But as a war measure, and for the purposes already mentioned, this objection does not hold against a reasonable standardization program. Indeed, such a program may possess certain advantages from the standpoint of production and first cost, and it is essential for the creation of an effective liquid reserve of power available for transfer from one system or section of the country to another. The transfer of a common type, some of which are in use on many roads, from one road to another would not lead to the difficulties of maintenance which must necessarily arise where

locomotives belonging to one railroad and standard on its lines only, are thus transferred.

To make available all of these advantages, however, the standardization need not and should not be carried beyond the boiler, frames, cylinders, running gear, cab and tender. To standardize the great class of fittings and devices commonly classed as specialties, would be to reduce the available material now in stock and the productive capacity for the turning out of these essential devices, and thereby place a restriction on the speed of locomotive production. Furthermore, to place a discouraging restriction on the continued development and improvement of specialties, including possible developments which may have a direct influence on the efficiency and capacity of the locomotive or the convenience and facility of operation or maintenance, even for the period of the war, would be a backward step which we can ill afford to take now, or ever.

Relations of Railway Officers and Employees

RAILWAY OFFICERS have been accused during the last dozen years of many crimes and misdemeanors. Probably no charge ever made against them has attracted more attention or caused more discussion than the accusation of W. G. Lee and A. B. Garretson, heads of two labor brotherhoods, that railway officers have been "lying down," first to discredit the Adamson law and later to discredit government control. Nor has any accusation ever made against them aroused such bitter resentment among railway officers.

The best answer to the charge that railway officers were lying down before government control was adopted is afforded by the facts. In the year 1917, in the face of unprecedented difficulties, and with no increase in facilities, the railways handled more commercial traffic than ever before, and, in addition, a large military traffic. The labor leaders are sore because the report of the Goethals Commission on the operation of the Adamson law disproved the claims they made as to the effects it would produce and sustained the claims the railway officers made. It showed that the law had not reduced hours of work, but had given the members of the brotherhoods a \$61,000,000 increase in wages, which may militate against them getting all the increases they are now seeking.

As to the charge that railway officers have been "lying down" to discredit government control, it is false, unjust and malicious. Consider the irony of the situation! The very men who ordered a nation-wide railroad strike in August, 1916, and who again ordered it in March, 1917, when it was certain that within a few days the country would be at war with Germany, now charge railway officers with lying down! They were prepared to stop every engine, car and train; and now they appear before the bar of public opinion and indignantly accuse railway officers of disloyalty and sabotage. The record of those who make these charges should be a sufficient indication of their motives and purposes.

It is well known to everybody that railway service has been poorer since government control was adopted than it was before. But there can be no doubt as to the main reasons for this. The railways, and especially the eastern lines, were badly congested when the government took control. Even if weather conditions had been normal and there had been no change in control, service would have grown worse; for January almost always is, for various reasons, the hardest month of the year for railroad operation. But the weather was the worst the present generation of railway officers and employees ever had to struggle against. The congestion which already existed and the severe weather are of course

the principal reasons of the demoralization which has prevailed. Railway executive and operating officers and most railway employees never worked so hard in any month in their lives as in January.

Besides all the other unfavorable conditions, December and January were a period of transition. The intention to adopt government control was announced early in December and it went into effect toward the end of that month. There was bound to be much uncertainty, anxiety and confusion at such a time. If the Kaiser had chosen the time to make the transfer from private to government control and the devil had made the weather, the operating conditions could not have been more difficult.

There appears to have been another factor of importance which is hard to estimate. There are indications that discipline has been declining among some classes of employees. As already said, most employees recently have worked harder than ever before; but there is a manifest feeling that under government control the officers have not the authority and power of discipline they had before. The attitude assumed in some quarters was illustrated by the outburst of Messrs. Lee and Garretson when they appeared before the Railroad Wage Commission and found some railway officers there, Mr. Garretson said, "We do not intend to take the position of discussing this question with our former employers." It is also illustrated by the way some employees are treating the public. But if railway employees are now employees of the government, are not railway officers now officers of the government? And, if so, has not a division superintendent the same authority over a conductor or brakeman that he had under private control? If not, how long will there be discipline and efficiency?

If the privates in an army should begin to flout their sergeants, lieutenants and captains, and even their colonels and generals, because they were "working for the government," how long would the army be an efficient fighting body? The privates might be loyal to the government; but if they were not loyal and obedient to their officers, the effects would be much the same as if they were not loyal to the government. These statements apply with equal force to railroad operation.

The government should, of course, make clear to the employees—indeed, it has made clear—that it intends to treat all classes fairly as regards wages, conditions of employment and all other matters. But it should also disabuse the mind of the public, of railway officers and of railway employees of the impression which now seems to prevail, that government control means a change in the relations of employees to their officers.

New Books

Proceedings of the International Railway General Foremen's Association. 104 pages, illustrated, 6 in. by 9 in., bound in paper. Published by the association, William Hall, secretary, 1061 West Wabash avenue, Winona, Minn.

Although the General Foremen's Association held no convention in 1917, a successful effort was made to give the members of the association as much benefit from the organization as possible. The predetermined papers and reports were written and advance copies were sent to the members. The official proceedings contains these papers, together with many written discussions on them submitted by members of the association. The important subjects discussed include Engine Failures, Causes and Responsibilities, Methods of Meeting the Requirements of Federal Inspection Laws, Alignment of Locomotive Parts to Give Maximum Service with Minimum Wear, and What Interest Has the Locomotive Foreman with Car Department Matters. The association is to be congratulated upon the fact that even though no convention was held, a year book has been issued.

Letters to the Editor

Service Department on Railways

NEW YORK.

TO THE EDITOR:

Mr. Fritch's letter on "Creation of Service Department on Railways," appearing in your issue of December 7, is certainly most timely and the recommendations based on his long and valuable experience will undoubtedly carry weight with our railroad executives. His conclusions coincide with my own as based on a wide steam and electric railway experience.

It would seem rational that so long as the government contemplates guaranteeing returns on properties taken over it should insist on the maximum economy as well as efficiency of their operation. If the railroad executives, still in control of these properties, do not themselves accomplish this the government assuredly will, through more direct operation. This would be a long step toward actual government ownership, of whose wisdom not all are convinced. Can our railroad executives, in the light of their remarkable recent accomplishments, afford to neglect any opportunity to develop the maximum possible economy and efficiency of their respective properties?

In two details my conclusions differ from those reached by Mr. Fritch:

(1) On a large property the director of "service" or efficiency work should be, of course, a competent man, experienced in this line of work, with the title of The (or an) Assistant to the President, as a member of his personal staff exercising only such authority as may be specifically delegated by the chief executive but with the full force and effect of all his authority. In some organizations I am convinced such work would be handicapped at the outset if directed by a vice-president, as such.

On a smaller property such service work may better be organized and inaugurated, if not directed, by an outside specialist. The organization as outlined is definite and fixed, probably designed as the ultimate organization for some one property or group of properties. It would seem to me the better procedure in any case to inaugurate the work with a minimum "service" organization, building up that force as the results accomplished warrant its establishment. On most properties it will be found that certain departments or phases of the work need more attention than do others; hence, in order that the service department itself shall be efficient this procedure is practically necessary. Further, as such service work must demonstrate its worth it is desirable that not too much be attempted at the outset, that whatever is done be excellently well done and that definite or positive results therefrom be obtained—which will prove a convincing argument for the value of "the service department."

W. B. YERANCE.

Consulting Engineer and Operator for Public Utilities.

EXPORTATION OF SCRAP IRON OR STEEL.—The War Trade Board calls attention to the fact that the exportation of scrap iron or steel requires an export license, and that any shipper who exports under any different classification (such as second-hand rails, car wheels, etc.) any articles manufactured of iron or steel which are exported for the purpose of being scrapped at destination is guilty of false declaration and is subject to such penalties therefor as the law provides.

Activities of the Railroad Administration

Transportation Conditions Improve; a Waterways Committee Appointed; Standardization

WASHINGTON, D. C.

A MUCH MORE cheerful set of reports of transportation conditions throughout the country has been reaching the office of the Director General of Railroads during the past week as a result of the moderation of the weather, although floods caused by the sudden thaw continue to cause concern. The better movement of coal and of empty cars to the mines has led to a general expectation that the Fuel Administration order for heatless Mondays would soon be rescinded, as it was rescinded as to a large number of southern states last week. Mr. McAdoo and some of his assistants have been in conference with the Fuel Administration on the subject and it was understood for a time that Mr. McAdoo was insisting that the order be rescinded last week, but he was convinced that it was necessary to continue it until the weather allowed coal to be transported more freely and at least until after the holiday on February 12.

The daily statements given out by the Interstate Commerce Commission of reports to Commissioner McChord of congested conditions at various yards and terminals, however, continue to portray a most discouraging state of affairs, and as they represent conditions several days back of the time they are given out the latest reports still show the effect of the most severe weather conditions. In addition to the bad weather, the reports show a serious condition of shortage and bad condition of power, large numbers of bad order cars, shortage of labor for repairs, delays on the road and at terminals, delays by consignees in unloading cars, and a general cramped condition in the yards which makes prompt handling of cars difficult or impossible. The reports of the inspectors are given out in mimeograph form without comment, but by the time they get into the newspapers they have frequently been accompanied by inferences which the reporters have not always reached without assistance, and statements that the conditions are due to deliberate neglect on the part of railroad officers before the period of government control, and in one widely published story it was asserted that the conditions date from the time when government control was decided upon. All of which naturally causes indignation among railroad officers who have long been predicting publicly that their facilities would be found inadequate to the traffic. For example, the report for February 11 stated that in the Pennsylvania Philadelphia yards on February 8 only 79 trains of 2,291 cars were moved, while 58 trains were held because of no power being available, and that there were 2,400 empty coal cars in the yard, only 247 having been moved west during the past 24 hours. There were 44 locomotives out of service for repairs, 12 being held waiting for material. On January 30 there were on hand for city delivery 2,847 cars, available for unloading, while only 1,127 were unloaded. On February 6 of 2,839 cars available only 986 were unloaded.

At Harrisburg yard on February 7 it was reported that of 457 locomotives assigned, 83 were out of service for repairs. The average time for turning engines at Enola enginehouse was given as 6 hours and 3 minutes, at another 6 hr. and 47 min., and at another 7 hr. and 36 min.

On the Middle division on February 7 it was reported that during the previous 24 hours the number of cars delivered was 2,501, and received 3,070, while 10,709 cars were left over for movement to connecting divisions. On February 3 it was reported that of 46 crews started eastward and 48 started westward, 13 eastward crews and 32 westward crews were relieved on the line under the 16-hour law and

one was required to exceed the 16-hour limit. It was also stated that "for each one of the crews involved, initial terminal delay was excessive."

The East Altoona enginehouse, it was stated, furnished 92 locomotives for 37 westbound trains, being short 86 locomotives for 35 trains, and 48 eastbound locomotives were ordered for which only 32 were furnished. There were 39 locomotives turned out of the enginehouse in 24 hours and 42 in the house on which work would not be completed during the next 24 hours.

At Pitcairn yard it was stated that the yards were so full that classified trains were stored in channels foreign to their proper movement, wherever room could be found for them. It was also stated that the shortage of power was aggravated by the use of freight locomotives for passenger service.

On the New York, New Haven & Hartford on February 5 it was stated that the entire movement was 10,238 cars and there remained on hand awaiting movement 13,595 cars. Similar reports were given for other roads but the report on the Pennsylvania was given more in detail than for other roads.

Washington has been suffering from a fuel famine and the local fuel administrators have ascribed the cause principally to transportation conditions, but Mr. McAdoo's office had a check made and showed that during the period when the coal shortage was at its worst there were usually over 100 more cars available for unloading each day than were unloaded.

Waterways Committee Appointed

Director General McAdoo has appointed a committee of three members to investigate the inland and coastwise waterways of the country and advise him as to the best means of putting them to advantageous use in solving the transportation problem:

The personnel of the committee is as follows: Major General W. M. Black, Chief of Engineers, U. S. A., chairman; Walter S. Dickey, of Kansas City, Mo.; G. A. Tomlinson, of Duluth, Minn., and Colonel Charles Keller, Corps of Engineers, U. S. A., secretary.

Work was begun by the committee immediately following its appointment. The initial step was the assignment of Major S. W. Fox and Major John Stewart, of the United States Engineer Corps, to investigate and report at once the condition of the Chesapeake & Ohio Canal with recommendations as to its utilization and capacity for traffic.

Consideration will also be given to the availability of other waterways throughout the country, such as the Hennessee, Delaware & Hudson, Morris, New York State Barge, Chesapeake & Delaware and Delaware & Raritan canals. The coastwise, Mississippi and lake traffic will also come in for serious attention.

General Black, who in addition to his strictly military duties, is charged as Chief of Engineers with supervising the improvements of rivers and harbors, is well acquainted with all of the waterways of the country. He has been very active in promoting their employment by commercial interests. Appointment of the Committee on Inland Water Transportation of the Council of National Defense was due in great part to his efforts, and since that appointment was made he has insisted upon the use of the waterways for transportation whenever it was more economical or feasible than the use of other means of transportation. He strongly favors the

policy of giving the best transportation to the nation at a minimum cost, regardless of whether it be by water or rail.

Mr. Dickey, who is a manufacturer of burnt clay products with plants in eight cities, long has been active in promoting waterways transportation improvements, and he was largely instrumental in the organization of the Kansas City-Missouri River Navigation Company. This corporation was financed through public subscription and now efficiently operates a boat line between the two cities.

Mr. Tomlinson is one of the shipping leaders of the Great Lakes region. He is identified with the American Shipbuilding Company and has devoted his energies to the up-building of the shipbuilding industry of the country. His interest in the shallow draft waterways of the Atlantic coast as logical extensions of the deeper waterways of the Great Lakes was largely instrumental in his being named as a member of the committee.

Colonel Keller has for several years been on duty as assistant to the Chief of Engineers with particular charge of the executive duties pertaining to the Inland Waterways Commission. He not only is intimately acquainted with virtually all of the inland waterways of the country, but also with a great number of persons who reside near them.

The committee has been instructed by Mr. McAdoo to devote its first attention to projects which can produce results within the year. It will devote particular attention to correlating rail and water transportation and will report as to various projects which have been suggested as to whether better results can be obtained by the expenditure of money on the water facilities or on rail facilities. Mr. McAdoo's authority under the pending railroad control bill in Congress does not extend to the construction of waterways but he is authorized to make expenditures for their equipment.

Standardization

Standardization of railroad cars and locomotives and their parts is one of the plans on which the railroad administration is working and one by which Director General McAdoo expects to accomplish important results. The administration expects to let contracts for a considerable amount of equipment and power, to be paid for out of government funds, after Congress has passed the bill providing an appropriation for the purpose, and it is expected that contracts will also be placed by individual roads under the supervision of the government through its division of purchases, which is under the direction of John Skelton Williams. To what extent it is proposed to have this division take over purchases, or whether it will confine itself principally to the purchases out of government funds has not been made clear, but it is apparently the intention that even if it does not actually make purchases it shall establish standards to be followed by the railroads in making their purchases while under government control and it is hoped to be able to carry the programme to such an extent that

the standards set by the government will be made permanent. It is understood that for this purpose railroad purchasing agents and experts in various lines will be drafted to form a general purchasing or standardizing board on Mr. McAdoo's staff.

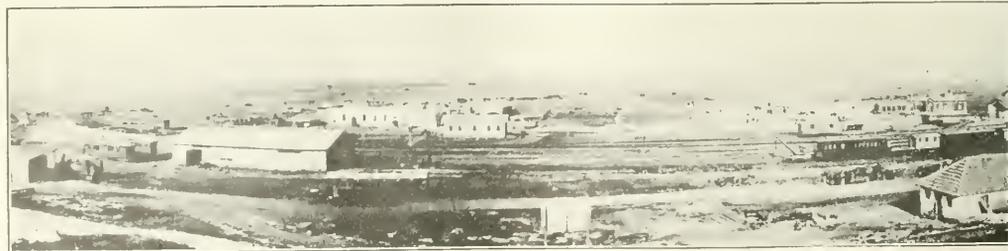
Mr. McAdoo has referred to the possibility of standardization as one of the greatest reforms that can be accomplished in the railroad business and while he has not indicated whether or not he would go so far as to destroy the value of patents or of plants making particular specialties by prescribing certain types as standard to the exclusion of all others he has shown that he has great enthusiasm for the general idea. A study is being made for him of the patent situation. He also expects to be able to reduce prices by the fact that hereafter there will be but one buyer for equipment and supplies.

It is considered likely that the designs of the American Railway Association Committee on Standard Box Cars may be used as the basis for the proposed box car standards.

Inspectors to Report on Service

While Messrs. Lee and Garretson have been charging railroad officers with "laying down" and deliberate inefficiency in managing their roads in an effort to discredit the government, some other people have been talking about some examples of inefficiency and discourtesy on the part of some railroad employees since they became in effect government employees and some complaints have reached Director General McAdoo. For the purpose of checking up on such reports, it has been announced, Mr. McAdoo has sent out a large number of inspectors who are to ride trains and observe the character of the service at ticket offices, in dining cars and at other places, and submit reports to him. Among the reports on which he has acted were several relating to civility at ticket windows and one of a case in which a dining car conductor found a table for a prominent railroad director and his wife ahead of a long line of people who had been waiting.

Railroad traffic associations and committees, as well as various departmental associations maintained by the railroads, whose status was made uncertain by General Order No. 6, recently issued by Director General McAdoo, have been authorized to continue operations until April 30, before which time a conclusion is expected to be reached as to their permanent status. C. A. Prouty, director of public service and accounting, has been writing to those that have inquired as to their status approving payment of such assessments as may be necessary to meet current expenses from funds already in hand. Organizations to which letters have been sent include classification committees, territorial traffic associations, American Railway Association, Accounting Officers' Associations, Committee on Railway Mail Pay and Bureau of Railway Economics. Luther M. Walter, traffic attorney at Chicago, has been appointed assistant to Director Prouty.



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A Railway Junction in Palestine

Progress of the Railroad Control Bill in Congress

Reported by Senate and House Committees and Discussion
Begun—Differences in Senate and House Drafts

WASHINGTON, D. C.

DISCUSSION of the railroad control bill in the form in which it was amended by the Senate Committee on Interstate Commerce was begun in the Senate on Monday and the House was expected to take up its consideration later in the week. A rather long contest is predicted before its passage, but perhaps not so long as if the bill had not been so carefully considered in the committees of both the house and senate, which each devoted about a month to public hearings and two weeks to perfecting the bill in executive sessions.

Both committees have made important changes since the bill was redrafted by Interstate Commerce Commissioner Anderson, and the house bill, which was reported on Saturday as H. R. 9685, differs considerably from the Senate bill, although most of the language is the same. The senate amendments were described in last week's issue. The formal report of the senate committee was filed on Friday, February 7.

There are differences between the senate and the house bills in the provisions for a limitation of federal control after the war and those relating to rate-making. The Senate bill sets the limit at 18 months after the proclamation of peace and the house bill at two years after the President's peace proclamation. The provisions regarding rate-making are diametrically opposed in principle, although it is likely they would work out the same in practice. The senate bill authorizes the President to initiate rates by filing them with the commission, but the commission, after a hearing, is given final authority. The house bill provides that: "Until and except so far as the President shall from time to time otherwise order, the rates, fares, charges, classification, regulations and practices of carriers under federal control shall during the period of federal control continue to be and to be determined as hitherto. But when in the judgment of the President it is necessary in the public interest he may initiate rates, fares, charges, classifications, regulations, or practices, or changes therein by filing the same with the Interstate Commerce Commission in such form and at such time and upon such notice as he shall direct. All rates, fares, charges, classifications, regulations, and practices, or changes therein so ordered, shall be fair, reasonable, and just; and the Interstate Commerce Commission shall upon complaint make investigation and grant full hearings concerning the fairness, justice, and reasonableness of any rates, fares, charges, classifications, regulations, or practices, or changes therein so ordered by the President; and shall make report of its findings and recommendations concerning the same (which findings and recommendations shall prima facie be taken as correct) to the President for such action as the President may deem required in the public interest."

The senate bill has a provision that there shall be no increase of compensation for additions, improvements or betterments paid for out of earnings for investment or surplus earned during the period of federal control, which is not in the House bill. It would seem that this would, to a considerable extent, prevent the investment of such surplus, and, as the committee suggests in its report, result in throwing an unnecessary burden of financing upon the government.

The house bill has a provision not in the senate draft that nothing in the act shall be construed to affect the existing laws or powers of the states in relation to taxation or police regulations of carriers and another, for the benefit of the short lines, that "nothing in this act shall be construed to affect the routing instructions over and the traffic arrange-

ments of such railroads as may not be taken under federal control by the President unless such arrangements and instructions prejudice the transportation of war materials or of government supplies, in which case the President may change the routing of such materials and supplies as the war and national interests demand." Both bills contain a provision not in the Anderson bill that any net railway operating income in excess of the standard return shall be paid into the treasury and placed in the revolving fund created. Both bills also omit the provision which was in the original bill providing for a workmen's compensation fund for injuries or disabilities. The senate committee's report, giving reasons for interpretations of various sections, follows in part:

Senate Committee Report

Your committee were of opinion that this is the time for war emergency legislation and not the time to settle the many controversial and vexed questions concerning our future transportation policy.

Section 1 authorizes the President to agree with the carriers whose property has been taken over that during the period of federal control each carrier may receive as just compensation—in lieu of all rights arising under due process of law—an annual sum not exceeding its average annual railway operating income for the three years ended June 30, 1917, plus a return at a rate to be fixed by the President upon the cost of additional facilities made during the last six months of 1917, the amount of such net earnings and the cost of such additional facilities to be determined by the Interstate Commerce Commission and certified to the President. This is in substance the President's suggestion. The certification of the commission is to be taken as conclusive for the purpose of such agreement. Any operating income in excess of such standard return is to be paid into the Treasury of the United States and placed in the revolving fund.

About 75 great operating railroads do over 90 per cent of the railroad business. It is believed by your committee that most of these great railroad carriers will accept these terms as a just and fair measure of their constitutional rights. Section 1 further provides that ordinary taxes, national and state, shall, as now, be paid out of operating revenue; but war taxes accruing under the act of October 3, 1917, are to be paid by the companies out of their own funds, or charged against the standard return. In other words, the holders of railroad securities are by section 1 (like holders of other securities) to bear their own just portion of the war burden. Section 1 also requires that each agreement shall contain adequate and appropriate provisions for the maintenance and depreciation of the property and the creation of any reserves or reserve funds found necessary in connection therewith; so that the properties may at the end of federal control be returned to the owners in a condition substantially equivalent to their condition when taken over by the government; and that proper adjustments both in the standard return and in the terms of final settlement may be made. Thus even handed justice will be worked out as between each company and the federal government.

If the rights of all the railroads making returns to the Interstate Commerce Commission are fixed under the provisions of this section, the government will guarantee approximately \$945,000,000 a year.

Since the preparation of this summary, however, the committee has amended section 1 by inserting a provision author-

izing a return, at such reasonable rate as the President may determine, upon the cost of additional transportation facilities made during the last six months of 1917. This addition, of perhaps 10 to 15 millions, is made in the interest of equality, it appearing that 200 to 250 millions of additional capital has during the last half of 1917 been put into transportation facilities by a comparatively few of the carriers taken under federal control.

There has, of course, been much discussion as to the fairness and justice of the proposed amount of the standard return. It should not be overlooked that the gist of the question is, What would these companies be likely to receive from the courts as just compensation? The amount of just compensation is not a legislative question—it is a judicial question. (*Monongahela Navigation Co. v. U. S.*, 148 U. S., 312.) It follows, in the opinion of your committee, that much of the evidence and discussion concerning the so-called surplus is irrelevant. It is plainly in the public interest—and indeed a war need—that the President be authorized to offer to settle with the owners of these properties on a basis approximately equivalent to that which sound-thinking men would advise the owners they would be likely to receive by court decision. The rights of such owners must be tested by present conditions—not by some theory of capitalization never made operative under federal or state law or generally followed by the courts.

Neither Poverty Nor Riches

Questions of value are always difficult questions. It is highly probable, if not certain, if the whole question were remitted to the courts, they would take as the basis for determining just compensation, the actual net earnings for a reasonable period. During the last three years new investment in the properties now under federal control has been at the rate of approximately 375 millions a year. The year ended June 30, 1915, was one of the poorest in recent railroad history. The other two years have been prosperous years. The average of the three years therefore reflects neither poverty nor riches. The purchasing power of the dollar accruing to the stockholder, as well as to the wage earner, has decreased. Dividends in industrial companies have largely increased. The rate of return upon government bonds, both abroad and in the United States, has largely increased.

The percentage of return upon the value of the railroad property taken under federal control can not be accurately stated: for until the federal valuation, now in process, is completed, no one knows the value of that property. The book value may be taken for certain comparative purposes, as of some significance; it must not be regarded as accurate. The proposed standard return, figured upon the book value of all the companies will give a return not far from 5.32 per cent. Comparing this return to that which accrues to the purchaser of government bonds, it seems large; but government bonds run for a period of 25 or 30 years. The proposed guarantee to the owners of railroad securities may run for only a few months. The government is practically a tenant at will.

After the most careful consideration your committee are of the opinion that the owners of these properties would not be unlikely to receive an award from a court at least equal to the proposed offer; that it is therefore the duty of Congress to authorize the President to make such offers as will prevent patriotic and fair-minded American citizens from resorting to litigations, in time of war, in order to determine their rights against their government.

The standard return thus provided for will, if accepted by the various operating companies, be disposed of substantially as hitherto; that is, for the payment of their fixed charges (and war taxes which remain a burden upon the standard return), for dividends, and if any balance remains,

for so-called surplus. The fixed charges ordinarily fall into interest on bonds and other debt obligations, and leased line rentals, generally in the form of interest and dividends on outstanding bonds and stock of leased companies. These rentals are not, as is sometimes thought, properly a part of operating expenses. They are really disbursements for the use of capital; for it makes no practical difference whether the operating company is consolidated with the leased companies and pays interest and dividends upon its own bonds and stock issued in payment for the subsidiary companies' property, or whether it pays interest and dividends upon the stock and bonds of the leased companies. In either event the disbursement is a disbursement on capital account and not on operating account.

The foregoing makes it clear that the railroads accepting the suggested terms will be fully able to make all their usual disbursements to their security holders. In effect, this regular income is guaranteed by the government to the security holders during the period of federal control.

The stabilizing, confidence-producing effect of such guaranty will, as your committee believe, be of great assistance in future war financing.

The terms above indicated will probably be found just and fairly applicable to the security holders of most of the railroads of the country. But there are certain undeveloped and reorganizing roads whose operating income for three years will not fairly test their right to just compensation. Some special provision to meet the just demands of these companies seems requisite. Section 1, accordingly, provides in the last paragraph thereof that, when the President finds that the condition of non-dividend paying carriers is because of non-operation, receivership, or other undeveloped or abnormal condition such as to make the basis of earnings provided for the other carriers "plainly inequitable," as a fair measure of just compensation, then the President may make with such carrier such agreement as under the circumstances of the particular case he shall find just.

Section 2 provides that in case the agreement provided for in section 1 is not made, the President is authorized to pay not exceeding 90 per cent. of the estimated amount of just compensation.

This, in the opinion of your committee, would tend to stabilize conditions for the security holders of the newer struggling companies, whose rights may not be easy of speedy ascertainment.

Section 2 does not require the President to make any payment at all to such owners, thereby avoiding the danger of offering a premium to unreasonable and greedy litigants.

Section 3 provides easily available facilities safeguarding the constitutional rights of owners to have their just compensation determined by due process of law. It also furnishes another opportunity for settlement of cases which may not be satisfactorily disposed of by agreements in accordance with the standard return, or under the special power of section 1.

Section 3 provides that the Interstate Commerce Commission shall, on the application of the President, or of any carrier, appoint boards of referees, the commission and its forces being made not ineligible as such referees. These referees are armed with the usual powers of judicial tribunals—to summon witnesses, require the production of books, etc., and may hold hearings in Washington and elsewhere, as convenience may serve. They may consolidate and classify cases. These boards are to give full hearings, consider all pertinent facts, and report their findings to the President in a form convenient and available for the making of such agreements as are authorized by section 1. The President and such company may then make an agreement for compensation not in excess of that reported by the referees. Failing such agreement, either the United States or the company may file a petition in the Court of Claims; and in the pro-

ceedings in this court such report is prima facie evidence of the amount of just compensation and of any facts reported.

It is the confident opinion of your committee that section 3 not only effectually guards the constitutional rights of all owners but that the proceedings before the referees will be found so complete and satisfactory that few, if any, cases will ever reach the Court of Claims.

Section 4 provides that the agreed or ascertained just compensation may be increased during federal control by an amount reckoned at a reasonable rate per centum to be fixed by the President upon the cost of additions made while the government is in possession. Manifestly an increase in the property used requires a corresponding increase in the compensation for the use. No increase is allowed for additions paid for out of surplus during the period of federal control. Whether a denial of any return upon surplus earnings invested in additional facilities will result in throwing an unnecessary burden of financing upon the federal government and in the accumulation of a dead surplus will require careful consideration by the senate.

The main purpose of section 5 is to give stability to our financial conditions. From the standard return the railroad companies may without permission pay their regular dividends. Conceivably it may be desirable that some of the prosperous carriers should be permitted somewhat to increase their regular dividends; if so, the President's prior approval must be obtained. Non-dividend payers or irregular dividend payers, whose standard or ascertained return warrants dividends, may with the President's permission be put in the dividend-paying class at such rate as the President may determine.

This section goes upon the theory that during the war the railroad security holders ought to receive certain, regular and moderate dividends; but that extra, unexpected dividends—a common source of speculation and manipulation—should not be permitted.

Section 6 is a very important section. It provides for a revolving fund to be made up from an initial appropriation of \$500,000,000, together with any excess earnings of any of the carriers. This fund is to be available to the President for the purpose of paying the expenses of the federal control, supplying any deficit in the just compensation accruing to any carrier, and to provide for rolling stock and terminals, to be used and accounted for as the President may direct, and to be disposed of as Congress may hereafter by law provide. This contemplates that engines, cars, and perhaps terminals, will be purchased or constructed by and will belong to the United States. This rolling stock will be used wherever war and national needs demand—precisely as the Pullman and other private car lines are now used on the lines of the various carriers as the needs of industry or the demands of the seasons require. The ultimate disposition of this rolling stock must await post-war legislation. This section contemplates that such rolling stock, although owned by the United States, will be used on the lines of the various railroads and the use charged for upon the books of the companies, so that at the expiration of federal control the book-keeping of each railroad company will reflect, as hitherto, the traffic which has moved over each road and the cost of operation.

The section further provides that the President may, on or in connection with the property of any carrier, make or order any company to make additions desirable either for war purposes or in the public interest. Doubtless it will be necessary in connection with army camps and shipyards to make substantial extensions of railroad and other carrier property. Your committee believes that such additions and extensions should become and remain the property of the separate carriers, that there should be no confusion of title as to real estate, tracks, and other fixed property between any railroad company and the United States. As it is possible that some

such additional facilities thus made to the property of various carriers will in times of peace be found worth less than the cost thereof, this section provides that claims for loss or damage accruing from such compelled investment shall be settled either by agreement between the carrier and the President, or, failing such agreement, shall be ascertained by due process of law, as provided in section 5.

As some of the companies may not have the requisite funds to pay for such extensions and additions, the President is authorized from the revolving fund to advance all or any part of such cost, these advances to bear interest at rates and to be payable on such terms as the President may determine, so that the United States may ultimately be fully reimbursed for such advances.

Section 6 also provides that the President may, from the revolving fund, expend such sums as he deems necessary or desirable for the utilization or operation of canals and for the purchase, construction, utilization, and operation of boats and other water carriages on the inland and coastwise waterways. It is believed by your committee that much relief may be afforded the rail carriers by a further development of the water carriers and of facilities on these natural water highways.

Section 7 provides for financing the maturities of carriers during the period of federal control. It authorizes the President to purchase for the United States, at prices not exceeding par, any securities issued by the railroads, approved by him as consistent with the public interest. Such securities may be sold without loss to the treasury whenever the President deems it desirable, the proceeds of such sale to go back into the revolving fund. The estimates of the maturities for the next four years are as follows:

1918.....	\$18,996,738
1919.....	17,234,052
1920.....	146,536,253
1921.....	440,905,528

Section 8 provides in general terms that the President may execute his powers with relation to the federal control through such agencies as he may determine and fix the reasonable compensation for services rendered in connection therewith, using also the personnel and facilities of the Interstate Commerce Commission and all other governmental bodies.

Section 9 is simply to the effect that nothing contained in this act shall be deemed to restrict the powers heretofore given to the President to take possession and assume control of any and all systems of transportation. It also provides that this act shall apply to any carriers to which federal control may be hereafter extended.

Section 10 provides that so far as not inconsistent with federal control, each of the carriers shall remain subject to all laws and liabilities whether arising under statutes or at common law. It also provides that the President may, whenever in his opinion the public interest so requires, initiate rates by filing the same with the Interstate Commerce Commission, such rates to be fair, reasonable, and just, and that upon complaint the rates thus initiated by him may be reviewed by the Interstate Commerce Commission. In such review the Interstate Commerce Commission may consider all the facts and circumstances existing at the time of the making of the rate. After full hearing the commission may make such findings and orders as are authorized by the act to regulate commerce as amended.

Your committee were of opinion that the commercial organizations of the country should be disturbed as little as the emergency would allow, and that every safeguard should be thrown around the great productive activities of the country and that everything possible be done to inspire confidence in their being protected from unnecessary embarrassment.

Section 11 provides penalties for violation of this act or orders of the President made thereunder.

Section 12 has been inserted at the request of the Depart-

ment of Justice and is intended to provide for continuing the life and status quo of cases pending under the anti-trust and interstate commerce acts.

Section 13 provides that the federal control shall continue not to exceed 18 months after the declaration of peace. It is possible that certain conditions may arise from federal control which will need adjustment before the properties are returned to their owners, and a reasonable period should intervene in which these conditions may be met and adjusted. It may be that the nation will be unwilling to return to the conditions obtaining before the assumption of federal control. Legislation may be demanded radically changing the relation of the government to the railroads from that now existing in the interstate commerce act as amended.

These problems will require time for careful and deliberate consideration. Therefore your committee has suggested a period of 18 months, and they believe it will be found adequate for that purpose.

In section 13 there is also a provision to the effect that the President may, prior to July 1 next, relinquish control of such transportation systems as he may deem not needful or desirable, and may, thereafter, on agreement, relinquish all or any part of any system of transportation.

Your committee also recommends that at any time after July 1, 1918, the President may agree with the owners of all or any part of any system of transportation, when in the opinion of the President further federal control of the same is unnecessary, to relinquish such control to the owners of the roads.

The section also contains a general provision that the President may relinquish all railroads at any time when he shall deem such action needful or desirable.

Your committee have adhered to the set purpose to limit this legislation to war emergency purposes, and to avoid all contentions and controversial questions. We believe that the bill will accomplish these results. It follows closely the President's recommendations. It has in its main provisions and purpose received general approval and comparatively little criticism.

Minority Reports

Senator Poindexter filed a minority report objecting to the inclusion of a time limit and also to the provision authorizing the President to initiate rates subject to review by the commission. This, he said, would be an illogical and unworkable arrangement and it would be a great mistake to restore the railroads to their private owners without in any way changing "the dangerous and unscientific conditions which formerly existed." He advocated a more adequate and extensive government control or operation in the interest of the people.

Senator Cummins also filed a minority report condemning the bill as "dangerously imperfect" and the proposal to leave the roads in the control of the President for 18 months after the war as "utterly abhorrent to the fundamental principles which underlie free government." When peace comes, he said, "the management and operation of the roads should instantly pass to a responsible board, appointed by the President and confirmed by the Senate, governed by law and removed as completely as is humanly possible from the temptation to use authority for personal or partisan advantages."

He also objected to the provision authorizing the President to initiate rates and particularly to the proposed standard of compensation. The estimated \$950,000,000, he asserted, is \$175,000,000 more than what he considers would be fair and just compensation, and amounts to 8.5 per cent upon the par value of all the stock outstanding.

No objection is made to government possession and operation, the only criticism being that "the change was not accomplished immediately after the declaration of war, so

that long before this the confusion incident to the transition would have been overcome."

"It is unfortunate," the report said, "that when, in the last days of December, 1917, the President did act, he left the situation so indefinite and uncertain that nobody knows what railroads have been taken over. Nobody knows whether the men, from the presidents of the companies to the section hands, are working for the government or for their respective corporations, and the morale of the service is seriously impaired. Nobody knows whether the earnings of the railways belong to the United States or to private companies."

Other objections to the bill were its "failure to provide definitely that additions, betterments and extensions made out of surplus earnings shall belong beneficially to the public and shall not be treated hereafter as capital entitled to a return" and failure to define the position of short-line railroads.

Senator Cummins also presented five amendments carrying out his ideas.

Senator Smith of South Carolina, chairman of the committee on Interstate Commerce, introduced the discussion of the bill with a long speech urging its prompt enactment as a war measure because of its intimate relation to the financial problems of the nation and the bill was made the unfinished business of the Senate.

Senator Kellogg gave notice that he proposed to address the Senate on the bill on Wednesday.

Consideration of the bill in the House was delayed by the unexpected address of the President but Chairman Sims of the Committee on Interstate and Foreign Commerce expected to obtain an agreement for taking it up later in the week.

An abstract of the House committee report follows:

House Committee Report

This measure is war emergency legislation, intended to meet the essential needs growing out of federal control of our greater carrier systems. It is not to be regarded as a bill for government ownership or control of railroads or against government ownership or control of railroads. The bill makes neither for nor against any particular kind of railroad regulation. It undertakes to provide for war needs and only for those.

The act of August 29, 1916, authorized the President in time of war to assume the possession, control, and use of transportation systems. It provided no method for determining the just compensation of the owners of properties thus applied to public use. The right to just compensation is a constitutional right, and the determination of the amount of just compensation is a judicial and not a legislative question.

But Congress may and should provide speedy and easily available judicial machinery for determining this just compensation. (*Monongahela Navigation Co. v. U. S.*, 148 U. S., 312.) It is also desirable that the owners of the properties should, instead of being required to resort to the courts for their rights, be made such offers for just compensation as will probably result in an agreement between them and the United States, determinative of all rights. These two desiderata, together with certain obviously needed supplementary power as to financing during federal control, are the main purposes of this bill.

Section I is a fundamentally important section; for it sets the outside limits of the expected agreements. Its sole function is to provide a basis of such just and proper agreements as may eliminate litigation.

This standard provision will doubtless be found applicable to most railroad companies. But there are some new, undeveloped, reorganizing companies for which some special provision ought to be made. The bill accordingly authorizes the President to make such agreement as he may deem just

with companies whose just compensation he finds will plainly not be measured by the three-year earnings' basis.

Naturally there has been much discussion as to the justice of the proposed basis of settlement. Your committee has dealt with this as a practical question. It consequently regards much of the evidence adduced before the committee concerning "surplus" as irrelevant. This is not the time to undertake to settle public policy as to so-called "surplus earnings." The facts are that these companies have during this three-year period had certain earnings; that they are entitled as a constitutional right to have their just compensation adjudicated by the courts; that it is probable—almost certain—that any court would take their average earnings for some reasonable period as persuasive, perhaps conclusive, evidence of such just compensation. Viewing their constitutional right in connection with the great public needs of stabilizing the security market—of restoring and not impairing confidence—your committee are of the opinion that the average earnings of three years is a fair basis for a settlement of the rights of most of these owners against their government and ought to be approved. Nineteen hundred and fifteen was one of the worst years in recent railroad history; the other two years were prosperous years. The average of the three years is therefore a fair test of earning power. Moreover, the investment in the properties of railroads now taken over has been increasing at the rate of about \$375,-000,000 a year. The properties the government now has use of are larger by about a billion than the properties that made the earnings of 1915, taken as one of the three years in order to reach the standard return.

It is not pretended that the three-year basis is an accurate mathematical test of just compensation, but your committee does believe it to be a basis essentially just, and one that will be plainly understood, easily workable, and generally approved both by the public and by the security holders.

Section 3 provides "due process of law" for non-agreeing carriers and also authorizes an agreement between the President and any company after report by the referees to be appointed by the Interstate Commerce Commission. It is the belief of your committee that few, if any, cases will ever reach the Court of Claims. This section requires no explanation.

Section 4 provides for increasing compensation as the properties used may increase during the period of federal control.

Section 5 limits dividend disbursements to regular dividends except as the President may otherwise permit. Non-dividend payers may, however, pay dividends as permitted. Manifestly any excess revenues accruing from standard return ought not to be made the basis of speculation or manipulation. Steady, regular income is what is desirable during the period of the war.

Section 6 provides for a revolving fund, to be made up of an appropriation of \$500,000,000 from the treasury and any excess revenue derived from the operation of the companies. This revolving fund may be used by the President to provide equipment, additions, and road extensions and to make advances to the companies so far as necessary for these purposes. This section contemplates direct ownership by the United States of new railroad equipment and perhaps of some terminals. It does not contemplate ownership of such road extensions, tracks, etc., as may be necessary in connection with Army camps, shipyards, etc. In the opinion of your committee the title to such additions and extensions should be in the various companies and not in the United States. But as some such extensions will be made for war purposes and cost more than their value during peace times, the right of the company to have a just portion of this compulsory investment paid by the government is protected. This section also provides for the construction and utilization of transportation facilities on our waterways. The burden on

our rail carriers may be much lightened if we make proper use of these great natural highways.

Section 7 provides for government financing of maturities and other necessary capital requirements of the companies during federal control. Securities purchased may, if the President finds it desirable, be sold at not less than cost.

Sections 8 and 10 require no comment.

Section 9 guards the rights of certain railroads which may not be taken over not to have their traffic and routing arrangements unnecessarily injured.

Rate-Making

Section 11 embodies the theory of the President's proclamation, that there shall be no unnecessary disturbance of established methods of procedure by and against the carrier companies. While it is undoubtedly true that during the period of federal control the revenues of the railroads are government money, section 11 (certainly when read in connection with section 8, which authorizes the President to execute his powers through such agencies as he may determine) permits the utilization of the various carrier companies, as a species of government agencies, so that for all practical purposes passengers, shippers, and employees will proceed as hitherto in the exercise and enforcement of all their accustomed rights.

But when federal control for war purposes requires changed methods the President must have power to make such changes. This raises an interesting problem as to rate making. The rate fabric of the country is now based upon the competitive theory. In many instances rail rates have been made for the purposes of meeting, if not destroying, water competition. Section 6, as already pointed out, contemplates that the federal government shall from its own resources create new facilities upon the waterways. Manifestly during federal control rail rates ought not to be made for the purpose of destroying or "meeting water competition." The nation should not compete with itself. It should furnish transportation service, both rail and water, at just and reasonable rates. On the other hand, it is manifestly impracticable and undesirable for the President or any agencies he may create to readjust our present rate fabric. Comparatively little of it ought to be readjusted, and such necessary adjustment should come tentatively and only to meet obvious needs. Your committee is of the opinion that the section 11 now drafted meets the situation in the least objectionable and in the most practicable way. It provides that, except as the President may from time to time otherwise order, rates shall continue to be and to be determined as hitherto.

This leaves the Interstate Commerce Commission and the state commissions to proceed, precisely as hitherto, in the determination of all rate questions unless and until the President, in the exercise of the war power, shall order otherwise. But when the public interest so requires the President may initiate rates, filing them with the Interstate Commerce Commission, to take effect upon such notice as he shall direct. Such rates are to be "fair, reasonable, and just." But to guard against even remote possibilities of error the section provides that upon complaint the Interstate Commerce Commission shall make investigation, grant full hearings "concerning the fairness, justice, and reasonableness" of rates so ordered by the President, and "make report of its findings and recommendations" to the President for such action as he shall deem required in the public interest.

It was suggested that after such hearing the Interstate Commerce Commission should be given power to make orders, thus in effect overriding the President's war power to make rates on transportation systems in his possession and control because of war conditions. It would, in the opinion of your committee, be most unseemly to authorize the Interstate Commerce Commission to overrule the Presi-

dent in the exercise of his war powers—indeed, of any other powers. It should not be overlooked that the President is responsible for the financial results of operating these great carrier systems with gross revenues approximating \$4,000,000,000. It will not be contended that during federal control the carrier systems should not be substantially self-supporting. The general tax payer ought not to be left to make up a large deficit accruing from carrier operations. Wages and prices of materials are exceedingly high and may rise still further. The volume of traffic, great during the past two years, may fall off. Weather conditions have for two months been unprecedentedly bad, making operation extraordinarily expensive. The President, responsible for the general financial result, from factors so numerous, so uncertain and so varying, must be given power commensurate with his responsibility.

Moreover, if the Interstate Commerce Commission were given final power to make rates, what would be its standard of "reasonableness and justice"? Plainly the old, competitive standard unless the present statute is repealed or greatly modified. To authorize the Interstate Commerce Commission to overrule the President and to make such orders as to rates as are now permitted under the Interstate Commerce act would be granting an authority to make rates, based on the competitive theory, applicable to a co-ordinated, unified noncompetitive war control. In other words, the Interstate Commerce Commission could not, until Congress supplied a new code, make orders logically applicable to the "justice and reasonableness of rates" made for a unified, co-ordinated system during war time.

We are satisfied that the method proposed of (a) leaving rates, and rate making, undisturbed except as the President otherwise orders; (b) authorizing the President to initiate rates; (c) providing for a review on full hearing by the Interstate Commerce Commission; and (d) the findings and recommendations of the Interstate Commerce Commission to be reported to the President, so that he may, if necessary, revise his own primary determination—is the best solution of this difficult problem. In practice this method will, we think, give to shippers and consignees all the protection they now have under the established practices of the Interstate Commerce Commission, while enabling the President to make such necessary changes as unified war control demands. It gives also the Interstate Commerce Commission an opportunity to review and to discuss fully the "justice, reasonableness, and fairness" of any rate in the light of the war conditions, without now putting upon Congress the impossible burden of providing a new, noncompetitive rate-making code.

Section 12 provides for penalties to be enforced by the usual processes in the courts, and calls for no comment.

Section 13 provides for continuing the life and status quo of cases pending. It is inserted at the request of the Department of Justice.

Section 14 deals with the duration of federal control. It authorizes the President at any time prior to July 1, 1918, to relinquish control of all or any part of any system of transportation which he thinks not necessary or desirable for national or war purposes, and at any time thereafter to make such relinquishment on agreement with the owners; thus in either case ending all further claim for compensation. But this power will in use be of little importance. The main question is when and how to end general federal control.

While these transportation systems were taken over under the war power, it is easily manifest that they ought not to be turned back to their owners immediately upon the return of peace. They might have been taken, they may be kept, under the commerce clause of the Constitution. Section 6 contemplates the investment of a large amount of government money in rolling stock and perhaps in terminals "to be dis-

posed of as Congress may hereafter by law provide." Section 7 contemplates financing the carriers' maturities; these in the years 1918 and 1919 will amount to approximately \$400,000,000.

Unified control will involve substantial changes in the traffic departments of the various carriers, new routing of much traffic, and many other changes from the methods obtaining under the competitive system. It would be just neither to the public nor to the owners of the properties to return the properties to private control without legislation adequately providing fair and reasonable terms for the liquidation of the government's holdings of railroad securities, for the sale or other use of the government's rolling stock, and for other changes incidental to the war control. It may be that the country will never be willing to have the carriers go back to the old system of unco-ordinated, competitive operation. For many years many forms of new and enlarged regulation have been pending before Congress. That some program of constructive, far-reaching policy ought to be worked out before the railroad companies are returned to private control seems too clear for argument.

The majority of your committee, while accepting these views, are of the opinion that a definite period of two years should be set as the time limit within which such legislation should be matured and enacted. Obviously, the period may hereafter be extended if such extension be found necessary in the public interest. The majority are of the opinion that the insertion of a definite time limit for federal control puts the burden of presenting proper measures of constructive legislation where it belongs—upon the owners of the properties—and that it is inconsistent with the public interest to allow a war control, admittedly assumed for emergency purposes only, to extend indefinitely in time of peace. A minority of your committee hold a different view. They believe that the public interest is much better safeguarded if the federal control herein and heretofore provided for shall be continued until Congress shall after the war otherwise provide.

Clifford Thorne has wired shippers urging them to write to congressmen and senators protesting against giving the President power to initiate rates.

A CHIEF COMMISSIONER FOR AUSTRALIAN RAILWAYS.—As a sequel to the completion of the East-West Transcontinental Railway, there has recently been passed by the Federal Parliament of Australia an act authorizing the creation of a Railway Department, to be presided over by a Chief Commissioner. In addition to the East-West Railway there are two others opened, the aggregate of the three lines being 1,730 miles. Moreover, there are others under construction and proposed. The new commissioner has now been appointed in the person of Norris G. Bell, who has been the chief engineer and acting commissioner. Considerable satisfaction is expressed locally at this appointment, as it does away with all political control. All railways, rolling stock, lands, wharves, stations, machinery, etc., are to be vested in the commissioner, who is to hold office for a period of five years and be paid a salary of £2,000 (\$9,720) a year. The new commissioner is not allowed to buy any locomotives, rolling stock, or motive or tractive power, nor any material of a greater value than £1,000 (\$4,860) from outside the Commonwealth, without the sanction of the Minister, nor without the permission of the latter may any contract be placed where the amount involved exceeds the sum of £5,000 (\$24,300). No increase in the salary of an employee getting more than £500 (\$2,430) a year may be given without the sanction of the Governor-General, while the rights of employees are conserved by a provision which enables an appeal to be made against dismissal by the commissioner or reduction of pay for incapacity or misconduct.—*Railway Gazette, London.*

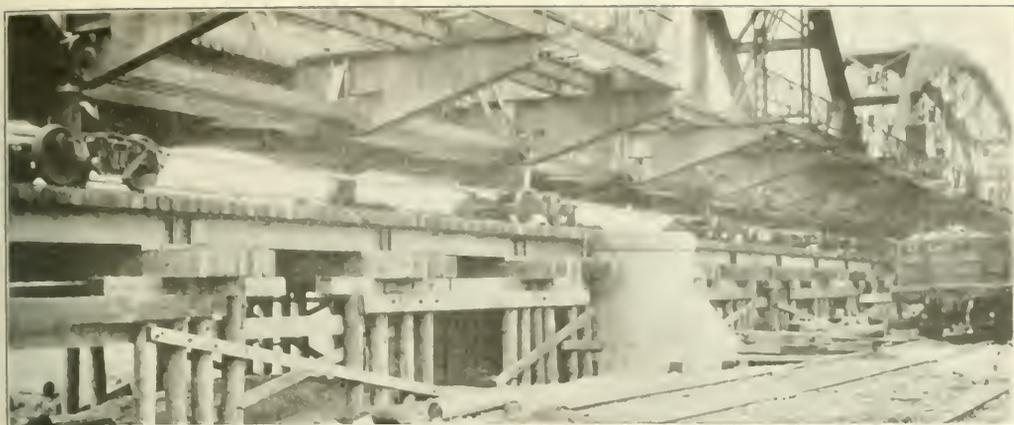


Fig. 1. 4,000-Ton Spans supported on Trucks Preparing to Moving

Shifting a 4,000-Ton Bridge on Freight Car Trucks

Three Spans of St. Joseph & Grand Island Structure Over the Missouri River Were Moved 136 Ft.

ON NOVEMBER 15 three through pin-connected truss spans 297½ ft. long weighing a total of 4,000 tons were moved longitudinally a distance of 136 ft. on freight car trucks in 15 min. These spans form part of a bridge of the St. Joseph & Grand Island over the Missouri river at St. Joseph, Mo. This change was made to provide room for a longer draw span required by the United States war department. Other operations incident to the shifting of the spans, such as falsework changes, jacking, restoring tracks,

were found after careful investigation to require its entire renewal.

The piers suffered both from undermining caused by scour of the river bottom and disintegration of the stone masonry below the water line. After an unsuccessful attempt to underpin the pivot pier, it was proposed to build new piers down stream and in line with the old ones so that the existing spans could be shifted transversely to the new piers, but the government refused to sanction this plan and indicated

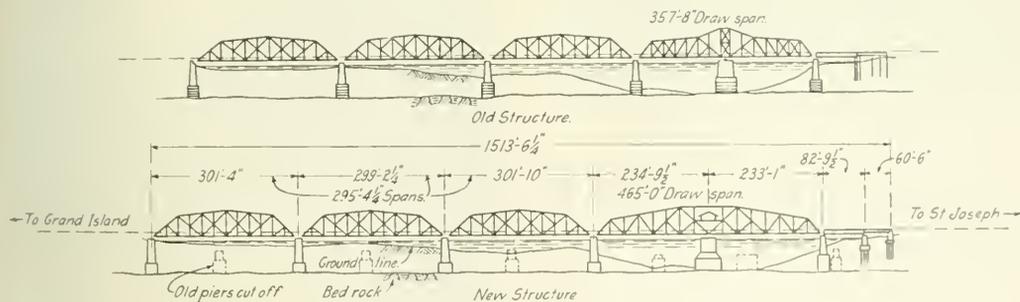


Fig. 2. Elevations of the Old and New Bridges

etc. occupied the better part of a working day. All steps were carried out according to a prearranged plan from which it was found unnecessary to deviate in any way.

This structure carries the trains of the St. Joseph & Grand Island, between St. Joseph, Mo., and Grand Island, Neb., and those of the Chicago, Rock Island and Pacific from St. Joseph to Bellville, Kan., and Topeka. The original bridge was built in 1872, the superstructure being renewed on the old piers and abutments in 1904. The new spans consisted from east to west, of a plate girder approach span, a 357-ft. 8-in. draw span and three 297-ft. 6-in. fixed spans. While the new spans are entirely adequate to handle modern railway equipment, faults developed in the substructure which

that it would not approve any changes which did not embody an increase in the length of the draw span sufficient to provide clear waterways of 200 ft.

This condition being imposed, it was decided to adhere to the present location of the bridge and make room for the longer draw span by shifting the three fixed spans longitudinally west by an amount equal to the difference in the lengths of the two draw spans plus the distance necessary to permit the construction of a new east rest pier just west of the old rest pier. This amounted to a total of 136 ft. 2½ in. and gave ample room for the construction of all of the new piers. The new west abutment and the five new piers supporting the main spans were founded on rock, using the

pneumatic process. One pier and the east abutment are carried on pile foundations.

These new piers were built during the past year. The pivot pier is cylindrical, 31 ft. in diameter with an octagonal footing 50 ft. 6 in. wide. The other piers are of rectangular section except a rest pier for the swing span up stream from the pivot pier which is shaped like a flatiron. The caissons were of timber construction using reinforced concrete con-

bridge just outside of the trusses on each side and thus greatly simplify the pile driving. They were capped with 12-in. by 14-in. pieces, on which were placed nine 8-in. by 17-in. timber cross-beams, 30 ft. long, packed solid and spanning between bents on opposite sides of the bridge. These groups of crossbeams served as the supports for four lines of 24-in. I-beams, which carried the two temporary tracks. The piles were driven to rock or to absolute refusal and the bents

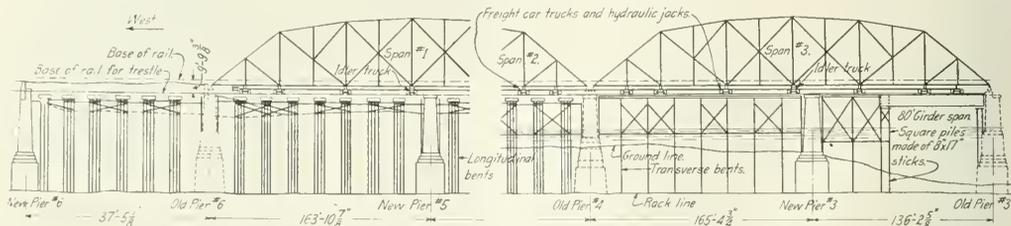


Fig. 3. Part Elevation of the Three Spans Showing the Falsework

struction over the roofs to support the piers until the working chambers were sealed. Three of the caissons were built in a pontoon of octagonal shape from which they were floated later by filling the pontoon with water and removing one side of it. After a caisson was removed the pontoon was pumped out and made ready for building the next caisson.

The Plan Adopted

The plan for moving the three fixed spans was briefly to provide falsework for two standard-gage tracks, one directly under each of the trusses, these tracks to be used by freight car trucks on which to haul the spans simultaneously to their new positions. The tractive power was furnished by lines

were sash-braced and cross-braced in both directions with 6-in. by 14-in. timbers.

Under the cast fixed span, the river bed falls off toward the main river channel under the draw span, a condition which demanded a variation in the falsework plan. Between old pier 4 and new pier 3, the bents were placed perpendicular to the track to reduce the obstruction to the stream

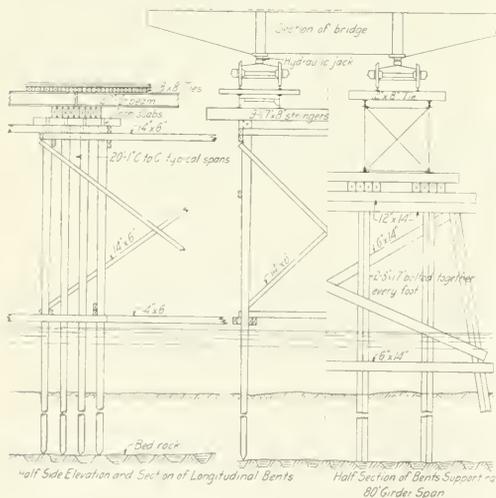


Fig. 4. Falsework Details



Fig. 5. Tearing Out the Falsework for the Main Track Between the Old and New Abutments. One of the Hauling Tracks Is Shown in the Foreground

from hoisting engines placed back of the new west abutment.

Freedom from settlement and vibration was the prime consideration in the design of the falsework. Under the two westerly spans and between the new and old west abutments the river is shallow and not subject to much current. Consequently it was permissible to place the bents parallel to the

flow. In the space between new pier 3 and old pier 3, which forms a part of the new west channel, the water is materially deeper and there is a strong current. Consequently a wider waterway was desirable, so an 80-ft. deck girder span was introduced, supported at the east end by two frame bents standing on offsets on the side of old pier 3 and on the west end on two bents consisting of six square piles, each made of two 8-in. by 17-in. timbers bolted together. To obtain the desired length it was necessary to splice out these timbers, using angle irons for the splice bars. Trestle construction consisting of bents of the same kind occupied the remaining space between the old and new piers 3. The space between the old and new west abutments (piers 6) formed part of the old west approach embankment, so the removal of the fill to permit work on the falsework required the con-

struction of an independent pile trestle to carry the traffic between the two abutments. This is shown in one of the photographs.

One condition imposed by the plan was that the tracks for the moving trucks pass over the tops of the piers. This required that the spans be jacked up to remove the bearing pedestals and the track placed continuous over the piers and talsework. After this work had been completed, the spans

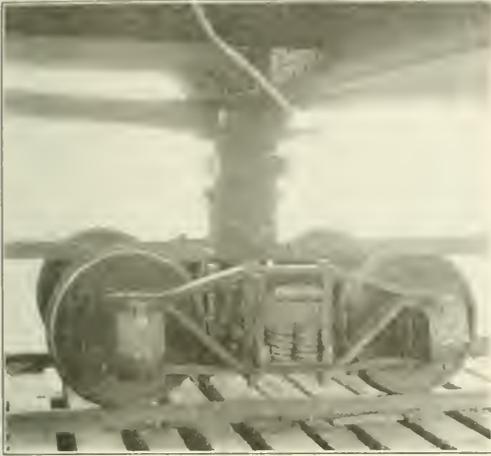


Fig. 6. One of the Hauling Trucks, Showing the Jack and Draft Rigging in Place. Plate Blocking May Also Be Seen in Place Around the Plunger of the Jack

were again brought to bearing on the piers, using wooden blocking instead of the pedestals under the shoes.

Another requirement of the plan was that the spans remain in bearing on the piers for the passage of traffic until all preparations for moving were complete, when it was required that the weight of the structure be transferred quickly to the moving trucks for making the shift. This was ac-



Fig. 7. One of the High Power Pumps Supplying Pressure to the Jacks

complished by the use of high power hydraulic jacks mounted on the trucks and operated in gangs from high power pumps installed on the bridge. The pressure was transmitted to the jacks by a main line pipe consisting of extra-heavy wrought steel pipe with branch lines to the individual jacks of small diameter flexible copper tubing. The photographs show these jacks and the high power hydraulic pump from which the pressure was supplied. The pressure-transmitting

fluid was an alcohol mixture. What appears to be a wire attached to the side of the jack in the photograph of the jack is the copper tubing through which the pressure is transmitted. The jacks under one of the spans were of 500-ton capacity and those under the other two spans of 1,000-ton capacity. As the average load to which the jacks were subjected in this case was only 70 tons, the pressure on the jacks, pumps and piping was only 2,000 to 2,500 lb. per sq. in. as compared to the capacity pressure of 10,000 lb. per sq. in. Jacks were placed on the trucks only at panel points 1, 2 and 4 of each span, the trucks under the center panel serving solely as idlers to afford a measure of safety in case of a blowout of one of the jacks. Blocking was maintained on these center panel trucks to within one inch of the steel work. Another safeguard in the jacking was to block up around each of the jack plungers with plates placed on the rim of the jack cylinder. These plates were cut to fit half way around the jack plunger, and were arranged to break the joints, as may be seen in the photographs.

Special Draft Rigging Required

In consequence of the interposition of the jacks between the trucks and the load, an adequate draft rigging was required in the plane of the trucks. This consisted of two lines of structural steel angles made continuous from end to end of the three spans by plate splices at each truck and around the shoes at the ends of the spans. At each truck this

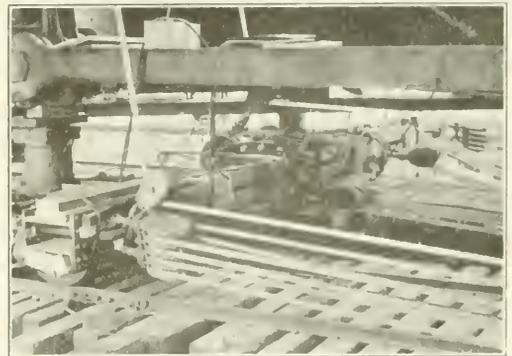


Fig. 8. The Pulling Beam to Which the Tackles Were Attached

connection consisted of a small plate which performed the additional function of a bearing plate for the jack on top of the truck bolster. At the end bearings of the trusses it consisted of a yoke to transmit the traction around the shoes.

One of the photographs shows the pulling beam through which the tension on the pulling tackles was transmitted to the draft rigging. It consisted of two I-beams held together by batten plates and placed cross-wise just ahead of the first two trucks, to which the tackle blocks were hoisted or lashed. The pulling rig consisted of four sets of 2-in. rope tackles, each equipped with four-sheave blocks and snafle blocks to give a multiplication of 10 in passing the lines to the spools of the hoisting equipment. The latter consisted of a steam-operated double-drum hoist mounted on a flat car, dinged at the end of the embankment and a large capacity electric hoist (built for use at the Hill Gate bridge), placed in a house south of the track just back of the abutment.

On the morning of November 15, after the passage of the last trains at 8:15 a. m., the first operation was the removal of the trucks and the tearing out of the temporary trestle between the old and new west abutments. This was accom-

plished largely by the use of locomotive cranes, one standing on the end of the west span and the other on the end of the approach embankment. The next step was to jack up the spans and remove the blocking under the shoes. All was ready for making the shift shortly before noon, and with the giving of a signal the hauling started. The movement was continued without interruption until completed and the total time elapsed was only 13 min. As the movement was practically uniform throughout its duration this is equivalent to an average speed of $10\frac{1}{2}$ ft. per min. The hauling was

deck for the railway track but also that for the north highway, so that the flooring for the highway was placed at the same time that the ties and rails for the railway tracks were installed. This work involved a large amount of detail that



Fig. 9. The Motive Power, Steam and Electric Hoists at the West Abutment

stopped at the exact position on a signal from an observer standing on the west end of the superstructure, but buffer timbers were placed against the back wall of the abutment to insure against overtravel.

Following the successful transfer of the span to the new

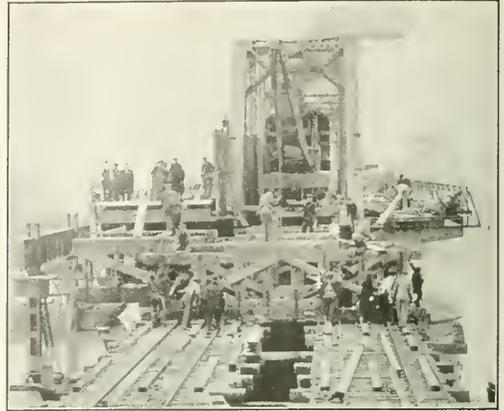


Fig. 11. Placing the Pony Bents to Close the Gap

could not be hurried, but it was greatly expedited by a most complete prearrangement for all operations. For this reason it was unnecessary to saw any lumber during the time that the change was being made. Another measure which expedited the work was the drilling of all holes with an electric drill, and when the gap in the track rails was closed the last rails were cut to length and the bolt holes drilled with an oxy-acetylene torch. The bridge was ready for the passage of trains at 5:30 p. m. The absolute precision with which



Fig. 10. The Gap Between the Draw Span and Fixed Span No. 3 After the Shift Had Been Completed

piers, work was started on the closing of the gap between the west end of the draw span and the east end of the east fixed span. This space was now occupied only by the false-work on which the span had been moved, with the two hauling tracks about 10 ft. below the rail level of the bridge. To make up this difference in elevation pony bents previously framed were brought from the east approach by a locomotive crane and set into place. Stringers and ties for the deck, already framed for use, were lifted from a barge floating in the river alongside. This work included not only the

each detail of the day's work was completed, testified to the care and accuracy with which each step had been studied and arranged for in advance by the erection forces.

Other Work to Be Done

Following the shifting of the spans, work has been in progress on the erection of the new draw span. It is the intention to erect the new span in the open position, dismantling one half of the old draw span and providing a temporary draw, following the general plan by which this method

has been used in previous draw span renewals. The work on this bridge is being handled by R. L. Huntley, chief engineer of the Union Pacific, under the immediate direction of A. C. Everham, terminal engineer, Kansas City, and H. M. Stone, assistant engineer, resident engineer at St. Joseph, the entire project being under the general supervision of E. E. Adams, consulting engineer of the Union Pacific System, New York City. The new substructure was built by the Missouri Valley Bridge & Iron Company, of Leavenworth, Kan., and the fabrication and erection of the steel work was handled by the American Bridge Company, which conducted the movement of the three spans described above.

Letters from Overseas*

“OUR WORK ON THE LIGHT RAILWAYS,” writes a lieutenant in the Fourteenth Engineers, “is becoming more fascinating as we get deeper into it. The volume of traffic is constantly increasing, and at the present time we are able to handle little but ammunition and supplies. Car shortage seems to be our chief difficulty.

“The power situation is fairly good. On account of the high cost of gasoline (petrol they call it here) we use our steam locomotives wherever our location will permit. Our engines are small, of the 2-4-0 type, and on ordinary grades will handle 10 to 12 cars. They are equipped with brass flues, but on account of shallow fireboxes require constant rolling. The water is very bad, which necessitates washing the boilers about once in six days. Some of our boys had quite a time getting accustomed to the old straight steam brake, with which our engines are equipped, after having used the Westinghouse in the States, but fortunately we have escaped without serious accident.

“In places our track runs up to within 500 yards of the German front line trenches, and it is quite a ticklish job to take a train up there at night without lights, get it unloaded and get away again without being detected. As soon as the enemy discover a train they begin to drop shells, or pepper them with machine-gun fire. One night recently one of our men had the track blown out in front of him; he started to back up and another one landed just back of him and there he was marooned. He jumped into a shell hole and waited until things had quieted down, then crawled out, wen to the nearest control station, got out the trackmen, fixed up the track and got away safely. Another night one of our men stopped his tractor and stepped down into a dugout to get some water; while he was gone a shell landed, and when he came out his tractor was scrap. However, such occurrences are the exception and not the rule.

“Our men are standing up bravely under such conditions; not a whimper or complaint. At first they were a bit timid when entering the danger zone, but when they once got into the work that quickly disappeared. We are connected very closely with the British troops and Light Railways and are constantly rubbing elbows with the Canadians. They are a fine bunch of fellows and good railroad men. I am surprised to find so many C. P. R. men over here; they seem to have responded very generously to the call.

“We have considerable trouble with the ‘tanks’ crossing our tracks at the most unexpected places, and you can imagine what it does to our track. One night recently one of our troop trains struck a tank which was crossing the track without lights. The train came to a dead stop, the impact throwing the engineer and fireman out on the ground, slightly stunning them. The ‘tank,’ however, did not stop, but continued on its way, and as soon as it cleared the track, up

starts the engine, breaking away with one car, and before any one realized what had happened was running wild down the hill. After running wild for a couple of miles she turned over in the ditch. Fortunately no one was seriously injured. The ‘tanks’ certainly are wonderful machines. There is not much left of the barbed wire entanglements when they get through with them. So far the German have not made use of them.

“No doubt you have read more or less in the magazines of the development of the art of camouflage. It is truly marvelous what they have done along that line, and what they are able to conceal with a little paint and fixings. The other day I was walking along the track, little dreaming that there was a gun within sight, when a big 12-incher let go within 100 yards of me. Well, for a minute I thought that I had been shot, so great was my surprise. There was not a bush or tree in sight, yet so successfully was it concealed that one would never see it unless one knew it was there. Many of our cars are also painted all sorts of colors and designs; so far as far as car decoration goes, Barnum & Bailey have nothing on us.

“When we first arrived in France we were given steel helmets and gas masks. The helmets we find useful as protection against shrapnel, but the gas masks we seldom have to use, although we must carry them, ready at a moment’s notice. The gas warfare has proved a great disappointment to the Germans. While it is true that during the early part of the war the Allies’ casualties were quite serious, they have invented a mask which is absolute protection against every known gas for an indefinite period, while the mask used by the Germans is protection only against certain kinds of gas, and good for only about two hours. Then, again, the Allies have greatly improved the methods of using gas, which the Germans find it hard to combat. This, together with the fact that the prevailing wind is toward the German lines, has made them deeply regret that they ever started the gas game. Curiously enough, one of the most effective gases is in reality quite harmless. It is known as ‘weeping gas.’ Its only effect is to get into the eyes and make the tears run so freely as to make it absolutely impossible to see. The smallest quantity is highly effective, but as soon as the gas is removed its effect soon passes off.

“We have an opportunity to see a good many of the prisoners within an hour or two after being taken, and it is not uncommon for them to be quite overcome at the sight of American troops. Many of them tell us they had no idea that the United States had entered the war, and still less that we had troops here.

“Before leaving the States, if I recall correctly, we used to hear rumors of the Allied armies starving, etc. I don’t know whether food is getting scarce in the States or not, but I do know that we are getting plenty of good wholesome food here, and so far as I have been able to observe I have seen nothing which approaches a shortage of food supply. It is true that the governments have put certain restrictions on food, but that is but a wise policy of conservation. At any rate, at the present rate of supply we shall be a long, long time starving or, in fact, losing very much flesh. This is true, not only of the American Army, but of all the Allies. Back of the ‘Boche’ lines, however, we have reason to believe that the situation is different.”

CANADIAN PACIFIC RAILROAD STOCK is now held by over 50,000 persons, chiefly in Great Britain, Canada and the United States, approximately 12 per cent of it being held in other countries. The holdings in Canada have increased considerably since the beginning of the war, and now represent over 15 per cent of the outstanding capital stock, distributed among 7,000 holders. In the last four years, the number of shareholders has more than doubled.

*The Railway Age expects to publish regularly letters from railwaymen overseas. If you receive a good letter from a railwayman who is now in France, send it in for publication and let the Railway Age pass it along for all to enjoy.

Some of the Members of Director General McAdoo's Staff



Walker D. Hines



W. S. Carter



C. R. Gray



Edward Chambers



C. A. Prouty



H. P. Anewalt



John Skelton Williams



W. C. Kendall



Frank McManamy

Organization of the Railroad Administration

Divisions of Transportation, Traffic, Finance and Purchases, Labor and Public Service and Accounting

WASHINGTON, D. C.

DIRECTOR GENERAL OF RAILROADS WILLIAM C. MCADOO announced the organization of his railroad staff on February 6. Up to that time he had been assisted by a temporary staff of advisers, most of whom have been retained in the permanent organization. The names of the staff members with the departments over which they are to have jurisdiction and some of their assistants were published in the *Railway Age* of February 1, page 256, but the news of the formal announcement was delayed in transmission from Washington to New York and was not included in last week's issue.

The organization is as follows: Assistant to the Director General, Walker D. Hines, chairman of the executive committee and general counsel of the Atchison, Topeka & Santa Fe.

General counsel, John Barton Payne.

Director, division of transportation, Carl R. Gray, president, Western Maryland.

Director, Division of Traffic, Edward Chambers, vice-president, Atchison, Topeka & Santa Fe.

Director, Division of Finance and Purchases, John Skelton Williams.

Director, Division of Labor, W. S. Carter, president, Brotherhood of Locomotive Firemen and Enginemen.

Director, Division of Public Service and Accounting, Charles A. Prouty, director Bureau of Valuation, Interstate Commerce Commission.

Additional divisions will be created from time to time as conditions may justify. The Director General has in contemplation a division on capital expenditures and improvements.

Frank McManamy, chief inspector of locomotive boilers of the Interstate Commerce Commission, has been appointed manager of the locomotive section and is attached to the division of transportation. He will also continue in his present office.

Mr. Hines has been acting as assistant to the Director General since the temporary staff was appointed on December 31. Mr. Hines was born February 2, 1870, at Russellville, Ky. He graduated from Ogdon College in 1888 and from the University of Virginia in 1893 with the degree of LL.B. He entered railway service in 1893 as assistant attorney of the Louisville & Nashville. From 1897 to 1901 he was assistant chief attorney of the same road, and from 1900 to 1904 first vice-president. From 1904 to 1906 he was a member of the law firm of Humphrey, Hines & Humphrey at Louisville, and in 1907 he became a member of the law firm of Cravath, Henderson & De Gersdorff. In 1906 he was appointed general counsel of the Atchison, Topeka & Santa Fe and in 1908 chairman of the executive committee of the same road. He represented his road before the Interstate Commerce Commission in the 5 per cent rate case, and the anthracite carriers in the commission's investigation into anthracite coal rates; and in the New Haven investigation appeared before the commission on behalf of the stockholders of the New York, New Haven & Hartford. He has also represented the express companies and he summed up the case for the railroads in the argument before the Supreme Court on the Adamson eight-hour law.

A photograph and sketch of John Barton Payne were published in the issue of February 1.

Carl R. Gray has been acting in charge of transportation matters for some time, succeeding Hale Holden, president of

the Chicago, Burlington & Quincy, who was temporarily appointed at the time of the resignation of the Railroad War Board. Mr. Gray has been president of the Western Maryland for the last four years. He was born September 28, 1867, was educated at the Arkansas Industrial University and entered railway service in 1882 as telegraph operator for the St. Louis & San Francisco, after which he was consecutively agent, clerk in the traffic department, commercial agent, division freight agent, division superintendent, superintendent of transportation, general manager, second vice-president and general manager, second vice-president and senior vice-president. On May 1, 1911, he became president of the Spokane, Portland & Seattle, and on May 15, 1912, president of the Great Northern. In March, 1914, he was elected president of the Western Maryland.

Mr. Chambers was also appointed a member of Mr. McAdoo's temporary staff. He has been in Washington since last summer, when he was appointed director of transportation of the Food Administration. He was born February 16, 1859, at Waukegan, Ill., and was educated in the public schools. He entered railway service in 1878 as freight handler for the Atchison, Topeka & Santa Fe at Pueblo, Colo., with which road he has been connected ever since as check clerk, transfer foreman and cashier, agent, commercial agent, assistant general freight agent, general freight agent lines west of Albuquerque, assistant freight traffic manager of the coast lines, and vice-president.

John Skelton Williams, comptroller of the currency and ex-officio a member of the Federal Reserve Board, has had considerable experience both in railroad operation and in finance, as a member of the banking house of John L. Williams & Co., of Richmond, Va. He was born July 6, 1865, in Powhatan County, Va., and was educated at the University of Virginia. In 1895 he became president of the Georgia & Alabama Railway and later with his associates purchased a controlling interest in the roads comprising the old Seaboard Air Line System, of which he was president from 1899 to 1903. He was later president of the Florida Central & Peninsular System and later chairman of the board of directors and the executive committee of the Seaboard Air Line System. He was also president of the Georgia & Florida Railway.

W. S. Carter, president of the Brotherhood of Locomotive Firemen & Enginemen, has been granted a leave of absence by his organization to enable him to take charge of the division of labor and will represent all railroad labor, both organized and unorganized.

C. A. Prouty in his new position will continue as director of the Bureau of Valuation and will have charge of questions raised by any portion of the public as to the adequacy of the service rendered shippers and consignees and as to the safety of railroad operation. He will supervise the inventories of the railroad properties of which the government has possession and control, together with receipts and expenditures in connection with their operation. He will, therefore, represent the interests of farmers, manufacturers, producers and consumers generally.

Mr. McManamy has had experience as a locomotive fireman and engineman and was for a time manager of the western district for the air brake department of the International Correspondence Schools. He entered the service of the Interstate Commerce Commission about 10 years ago as inspector of safety appliances. In March, 1911, he was ap-

pointed assistant chief inspector and in the fall of 1913 he was appointed chief inspector of locomotive boilers.

The manager of the locomotive section will supervise the condition of, and repairs to, locomotives at all railway shops and roundhouses and at outside shops, in addition to his present duties for the Interstate Commerce Commission as its Chief Inspector of Locomotives.

Henry Walters, chairman of the Atlantic Coast Line and of the Louisville & Nashville, who was appointed as a member of Mr. McAdoo's temporary staff, will continue to act in an advisory capacity.

W. T. Tyler, assistant to the vice-president of the Northern Pacific, and H. T. Bentley, superintendent of motive power and machinery of the Chicago North Western, are acting temporarily as assistants to Mr. Gray in the transportation division. The Commission on Car Service and the Bureau of Car Service of the Interstate Commerce Commission have been merged and are attached to the transportation division.

Mr. Chambers also has a staff of assistants, most of whom were mentioned in last week's issue. C. B. Buxton, recently assistant director of transportation of the Food Administration, formerly general agent of the Atchison, Topeka & Santa Fe at Philadelphia and later vice-president of H. L. Edwards & Co., cotton merchants, of Dallas, Tex., is Mr. Chambers' personal assistant. R. C. Wright, general traffic manager of the Pennsylvania, is assistant in charge of freight matters. Gerrit Fort, passenger traffic manager of the Union Pacific System, is in charge of passenger matters. G. W. Kirtley, formerly general superintendent of transportation of the Erie and recently assistant to Priority Director R. S. Lovett, is in charge of matters pertaining to preferential service.

Car Service Section Organized

For the handling of car service and other matters formerly in charge of the Commission on Car Service of the American Railway Association, the Car Service Section of the Division of Transportation has been created. W. C. Kendall was appointed manager of the Car Service Section and W. L. Barnes, E. H. DeGrott, Jr., A. G. Gutheim, C. B. Phelps, G. F. Richardson and J. A. Somerville were appointed assistant managers.

The Car Service Section, according to the circular:

(a) Will have charge of all matters pertaining to car service, including the re-location of freight cars.

(b) Will provide through the regional director, on application of proper governmental authorities, for preference in car supply and movement, where more than 10 cars are involved.

(c) Will receive from railroads such reports, periodical or special, as it may require in order to keep fully informed with respect to the car service, the embargo or transportation conditions.

(d) Must be promptly informed of all embargoes placed, modified or removed, and will, from time to time, recommend such embargo policies and exemptions as the needs of the government, seasonal requirements, or other circumstances may demand.

(e) Will deal directly with railroads with respect to matters within its jurisdiction, and will keep the regional directors properly advised.

W. C. Kendall, superintendent of transportation of the Boston & Maine, has been a member of the Commission on Car Service since its organization. He was born on May 22, 1877, at Pompanoosuc, Vt., and graduated from St. Johnsbury (Vt.) Academy in 1895, and from Dartmouth college in 1899. His first regular railway position was on the Boston & Maine as telegrapher at Boston, Mass., in August, 1899. He subsequently served as clerk to various officers and since March 1, 1912, has been superintendent of transportation of the same road. C. M. Sheaffer, general superintendent of transportation of the Pennsylvania Railroad, who was chairman of the Commission on Car Service, has been recalled by his road. The new section is a merger of the Commission on Car Service and of the Bureau of Car Service of the Interstate Commerce Commission, consisting of Mr. De Groot and Mr. Gutheim. Mr. Barnes, Mr. Richardson and Mr. Somerville were members of the Commission on Car Service. D. E. Spangler, superintendent of transportation of the Norfolk & Western, has resigned on account of ill-health. Mr. Phelps is superintendent of transportation of the Louisville & Nashville.

In addition to appointments previously mentioned in the government departments, the Army, Shipping Board and Food and Fuel Administrations, H. P. Anewalt, general freight agent of the Atchison, Topeka & Santa Fe, Coast Lines, has been appointed director of inland transportation of the Navy Department.



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British Engineers Reconstructing a Bridge in Flanders

My Forty Years' Selling Experience in Europe

No Properly Equipped American Firm Ever Lost Money in Europe—Peace Will Open Big Markets There

By Hugh Reid Griffin

THIS ARTICLE is written from the point of view of an American traveling salesman who has been studying the European field for the past 40 years, who has sold many classes of iron and steel products, who can say he has been fairly successful in dealing with men of every nation in Europe, and who now, while still in Europe, has retired from active business, though he still loves business for the fun there is in it. I hope that I may be able to give a few pointers not only to firms expecting to do business in Europe but also to the representatives they send abroad.

To the firm I would say: Prepare now for the business coming with peace. You may have to do a credit business, often, but you will make money in the end. Andrew Carnegie got his first big start by being prepared to do business, by being ready. He foresaw the need of steel railroad bridges. He didn't go around and try to convince railroads that they were going to need these bridges. He first had a lot of bridge parts made up, then he went to the railroads needing those particular bridges and said: "You've got to have a bridge at such and such a point. It will cost you so much. The bridge is ready to deliver. I know you had to have it, so here it is." Some people would call that luck. I call it being prepared.

To the firm I would also say: Get your young men in the field now. Let them be studying it, learning the language and the ways of the country you want them to do business in. Be sure they are Americans who know your product; who can show all of its good points, for by so knowing a salesman is able to convince a prospective customer and sell in big lots instead of in small parcels, as your foreign agent would probably do.

To the representative I would say: Business is the greatest sport in the world, because every day there's something doing, something new, some new twist in the game to be worked out. A lot of people think you don't have to have much sense to sell goods. It's a colossal mistake. Business is no place for a fool, and foreign business least of all.

Study Your Customer Closely

In doing business in Europe, you have got to study your customer closely. He may take plenty of time to do business, to get started in buying from you, but once you get his confidence you hold him. It is commonly said that you can't drive an English customer away, after he gets used to you.

I think one of the big points of doing business anywhere is to waste all the time you can spare in landing your man, but once you have landed him, and have gotten his signature to a contract, take the first train out of town. No matter whether it is going north, east, south or west, board it. Else your man may change his mind.

The American habit of buying many drinks, of giving big dinners, is often looked on suspiciously over here, and little things like that may ruin a good deal. I remember once in Dusseldorf, Germany, many years ago, in talking with the head of a big firm of steel product buyers, the man told me about an American salesman who came to town and at once gave a banquet to him and his friends, something gorgeous in the way of a banquet. "The next day the salesman came around to sell, and I cut his prices way down," related the man, "because I figured that a firm able to throw money away on banquets must be making big profits and could sell

much cheaper than quoted prices." The foreigner rarely invites anybody to dinner except as a matter of personal liking, of friendship, and then he doesn't splurge. It's just a quiet affair. So he very naturally looks with suspicion on a costly dinner. "Why is this fellow giving me this dinner?" the foreigner asks. "It must be to get something out of me." And before he gets done thinking about it, he concludes that there must be something wrong with the goods.

We must accept good naturedly the peculiarities of people whose ways are not our ways, and try to use our wits to accomplish our end just the same. Many, many years ago I was selling harvesting machinery in Germany. I heard of a prospect in a Polish city. I went there, met a lot of the well-to-do business men of the place, and suggested they should form a subsidiary company for selling machines locally. In this case, they, not I, invited me to a dinner. The thing lasted all night. We told stories, for seven or eight hours straight, as I happen to know German, as well as French—the two languages, which together with English, will carry you around the world.

About daybreak I said to the party: "Look here, gentlemen, I am getting sleepy. If we are going to do any business, let's do it." Well, within a few minutes each of the men subscribed the amount of money necessary to form the total sum to buy up a hundred machines or so.

I went on back to Berlin, finally to Paris, and there I got a wire from the head man of the agreement to come to see him, that there was trouble. When I reached him, he said: "The machines are here all right, but there's a strike among the farm laborers. They won't let us use the machinery, and the farmer buyers are being scared off."

"Oh, is that all?" I said. "Let's go out to that strike. When we got there I made a bee line for the village priest and to him I handed a comfortable sum of roubles for charity. Then I brought up the subject of the machines and the strike. He was an intelligent man, saw the need of the machines, and before the day was over he had gone out, arranged a ceremony, and blessed the machines in the presence of the strikers. So the strike was off.

Changes Brought by the War

My memories of such things run a long ways back; 40 years is four decades—the life of the average man. I began business just after another big war, when Europe was settling down and rapidly developing after the death struggle of 1870-71 between France and Germany, and Germany with a fat indemnity of five milliards of francs—spot cash practically, or short time credit at most. The year 1875 was the year of the great Vienna exposition, and while the United States did not make a large exhibit there, it showed champagne from California, harvesting machinery from the Eastern states, and various other products of American ingenuity. Think, just think, no one has ever heard over here of a large order of California champagne. On the other hand, European crops have been harvested ever since that exposition with increasing numbers of American mowers, reapers and binders.

Consider the champagne and the harvesters. There's a lesson in them. They go to show that you can drink yourself drunk and talk your head off without result, if you offer what is not wanted, while the needed or practical article meets

with a large demand. It was so after 1873 and will be so after the unknown date when this terrible war ends.

To judge what is needed requires familiarity with conditions and a willingness to meet these conditions. No one branch of American manufacture has been pushed as has the harvesting machinery, and in this branch mowers and simple reapers were followed by sheaf binders and, notwithstanding the attempts to copy the models or original devices on the ground, America has so far had the trade and will continue to have it. This success in a special line should stimulate men in other lines.

There is one point we as a nation must consider before that of any foreign trade at all. Since 1865 the United States has never had a commercial marine of any importance on the high seas. England and then Germany have done the carrying. France has had a share but the United States has sat tight and let the other nations carry our products. This condition cannot and will not continue. The world is open to us as never before; it is our great chance to develop further our transportation business which at present, the best in the world on land, stops short at the water's edge. It is not often so considered, but foreign transportation is an industry and a paying one just as much as selling shoes in a foreign land. Hand in hand with the pushing of our manufactures in foreign lands should we push the transportation.

The Possible Markets

England is the easiest market to tackle for us because the language is our own; but the future is not confined to English trade.

Germany had a population of seventy millions, possibly ten millions of which has been killed or disabled. Yet these sixty millions left after the war will be just so many millions of resourceful, needy, obstinate, systematic organizers. In time, Germany, hated and despised now, will, like the Hebrews, blossom and flower into something better than war, murder and depravity. Too much has been made, however, of the bad side of the German character. I have done business with Germans all my life, and I have found them, while exacting in their contracts, always honest to a penny, and therefore excellent people to do business with. They succeeded in business because of remarkable virtues, because they asked, "What do you want?" and then gave it to you. These people must and will live, and perhaps we as a nation will be the ones to help them most in the future, and Germany may become one of our best markets.

France is rich and will not be poor when the war is over. Possibly because of their Republican institutions and the consequent manner of thinking, they are the more nearly like the Americans in character of all the peoples of Europe. Anybody can agree and get along with a Frenchman, and best of all ourselves. They are a people of many qualities which it took this war and their sacrifices in it to understand. For one thing, a Frenchman of business standing will never, *never*, make a contract which he does not expect to keep, nor which he does not clearly see his way to keep.

Russia is a second United States, as far as self-supporting problems affect her. She is weak on many manufactures but has material and will develop.

Austria-Hungary, Roumania, Turkey, even the Balkans, will be big buyers after the war.

Financial conditions should be studied by our best men, just as France, Belgium and England have men busy with all these problems now, getting ready to meet conditions after peace. Naturally, unlimited credit cannot be given. Guarantees will be required, but much that we can supply will provide the means of paying for such supplies. Already an international trade clearing house is being devised, something after the manner in which Morgan, Harjes & Co. acted as agents for England and France in the United States. In this way the manufacturer, the seller, is relieved of the long

individual credit bother. His bank at home provides the credit for him to carry the foreign customer. Also, we need an all-American bank in every big city in Europe.

Among the big articles that will sell—and everything will sell—is steel of all kinds, cement, wood furnishings, windows, doors, floorings, fittings of all kinds, bridges, rails and structural steel. These and hundreds of other items can be sold without too great risk in Europe. The sooner the study of the market begins the better. There is no human probability of a general resumption of industrial output in Europe sufficient for the needs until long after the war. Therefore iron, steel, coal, wood, cotton, food supplies, and a thousand other products we can deliver will find a market.

Cultivating the Market

To cultivate this field and prepare for what common horse-sense tells one must result in the way of demand, the markets should be studied. I cannot repeat this too often. Forty to forty-five years ago it was far less easy to introduce our manufactures, and prejudices were a hundred times harder to overcome. Communications of all kinds were slower and not available.

Once the head of a firm or some one in whom he has confidence has mapped out market prospects, the next step is to get a man in the field. The mere placing of agencies in local districts is not enough. Customers must be seen personally by the American representative.

The art of selling is natural or acquired, though most generally it is born in a man. Let me repeat, the salesman must have an absolute knowledge of his wares, of their good points, and after this he should study closely all the possibilities of his given field. For one thing, he should always be willing to help any firm he comes in contact with whether he can do any immediate business with it, or for it, or not. I have all my life made it a rule to help business people, give them any special information I possessed, whether the firm was American or foreign. Frequently I have seen a business possibility and dropped a line to some firm I knew suggesting that it follow it up, though there was no immediate interest in the affair for myself. This sort of thing pays. Firms remember such favors and when they have something they can throw your way they do it gladly.

The second great requisite for the foreign representative of an American firm, after that of knowing his wares, is that of knowing well his own language and country and then the language and country where he must do business.

These qualifications involve a general store of information which often leads to good business. It makes the salesman able to interest the man he meets in a business way. Selling introduces the personal equation. If a man likes you, is interested in you, he becomes interested in what you have got to sell. Big sales sometimes turn on little points. A buyer has his peculiarities and in passing large contracts he may haggle over minor points that the seller cannot well modify, and in such cases you've got to use your personality, tell the man a funny story, get his attention off his hobby, and close your deal while he is in a good humor.

It is very important never to let your buyer quarrel with you over national prejudices. He may begin by abusing the United States, telling you that its business men never make prompt deliveries, relate how unsatisfactory such and such an arrangement proved as in the case of a friend of his. When he begins to abuse your country, don't get mad about it. Let the steam blow off. Praise his own country, tell him how many of his countrymen have succeeded in the United States, try to think up specific cases, and then lead your man up to the question: "Has he ever visited the United States?" "No," he will probably say. Then tell him he should do so, how we welcome visitors, explain to him some of its good points; don't brag about it too much, because that offends him, makes his own country seem small and insignificant;

But tell him that while it has its good points, many of them were borrowed from the old world, probably from his own country. People in Europe are extremely sensitive about questions of nationality. The English have an air of indifference, of coldness, of superiority about them which offends others, though they really do not mean to be so, being honest and square people in business. The French and the Italians have never liked each other too much, it is said, despite many common interests, because the French, being wealthier and more powerful, have often used, in politics, high handed methods with the Italians, or at least, so the Italians think.

If you find that you are unable to interest foreigners in your country, then clear out and go home and don't come back until you have really learned to talk intelligently about it.

Be ready to learn new points about the country you are in and if some local interest is brought up, follow it and show your interest in it. We are never too old to learn and every man who has talent, position, or ability, whom you meet, if he sizes you up favorably, is willing to help you.

I remember once, in England, that I had a shipment of machinery due in London and this machinery was not labelled or marked according to some new customs rule that had been made after I had ordered it from home. I went down to see the head of the Board of Trade, a gentleman whom I had never met and whom I didn't have time to get an introduction to, or write for an appointment; anyway, letters often involve matters and give the other fellow a chance of getting rid of you politely. So I went into his outer office and told the uniformed porter I wanted to see this man.

"Have you an appointment with him? Do you know him?" asked the porter. "Certainly," I said, knowing I would never see my man if I appeared to be some stranger whose business was not understood. The porter took in my card, and the man's secretary came out. He did not recall the appointment, said the secretary. "Tell Mr. So-and-So it is absolutely necessary I see him at once on important business," I told the secretary. The secretary disappeared and came back with the word that I would be seen at once. After that, when I got to my man, I explained the case. "I'm sorry I've never met you," I told him, "but I've heard a great deal about your courtesy to American business men, and such-and-such is the case." Well, the man softened up and said while the case was unusual, he would give me a letter that would arrange the matter, he thought, with the customs.

On the question of time, the salesman must possess his soul in patience, whether it is a matter of hours or of years. Be punctual yourself in keeping appointments though your customer may keep you waiting often. Patience, whether Jobistic or Wilsonian, is sometimes a virtue and more frequently a necessity. Once you get into a man's office, you need not be so short and quick, afraid of taking up his time, as is the rule with business calls at home. First take a lot of time, if the man is new to you, making a good impression; mention your connections in the country if they are good and not unfriendly to the man you are calling on. Of course, don't forget the object of your visit. Business is business, and there is a moment when the hammer should fall on the nail and drive it home.

Don't be ashamed of being in business, as they used to be over here. The business of selling is the most interesting occupation in the world. If educated, it broadens and enlarges one's views, it rounds up and polishes and it is the greatest university the world possesses. It makes demands on every professional and artistic instinct a man possesses; after the busy struggle for dollars is over, and a man sums up his work, it leads him to charity and liberality in dispensing his money to help suffering or oppressed humanity.

World-wide business enterprise offers the greatest attraction, it is full of bold adventure, it takes men to the extremes of the earth, it maps out and records facts and furnishes data which no government bureau ever jots down.

Business Papers Advise Shippers

THE SERIOUSNESS of the transportation situation and the resultant threatened decrease of production in industries has caused the Associated Business Papers, Inc., to call for co-operation of the entire business and trade press of the country in urging special efforts on the part of the shippers. The executive committee of the Associated Business Papers, Inc. is sending out to the technical and trade papers the following report.

Your committee, appointed to consider the question of constructive practical suggestions which can be made to the shippers in various lines of industry so that the traffic situation can be temporarily improved and later permanently bettered, has considered the matter and makes the following report.

To win this war we must do things. Do them quickly, with less labor and less waste. We must increase valuable activity and decrease wasteful activity. We are at present suffering from a decrease of activity all along the line. This decrease comes from the inadequacy of the distribution system. It is time for the producer of raw material, the manufacturer, the warehouseman, the jobber and the dealer to understand that distribution, the movement of materials from the point of production to the point of fabrication and the movement of goods from the point of fabrication to the point of consumption is the foundation of all industrial endeavor.

Neither the efficient control of government bodies, nor the wisdom of the railroad men can solve the whole problem. A large part of the difficulty is the local and short haul difficulty, resulting in congestion which extends back into the main arteries of transportation. It is time for the business man in all lines of endeavor to realize that he is not merely a buyer of transportation, at a price per mile or per ton, but that adequate transportation service is absolutely necessary to the profits of his business. At the present time the interest charges on goods in transit frequently amount to very much more than double the cost of the transportation, while the cost of waste, due to inability to secure materials and ship goods, runs into much larger figures.

For these reasons all men who secure their livelihood from the production of materials or goods and the sale of those products, should be interested in pushing for these items, which will enable us to build up an adequate transportation system.

The government has now assumed control of the railroads, and Director General McAdoo has surrounded himself with an able staff of practical and successful railroad operators. A National Highway Committee has been appointed with Roy D. Chapin, president of the Hudson Motor Car Company, as its head, and the Board of National Waterways Association is working with the official committee on this problem. Under these circumstances, and having in mind that we have not in our industries displayed any well organized efforts to aid in the solution of the traffic problem, it is our recommendation that the matter will be best served by our full co-operation with these governmental bodies. It is time to quit kicking, but rules which are established in the endeavor to clean up the situation and to operate in such a whole hearted and intelligent way that the tangle of transportation difficulty may be more rapidly untied and the situation cleared in record time.

It is recommended for this reason that generally speaking, the shipper should be urged to foster movements in the following directions:

For the Improvement of Railroad Service

1. The provision of adequate rules to secure the full efficiency of transportation service.
2. This includes establishing proper charges for freight

and demurrage and the enforcement of equitable rules of loading and unloading, shipping and packing.

For the Highways

1. The extension of paved highways.
2. Provision for keeping these highways open at all seasons.
3. Proper provision the maintenance of these highways.

For the Waterways

1. The construction of barges and small tow boats to provide for the adequate use of existing highways.
2. Provision for putting into shape existing waterways that have been allowed to become obsolete.
3. Provision for the wise extension of these waterways to correlate with the railroad system.

As a measure of relief from the present congestion, it is recommended that the shipper be advised that he can materially aid himself in the improvement of his own transportation conditions and the elimination of the excessive costs of not being able to do business, by carrying out the following suggestions:

In Connection with the Railroads

1. Co-operate and put it over. Do not kick at changes.
2. Load and unload promptly. Do not wait for a convenient season.
3. Load to capacity.
4. Do not reconsign en route. Decide the destination before the goods leave.
5. Pack securely and mark plainly.

In Connection with the Highways

1. Make a survey of all the incoming and outgoing freight handled within zones of 10, 25, 50 or 75 miles from your city.
2. Ship all goods to be delivered within the above zones over the road by motor trucks.
3. Demand that all goods to be shipped to merchants in your city and originating within the zones mentioned be delivered by motor trucks.
4. Make a census of all motor trucks in your town available for this work.
5. Take up with your local offices of the national express companies and your local haulage and express concerns as to how far they can extend their present delivery routes.
6. Select a committee of the best traffic managers of the concerns in your city to lay out a detailed plan to suit your own local conditions and determine upon the fair rates to be charged.
7. Arrange for a sufficient number of receiving platforms or warehouses where you can use horse wagons and motor trucks up to 3-ton capacity to deliver and set down goods, leaving for the larger trucks the running between the main points in the zones. Do not try to make the trucks running overland between the main points do pick-ups and deliveries. It cuts down their efficiency and makes the maintenance of schedules impossible.
8. Put some trucks in the overland haul work on definite leaving schedules so that goods can be delivered to the receiving platforms or warehouses in time to make up full loads to any given points.
9. Arrange a Return Loads Bureau. Arrange with the local telephone companies to give your regular telephone number to any inquirer calling up and asking for Return Loads Bureau. Post notices in the offices of all of your merchants that you have established a Return Loads Bureau. Post similar notices in conspicuous places in the smaller towns and cities through which trucks running to or from your city will have to pass. This will enable your trucks and those of private truck contractors doing this kind of

haulage and entering your city to quickly collect loads to be transported to their home cities.

10. Bring all pressure to bear upon your mayor and the governor and thence to your highway commissioners to keep all the main highways leading out of your city open during the remaining winter months.

11. Bring all pressure to bear on the proper authorities toward the resumption of the construction of main line highways at the earliest possible moment this spring and for a proper maintenance of the roads all year around.

In Connection with Waterways

1. Secure information upon transportation available on existing waterways covering short hauls.
2. Get behind the movement for immediate production of barges for the large canals, such as the Erie barge canal, which would relieve the freight situation between the lakes, coal regions and the important centers on the Atlantic seaboard.
3. Take up with the traffic manager of your business and the traffic expert of the local chamber of commerce the possibility of the use of waterways for any part of your freight movement and arrange shipping plans accordingly.

The New Army Storage and Traffic Division

SECRETARY OF WAR BAKER on February 10 announced a reorganization of the general staff of the army dividing its functions into five divisions, one of which is the storage and traffic division. Concerning this the announcement says:

"This division shall have cognizance and control of the transportation of all branches of the army and of all munitions and other supplies for the army, both by land and sea, and all storage facilities in connection therewith, under an officer designated as the Director of Storage and Traffic, who shall be an assistant to the Chief of Staff. The duties of this division shall include the following matters:

"(1) All movements of troops, as well as of munitions and of supplies of every kind, including raw materials, and finished products both during manufacture and after assembly, to points of embarkation, interior points, and overseas points, and in and out of all storage.

"(2) All inland traffic, embarkation service, and overseas service relating to the army program, including the employment of all army transports engaged in the transatlantic service, and such commercial shipping as may be used to supplement that service, including all arrangements with the Navy Department for convoy service.

"(3) All storage for munitions and all other supplies of the army on the seaboard and at interior points.

"Direct correspondence between the Director of Storage and Traffic and the commanding officers of ports of embarkation is authorized. Copies of all requisitions, requests, and information of every character received from the Commanding General of our forces in Europe, or his subordinates, which bear upon reinforcements or renewals of supplies, will be transmitted to the Director of Storage and Traffic, and, in general, this officer is charged with the duty of arranging that all supplies for our forces in Europe shall be forwarded in the most expeditious and convenient manner, and to that end he is authorized to exercise control of army shipment, both within the territory of the United States and as the same relates to the overseas haul.

"The embarkation service created under Section 3, G. O. 102, W. D., 1917, is hereby transferred to the Storage and Traffic Division."

The appointment of the director has not been announced.

The Great Northern Elects a New President

A Man Who Believes in Personal Relations with Patrons
and in Taking Pains to Accommodate Them

THE INCREASED importance attached to the maintenance of satisfactory relations with the public makes it desirable to have an executive at the head of a railway who is capable of pursuing a policy which is both understood and approved of in the territory served. No railroad officer has an opportunity to become more adept in reading the public mind and in satisfying the wants and whims of railroad patrons than the experienced traffic man. This type of officer was elevated to the position of chief executive when James E. Gorman was elected president of the Chicago, Rock Island & Pacific, and that road's example was followed on February 12, when William P. Kenney was elected to succeed Louis W. Hill as president of the Great Northern.

Mr. Kenney, although not so well known in the East, has an extensive acquaintance in the Northwest and has a thorough knowledge of the resources and traffic possibilities of the states traversed by his road. "The public be served" has been his motto as the head of the traffic department of the Great Northern, and adherence to this principle has won for him and his company the increasing confidence and good will of shippers and passengers. Mr. Kenney is a believer in close personal relations with patrons and in painstaking efforts to accommodate them, rather than in wholesale methods of publicity. His election to the presidency has been jokingly ascribed to his consummate ability to tell humorous stories in the Swedish brogue. Although referred to in a spirit of jest, Mr. Kenney's wit and genial good humor have played no small part in winning for him a large personal following as well as countless friends for the Great Northern.

A close student of human nature, he is adept in handling the most delicate situations which may develop through misunderstanding or super-sensitiveness. Like others of Celtic stock Mr. Kenney is a born fighter and keen to match his strength with others in the same vocation. In securing competitive business for his line he has been particularly successful. In inculcating a keen business sense in his subordinates he has shown the qualities of a natural leader.

Perhaps the highest compliment which can be paid to Mr. Kenney is that he was a protege of James J. Hill. Under the direction of the great "empire builder" and later of Louis W. Hill he continued the development work for which the Great Northern long has been noted. He has helped induce immigration to Montana and other western states and has supervised his company's extensive program of practical and educational assistance to the farmer. He has likewise aided

in bringing the attractions of Glacier National Park and other points of interest to the attention of prospective travelers. In fact, his familiarity with this kind of work probably constitutes one of the reasons why he has been selected to direct the policies of a road serving a country still rich in its possibilities for further development.

Mr. Kenney's election as president of the Great Northern as well as Ralph Budd's election as vice-president, illustrates the policy of the Hill lines to give positions of responsibility

to comparatively young men. The former has not yet reached the half-century mark and the latter is barely over 40 years of age. Although Mr. Kenney's career is marked by his rapid rise to high position, it has not been spectacular. His has rather been the steady progress of the persevering, industrious and efficient officer who advances from post to post through sheer merit and remains relatively unnoticed until he surprises his associates by reaching the top.

It is difficult to say when Mr. Kenney left school to enter business life. As a matter of fact, he sold newspapers in the streets of Minneapolis and delivered messages for the Western Union Telegraph Company before he discontinued his schooling. His first railroad position was that of a telegraph operator on the Chicago Great Western from November, 1888, to September, 1889. He then entered traffic work as a clerk in the local freight

office of the same line in Minneapolis, and has been in the traffic department ever since. His connection with the Great Northern dates from September 15, 1902, when he became chief clerk in the general freight office.

Mr. Kenney was born at Watertown, Wis., January 10, 1870, and entered railway service November, 1888, as a telegraph operator on the Chicago Great Western. From 1889 to September 1, 1890, he was consecutively yard clerk and clerk in the local freight office at Minneapolis, following which he was clerk and stenographer to the general agent in the same city until May, 1892. For seven years he was contracting agent of the Great Western, and in 1899 was contracting agent for the Empire Line. He then entered the general freight office of the St. Paul & Duluth, later assimilated by the Northern Pacific, as chief clerk, remaining there until September 15, 1902, when he took a similar position with the Great Northern. On April 11, 1903, he was appointed assistant general freight agent and in January, 1905, became assistant to the fourth vice-president. From May 1, 1908, to September, 1911, he was assistant traffic manager and during the following year was general traffic manager. Since October, 1912, he has been vice-president in charge of traffic.



W. P. Kenney

Hearings Before the Railroad Wage Commission

Firemen and Hostlers Ask Ten Per Cent Increase with Minimum of \$3.50 Per Day. Other Witnesses

WASHINGTON, D. C.

THE Brotherhood of Locomotive Firemen and Enginemen, representing engineers, firemen and hostlers, on Monday and Tuesday of this week presented to the Railroad Wage Commission the requests for increased wages which it had not got around to presenting to the railroads when the government took over the roads.

The request of the firemen's brotherhood may be generally described as for a 10 per cent increase in wages with a minimum of \$3.50 a day of eight hours or less, 100 miles or less, with time and one-half for overtime, calculated on the basis of eight hours or a speed basis of 12½ miles an hour. In passenger service the minimum is placed at \$3 per 100 miles for road service and \$3.50 a day on short turn-around runs not paid on a mileage basis. A minimum of \$3.75 a day is asked for hostlers running on the main track, as between the engine house and a station, and a minimum differential of 50 cents a day is asked for local freight service over through freight rates. It is also proposed that helpers in electric service shall receive the same rates as firemen in steam service.

Timothy Shea, acting president of the Brotherhood of Locomotive Firemen and Enginemen, presented the case for his organization, representing 103,645 engineers, firemen and hostlers, in place of President W. S. Carter, who has been given a leave of absence because of his appointment as director of the Division of Labor on Mr. McAdoo's staff. He explained that Mr. Carter had charge of the case until his appointment, and he filed an elaborate brief prepared by Mr. Carter, and two exhibits dealing exhaustively with the wages and working conditions and the cost of living, including one entitled "Wages and the Law," by Hugh S. Hanna and W. Jett Lauck.

The proposals, he said, were drawn by a committee of 18, representing the three territorial associations of the brotherhood, in response to numerous complaints received from the members during 1917, and demands for a new wage movement because their standard of living was being depressed by the increased cost of living, and they were "made extremely modest" in the hope that if the railroads were disposed to give any relief they would grant them quickly. They were submitted to a referendum vote on December 22 and approved practically unanimously on January 21, after which they were presented to the director general and referred to the Wage Commission.

The wages of firemen and hostlers are abnormally low, Mr. Shea said, as compared with wages in other industries except where earnings are increased by excessive overtime or excessive mileage, and the work is "almost beyond human endurance." Because of the "conservatism of the organization" they have repeatedly accepted compromises and "lean awards" from boards of arbitration until "their conservatism has been capitalized by the railroads" and many of them are now paid less than unskilled laborers. In the west, Mr. Shea said, they received a 10 per cent increase in wages in 1910, but have not received any increase since, except in a few instances in the 1915 award, which, he said, would have reduced the pay of many employees if they had not been protected by the "saving clause." In the east they had received no increase since 1913. The eight-hour movement, according to Mr. Shea, had brought little relief, and he declared that the Goethals commission report was made up largely of forecasts of what the railroads believed would be the cost of the law rather than actual results.

"We hope that the government will now extend the relief so long denied by the railroads," he said. "These employees are performing a very important duty and the firemen and hostlers are the one class of railroad employees that are underpaid."

When Mr. Shea presented comparisons of wages paid to firemen, ranging from \$2.45 to \$4 for an eight-hour day, with wages in other industries, Chairman Lane of the commission asked why so many examples of wages paid in the San Francisco ship yards were included, such as sheet metal workers at \$6.60 a day, whereas in the case of bricklayers and structural iron workers the average of 30 and 32 cities, respectively, were taken. Mr. Shea said he had not compiled the table. Bricklayers' wages, according to the table, had increased from \$5.17 in 1911 to \$5.83 in 1917, while those of structural iron workers had increased from \$4.58 to \$5.62. The rate usually paid firemen, Mr. Shea said, was \$3.10 or \$3.20 because there is a preponderance of the classes of engines on which those rates are paid.

Chairman Lane asked which class of employment in the table of other industries was most nearly comparable with the work of the fireman, and whether the fact that a man has to serve an apprenticeship in the other employments constitutes a difference. The duties of a fireman are comparable with those of any skilled craft, Mr. Shea replied. Chairman Lane also asked what percentage of the members of the organization are married men and heads of families. Mr. Shea said the records of the brotherhood do not show that fact.

Mr. Shea asked particularly that any settlement be made specific enough to avoid any dispute as to its application to hostlers and he recounted at length his long controversies with the railroads that had refused to apply the awards of arbitration boards or other settlements to the hostlers. Some roads, to avoid paying the awarded scale, he said, have changed the classification of hostlers to roundhouse foremen or engine repairers and have kept the men on a 12-hour day.

He also dwelt at length on the request for time and one-half for overtime, saying that a punitive rate would be necessary to enforce an actual eight-hour day. The best way to prevent train delays, Mr. Shea asserted, would be to penalize overtime and give each locomotive only its "proper tonnage rating." He said the roads had sought to make the application of the eight-hour law as expensive as possible.

Chairman Lane suggested a plan of payment for firemen which would reward economical use of fuel. Any such plan, Mr. Shea said, would be opposed. It had been tried on some roads and had caused a great deal of discontent because it was impossible to measure accurately the amount of coal used by a fireman, and it led to dishonesty on the part of some employees. Railroads are not burning coal now, he said, but are using "real estate."

"That is an experience common to all of us in these days," said Chairman Lane, "but why cannot the brotherhood make itself very useful by devising some plan or system of education among its men to save a percentage of coal?"

The brotherhood publishes educational matter in its magazine, Mr. Shea said, but the bonus system would not work. The fireman does not want to shovel any more coal than he has to, but there should be more competent instructors to show him how to be economical.

Mr. Shea continued his testimony on Tuesday, making numerous objections to statements included in the report of

the eight-hour commission. He particularly objected to a table included in the report showing that firemen spend only a small part of their time in the physical labor of shoveling coal and he referred to an exhibit filed by the railroads in the western arbitration case, showing that in 1,556 trips an average of only one hour and 42 minutes, or 19 per cent, was actually spent in shoveling coal. Mr. Shea said that as firemen shovel from 15 to 20 tons going over a division, if they could handle that amount of coal in such a short time it would not be necessary to send steam shovels to France.

He also filed 11 exhibits which had been used by the brotherhoods in the western arbitration case in spite of the fact that the board in that case was not sufficiently impressed with the presentation made by the brotherhoods to give an award anything like what the men demanded. These exhibits gave statistics as to increased cost of meals and rooms and the increased cost of living, increased work and productive efficiency of the employees, the hazard of the occupation, etc., and he declared that the relief which the men had asked had not resulted from the eight-hour law so that the old statistics were still useful. He also attacked many of the conclusions reached by the Eight-Hour Commission as erroneous on the ground that they were based on the period before the law was actually made effective. Reverting to what he declared to be the practice of the railroads in avoiding increased payments to hostlers, Mr. Shea presented what he called "very sensational testimony" in the form of a report from an employee relating instances of accidents and damage to locomotives caused by using machinists and helpers, boiler-makers and their helpers, or inexperienced or low-paid employees in the place of hostlers. These instances, he said, were samples of conditions on other roads and he cited examples of delays in putting engines through the roundhouse as the result of employing inexperienced men at low wages.

There has also been startling increases in the number of violations of the hours of service law, he declared, and he cited reports from a road which for five years had shown a steady decrease in the number of instances of service over 16 hours, from 824 in 1913 to 89 in 1917, whereas he had received reports of 123 instances on the same road from January 2 to January 24.

"That is not an extraordinary situation at all," said Chairman Lane. "If I were running that railroad I would probably have had that amount of overtime. January was a very abnormal month and I would not put any confidence in figures of that kind."

Mr. Shea declared that the men are saying that railroad officers now feel at liberty to violate the law because they are in the hands of the government. Commissioner McChord said that was a very mistaken idea and probably arose from the fact that some railroads had asked for relief from the provisions of the law, but that he was approving prosecutions for violations of the law every day.

Mr. Shea also introduced an exhibit on the increased cost of living prepared by W. Jett Lauck and also a statement by a clothing dealer showing the large increase in the cost of overalls, gloves and other clothing. In order to be able to maintain their pre-war standard of living, Mr. Shea said, the men should receive an increase of at least 45 per cent.

Mr. Shea was to be followed by W. S. Stone, grand chief of the Brotherhood of Locomotive Enginemen.

Other Witnesses

S. L. Heberling, president of the Switchmen's Union, testified before the Railroad Wage Commission on February 8 regarding the demands presented last October by the union to the railroads with which it has contracts for a 50 per cent increase in wages and time and a half for overtime after eight hours. The practicality of establishing an eight-hour day during the war by punitive overtime was questioned by Chairman Lane.

"I sympathize with you as to the desirability of a standard eight-hour day," he said "but when industries or short of men would it be more desirable to come to that ideal or to give an increase in pay without disturbing the hours?"

Mr. Heberling said the switchmen did not ask an arbitrary eight-hour day if overtime work was necessary, but wanted to keep the work day as near to eight hours as possible by imposing a penalty for overtime work.

"But would your men not be better satisfied with an increase in pay than with an enforced reduction of hours?" asked Chairman Lane.

"We want enough to make both ends meet," replied Mr. Heberling, "but do not want the principle of the eight-hour day destroyed because of war conditions." Mr. Heberling said that the only limit to the hours of work now is the 16-hour law and that overtime is responsible for the extreme hazard of the switchman's occupation. He also asked consideration for unorganized employees.

C. L. Darling, of Spokane, Wash., A. S. Binrose, of Portland, Ore., and J. C. Wessels, Ashland, Wis., appeared in behalf of train dispatchers on February 8 and asked for increases in pay for train dispatchers to \$285 a month, for chief dispatchers and \$215 for trunk dispatchers, an eight-hour day, one day a week off or double time, two weeks' vacation with pay, and free transportation. They said that opportunities for promotion for dispatchers were being reduced because brotherhood men are given positions as trainmasters and assistant superintendents.

Thomas McNeill, representing car inspectors on the Pennsylvania contended that the inspectors should come under the provision of the eight-hour law because of their part in the operation of trains, but he said the railroad managements have refused to concede this. He also asked increases in wages.

Robert L. Mays, a dining car waiter, spoke for unorganized negro waiters and colored employees generally, asking that they be given the same pay as white employees in the same classes of work. He said the waiters received about \$25 a month for 16 to 18 hours work a day. He asked for an increase in wages, but said that they could not get along without tips unless the pay was increased to about \$100 a month.

The commission has received a large number of telegrams and letters from train dispatchers in all parts of the country challenging statements made by W. G. Lee and A. E. Garretson at the hearing last week in which the dispatchers were referred to as train "delayers" and the railroads were charged with "laying down" and deliberately trying to increase overtime both for the purpose of discrediting the eight-hour law and in an effort to make a failure of government control of the railroads. The dispatchers declared that they were in a position to know that railroad officers are striving with all their energy to expedite traffic, and they demanded either proof or a retraction of the charges. A telegram signed by dispatchers on the Union Pacific said, "We desire to revoke and brand such statements as malicious falsehood." A letter received from George W. Greenert, a train dispatcher on the Chesapeake & Ohio, said:

"As a train dispatcher I wish to object against the remarks made by Lee and Garretson before the wage commission as reported by the press today.

"I wonder if the gentlemen are woefully ignorant or deliberately distorting the truth when they intimate that railroads, from the president down to the train dispatchers, are train delayers as they blipantly call them, are laying down.

"They would have you believe that it is within the power of the managements—like Joshua of old—to command the sun to stand still until all the ice and snow of this winter of blizzards is melted and the sun-kissed flowers are waving to and fro by the balmy breezes as the trains pass by—but here they let you see the inside of the plot. The railroads refuse

to do what Joshua did—they are laying down, because they don't want the government to have the railroads.

"Seriously speaking, however, when we see railroad officers 'get on the job' at 5 o'clock in the morning and work steadily, earnestly, faithfully until 10, 11, or 12 o'clock at night and subject themselves to calls at any time during the night; when we see officers working like Trojans to move business through ice and sleet and snow blown head high by blizzards, 36 hours and even longer at a stretch without rest, it makes a man's blood boil with indignation to hear the remarks made to your honorable committee about them laying down.

"As to the train dispatchers—their hours of work and days of work have not been lessened for 30 years. They are on duty continuously during their 8-hour trick and in touch with all trains and all conditions on their divisions of from 100 to 400 miles every minute they are on duty, ever ready to act instantly when necessary to issue orders or instructions for the safety of trains. I have seen them remain on duty from one to three hours in order to look after some important matter and to see that the relieving dispatcher was properly posted—this after they were off duty.

"A dispatcher takes pride and interest in his work (which is like a game of chess) to a degree that is beyond the calculation of dollars and cents. Every dispatcher has 'sweated blood' on his trick many times and would have gladly traded places with some negro section hand—color, flat feet, and all—at these times.

"They do delay trains—and many a man and woman and child are alive today because of the delay. Many a train and engine man is alive and with his family today because the dispatcher delayed them. A broken rail reported, a wash-out, a land slide will cause the dispatcher to act instantly and delay trains. Two trains cannot meet on the same track without a collision—he may delay one of them at a siding with orders to meet another—he does it on purpose. The men delayed, if they are not big enough to see anything but their own train, will damn the dispatchers, call them train delayers and make other light-headed remarks to the farmers along the line.

"I believe that as a whole the railroad train and engine employees, trackmen, dispatchers, and in fact all employees are doing their utmost to make the director general's operation a success and to speed up war transportation to the limit.

"Just wait until we get a little warmer weather and watch them roll. Wonderful things will be done in the transportation line the coming eight months. Let us all have a fair and square deal."

Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers, testified before the wage commission on Wednesday. He said his organization had decided not to enter the general wage movement; it did not desire to embarrass the government and he presented no formal demands, but said that the engineers should have an increase, to meet part of the increased cost of living, to a minimum of six dollars a day. He did not criticize the roads as much as the other brotherhood officers.

Mr. Stone also referred to Mr. Shea's testimony regarding increased violations of the sixteen-hour law, saying that the roads had been ordered by Regional Director A. H. Smith, with approval of Mr. McAdoo, to disregard the law as necessary to move traffic during the emergency; but after it had been taken up with Mr. McAdoo he had ordered the roads to observe the law.

THE GRAND TRUNK LITERARY AND SCIENTIFIC celebrated its 60th anniversary recently. It was organized by F. H. Trevithick, in 1857, when he was Locomotive Superintendent of the Grand Trunk, and led to the establishment of G. T. R. libraries at London, Stratford, Belleville and Lindsay, Ont., and Battle Creek, Mich.

The Financial Future of British Railways

THE FOLLOWING EXTRACT is from the January issue of the Railway Magazine of London, Eng. There recently appeared in the Financial Times an able article on the future prospects of British railways, by W. J. Stevens. After recapitulating the war terms arranged in 1914 between the railways and the government, familiar to most readers of the Railway Magazine, Mr. Stevens went on to show that the economies in railway working under government control result in financial benefit for the government and not the railways. Then he disposes of the misapprehension prevailing in some quarters that the government is making no provision for delayed repairs and renewals, which is the reverse to the truth. In fact, one important change wrought by the war in British railway finance is that the companies, instead of being large borrowers, are for the time being very large lenders, and will remain in that position until they are able to resume normal outlays on maintenance and renewals of their permanent way and rolling stock.

When all is said and done, however, says Mr. Stevens, the government has driven a very hard bargain with the railways, and the experience of the latter is in marked contrast to that of other industrial enterprises. A summary published in the Economist shows that nearly all branches of industrial enterprise increased their profits substantially during 1916 and 1917, and are earning much larger percentages than the modest 4 per cent earned on British railway capital. Many of these undertakings have also made and are making large bonus distributions on capital account. The dividends distributed on the ordinary stocks of our railways have not varied much since 1913, but are slightly below the pre-war level. What is more serious is that the income tax has been raised to 5 shillings in the pound, so that what the government seems to give with one hand it more than takes away with the other.

Many thousands of small investors interested in railway stocks are probably quite as much in need of war bonuses as the railway employees themselves, but they have not received them. On the contrary, their income is reduced, and over and above that reduction they are confronted with the increased income tax. That the railway shareholders as a body have not complained is the most wonderful testimony to their patriotism that I know of, but whether it is altogether wise for the government to treat the largest section of the investing public in so niggardly a fashion is another question, and, personally, I have no doubt that it reacts unfavorably on contributions to war loans, etc.

Why are our railways, who have rendered unrivaled services to the community during the war, treated on a different basis from all other industrial enterprises? What essential difference is there between the railway companies and shipping, for instance, that the shipping industry should have been allowed to earn enormous profits and the railways treated in such a cheeseparing fashion? It might be tolerable for the railway industry to submit to the existing arrangement, for which, after all, they have to thank their own directors, but it is high time that needless uncertainty as to the proprietors' future should be removed. They only ask for an assurance that after the government arrangement comes to an end they will be allowed to adjust their charges to the public in such a way to meet, in a reasonable manner, their increased burdens in the form of wages, bills, etc. To a large extent this new burden is already being met by fresh forms of economy, and which will, no doubt, be of a lasting character.

THE VALUE OF COAL AND COKE sent out of the United States since the beginning of 1900 exceeds \$1,000,000,000.



Pulling the Chicago Terminals Out of the Snow

What the Railroads Were Compelled to Do in Restoring
Traffic After the January Blizzards

THE MONTH OF January, 1918, will be recorded in railroad annals as a record breaker for snow trouble in Chicago and its environs, not only because of the depth of snow fall, the severity and frequency of the storms and the continuous cold weather, but also because of the complete tieup of traffic which followed the burial of the complex network of badly congested terminals in a deep bed of snow. The efforts made to overcome the blockade which was paralyzing industry and threatening a serious coal famine cost the railroads several millions of dollars and called forth herculean efforts on the parts of their officers and employees.

An account of the two severe storms occurring on January 5 and 11, respectively, and the details of the traffic interference which followed in their wake was given in the news columns of the *Railway Age* of January 18, page 182. The character of the conditions produced by the storms is illustrated in the photographs. While not suffering any worse in the aggregate than the other roads, the Illinois Central was subjected to some of the more spectacular conditions throughout the portion of its line exposed to the sweep of the winds off Lake Michigan. The eight main tracks of this railroad are bounded on the side away from the lake for a considerable distance by a high retaining wall and the snow which piled up against this wall, completely buried the two adjacent tracks and any equipment standing on them. On the other roads not subjected to such an open sweep of the storm the snow was more evenly distributed over all of the tracks.

A large part of Chicago's railway mileage is on elevated embankments and in places where these embankments are occupied by only a relatively small number of tracks the wind accompanying the storms swept away most of the snow, but in many cases main tracks on the elevation are flanked on one or both sides by yards of considerable width so that the conditions approximated those experienced where tracks are on the natural surface. In general the chief difficulty was with the many miles of yard tracks largely occupied by standing cars, the movement of which at the earliest possible

date was imperative to the welfare of not only the city but also the nation.

The railroads employed large forces of men in the removal of the snow and considering that their demands were combined with those of the city for men for street cleaning, it is not surprising that the wage rates in some cases attained almost unbelievable heights. There was, however, a plentiful supply of labor. The wholesale shutting down of industrial plants as the result of the blockade threw many men out of employment who were glad to shovel snow. Some industrial plants turned over large forces of men to the railroads temporarily, while the latter were enabled to recruit large forces from freight handlers, office clerks, draftsmen, etc., many of whom could not be employed at regular work on account of the stopping of the traffic. It is also found that lodging houses were accommodating an unusually large number of idle men who had come into the city for the winter.

Various plans were adopted for recruiting the forces. Some railways depended on the regular employment agencies. Others resorted to the free labor agencies or to picking up the men direct from the streets or the lodging houses. Employment was also encouraged by making special arrangements to pay the men promptly. Some of the roads paid the temporary men daily, a measure which introduced no small task in the time keeping and accounting. It was also necessary to feed the men one or more meals each day. The men were taken to nearby restaurants or boarding houses or special trains were run out at intervals with sandwiches and coffee. During the colder weather arrangements were made to supply the men with hot coffee at frequent intervals throughout the day.

The administration of the work at the large terminal areas in a manner that would insure most effective results and a thorough co-ordination of the efforts being made by the various branches of the rapidly created organizations was no simple task. In this connection the Baltimore & Ohio Chicago Terminal developed a most interesting system. Men of known ability and who had previous experience in fighting snow were placed in charge of various subdivisions of

the terminals and made responsible for the progress within certain prescribed limits. In order that the officers of the road could be kept advised of the conditions at all parts of the terminals and the progress being made in restoring the tracks to operation, as well as give the necessary advice and

despatch men, materials and supplies where most needed, an intelligence bureau was established in the office of the district engineer. All of the telephones in the engineering office were assembled on a single large table where a staff of men was kept busy receiving and answering telephone calls,



Snow Conditions Around Chicago

while a record of the information given and received was kept on a quickly devised chart.

With a knowledge of the situation gained through this system the needs of the men in charge of the various parts of the terminal were fulfilled by different men detailed to look after certain requirements. Thus some men were commissioned to gather laborers, others to requisition or purchase tools to provide lunches for the men, etc.

By far the largest portion of the snow was handled by shovels. Obstructions tended to preclude the use of power equipment in many places, consequently the snow was largely loaded by hand on cars of all classes—flat cars, gondolas, hoppers, box cars and stock cars—and hauled to a convenient point of disposal where they were unloaded by hand. In some cases coal cars were handled direct to mines in the southern or central part of the state where the snow was unloaded on mine spoil banks. One road used locomotive cranes with clam-shell buckets for unloading snow from cars, and while a large yardage was handled in this manner it represented only a relatively small proportion of the total amount of snow unloaded. The Chicago, Burlington & Quincy also made some use of a crane and clam shell bucket, assigned to coaling and cinder pit service, for excavating snow during intervals of the day when it could be spared from its regular work. On another road, boxes with a capacity of seven or eight cubic feet of snow with handles on the sides so that they could be carried by two men, were provided for use in this service where the snow could not be handled conveniently in larger quantities. In some cases wagons and motor trucks were used to haul snow from team yards and freight house grounds, dumping the snow into the river or the lake.

Snow plows were used where practicable, but the use was limited largely to main tracks. On the whole the supply of plows for such use as they could be put to was generally adequate.

One road, however, found it expedient to import a rotary snow plow from western heavy snow country to be used in clearing drifts in cuts, but its use was restricted principally to tracks at some distance from the city.

Of all the equipment available the ballast spreaders were the most effective. They were used in some cases with short wings to clear and flange a single track, but the most efficient results were obtained with the long wings with which an adjacent track was cleared, while the one occupied by the spreader was being flanged. By following this procedure progressively on track after track, it was possible to clear an entire yard of snow, although it was found advisable in some cases to block one track with snow plowed from a series of tracks on either side and later to clear this track by shoveling the snow onto cars. Whether the tracks were cleaned by hand or with spreaders the most difficult task was to remove cars that had occupied these tracks during the storm with the snow in many cases well up under the car bodies. These cars had to be pulled out in small cuts, using one or more engines for three or four cars, a process that frequently proved disastrous to the draft rigging.

Snow melters at the Chicago & North Western passenger terminal installed at the time that this station was built, served in good stead during the recent storms. There are 10 of these installed near the end of the train shed and along the approach tracks. They consist of pits or boxes about 3 ft. by 6 ft. equipped with steam pipes and connected by drains with the city sewers. Shoveling snow into these boxes solved the problem of disposal with a minimum of interference with traffic.

As the work progressed and the tracks were restored to operation it was possible gradually to reduce the maintenance forces on the various railroads to more nearly the normal basis.

A New Scale Test Car

By A. Christopher,

Scale Inspector, Nashville, Chattanooga & St. Louis.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS has recently constructed a scale test car at its shop in Nashville, Tenn., the general design of which is shown in the photograph. The car is of iron and steel construction throughout. It has two four-wheel trucks of the standard 80,000 lbs. capacity type, with special heavy arch bars extending 27½ in. from the center of base cross cut to parallel to the end of the car. The overall dimensions are:

Length, 22 ft. 9 in.; width, 8 ft. 4 in.; top of roof to top of runway, 6 ft. 4 in.; extreme wheel base, 17 ft.; and intermediate wheel base, 6 ft. Weight, 90,000 lb.

The main body of the car is built of heavy channel irons and I-beams with two cross members built up with heavy angles divided between the transom plates. These plates are of ½-in. steel, 24-in. wide and 8 ft. 4 in. long. The plates are riveted to the longitudinal channels and I-beams. The center plates are of cast iron and weigh 40



The New Car Standing on a Scale

lb. each. Four 24-in., 100-lb. I-beams, 16 ft. long, form two separate test compartments which will accommodate 1,100 secondary test weights of 50 lb. each. All joints in connection with the compartment are cemented and welded to prevent leaking. The car is designed with a view to reducing the area as much as possible so as to limit wind pressure.

The car is floored with ½-in. steel plates. The roof is composed of three pieces of ¾-in. steel formed so as to be freed quickly from the water which falls upon it and to provide a runway at the top. Two hand rails are attached for the convenience and safety of the trainmen passing over the car. The end plates are of 1-in. steel, cut to conform to the shape of the roof, and are heavily anchored to the ends of the 24-in. I-beams which form the secondary test weight compartment.

Twenty small jacks are provided in each end plate to hold the secondary test weights so that they will be held securely in place to prevent loss of weight owing to wearing away by shifting. There are two hoisting jacks on each end of the car with swinging straps to connect the jacks to the extending arch bars. By this means the four end wheels are raised to clear the rails. This places 90,000 lb. on the 6-ft. intermediate wheel base. It requires only 11 min. to connect the straps and raise the end wheels. The test weights referred to above are rectangular in form. They were sealed on an even balance master sealing scale with a capacity of 100 lb. in each pan and are sensible to within 10 grains of their

true value. One-inch gas pipe was used for handholds and for sealing purposes.

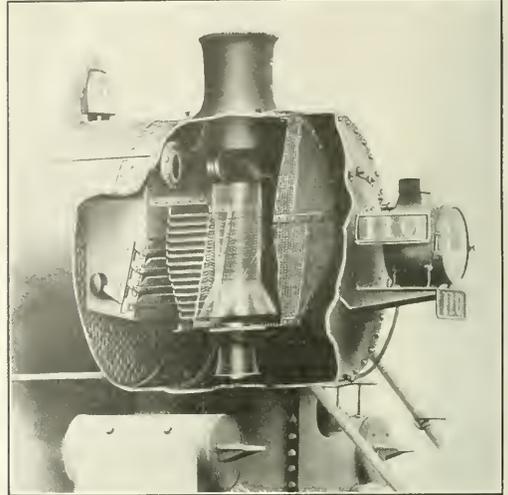
The weight of the car when completed and painted was 45,000 lb. No master track scale was available to obtain the correct weight of the car so it was necessary to make 900 50-lb. test weights. A modern 150-ton track scale was tested with the 900 50-lb. test weights on each section by 5,000-lb. drafts up to 45,000 lb. The scale was checked in opposite directions and all small errors corrected.

The correct weight of the car was then taken and the 50-lb. test weights placed in the compartments through the man-holes until the beam registered 90,000 lb. When the car was complete the end wheels were raised to clear the rails, placing the 90,000 lb. on the 6-ft. wheel base. Each section of the scale was tested and checked without an error.

If it is desired at any time to increase the weight of the test car to 100,000 lb. there is ample room in the compartments for 10,000 lb. additional weight. The 6-ft. wheelbase will be used for sectional tests on standard track scales of 85-ton capacity and over, built with a heavy steel bridge and on concrete foundations and walls. The 17-ft. wheelbase will be used to check scales that will not stand the 90,000-lb. test on the 6-ft. wheelbase on account of the deflection in the light scale levers and timber girders, side walls, bearings, etc. To the latter class belongs the larger number of the privately-owned scales on the system. The new car has been in service for three months, during which time it has been tried on many different scales and is proving entirely satisfactory.

have wide fireboxes and burn anthracite coal, and the remainder have narrow fireboxes and burn bituminous coal. It is claimed that this spark arrester will not appreciably reduce the steaming qualities of the locomotive, and a statement has been made that by its use the fire claims have been reduced 40 per cent.

The sectional photograph shows the device applied to a

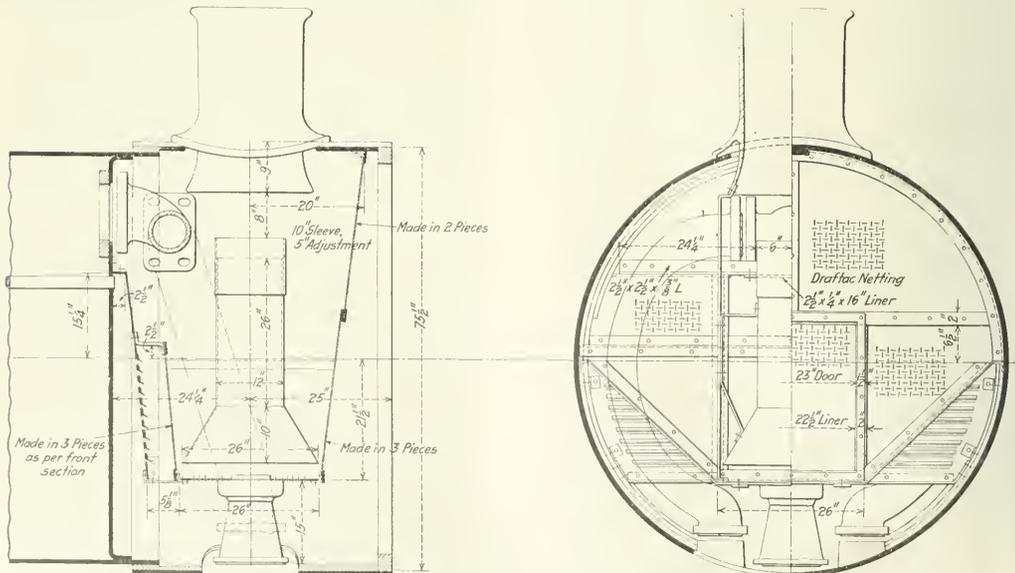


Application of Spark Arrester to a Superheater Locomotive

Locomotive Front End Spark Arrester

A NEW TYPE OF LOCOMOTIVE spark arrester has been developed and patented for both anthracite and bituminous coal burning locomotives by I. A. Seiders, superintendent of motive power and rolling stock of the Philadelphia & Reading. During the past two and one-half years it has been applied to 474 locomotives, 390 of which

locomotive with a superheater, and the drawing illustrates the application to a saturated steam locomotive. The principal features of this spark arrester consist of a "breaker plate" made up of a slotted plate fitted with deflecting veins, which



Arrangement of the Spark Arrester for Non-Superheater Locomotives

is applied in line of the blue gases ahead of the front blue sheet. This breaker plate tends to break up the largest sparks before they strike the netting. The horizontal diaphragm table plate is perforated with 7/32-in. holes and the side sections are inclined, being attached to the sides of the smokebox. This type of diaphragm reduces the amount of resistance to the draft and adds to the self-cleaning characteristics of the front end. The horizontal table is made up of 3/8-in. material, being 26 in. square. It is perforated to permit of better entrainment of the gases without decreasing the size of the exhaust nozzle and rests on a flange at the top of the nozzle tip. The blower pipe is fitted into the exhaust nozzle below the table line.

The side table plates are inclined, as shown in the illustration, to prevent the collection of cinders. The fine particles fall to the bottom of these plates on top of the perforated horizontal table and are carried out of the stack by the exhaust. The plate around the steam pipes is so secured that it will not vibrate, opening up holes for sparks to pass through.

The joints in the netting are so made that no openings can occur to permit the passing of unduly large sparks. All nettings and plates are bolted at the side to a 2-in. angle iron, which is riveted to the smokebox.

The front netting and plates are arranged in separate

parts with ample support at their intersections, as shown in the illustration. The center plates may be easily removed when it is necessary to work on the flues, making it unnecessary to remove the entire front end netting or the table.

The spark breaker plate, located directly in front of the tube sheet and back of the front end netting, is secured to the flue sheet over the top row of flues under the T-pipe. It has 16 pressed steel openings 4 in. wide and pressed out 1/2 in. away from the plate for the full length of the plate. Its purpose is to break up the sparks, permitting only the finer particles to pass through the netting in front of it. The larger particles will travel to the front of the smokebox and in their passage be reduced sufficiently to pass through the netting.

The netting used with this device has an oblong opening 3 1/16 in. by 3 1/4 in. In the front end, shown in the drawing, the open area of the breaker plate is 462 sq. in. and the entire netting area has an opening of 1,607 sq. in.

Due to the large opening it will not be necessary to reduce the size of the nozzle to provide the proper draft. In this way it will provide greater economy in fuel.

This front end arrangement has reduced shop maintenance costs due to its self-cleaning qualities. It is simple in construction, strong and durable, and reduces the number of leaky joints in the netting commonly found on locomotives.

Duties and Responsibilities of Engineers and Firemen

Firemen's Work Particularly Laborious; Mechanical Improvements Lighten the Work of Both

THE REPORT of the Eight-Hour Commission, of which General George W. Goethals was chairman, and which was reviewed in the *Railway Age*, February 1, 1918, has an appendix, No. 7, devoted to "Employment Conditions in Train and Yard Service Under the Eight-Hour Law." This was prepared by Victor S. Clark. That part relating to the duties of enginemen follows:

A road engineer's responsibilities and duties are less varied than those of a conductor, but they are more intensive and continuous. His preparatory work is merely to inspect his engine and to see that it is supplied with fuel, water, oil, and other necessities for the run; and his clerical work is limited to making out a time slip for himself and his fireman, and to reporting engine defects and failures. But from the time he takes the throttle at least six things constantly weigh upon his mind—his train orders, the automatic block and manual signals along the line, the track immediately in front, the water gauge, the steam gauge and the sound of his engine. Even a moment's inattentiveness to any of these things may mean delay or disaster. In time the constant observance of these essentials becomes almost automatic and subconscious; but the general testimony of engineers is that the sense of responsibility and of latent danger always remains. In bad weather, when soft tracks and possible washouts or slides are to be watched for, or when blizzards sweep the prairies, burying landmarks and blinding the outlook until only the jarring of the drivers on the frog tells the engineer that a station has been reached, the strain of this responsibility rises to a maximum even with the most experienced. Moreover, a careful engineer does more than run his locomotive according to orders and keep it in condition upon the road. When rounding curves he looks back for hot boxes, he senses in the movement of the slack the development of equipment defects in the cars behind, and in general he co-operates with the caboose crew to maintain the smooth, mechanical operation of the entire

train and is held equally responsible with the conductor for its safety.

Firemen Are Hard Worked

An engineer's physical labor, however, is much less arduous than that of a locomotive fireman. The latter is in this respect the hardest worked man in train service. His direct responsibility is comparatively light, though he must watch signals from the left side of the cab and must read and understand train orders. A very few large locomotives of recent construction have mechanical stokers, but they form an inappreciable fraction of the motive power in use on American railways. A considerably larger part of the engines running in the Southwest and on the Pacific coast burn oil fuel, and in such cases the physical labor of the fireman is comparatively light. In suburban and mountain service, especially where there are long tunnels, electric power—which is cleanest and easiest of all for the engine crew—is being introduced; but this change is still in its infancy. Therefore the typical fireman is a coal shoveler. The amount of coal he must put into the firebox in a given time varies with the size and construction of the locomotive, the class of service in which it is engaged, the weight and speed of the train, the quality of fuel, the grade of the road, weather conditions, and other factors, among which must be reckoned the skill of the fireman himself.

Taking the average of all locomotives upon a representative American railway in 1916, every switch engine burned 135 lb. of coal for each mile it ran, each passenger engine 105 lb., and each freight engine 229 lb. In covering a division of 100 miles the fireman of a freight locomotive would have to shovel more than 11 tons of coal through a low firebox door, stooping and swinging well back to spread the fuel or to place it on thin places in the fire, and opening and closing the door for every scoopful. He performs this labor standing on the unsteady deck of a locomotive, where an in-

experienced man might have difficulty in balancing himself without support. Among other duties of a physical character he must wet down the coal, break up the large lumps, pull the coal forward from the back of the tank or tender box—which sometimes amounts to double handling nearly half the fuel burned—shake the grates, and if the coal clinkers badly he must sometimes clean his fires in the course of the run. He takes on coal and water, attends to other engine supplies, watches the steam gage and the road signals on his side of the cab, and assists the engineer in minor phases of engine operation.

Besides being laborious these duties are sometimes attended by severe physical hardships. The heat thrown out by the fireboxes of the extremely large locomotives now coming into use is intense, especially when a long freight is barely moving up a heavy grade, devouring fuel as fast as it can be piled upon the fire, and making practically no breeze through the cab by its own motion. Firemen on runs of this kind sometimes have to protect themselves with leather aprons to keep the heat from igniting their clothing. When we add to these conditions an outside temperature of 100 deg. or more, such as not infrequently occurs in the southern and prairie states during the summer, a situation is reached that taxes the limits of physical endurance. At such times heat prostrations become frequent—as railway men say, the firemen “burn out” or “the monkeys get them.” They suffer undue strain when a badly clinkered fire has to be cleaned in the middle of a heavy run, for this is rated exceptionally exhausting labor. Firemen are also exposed to more or less suffering from smoke and from gases thrown back from the firebox in passing through long tunnels or snowbeds, especially where more than one locomotive is attached to a train. They sometimes lose consciousness and even die under these conditions.

Mechanical Improvements Lighten the Work

It is a matter of controversy between railway employers and firemen whether the labors and hardships of the latter are increasing or diminishing. On the one hand, much larger engines are now employed than formerly, and the tonnage of trains is constantly growing—two conditions that add to a fireman's burdens. On the other hand, important mechanical improvements have lightened the work of stoking, and the Brotherhood of Locomotive Firemen and Enginemen has secured new working rules in its schedules with many companies that relieve its members of some of their former labor. Such rules are those providing that men shall be stationed at intermediate points on a division to clean fires, or to pull down coal to the front of the tender, and that helper or relay firemen be furnished on exceptionally long or difficult runs.

However, new mechanical devices have contributed more than these rules to alleviating the fireman's condition. Oil-burning locomotives have made possible firing heavy trains through the south-western deserts, where the mercury reaches 120 deg. or more in the shade and the temperature of the breezes through the cab window almost rivals the blast from the firebox door. Brick arches and superheaters, by causing the gases in the firebox to be consumed more completely, and by utilizing a larger fraction of the heat generated for steam production, have lessened the amount of fuel employed to pull a given weight of train. Fire grates are now shaken by power, and air doors enable the fireman, by a mere pressure of his foot, to throw open the firebox to admit coal, where formerly he had to stoop over and pull the door open by a chain. Coal pullers automatically shift the coal forward in the tender tank to a point within reach of the fireman. Mechanical stokers feed the coal from the tender into the fire by a conveyor and blast contrivance, so that the fireman's stoking duties are reduced largely to attendance upon machinery.

An analysis of work performed by locomotive firemen in slow-freight service during four runs with hand-stoked and mechanical-stoked engines, respectively, affords the following

illustrative data: The four hand-stoked locomotives ran an average of 79 miles, pulling trains having an average weight of 3,149 tons, and the firemen were on duty an average of 14 hr. 9 min. Of this time they spent 7 hr., 3 min. in actual manual labor, of which 4 hr., 59 min., or more than one-third of the time they were on duty, was devoted to shoveling coal into the firebox. Most of the remaining time used in manual labor was employed in hooking and scraping fires, shaking grates, breaking up large lumps of coal, shoveling down coal from the rear of the tender, and cleaning fires. Each fireman handled with the scoop—directly into the firebox—about 11½ tons of coal. The time not employed in manual work included rest intervals while running and station work and watching signals.

Similar figures for the four locomotives having mechanical stokers are: Average distance traveled, 115 miles; average weight of train hauled, 2,135 tons; time on duty, 13 hr., 10 min.; time devoted to actual manual labor, 4 hr., 5 min., or 19 per cent less of the time on duty than in case of hand-stoked engines; time employed shoveling coal by hand into the firebox, 1 hr., 24 min., or nearly 25 per cent less of the time on duty than in case of hand-stoked engines; amount of coal burned, 22½ tons, about 2½ tons being fired by hand.

Some objection is still made to mechanical stokers, though they are rapidly being improved. Those of an older type are noisy and dirty, keeping the cab full of flying coal dust. They are a recent invention, the number in use having risen from six of all designs in 1910 to 1,418 in 1916. Even the latter number would not supply the road service of one of our larger railway systems.

Firemen occasionally receive assistance from the engineer and the head brakeman. The latter may shovel down coal from the rear of the tender—though this is forbidden by union rules on some roads—or even fire the engine for a short period, especially in exceptionally hot weather when the fireman shows signs of playing out. He also lights signal lamps and performs other minor services around the engine as a matter of accommodation. Engineers sometimes assist in cleaning fires; indeed, one case was observed where both members of the engine crew and two members of the train crew, including the conductor, were engaged in this operation. Likewise in very hot weather an engineer will put an exhausted fireman at the throttle for a few minutes and fire the locomotive himself. But all these interchanges of service are voluntary, and are more or less the exception. They are looked upon with disfavor by union officials, as tending to create precedents that may be used oppressively by operating officers.

A fair summary of the present situation of locomotive firemen would seem to be that their duties are passing through a transitional phase, where exceptional labor and hardships are imposed in some instances, but where the promise exists not only of remedying these but of making the general condition of this branch of service better than before. The brotherhoods have thrown their influence toward mechanical improvements, in some instances making the adoption of labor-saving devices within a stated time an article of their agreement with employers. Some of these improvements, such as the brick arch and superheaters, are intended primarily to save fuel, which is a most important matter with railway managers. Exceptional hardship is just now imposed on firemen where train tonnage has been increased and large engines have been introduced without these improvements, where double-heading has become the rule not only on grades but over an entire division, and where the recent coal shortage has forced the adoption of inferior fuel, that increases the labor of shoveling and clinkers the grates so that fires demand frequent cleaning. The deterioration of motive power during the late railroad depression, and the subsequent period of excessive traffic and shortage of skilled mechanics, has also added to the labor of both firemen and engineers.

The Wabash-Pittsburgh Terminal Investigation

The Interstate Commerce Commission Finds This Expensive Little Road a Poor Business Venture

THE FOLLOWING excerpts are taken from the report of the Interstate Commerce Commission signed "by the commission" on the Wabash-Pittsburgh Terminal:

The building of the Terminal into Pittsburgh, the resultant break between the Gould and the Pennsylvania Railroad interests, and the subsequent bankruptcy of the Terminal, followed by the collapse of the scheme for a transcontinental railroad under Gould control, are important events in recent railroad history. The possibilities held out, when the bonds of the Terminal were first being sold, of that company's securing a large share of the traffic of the Pittsburgh district, were alluring, and the failure of the company to secure more than barely sufficient traffic to meet its operating expenses was complete. The plan of reorganization, now practically concluded, was unusually drastic.

The Terminal owns a 60-mile single-track road running over 88 bridges and through 18 tunnels from Pittsburgh Junction, Ohio, where it has a connection with the Wheeling, to the corner of Ferry street and Liberty avenue in the city of Pittsburgh. The entrance into Pittsburgh was secured by tunneling the rock-bound ridge on the west bank of the Monongahela river, crossing that river over a bridge 1,504 feet long, and by building a line to its Ferry street station and yards under an old street railway franchise. The record indicates that the Pennsylvania considered the Terminal's entrance into Pittsburgh an invasion of its territory.

In addition to its main line, the Terminal owned a majority of the stock of the Wheeling, and all of the stock and bonds of the coal company. The coal company, in turn, owned the stock and bonds of the West Side Belt—a single-track railroad 21 miles in length—running from a point in the west end of Pittsburgh to Clairton, Penn.

Following the failure of the Terminal to meet its note and interest obligations, receivers were appointed and shortly thereafter its traffic and trackage contract with the Wheeling and the Wabash, considered one of the Terminal's valuable assets, was canceled. Foreclosure proceedings were then brought. The properties of the Terminal were sold, on August 16, 1916, to a reorganization committee and are now owned by a new company, the Pittsburgh & West Virginia. While the property under consideration is now owned and operated by the Pittsburgh & West Virginia, it should be borne in mind that this investigation was confined to the Terminal and its predecessor companies.

Pittsburgh-Toledo Syndicate

The Pittsburgh-Toledo syndicate, formed by a written agreement dated February 1, 1901, and supplement of April 8, 1901, was the outgrowth, as the record shows, of the desire of Andrew Carnegie, of the Carnegie Steel Company, and of the Gould interests, to have another railroad serve Pittsburgh. The idea originated, apparently, with Joseph Ramsey, Jr. He was vice-president and general manager of the Wabash from 1895 to 1901, and president from 1901 to 1905.

George J. Gould, a director of the Wabash, Joseph Ramsey, Jr., its vice-president and general manager, together with Louis Fitzgerald, president of the Mercantile Trust Company of New York, were designated as syndicate managers. Later, Myron T. Herrick, chairman of the board of directors of the Wheeling, and James Hazen Hyde, president of the Equitable Trust Company, became members of the managing board.

The members of the syndicate subscribed \$20,000,000 to be used in acquiring control of the Wheeling and in building a line from a convenient point on the Wheeling to the city of

Pittsburgh. Ramsey was chosen as the active directing manager of the syndicate, and as such applied for charter and franchises, executed contracts for the building of the road, and supervised the expenditures.

In the Wheeling foreclosure proceedings Gould testified that at the time the syndicate was formed the object was to get a line into Pittsburgh and that a connection beyond Pittsburgh was not then contemplated. Ramsey, in the same proceeding, testified that he became president of the Western Maryland in 1903 because he had been made president of the Western Maryland syndicate. Gould was not, apparently, among the originators of the Western Maryland syndicate, but upon becoming interested later, requested Ramsey to serve of this syndicate, presumably to look after the Gould interests.

Neither Gould nor Ramsey testified that the Terminal was to be connected with the Western Maryland to complete the proposed so-called coast to coast line of the Gould interests, but B. A. Worthington, formerly vice-president of the Wheeling and the Terminal, testified in the foreclosure proceedings of the Wheeling as follows:

"If we could have multiplied the tonnage of the Wabash-Pittsburgh Terminal and carried out the plan Mr. Gould had in mind, of connecting up with the Western Maryland, and had the Wabash traffic going that way instead of going up around Detroit, we probably would have kept out of a receiver's hands."

F. A. Delano, who succeeded Ramsey as president of the Wabash and its eastern subsidiaries, testified in the same proceeding as follows:

"I understand it was Mr. Ramsey's idea to cross the Allegheny river with a line that crosses into Pittsburgh. He was trying to get a charter for a bridge, and there connect with the Buffalo, Rochester & Pittsburgh, and thus get an outlet to the east. He also expected, by means of the West Side Belt, and completion of the Western Maryland, to get a good connection or outlet to Baltimore. Both of these things would have made a tremendous change in the whole situation."

Immediately after its organization the syndicate managers entered into a contract with the Union Railroad and the Carnegie Steel Company at Pittsburgh, whereby the syndicate managers, in consideration of receiving certain traffic, agreed to construct, purchase, or lease such lines of railway as would be required to make a continuous route to Chicago.

The syndicate incorporated the Pittsburgh & Carnegie Railroad, and under its charter planned to effect an entrance into the city of Pittsburgh. This charter, however, conflicted with a charter previously granted to the Pittsburgh & Mansfield and so the property of the latter was purchased. The syndicate then incorporated the Washington County Railroad to provide an extension of the Pittsburgh & Mansfield to the Pennsylvania-West Virginia state line, and later consolidated the two companies into the Pittsburgh, Carnegie & Western. It also secured the incorporation of the Cross Creek Railroad and the Pittsburgh, Toledo & Western. Under the charter of the former there was to be constructed the line in West Virginia, and under the latter, the line in Ohio.

The syndicate purchased control of the Wheeling and caused to be executed a traffic and trackage contract between the Wabash, the Wheeling, and the Pittsburgh, Carnegie & Western.

As the construction work under the charters of the three separate railroad companies was nearing completion, the syndicate caused to be organized, by consolidation and merger, the Wabash-Pittsburgh Terminal, to which it made a pro-

posal to transfer the Wheeling stock, a majority of which, issued and outstanding, was owned by the syndicate; the Carnegie traffic agreement, and the traffic and trackage agreement between the Wheeling, the Wabash, and the Pittsburgh, Carnegie & Western were also assigned to the Terminal; the syndicate further agreed to call and pay over to the Terminal the unpaid portion of the syndicate subscription; to assign to it an agreement of the Wabash to purchase \$6,600,000 of Terminal first mortgage bonds for \$6,000,000; and, to discharge and release the Terminal from all indebtedness and claims owing to the syndicate. As the consideration of this undertaking the Terminal agreed to deliver to the syndicate \$20,000,000 of first mortgage bonds, \$20,000,000 of second mortgage bonds, and \$10,000,000 of capital stock.

The acceptance of this proposal by the Terminal resulted in the final call upon the syndicate subscribers and the winding up of the syndicate affairs.

The Wabash-Pittsburgh Terminal

The Wabash-Pittsburgh Terminal is the successor, through consolidation and merger on May 9, 1904, of the Pittsburgh, Carnegie & Western Railroad Company, the Cross Creek Railroad Company, and the Pittsburgh, Toledo & Western Railroad Company, as previously explained.

The articles of consolidation and merger provided that the capital stock of the new company should be \$4,000,000, consisting of 80,000 shares of a par value of \$50 each, and that it was to be exchanged, at par, for the capital stock of the merged companies. On May 11, 1904, the capital stock was increased to \$10,000,000 and this amount was subsequently issued. On the same date authority was given for the creation of a bonded indebtedness of \$70,000,000, consisting of \$50,000,000 first mortgage 4 per cent 50-year gold bonds, and \$20,000,000 second mortgage 4 per cent 50-year gold bonds. The bonds were to be dated May 10, 1904, with interest payable from June 1, 1904; the interest on the second mortgage bonds, however, was "to be payable for the period of six years from the date of such bonds only out of the net earnings and revenues of the company, as defined in said mortgage, and thereafter to be payable absolutely" on the interest dates.

The record clearly indicates that George J. Gould was the dominating factor in the management of the Wabash, the Terminal, and the Wheeling.

The first meeting of the board of directors of the Terminal on May 11, 1904, received and acted upon the before-mentioned proposal of the syndicate.

The proposition of the syndicate was approved and accepted by the board of directors at the same meeting, subject however, to approval of the stockholders, which was given at a meeting held on the same day.

The carrier, in the opening entries on its books, charged to "Cost of road," \$44,000,000, and to "Wheeling & Lake Erie Railroad—Stock on Hand," \$6,000,000, thus offsetting the par value of the following securities issued and outstanding:

Capital stock	\$10,000,000
First mortgage bonds	20,000,000
Second mortgage bonds	20,000,000

Traffic and Trackage Contracts

The contract between the Carnegie Steel Company, the Union Railroad and the syndicate, referred to in the syndicate's proposal to the Terminal, provided, in substance, that the syndicate should construct or purchase a line of railroad; that the proposed railroad should connect with the Wabash at Toledo; that there should be secured a traffic or trackage arrangement, or both, with the Wabash from Toledo to Chicago; that the Union Railroad should transport cars of the syndicate lines to the works, plants, and tracks of the Carnegie Steel Company, and the charge therefor should be agreed upon with a minimum of 10 cents per ton; and, that the Carnegie Steel Company should give to the syndicate

lines one-fourth of all the tonnage it controlled, when such tonnage was destined to or came from points within and west and south of "central traffic association" territory, but there was to be "deducted from the total tonnage, before computing said one-fourth, freight transported by water, freight routed by consignees, and ores, coal, coke, and limestone, to the works of said Carnegie Company over railways owned, controlled, or leased by said Carnegie Company." The contract was to remain in force for 20 years from February 4, 1901.

On October 10, 1902, the Wabash, the Wheeling, and the Pittsburgh, Carnegie & Western, one of the constituents of the Terminal, entered into a traffic and trackage contract. This contract provided, in substance, for the interchange of traffic, through train service, through rates and divisions, and the routing of traffic to the mutual benefit of the parties at interest. It also provided, in the event any dispute should arise with respect to the interchange of traffic, that each of the parties could operate its trains over the rails of the other party or parties.

The contract provided that, in fixing rate divisions, the Pittsburgh, Carnegie & Western, later the Terminal, would be allowed an arbitrary mileage of not less than 100 miles, instead of its actual mileage of about 60 miles. The contract was to continue in force for 20 years from the date of commencement of operations.

After the contract was made, the syndicate proceeded to build the Terminal property at great expense. The syndicate's subscribers would not accept the Terminal bonds and accordingly, in order to finance the Terminal, a supplemental traffic and trackage contract was executed. With respect to this supplemental contract, dated May 10, 1904, Ramsey further testified:

A. The syndicate subscribers, as represented by Mr. Herrick, Mr. Connor, and Mr. Sanders, declined to accept simply the plain bonds of the Wabash-Pittsburgh Terminal Railway Company just as they stood, without some sort of guaranty. They first wanted the Wabash guaranty.

A. Yes, Mr. Herrick, Connor, and others. And that could not be done, or was not agreed to; and then this supplemental contract was drawn up and afterwards acted upon by the various companies; in the nature of a compromise guaranty, you might call it. It was to give the guaranty of the Wabash and the Wheeling & Lake Erie of 25 per cent of the gross earnings from traffic over these roads, in either direction, to or from the Wabash-Pittsburgh Terminal, in the event of that being necessary to meet fixed charges or make up a deficit of the Wabash-Pittsburgh Terminal. That was the object of this supplemental contract, based on the underlying agreement.

A. The Wabash road, for instance, if it received \$2,000,000 per year in gross revenues from traffic to and from the Pittsburgh terminal, was to pay to the Wabash-Pittsburgh Terminal, in the event of its being necessary to make good a deficit on fixed charges (of the Terminal) 25 per cent of the earnings, leaving 75 per cent to the Wabash, which was estimated would meet all its (Wabash) expenses in handling the traffic, and leave a little over. If it (Terminal) did not need the money, it (Wabash) did not pay the 25 per cent, or 25 cents even, therefore it (Wabash) assumed no obligation; this money came to it (Wabash) from the traffic produced by the Wabash-Pittsburgh Terminal.

The supplemental contract also provided for the extension of the original traffic and trackage contract so as to make its duration 50 years instead of 20 years.

Physical Characteristics

The main line of the Terminal, approximately 60 miles in length, extends from a point at Liberty avenue and Ferry street, in the city of Pittsburgh, in a westerly direction through the foothills of the Appalachian Range, to Pitts-

burgh Junction, Ohio, where it connects with the Wheeling. Over its entire length it crosses a rugged, hilly country.

Except for the first 4 miles, practically all within the city of Pittsburgh, the maximum curvature is 3 degrees and the maximum grade seven-tenths per cent compensated for curvature. The Pan Handle, which is practically parallel, has frequent 1 per cent gradients and curvature up to 8 degrees. If corresponding gradients and curvature had been used on the Terminal the cost outside of Pittsburgh would probably have been reduced by at least one-half. The plans, however, provided for the lightest practicable gradient and curvature.

Eighteen double-track tunnels, having an aggregate length of 20,545 feet, were driven. One of these, called "Bigham tunnel," about 250 feet in length, was afterwards eliminated and changed to an open cut. The construction of the tunnels involved the following quantities:

Tunnel excavation	642,000 cubic yards.
Timber lining	17,000,000 feet B. M. Y. P.
Masonry lining	90,000 cubic yards.

It should be kept in mind that the entire roadbed construction, including cuts, embankments, tunnels, and bridges, was built for two standard-gage tracks, although up to June 1916, only 4.1 miles of second track had been laid.

Inflation in Cost of Construction

In order to determine the actual amount of cash expended for road and equipment, all vouchers and other evidences of expenditures, charged by the carrier or its predecessor companies to road and equipment accounts, were examined, reclassified, and summarized.

From the foregoing the following condensed statement of account as of May 10, 1904, can be made:

Invested in Pittsburgh Terminal syndicate	\$15,873,000.00
Expenditure in road and equipment	\$15,761,530.86
Retained assets and unadjusted debit accounts	1,274,102.65
Retained liabilities and unadjusted credit accounts	1,160,633.51
	\$17,035,633.51
	\$17,035,633.51

The opening entries on the books of the Terminal were not based upon the above figures. If they had been, the item of \$15,873,000 would have been offset by the aggregate of the securities issued, \$50,000,000, and the difference between these items, \$34,127,000, would have been carried as discount on securities issued. The amount of this discount would have been subsequently reduced by the following:

Amount received from syndicate	\$3,521,195.73
May, 1904	\$704,000.00
June, 1904	2,065,506.05
July, 1904	5,283.33
October, 1904	746,406.35
W. & L. Lake Erie R. R. stock	6,000,000.00
Second mortgage bonds	27,186.25
Second mortgage bonds held by treasurer (par value)	7,000.00
Total	\$9,555,381.98

Leaving a net inflation in the original capitalization of \$24,571,618.02. This assumes, of course, that the book value of \$6,000,000 placed on the stock of the Wheeling & Lake Erie railroad represents actual cost.

If the debit balance in the Terminal's road and equipment account on May 10, 1904, had reflected only the actual amount of cash expended for construction to that date it would have been \$15,761,530.86. This amount includes \$1,157,133.51, representing retained percentages due contractors, which was not entered on the books of the Terminal. Obviously the latter amount must be added to the difference between \$9,255,015.37 and \$15,761,530.86 in order to obtain the inflation in the carrier's property account as of May 10, 1904, according to its own records. The difference thus obtained is \$24,650,618.02. This amount differs with the final net inflation referred to above as \$24,571,618.02 by \$79,000, and is accounted for by the three following items:

Second mortgage bonds held by treasurer	7,000.00
Retained percentages due contractors	1,157,133.51
Net inflation	\$24,571,618.02

The political contributions were made between October, 1902, and February, 1904, to politicians in Pittsburgh two receiving \$30,000 each and another \$17,500. An additional \$10,000 was contributed in February, 1905, to one who had previously received \$30,000.

The books of the Terminal show the following entries in the cost of road account:

Capital stock	\$4,000,000.00
First mortgage bonds	10,000,000.00
Second mortgage bonds	20,000,000.00
Open accounts	
Advances to contractors	\$1,011,577.34
Miscellaneous	1,277.83
Green County Railroad	14,674.49
Texas & California Construction Co.	51,000.00
Cash from Pittsburgh T. & E. Syndicate	
Transferred from Pittsburgh	
Carnegie & Western Railroad	\$11,989.11
May, 1904	764,000.00
June, 1904	665,706.05
August, 1904	5,283.33
October, 1904	746,406.35
Sale of second mortgage bonds	
	\$24,000,000.00
	\$4,742,084.93

Balance	\$4,742,084.93
	\$4,742,084.93

Reference has previously been made to an unpaid item carried forward from the old accounts under the title of "Texas & California Construction Company," \$45,000. It appears that this amount represents advances made in the early history of the Terminal to the construction company.

Character and Extent of Service

The Terminal has no direct connection with any large industries other than the mining operations, of which there are a dozen or more, located on its line in the vicinity of Pittsburgh. However, the branch connecting the West Side Belt and the Union Railroad furnishes connections with a number of industries located on the latter line.

The Terminal's traffic consists almost entirely of through carload shipments. The amount of local traffic is negligible. The bulk of the traffic consists of coal and ore. In 1916 coal and ore comprised almost 82 per cent, while in 1915 it exceeded 85 per cent of the total tonnage. The amount of general freight has, however, recently increased materially.

Owing to the Terminal's entrance into Pittsburgh at an elevation, the handling of traffic is difficult and expensive and the company is further handicapped by inadequate trackage facilities. It is estimated that about 25 per cent of the traffic, exclusive of coal and ore, is handled through its elevated terminal in Pittsburgh, which can accommodate approximately 40 cars, spotted. The Terminal would undoubtedly secure a larger share of the traffic of the Pittsburgh district if it were not for these operating difficulties.

Sale of Bonds

In addition to the \$20,000,000 of first mortgage and \$20,000,000 second mortgage bonds given to the syndicate as part consideration for the Terminal properties, there were issued, subsequent to May 10, 1904, \$10,250,000 of first mortgage bonds. For this latter amount of bonds there was received in cash \$8,809,828.77, the difference of \$1,440,171.23 between the par value and the proceeds represents brokerage charges and discount. To this should be added \$72,572.02 for other expenses incident to the issuance of these bonds and the \$411,000.00 of first and second mortgage bonds previously issued to the syndicate, making a total of \$1,999,189.15 expenses, commission, and discount entered in account to May 10, 1904.

Vermyle & Company and Blair & Company purchased \$5,000,000 of the bonds during the months of October, November and December, 1904, at prices ranging from 82 to 84; Blair & Company purchased \$2,000,000 of the bonds in May, 1905, at 80 net; William A. Read & Company, through G. P. Butler & Brother, purchased \$2,000,000 of bonds in February and March, 1906, at 87 $\frac{3}{4}$; Frank J. Gould purchased \$500,000 of bonds in July, 1906, at 80 net; \$75,000 of the bonds were sold during January and May, 1908, at prices ranging from 49 $\frac{1}{8}$ to 58 $\frac{5}{8}$, and \$663,000 of bonds given as collateral for a note were sold at auction by the trustee in June, 1909, at an average rate of 39.93 per cent.

It is impossible at this time to ascertain the total amount of first mortgage bonds which were eventually sold through brokers to savings banks and insurance companies. The records of bonds deposited soon after the receivership in 1908 show, however, that savings banks deposited \$410,000 and insurance companies \$3,989,000 first mortgage bonds. Changes in ownership no doubt occurred between the date of the original deposits and the date of the final cash payment under the reorganization plan. Presumably some of the banks and insurance companies did not pay the cash required for the reorganization committee's records indicate that in March, 1917, savings banks which had made the final cash payment held \$189,000 and insurance companies \$3,086,000 of first mortgage bonds.

Results of Operations

The carrier's operations between December 1, 1904, the date determined upon as the date revenue operations began, and May 28, 1908, the date receivers were appointed, resulted in a deficit in net income for each year, amounting in the aggregate to nearly \$3,000,000. During this period the excess of operating revenues over operating expenses and taxes was about \$1,000,000, from which fixed charges of about \$4,000,000 were deducted, creating the deficit of \$3,000,000. If the revenue derived from the so-called traffic and trackage guaranty is excluded, it will be found that the carrier's operating expenses and taxes exceeded its revenues.

The operations for the period from May 29, 1908, to March 31, 1916, resulted in a deficit of about \$350,000. During this period of slightly less than eight years, the excess of operating revenue over operating expenses and taxes was about \$680,000. The deficit of approximately \$350,000 was caused by interest on receivers' certificates and other fixed charges.

Lack of freight cars and motive power was apparently one of the Terminal's greatest handicaps and no doubt figured largely in the conditions which brought about the receivership.

Receivership

Receivership proceedings were brought against the Terminal by the Wabash, and on May 29, 1908, F. H. Skelding and H. W. McMaster were appointed receivers. The receivership continued for over eight years, or until August 16, 1916, on which date the property was sold, on the order of the court, to the reorganization committee, the only bidder, for \$3,000,000. The sale was confirmed on August 30, 1916. In confirming the sale the court set aside the objections of the Fearon committee, which claimed that the price was inadequate.

The protracted period of the Terminal receivership was due, apparently, to the difficulty of the situation and by reason of the numerous efforts made by the various interests to work out a plan which would be acceptable to all. The earnings of the carrier, which usually form the basis of any reorganization plan, were uncertain and indefinite until the years 1914 and 1915. Prior to the receivership the Terminal and Wheeling properties worked in close harmony with each other, the Terminal, the Wheeling, and the West Side Belt being operated practically as one property. Upon the appointment of receivers, however, the traffic and trackage contracts were

canceled, the car pooling arrangement was discontinued, and in the words of the Terminal's receiver, each company "stood on its own legs."

A receivership, or an adjustment of the capitalization of the Terminal was, from the beginning, almost inevitable. The company was greatly overcapitalized and according to the testimony of the receiver, which is borne out by the statements of the carrier's earnings, the interest on the first mortgage bonds was not earned even when the payments by the Wabash and Wheeling, of 25 per cent of the gross earnings of these companies on certain business interchanged with the Terminal under the terms of the traffic and trackage agreement, were included.

At the commencement of the receivership the physical property of the Terminal was in poor condition, due to unfinished permanent construction and insufficient maintenance. In order to safely operate the property considerable expenditures have to be made and the money necessary for this purpose was provided largely through receiver's certificates.

Reorganization

The reorganization plan provided that the Terminal should retain control of the coal company and the West Side Belt. Immediately prior to the reorganization the total capitalization of the Terminal amounted to \$60,229,000, consisting of \$10,000,000 capital stock, all held by the Wabash; \$30,236,000 of first mortgage bonds; and \$19,993,000 of second mortgage bonds.

The reorganization plan provided that holders of Terminal first-mortgage bonds should make a cash payment of \$300 for each \$1,000 of bonds deposited with the reorganization committee, receiving in exchange \$300 in preferred stock and \$1,000 in common stock of the new company, the Pittsburgh & West Virginia, together with Wheeling stock on the following basis:

\$28 (par) of first preferred stock;
\$210 (par) of second preferred stock; and
\$390 (par) of common stock.

The plan provides that there will be only \$5,100,868 bonds and mortgages left outstanding in the hands of the public undisturbed by the reorganization. Of these \$3,922,000 are first mortgage bonds of the coal company; \$383,000 first mortgage bonds of the West Side Belt; and \$795,868 mortgages on Terminal real estate. On this basis, the annual interest charges for the Terminal and its subsidiaries will be reduced to \$261,103.

Conclusion

The result of the operation of the Terminal to date shows clearly that the building of this property was a poor business venture. Fifty millions in bonds were issued against a railroad 60 miles in length and which cost about \$25,000,000. The par value of its first mortgage bonds alone exceeded by approximately \$5,000,000 the actual amount of cash expended for property devoted to transportation at the commencement of the receivership. Notwithstanding the assurance of traffic contained in its traffic and trackage agreements, and the 25 per cent guaranty of the Wheeling and Wabash, the Terminal failed to secure sufficient tonnage to enable it to pay interest on its first mortgage bonds.

As has been already shown in detail, the Terminal was not only greatly overcapitalized but the percentage of its funded debt, 83.04 per cent, to total capital obligations was unusually high. Against an actual cash investment in road and equipment and securities of affiliated companies of approximately \$38,000,000, there was outstanding, when receivers were appointed, over \$61,000,000 in securities.

This case illustrates again the great need for control of security issues and emphasizes the wisdom of the Commission's requirement, which has been in effect since 1907, that the charges to the accounts reflecting the carriers' investment in road and equipment shall be based upon the cash cost of the property.

General News Department

A fire at the Lehigh Valley freight transfer, at Oak Island, near New York City, on February 10, destroyed 18 cars, 13 of them loaded, and a large section of the freight platform. Estimated loss, \$40,000.

The Fuel Administration has rescinded the Monday fuelless order, leaving discretion to the state administrators to keep it in force locally, with the approval of Director General McAdoo.

Two carloads of coal were "appropriated" by mobs at Tompkinsville, Staten Island, New York City, on February 6, and carried off in bags, buckets and baskets. In the mob were many women and children.

The striking longshoremen at New York city, now said to number about 2,000, have voted to return to work, pending the consideration of their grievances by the Board of Adjustment of the United States Shipping Board.

The Fuel Administration last week rescinded its order restricting the use of coal on Mondays so far as it applies to the states of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi and Louisiana.

Senator Henderson, of Nevada, on February 7 introduced a bill, S. 3777, to make absolute the long and short haul clause of the fourth section of the interstate commerce act and take from the Interstate Commerce Commission discretionary power in enforcing it.

The shops of the Pennsylvania at Blairsville, Pa., on the Conemaugh division—a machine shop, a blacksmith shop and a boiler house—were destroyed by fire on February 5. Estimated loss, \$15,000. The fire occurred at 3 a. m. when the temperature was 10 deg. below zero.

The Daylight Saving bill was reported favorably in the lower House of Congress on February 9 by the Committee on Interstate Commerce. The bill provides for setting all clocks ahead one hour during the spring and summer months, beginning on March 30. The bill had already passed the Senate.

A pledge to save Fuel Oil is called for by Albert E. Swabacher, United States fuel administrator for California, who has sent a letter to all locomotive engineers in that state. The Southern Pacific is the greatest consumer of fuel oil in that state and the co-operation of its employees is expected to mean in the aggregate a great saving for other industries. Mr. Swabacher's letter says that the storage supply of fuel oil in California is decreasing at the alarming rate of 1,100,000 barrels a month. The abnormal demands of the last three years have decreased the available storage supply by one half. The pledge cards, which were sent also to the firemen of all California roads, are being signed and returned to the fuel administrator. A duplicate pledge card is to be displayed in a prominent position in the cab of the engine at all times.

A shortage of passenger cars is reported by the Pennsylvania Railroad. This unusual condition has arisen in connection with the rapid growth of war industries in the section between Philadelphia and Baltimore. Special trains are run daily to and from such industries in six localities which require the use of 215 cars. These runs are: Between Philadelphia and Hog Island, 60 cars; between Baltimore and Sparrows Point, 70 cars; between Baltimore and Aberdeen, 45 cars; between Philadelphia and Eddystone, 22 cars; between West Chester and Eddystone, 8 cars; between Bristol and Eddystone, 10 cars. In addition, 10 cars daily will be required soon for special industrial service between Philadelphia and Bristol, Pa., and five between Trenton and Bristol for the employees of the shipbuilding plant at Bristol. In order thus to provide for these essential war industries, it has been necessary to limit the length of some suburban trains in the neighborhood of Philadelphia and Baltimore. Special passenger train service for war industries is also being operated at Erie, Pa., and Huntingdon, Pa.

Western Railway Club Meeting

The monthly meeting of the Western Railway Club will be held at the Hotel Sherman, Chicago, on February 18. George Austin, general inspector of boilers of the Atchafalaya, Topoka & Santa Fe, will present a paper on "Locomotive Firebox Maintenance and Repairs."

Salaries of Officers and Directors

Director General McAdoo has recently addressed a letter to the railroads asking for information regarding the salaries of their officers, which was requested by Senator Cummins at a recent hearing before the Senate committee. The roads are asked to state the salaries of directors and of all officers paid more than \$10,000 a year.

Surplus Funds Already Transferred

The surplus funds on some railroads are already being transferred to others that have immediate need for cash. Later a clearing plan for such transactions will be established under the direction of John Skelton Williams, director of the Finance division.

Railway Strike in Argentina

Press despatches from Buenos Ayres dated February 9 report that a general railroad strike was called on that day throughout Argentina. Immediately upon quitting work the strikers began a wild anarchistic demonstration throughout the country. Trains were wrecked, tracks destroyed, cars laden with wheat were burned and wires were cut.

Troops were being rushed to points of greatest disorder in central Argentina. The large yards in the outskirts of Buenos Ayres, which cover 22 city blocks, were set on fire by the strikers, who fought off the firemen all Saturday morning. Exploding tank cars added to the conflagrations.

The strike is a fresh outbreak of the labor troubles which have been dormant since last October.

In the riots on the first day of the strike the destruction of property in the city of Buenos Ayres alone amounted to 1,000,000 pesos. Fully one-half of this loss was in wheat, corn and rice which was burned.

Telegraph and Telephone Battalion

Has Complete Staff of Officers

The 416th Railroad Telegraph Battalion, the organization of which was noted in the *Railroad Gazette* of December 7, now has a complete staff of officers. The commanding officer is Major Noten D. Ballantine, until recently, assistant to the chief vice-president of the Rock Island Lines at Chicago, and, previous to that, superintendent of car service of the same company, superintendent of transportation of the Kansas City Southern, and superintendent of telegraph of that road's predecessor, the Kansas City, Pittsburg & Gulf. The captains of the battalion are Clarence J. Bailey who has been train dispatcher and chief dispatcher on a number of roads; Harold B. Starbuck, an experienced telegraph operator, and Julian A. Hielscher, surgeon. The first lieutenants are John B. Delany, battalion adjutant, and telegraph operator for F. W. Wagner & Co., Chicago; Frank C. Johnson, traveling instructor, efficiency department, Per Merquette; Clarke L. Sheets, operator and radio detachment on the Grand Rapids & Indiana; and Robert Shelton Ubell, who has had experience as a telegraph operator, dispatcher and chief dispatcher on the Illinois Central, the Athens in Toledo & Santa Fe, the Northern Pacific, the Mobile & Ohio, and the Vandalia. The second lieutenants are Samuel W. Hallstrom, a commercial traveler with the Roberts Cone Company, and Edmund J. Miller, operator and dispatcher on the Coast Lines of the Chicago, Milwaukee & St. Paul. At present the battalion is stationed at the Eighth Regiment Armory, Chicago.

Railroad in an Unusual Role

In a suit in the Superior Court of Essex county, Mass., at Salem, January 24, the Boston & Maine figured in the unusual role of plaintiff in a crossing accident, and of securing \$500 damages against the Peabody-Woburn Machine Company. At a highway crossing in West Peabody in June, 1916, a local passenger train was thrown off the track by an automobile freight truck, the locomotive being overturned. The owners of the truck had also entered suit against the railroad and both suits were tried at once. The owner's suit was dismissed and the jury awarded damages to the railroad as above stated. The driver of the truck was killed. No suit was brought by his estate.

Swat the Spy

The Boston & Maine has taken up the cry to "Swat the Spy." It has posted placards in its trains and devotes a page in its time tables emphasizing to its passengers the necessity of keeping their eyes and ears open and of reporting any treasonable action or word. The placards are headed in big red letters, "Your Obligation to Your Country," and close with the exhortation, "It is time YOU woke up—this war is real." In the timetables the appeal to the passenger says in part:

"Everything that happens to cripple transportation should be looked upon with suspicion. Every stranger or any person, whose actions are in any way unusual, must be made to prove his honesty of purpose.

"Every loyal railroad man and every loyal American citizen must make it his business to combat the insidious evil of treasonable treachery.

"Resolve to keep your eyes and ears open and to report to the proper authorities every suspicious thing you see or hear.

"Better a thousand times to do innocence a seeming injustice than to overlook the chance to prevent a terrible catastrophe.

"This war is real; treat it as such."

Additional Railway Honor Men

The Philadelphia & Reading reports that 25 of its officers and employes have received commissions in the army or navy in addition to those mentioned in the *Railway Age* of January 4, page 33. These additions to the names already published in the *Railway Age* make the total number of railway men now holding commissions 1507. The Reading men now holding commissions whose names have not yet been published are as follows:

OFFICERS WHO RECEIVED COMMISSIONS			
Name	Railroad Position	Military Rank	Branch of Service
M. A. Laucks	Tr. Mast. Harrisburg Div.	Major	414th Teleg. Bat.
Philemon S. Lewis	Pass. Tr. Mast. Read. Div.	First Lieut.	Engineer Corps
EMPLOYEES WHO RECEIVED COMMISSIONS			
Harry Evans	Chf. Tr. Desp. Phila. Div.	Captain	414th T'leg. Bat.
Francis S. Ferris	Medical Examiner P. & R. Relief Assn.	Captain	11th Cavalry
Doctor Mansfield	Asst. Tr. Mast. Phila. Div.	Captain	21st Engineers
George W. Supplee	Draftsman	Captain	Russ. Ry. Service
John S. Thompson	Superv.	Captain	302d Engr. Regt.
W. S. Tunnell, M.D.	Medical Examiner Relief Assn.	First Lieut.	
Ross M. Swartz	Brakeman	First Lieut.	
John W. Snyder	Clerk	First Lieut.	
Wm. H. Starbuck	Electrician	First Lieut.	
E. P. Morton	Computer Val. Dt.	First Lieut.	
Edw. R. Meredith	Superv. Wilm. & Col. Div.	First Lieut.	Engr. Res. Corps
Ralph C. Keefer	Computer Val. Dt.	First Lieut.	
Wm. B. Carll	Flagman	First Lieut.	
John L. Barrett	Wharf builder	Second Lieut.	Russian Ry. Com.
Herbert G. Foster	Land Pilot Val. Dt.	Second Lieut.	Quarterm. Detach.
Chas. S. Heebner	Fireman, N. Y. Div.	Second Lieut.	Co. C, 21st Engrs.
Henry R. Heebner	Spec. Officer Clm. Dept.	Second Lieut.	Marine Corps
Wm. May	Clerk Acct. Dept.	Second Lieut.	Sixth Penna. Inf.
Robt. C. Montgomery	Clerk Purch. Dept.	Second Lieut.	85th Engineers
Chas. Nodler	Clerk Com'l. Of.	Second Lieut.	311th M. G. Bat.
John W. Stapleton	Clerk	Second Lieut.	
Chas. Olsen	Master P. & R. Tug "Conestoga"	Junior 1 Lieut.	U.S.S. Conestoga
Thos. N. Saul	Cant. P. & R. bge "Kimberton"	Ensign	

Traffic News

The railroads in southeastern territory (south of the Ohio and Potomac rivers and east of the Mississippi river) no longer accept or issue prepaid ticket orders.

The Northern Pacific now runs its passenger trains directly into and out of Vancouver, B. C., and interchange of passenger traffic with the Canadian Pacific at Sumas, Wash. on the Canadian boundary, has been discontinued.

One cent a mile for members of the Grand Army of the Republic and of the United Confederate Veterans and their families to and from their annual reunions next summer, has been authorized by Director General McAdoo. The Grand Army of the Republic will meet at Portland, Ore., and the Confederate veterans at Tulsa, Okla. The reduction in fare will be confined to the veterans and members of their families who accompany them on certificates of identification which will be furnished by their department or division commanders.

The Agricultural Department of the Buffalo, Rochester & Pittsburgh is already moving to give to each employe the same plot of garden land that he had last year, if he desires it. As a result of last year's efforts over 28,000 bushels of potatoes were raised in "war gardens" by employes from seed furnished, gratis, by the company. Large quantities of other vegetables were grown. The three farm tractors which were rented to the farmers for plowing and harrowing last year were very successful and the company has bought three more; and it has sent out to all farmers adjacent to its line an inquiry intending to bring forth information which will enable the company to co-operate with the farmers to the best advantage. Especial attention is being given to ascertaining the horsepower in various communities, amount of help available and what success farmers are having in securing fertilizers.

Preference for Grain Traffic

Director General McAdoo announced on February 9 that in order to meet imperative demands for war purposes he had ordered that preference be given for the time being to the furnishing of box cars for grain and grain products and for the movement thereof in the States of Illinois, Indiana, Iowa, Wisconsin, Minnesota, North and South Dakota, Montana, Nebraska, Kansas, Missouri and Oklahoma, with the exception of less than carload merchandise. This preference will be discontinued as soon as the emergency is over. Meanwhile, every effort should be made by farmers, grain dealers and others to facilitate the accumulation, prompt loading and shipment of all kinds of grain.

Good Summer Travel Expected

The heroic measures adopted by the government to relieve freight congestion have affected passenger travel in the east by drastic curtailment of passenger service east of Chicago. Unnecessary to travel has been openly discouraged by Director General McAdoo, and active solicitation by eastern railways has been discontinued. Train schedules west of Chicago are generally retained, and the soliciting forces of western roads are continuing their usual activities both east and west. These roads have, nevertheless, discontinued most of their winter tourist advertising in the public press. The general shortage of coal, widely threatening the comfort of private homes, has variously affected normal social activities and has created a considerable hegira to the south. The net result of these varying influences upon travel has been a normal volume of winter traffic to the south and a considerable curtailment in volume to the far west.

If prediction is at all justified in our day, one may venture the guess that with the passing of a winter of unprecedented weather to hamper traffic, and with the salutary effects of the government's measures to meet the freight congestion, the current embarrassing conditions will be removed and summer vacation travel may be expected in the usual volume. It is reported that during the third year of the war, in both Australia and Canada (two countries bearing close geographical analogies to our own), the volume of domestic travel has not decreased.

The Department of State has announced that passports will not be issued to persons traveling for recreation. This affects those desiring to visit any foreign country except Canada, and inasmuch as Canada looks to "the States" for 70 per cent of her tourist income, this regulation will not be unwelcome to her Commercial travel, under stimulation of war business, continues unabated. * * * *American Express Company's Travel Bulletin*

Government Freight on the Highways

Motor truck transportation across the State of New York is said to be no longer an experiment, and the State Defense Council announces that motor truck trains will be run this week between Buffalo, Rochester and Cortland and seaboard points. At the request of the Federal government the State Defense Council has taken steps to assure the convoy prompt passage through the State and to see that the 100 men accompanying the train are well cared for. There will be sixty trucks in the first train. A bulletin has been issued calling attention to the fact that under the laws of the State the duty of keeping snows from the roads devolves upon town authorities, and town highway superintendents are urged to begin immediate action to clear the routes, in order that the motor truck convoy be not delayed. The schedule from Buffalo calls for stops at Leroy, Geneva, Syracuse, Utica, Amsterdam, Hudson, Peekskill and New York

Southern Pacific Pullman Bureau in San Francisco

The Southern Pacific has opened a central reservation bureau in San Francisco for the making of sleeping car reservations for all of its "trains out" of San Francisco for agencies around the bay and on the main line as far as Roseville, Stockton and San Jose. The plan enables six clerks to take care of 6,000 reservations a day; and patrons are saved 50 per cent of their time. The possibility of duplicate sales is eliminated. The bureau is connected by 13 special telephone lines with points in the district at which reservations originate. The bureau clerks sit at a large table with the diagrams in revolving racks within easy reach. They have three small telephone switchboards wired in multiple, and as a lamp lights on the board the first clerk who is free "plugs in" and takes the message. There is no moving about the room and no confusion. The apparatus was arranged and installed by E. L. King, superintendent of telegraph.

Embargoes on the Pennsylvania

The Pennsylvania Railroad has adopted a new plan of handling freight under embargoes. During the existence of an embargo, freight will be handled through a system of special permits covering each individual shipment. The consignee, not the shipper, must apply for the permit, and before authority will be granted to move freight affected by embargo the consignee must show that the goods are necessary to meet his existing requirements, and that he will be able to unload the car or cars without delay.

Two other important changes will be made. All superintendents will be authorized to grant permits for the movement of freight from point to point on their own divisions, and all general superintendents will be authorized to issue similar permits from point to point within their own grand divisions. For the issuance of permits to ship freight from a point on one grand division to a point on another grand division, or to or from points on another railroad, a new embargo bureau has been established at Broad Street Station, Philadelphia, under the direction of W. C. Glynn, assistant general freight agent.

The new plan will enable the railroad to exercise greater control over the movement of freight than has been possible heretofore, while consignees and shippers can arrange more promptly for transportation, as in many cases it will not be necessary to go beyond the division superintendent. It is the belief of the management of the railroad that the new plan will not only permit the movement of a larger volume of freight, but should enable a more uniform operation of industries. It is also expected to reduce materially the amount of correspondence and telegrams and the number of telephone and personal calls.

The new arrangement will not apply in connection with export traffic through New York, Philadelphia or Baltimore, or with domestic carload shipments to New York. This traffic, under war arrangements, is in charge of the Freight Traffic Committee, North Atlantic Ports, 141 Broadway, New York

Freight Congestion Relieved

With the milder temperatures, which have prevailed since February 6 the railroads in New York, Pennsylvania and New England have made rapid recovery from the serious paralysis under which they had labored throughout the past week previous to that day, and thus far the losses suffered have not been so serious as very serious disturbance. On the Ohio river the high water has delayed some railroad traffic, and in northern New York there was a new fall of snow and continued low temperatures. With these exceptions the restoration of normal train movements has been general. On the main line of the New York Central the movement of freight has been unimpeded.

The records of delayed freight, as issued by the eastern regional director, show that the principal roads are getting the better of the congestion at the rate of 5,000 to 8,000 cars a day, in the aggregate, counting both eastbound and westbound movements. In New York harbor, freed from floating ice, coal is moving in nearly or quite normal volume. The daily statement issued on February 13 showed 1,259 cars dumped: 696 anthracite, 563 bituminous. Cars of coal at tidewater yards, 1,247 anthracite and 643 bituminous. Cars in transit within 24 hours of tidewater, 930 anthracite, 804 bituminous. Vessels and barges loaded to be moved, 442 anthracite, 237 bituminous. Vessels and barges waiting for coal, 249.

The daily report of the general freight movement in "eastern" territory showed cars above normal, as follows: "Eastbound, loaded, today 44,969, yesterday 46,040 decrease 1,071. Last bound, empties, today 5,823, yesterday 6,098, decrease 275. Westbound, loaded, 35,710 today, 34,081 yesterday, increase of 1,629. Westbound, empties, 30,488 today, 31,027 yesterday, decrease of 539."

In New England the weather on Wednesday showed 10 to 20 deg. above zero in northern sections, and 28 to 40 above, with some rain, in central and southern parts. Snow-plow had to operate in northern New England Tuesday on account of old snow drifting. Northern New York reported cloudy, and central and western New York cloudy and rain. Mild temperatures in all other parts. At New York in the 48-hour period of ending on Wednesday 16 steamers bunkered with 11,115 tons of coal, and 61 cars of anthracite were moved through the Pennsylvania tubes to Long Island.

Receipts of coal at Chicago, in Wednesday's report, total 2,626 cars, which is 25 per cent above normal. Ohio lines moved 924 cars of coal from the coal fields. Loading at all mines on Tuesday was very light because of the holiday and miners not working on account of high water yesterday, causing suspension of operation. High water caused some interference with operation in central New York. The Baltimore & Ohio bridge over the Miami river at Dayton was carried away, blocking the road 48 hours or more. A steel bridge and a trestle over the Miami river at Lawrenceburg, Ind., on the B. & O., 20 miles west of Cincinnati, was carried out by ice, breaking the line between Cincinnati and the west.

In the west the higher temperatures which became general about February 6, enabled the railways to recover rapidly from the effects of the succession of storms which had greatly impeded operation for several weeks. The western regional director of railroads reports that the movement of traffic is now almost normal. Barring a recurrence of the severe winter just passed, there need be no further fear of further water jams. The rains, which removed much of the snow in Chicago, northern Illinois and Indiana last week took the form of sheet rain on the Mississippi river and did much damage to wires in Iowa and Missouri.

The Indiana and Illinois coal mines are now working to capacity and are producing considerably more than a year ago. The output of Missouri mines is about equal to that of the same period in 1917, and the production of low-sulfur coals, with some exceptions, is rapidly approaching the records of last year.

Particular attention is now being directed to the movement of grain, and especially soft corn in western territory. This is in accordance with the serious effect of the excessive quantity of railroads.

On February 13, 1918, 10,472 tons of soft corn were shipped to the coast from Chicago and on February 14, more than 1,000. About 3,000 cars of soft corn are loaded with grain daily at eastern terminals. The grain is taken to grain car depots, except coal and fuel oil.

Commission and Court News

Interstate Commerce Commission

Increases ranging from 1 to 5 cents per 100 pounds in ocean and rail class and commodity rates from New York, Philadelphia and Baltimore rate points to Chicago, Mississippi river crossings and other western points are proposed in a fifteenth section application filed by W. J. Sedgman, agent.

The Interstate Commerce Commission has dismissed a complaint filed some time ago by C. E. Schaff, receiver of the Missouri, Kansas & Texas, against other southwestern roads, asking the commission to make an investigation of the practice of using 2-cent intrastate fares to defeat the through interstate rates. The complaint was dismissed "upon consideration of the record," and at the request of the complainant.

Western Cement Rates

In the matter of rates on cement between points in western trunk line territory and between points in western trunk line territory and adjacent territories. Opinion by Commissioner Daniels:

Reasonable maximum joint through rates to key points and distance scales are prescribed for the movement of cement in carloads between points in western trunk line territory and between points in adjacent territories and western trunk line territory.

Distances are to be calculated via short-line workable routes.

Fourth section relief is granted at points intermediate to key points, provided that the scale rates herein prescribed are not exceeded at such intermediate points, and that such rates are not in excess of the lowest combination.

A uniform minimum weight of 50,000 lb. is prescribed for the entire territory; a rate 13 per cent higher than the basic rate may be published for a minimum of 38,000 lb.

The practice of making through rates on cement on the basis of combinations is approved as to St. Paul, but disapproved as to Missouri river crossings.

Rates prescribed from Gilmore City, Ia., to all interstate destinations within the territory.

Carriers are directed to withdraw tariffs under suspension and to check in rates in accordance with the findings herein; formal complaints dismissed; fourth section applications denied, except where relief is consistent with the findings herein. (48 I. C. C., 201.)

Personnel of Commissions

P. J. Farrell, solicitor of the Bureau of Valuation, has been appointed chief counsel to the Interstate Commerce Commission, succeeding J. W. Folk, resigned.

The governor of New York has nominated for chairman of the Public Service Commission, Second district, to succeed Seymour Van Santvoord, Hon. Thomas F. Fenell, of Elmira, N. Y., now judge of the Court of Claims. The Senate has confirmed the nomination of F. J. H. Kracke and Charles B. Hubbell as members of the Public Service Commission for the first district.

Court News

Application of Workmen's Compensation Act

The Indiana Appellate Court holds that a railroad car inspector injured while taking a short cut to report to a railroad with which his employer exchanged services of employees under certain conditions, was hurt by an accident arising out of his employment within the Indiana Workmen's Compensation Act.—*In re Maroney (Ind.)*, 118 N. E. 134. Decided December 21, 1917.

Yard Accident

The New Jersey Court of Errors and Appeals holds that no negligence is shown in the case of a yardmaster killed while standing between two tracks, by being struck by a car switched onto another, the customary warning by a halloo being given by several, and, so far as appeared, as soon as any one had reason to think there was danger, in view of the fact that the men had a right to rely on his exercising due care and changing his position if too near the track, a change requiring a shift of only a few inches.—*Healy v. Erie (N. J.)*, 102 Atl. 629. Decided November 19, 1917.

Order of Public Utilities Commission

The Ohio Supreme Court will not substitute its judgment for that of an administrative board created pursuant to an act of Legislature, such as the Public Utilities Commission, as to matters within its province; and before the court will interfere with an order of the Railway Commission or its successors as to issuance of stock by a railroad, it must appear from a consideration of the record that the commission's action was unlawful or unreasonable.—*Pollitz v. Public Utilities Commission (Ohio)*. Decided July 3, 1917.

Construction of Switching Contract

A right of way was conveyed to a railroad company and the company covenanted to switch loaded cars between any industries located on its line in the city for one dollar a car. The Missouri Supreme Court holds that a lessee of the grantee company cannot be required to switch cars for the \$1 charge, where to perform the service it was necessary to pass over the tracks of an entirely independent corporation, the points between which it was ordered to switch cars not being on the line of the railroad company; the latter words referring to the physical line of such company, and not to the independent switching track of another company. *National Enameling etc. Co., v. Granite City & Madison Belt (Mo.)*, 199 S. W. 238. Decided December 3, 1917.

Demand for Cars—Recovery of Penalty

The Georgia Court of Appeals holds that a demand for cars, addressed to the agent of the railroad company at a named point, will, where nothing to the contrary appears, be held to mean that the cars were required at the point at which the demand was made. It is also held that the remedy given by section 2635 of the Civil Code of 1910 and the rules of the Railroad Commission made in pursuance thereof is one in favor of shippers; and one who may have entered a demand for cars, without at that time disclosing his agency for another, cannot recover the penalty thus imposed, where it appears that at the time of the shipment it was disclosed that the cars were intended solely for the use of another, and the bill of lading was issued in the name of the true owner and shipper of the goods. *Central of Georgia v. Rabun (Ga.)*, 94 S. E. 598. Decided December 13, 1917.

Injury to Pullman Passenger by Fright

In an action for damages against the Pullman Company by a woman passenger it was alleged that she was temporarily left alone in a sleeping car which had been placed on a siding in a city to await the next train; that she attempted to open the doors of the car and found them locked or too heavy to open, and that she became greatly frightened and fell into hysteria which lasted several days, and her health was greatly affected thereby. It appeared that the plaintiff only made a single effort to open a door and that it could have been opened by turning a knob and applying a twelve-pound pull. The Texas Court of Civil Appeals held that any negligence of the car porter in temporarily going away, leaving the plaintiff alone, was not the proximate cause of any injury to her from fright at being unable to open the door. If the evidence showed that the plaintiff used every effort to open the doors of the car, that did not disprove the uncontradicted fact that no Pullman car is ever locked so that it cannot be opened by applying the proper degree of force from the inside. Therefore the defendant could not have anticipated that a grown woman could not open the doors. And if she

could not have done so the defendant could not have anticipated that she would have been thereby thrown into hysterics and that the consequences alleged by her would have resulted from her fright. Judgment for the plaintiff was reversed and the cause remanded.—*Pelham Co. v. Gutierrez* (Tex.), 198 S. W. 1043. Decided November 21, 1917. Rehearing denied December 12, 1917.

Classification of Baggage

Under the act creating the Texas Railroad Commission delegating to it power to classify and subdivide all freight and property that may be transported over railroads, and despite the statute providing that each railroad passenger shall have an allowance of baggage not to exceed 100 lb., the Texas Court of Civil Appeals holds that it was within the power of the commission to classify and subdivide baggage, and to fix the articles included, determining that baggage shall consist of wearing apparel, etc., and articles carried as samples by traveling salesmen, since if baggage does not come within the term "freight," it comes within the term property.—*Levy v. Texas & New Orleans* (Tex.), 199 S. W. 513. Decided November 17, 1917. Rehearing Denied December 15, 1917.

Report of Railroad Agent

Held a Privileged Communication

The Georgia Court of Appeals holds that a report by the operating agents of a railroad to the superintendent of transportation, made for the purpose of being submitted to the company's counsel, in order that counsel might advise it as to whether or not there was liability on its part for anything connected with the transaction reported, and to enable such counsel to prepare for the defense of the defendant if litigation should arise out of the occurrence, which report was duly transmitted into the hands of such counsel as its proper custodian, constitutes a privileged communication, and its production cannot be enforced by the adverse party in a suit for damages growing out of the occurrence as reported; and this is true although such a report might have been made at a time so nearly contemporaneous with the transaction itself as might ordinarily permit its being received as a part of the res geste thereof.—*Atlantic Coast Line v. Williams* (Ga.), 94 S. E. 584. Decided December 24, 1917.

Furnishing Cars for Coal

In view of a great shortage of cars suitable for coal shipments, occasioned by extraordinary conditions bringing into temporary activity a great many mines that are not equipped with tipples for loading cars, but demand pro rata allotments to them of open-top cars for their shipments, which cannot be furnished without serious detriment to permanent and properly equipped mines, the carrier and the general public, the West Virginia Supreme Court of Appeals holds that a railroad company of which such allotments and distributions are demanded may by promulgation of a regulation applicable to all such mines assign its open-top cars to the permanent and properly equipped mines, and box cars to those loading without tipples, and from wagons and trucks. Such a regulation under such circumstances, is neither unreasonable nor unduly discriminatory. *Baltimore & Ohio v. Public Service Commission* (W. Va.), 94 S. E. 545. Decided December 4, 1917.

TRADE WITH THE GOLD COLONY.—Imports of railway equipment and materials to the Gold Coast Colony, British West Africa, showed an increase of 56 per cent in 1916. The United Kingdom contributed about two-thirds and the United States about one-third of this increase.—*Commercial Report*

COPPER OUTPUT VALUED AT \$510,000,000.—The production of copper from domestic ores in 1917 amounted to 1,850,000,000 pounds, or 38,000,000 less than in 1916, according to the United States Geological Survey. The domestic and foreign output is estimated at 2,352,000,000 pounds, an increase of 103,000,000 over 1916. The domestic production is valued at \$510,000,000, an increase of \$35,000,000 over 1916.

Equipment and Supplies

Locomotives

UNITED STATES GOVERNMENT.—See editorial comment on the Government Standard Locomotives as a War Measure, page 342.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., desires to purchase a second-hand, 50-ton, four wheel saddle tank locomotive with 16 by 24-in. cylinders.

THE CENTRAL OF GEORGIA has ordered 3 Mountain and 10 Mallet type locomotives from the American Locomotive Company. The Mountain type locomotives will weigh 318,000 lb., and the Mallet locomotives 440,000 lb.

THE MISSOURI, KANSAS & TEXAS, reported in the *Railway Age* of February 1 as ordering 20 freight locomotives from the American Locomotive Company, ordered not 20, but 25 locomotives. The locomotives will be of the Mikado type and will be superheated and weigh 314,000 lb.

Freight Cars

THE BUTTERWORTH-JUNSON COMPANY has ordered 75 tank cars from the Cambria Steel Company.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chester street, Philadelphia, Pa., wishes to lease six 8,000-gal. tank cars for four or five months.

Trade Publications

BAKELITE MICARTA D GEARS AND PINIONS.—The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently issued a booklet describing the material and the methods of using Bakelite Micarta-D gears and pinions. This is a non-metallic material made up of a special heavy duck of uniform weave, thickness and tensile strength, bonded together with Bakelite by heating under enormous pressure. The material is developed for use where silent operation is desirable and it is especially valuable because of the fact that it is not affected by water or oil, or by most acid or alkali solutions. The booklet gives a complete description of the properties of the material, the methods of working it, a complete outline of the methods of designing the gears and considerable data for the use of the designer. The booklet is thoroughly illustrated with drawings and photograps. Copies may be obtained upon request to the company's nearest office.

TRADE OPPORTUNITIES IN THE ORIENT.—American consuls in the great commercial cities of Shanghai, Tientsin and Hankow report that the American population has increased 25 per cent, and that there never has been such an opportunity as at present to obtain a large share of the valuable oriental trade. A prominent official of one of our western railroads, writing of orient trade, says: "This Far Eastern business, in my judgment is going to continue to grow by leaps and bounds, and I trust that the American business man will realize the possibility of this trade and become more aggressively acquainted with conditions in connection with the same. As I see it, the weakest point in the American business man is the fact that he does not travel abroad. It is only necessary for one to visit these Far Eastern countries to satisfy himself of the great opportunities that lie at our door across the Pacific, and I strongly urge every business institution that has any connection or desire of entering into this wonderful field to visit these countries (or send their representatives) and become acquainted with the real facts and more closely ally themselves with the people of the orient, where they will find an open door, a hearty welcome and many desirable and attractive business opportunities."—*Trade Bulletin* (Am. Exp. Co.).

Supply Trade News

The Schroeder Headlight Company, Inc., Evansville, Ind., has changed its name to the Schroeder Headlight & Generator Company.

C. H. Wilson, southwestern railroad representative for Fairbanks, Morse & Co., has been appointed first lieutenant in the Engineers' Reserve Corps and has been assigned to active duty.

G. F. Evans, formerly connected with the W. C. Moore Company, Columbus, Ohio, has been appointed supervising engineer for the National X-Ray Reflector Company, in the territory comprising Ohio, except Toledo and Cincinnati, West Virginia, and western Pennsylvania, with office at Columbus, Ohio.

G. R. Lewis, division freight agent of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Indianapolis, Ind., and for more than 20 years with the New York Central Lines, has been appointed manager of supplies and traffic, with the Standard Forgings Company of Indiana Harbor, Ind., and will have offices in the Railway Exchange building, Chicago.

W. N. Thornburgh, vice-president and general manager of the Harrison Railway Specialties Company, Sandusky, O., will devote his entire time to his duties as president and treasurer of the William N. Thornburgh Company, manufacturers of the "National" steel and wood dust guard, and purchasers and sellers of used rails, cars and locomotives. He will have headquarters in Chicago, as heretofore.

J. B. Henry, general superintendent of the Union Steel Casting Company, Pittsburgh, has been elected vice-president, to succeed **J. P. Allen**, recently elected president of the company. Mr. Henry will continue to discharge the duties of general superintendent, as heretofore. **W. C. Eichenlaub**, secretary, has also been appointed manager of sales. The other officers of the company are as follows: **C. C. Smith**, chairman of the board; **S. H. Church**, vice-president; **G. W. Eisenbeis**, treasurer.

Frank Fouse, who has been appointed works manager of the Marsh Refrigerator Service Company with office at Milwaukee, Wis., entered the service of the Pennsylvania in 1888. From 1896 to 1901 he was with the Pressed Steel Car Company at Pittsburgh, Pa.; from 1901 to 1908 he was with the Pittsburgh Testing Laboratory and in the latter year he entered the service of the United Fruit Company as general foreman of the car department on the Costa Rica division of the Northern Railway of Costa Rica.

Wilson S. Kinnear, E. A. Little and Carl H. Stengel announce the opening of the office of W. S. Kinnear & Co., engineers-investigators, at 111 Broadway, New York. The company will make general engineering and investment reports, investigations, valuations and reports on steam and electric railways. It may also be consulted on terminal, harbor and dock improvements and developments, land and subaqueous tunnels and heavy construction estimates and supervision, and will specialize on railway and public utility reports and valuations.

The Australian General Signal Company, Ltd.

This is the name of a new company incorporated under the laws of the State of New York, with its charter to be filed in Australia, which will handle the products of the General Railway Signal Company, Rochester, N. Y., and other kindred lines in Australia. The new company's Australian office is located at Dalton House, 115 Pitt street, Sydney, N. S. W.

The offices of the company are as follows: **Walter J. Plogsted**, managing director; **W. W. Salmon**, president; **George D. Morgan**, vice-president and treasurer; **J. P. Braam**, secretary, and **C. M. Terry**, assistant secretary and assistant treasurer.

Walter J. Plogsted, the new managing director, was at one time resident engineer for the General Railway Signal Company at

New York. Since February 1, 1913, he has been employed as an engineer by R. W. Cameron & Co., an export house with a number of branches in Australia. The new company terminates the former arrangement with R. W. Cameron & Co. Mr. Plogsted's headquarters will be at Sydney, New South Wales. **C. M. Terry**, the new assistant secretary and assistant treasurer, was also formerly connected with R. W. Cameron & Co. His headquarters are also in Sydney.

The directors of the company are: **J. N. Beckley**, Rochester, N. Y.; **Thomas W. Funicane**, Rochester, N. Y.; **W. W. Salmon**, Rochester, N. Y.; **George D. Morgan**, Rochester, N. Y.; **C. H. Littell**, Buffalo, N. Y.; **W. J. Plogsted**, Sydney, New South Wales, and **C. M. Terry**, Sydney, New South Wales.

The Chicago Pneumatic Tool Company

The Chicago Pneumatic Tool Company is doing four times as much business as in the pre-war period, according to its annual report for the year ended December 31, 1917, recently made public. In addition, the net profits have exceeded those of any previous year, even after providing for an additional tax of 4 per cent. on the company's net income and for the excess profits war tax. The increased demands made upon the company by the much larger volume of business have necessitated the borrowing of more money to cover increases in the cost and amount of material and labor used, but the sums which have been borrowed are more than offset by the increase in the value of current assets. The company's plants have been taxed to capacity to fill the orders received, making improvements and additions necessary. At the same time the physical condition of the plants has been maintained as usual. The British and Canadian subsidiary companies, both more or less under the control of their respective governments, retained their earnings for the year for additional working capital. To facilitate the marketing of the Little Giant truck, a subsidiary company, known as The Little Giant Truck Company, was incorporated in 1917, with a nominal capital stock which is owned and held entirely by the Chicago Pneumatic Tool Company.

The gross profits for the year 1917 amounted to \$2,006,372. Deductions of funds for developing and perfecting new tools and for the depreciation of physical property amounting to \$437,582; deductions for interest on bonds, and an installment for a sinking fund amounting to \$171,725; and a reservation for income, war income and excess profits taxes amounting to \$227,674, leave a net profit of \$1,169,390. From this amount \$257,952 were set aside for dividends aggregating 4 per cent per annum, and the remainder, exclusive of \$100,223 retained by the subsidiary companies for working capital, was added to the surplus as of December 31, 1916, making the surplus carried forward \$3,648,064.

Large Metal and Chemical Interests

Combine Business Under New Name

Announcement was briefly made in last week's issue of the *Railway Age* that the business of both the Goldschmidt Detinning Company and the Goldschmidt Thermit Company will hereafter be conducted by the "Metal & Thermit Corporation" with general offices at 120 Broadway, New York. These two concerns have been practically combined for the last two years and have occupied joint offices at the above address. The combination, which is controlled exclusively by Americans, has now been put in more permanent form as it is felt that this will tend towards greater efficiency and co-ordination of effort.

The detinning department of the Metal & Thermit Corporation will carry on one of the largest industries of its kind in the world, i. e., the recovering of tin from tin scrap. Approximately 100,000 tons of tin scrap is treated yearly by this department and the recovery approximates the equivalent of 2,000 gross tons of metallic tin. The output of this branch of the corporation consists of pig tin of a quality equaling Straits tin, tetrachloride of tin and detinned billets, the latter being the iron scrap after the tin is removed, compressed into billets and used by iron and steel plants for remelting.

In regard to the Thermit department, this will continue the production and sale of Thermit welding materials and apparatus as well as the various carbonfree metals and alloys which are produced by the aluminothermic process. The process was first introduced in the United States in 1902 and since then the business has grown very fast, particularly in recent years when there has been a very large demand for the metals as well as for the

welding material). In addition to its line of carbon-free metals and alloys, the company produces pure tungsten powder of high quality and in very considerable quantity. It is also selling agent for the output of a large plant in the Middle West producing 50 per cent electric furnace Ferro-Silicon.

The Thermit Welding process is used by practically all the railroads in the United States and Canada for welding broken locomotive frames and other heavy sections. It is also used very extensively by the different steel mills for welding broken equipment, such as rolls, pinions, crank shafts, etc. In fact over 1,000,000 lb. of Thermit is used annually by these two industries alone. The process is extensively employed for the welding of rails for trolley lines, the welding of broken sternposts and rudder frames of steamships and for other welding operations too numerous to mention. The process is quite different from either oxy acetylene or electric welding and is adapted to a much heavier class of work.

The Metal & Thermit Corporation operates four different plants, located respectively in Jersey City, Chrome, N. J., Wyandotte, Mich., and East Chicago, Ind. The Chrome and East Chicago plants are devoted to the tinning industry; the Wyandotte plant to the production of liquid chlorine and the Jersey City plant to the Thermit products, including welding materials, carbon-free metals and alloys and pure Tungsten powder. The corporation operates branch offices and welding shops in Pittsburgh, Chicago, San Francisco and Toronto.

The following are the officers and directors: W. T. Graham, Edgar L. Marston, Daniel G. Reid, F. S. Wheeler, Hubert E. Rogers, F. H. Hirschland, E. L. Ballard, L. A. Welles, Charles F. Dane, Philipp Gensheimer and Fred W. Cohen.

Chicago Railway Equipment Company Celebrates Its Twenty-fifth Anniversary

The Chicago Railway Equipment Company celebrated its "Silver" anniversary on the evening of February 5 at the Union League Club, Chicago. It was the twenty-fifth consecutive annual dinner held around the same table and in the same room. The participants included members of the organization, directors, shareholders and guests.

The table was set for 64 places, and was in the form of a dumb-bell. Two large round tables, 15 ft. in diameter, were placed at the ends; the curved "handle" connecting them being some 21 ft. long. In the center of each round table was the company's trade mark "Creco," 4 ft. in diameter, made of red carnations, and encircled by 12-in. silver letters "Twenty-Fifth Anniversary."

Around the table were 25 miniature transmission poles, replicas of a product of the Franklin plant, used as table lights and bearing the anniversary numbers from one to twenty-five. Alternating were 25 miniature poles, each having a curved bracket holding a suspended silver bell, the clapper of each marking the years from 1893 to 1917. There were other appropriate decorations in silver and carnation red. Practically all the decorations except the flowers were a product of or made by the company.

President E. B. Leigh informed the guests that the dinner was an adjourned shareholders meeting and that all had in due and regular form been clothed with proxies.

In his annual report he recalled that the company had never passed or reduced a dividend and that in the 25 years the distribution to stockholders had aggregated \$3,355,000, all based upon an original cash investment of \$30,000 which had never been increased by sale of securities. He announced that an extra dividend of 25 per cent had been declared at the directors' meeting held in the afternoon, and in commemoration of the 25th anniversary, 5 per cent in cash and 20 per cent in stock, the capital stock having been increased to \$3,000,000.

In the quarter century the floor space devoted to the business of the company had increased from 30,000 sq. ft. to over 800,000 sq. ft., the total land owned to about 60 acres and the number of plants from one to five, located at Chicago, Detroit, Grand Rapids, Mich., Monon, Ind., and Franklin, Pa. Founded originally upon its brake beam business, the company had so far diversified its product that now about 70 per cent is sold to customers other than railroads.

Mr. Leigh also told how the company had started with the original "Hein" (National Hollow) brake beam, and how at the expiration of the foundation patents fifteen years later it had in turn brought on the market the "Creco" brake beam. How ef-

fectively this worked out, he almost said "retroced to the fact that so far as known not a single National Hollow Brake beam has ever been manufactured or sold by any other than your own company." He also took occasion to comment on the recent rapid developments in the railway situation. He was unable to prophesy what lay ahead, or in his own words: "Standing upon the threshold of 1918, we are confronted with a tremendous interrogation mark—What?" He then commented on the new problem at Washington—standardization—but added that "whether standardization or the present system which recognizes the advantages of initiative, progress and the constant striving for higher efficiency shall prevail" the company is sufficiently well equipped to meet whatever condition may prevail and is confident of receiving its fair share of future business.

The matter of standardization was also brought up later in the evening by Frank W. Noxon, secretary of the Railway Business Association and one of the guests at the big table. In his remarks Mr. Noxon said:

"We have before us, when peace shall come, the project of re-constituting our whole railway system, in some way yet to be thought out, and to be debated out. We have a very animated, a very active, thorough-going propaganda, which has for its purpose to place all of the transportation agencies in the hands of the government. Of course, one of the first things that would result from that would be that the provision of appliances, the provision of rolling stock, and of tracks, of signals, and all those things would be centralized in the hands of some governmental agency.

"I have been wondering how, under such a system, it would be possible for a series of events to occur, such as we heard recorded tonight in these reports; how the event, which I noticed particularly, when at one stage a patent was about to run out, and when the inventive geniuses of the institution were set to work to provide an improvement over the old device—how such an event could come about.

"Naturally, if the government were to have in its hands the matter of developing the equipment, the men who now and in years past have devoted themselves to improvements in competition one with another, first asking the consideration of one railroad, and then finding that railroad indifferent, going to another, and so on until some hospitable mind was found—instead of that the purveyor or developer or inventor goes to some central board not composed of men who have direct personal interest at stake in proving their hospitality towards the new, but men perhaps overburdened with detail, tempted to standardize and over-standardize—and a deaf ear is turned, perhaps. Suppose it is—there is no recourse, there is no appeal. The improvement projected in the mind of the inventive genius is stopped, then and there.

"I question if men of the calibre of the men who have made this company what it is would be attracted to go in or stay in a business where the opportunity was in the hands, as it would be, of a government board.

"I just want to ask you to think of the great advantages, if we can have it, of maintaining some degree of decentralization, in the future, in the development of railway equipment.

"I think we all feel quite open-minded toward substantial changes from what has been in the past. We expect that what we have learned in the war will teach us things that we must apply and embody in a new system; and the question is whether or not we may have, when it is all over, sufficient decentralization so that the plans and schemes for the improvement of railroads may proceed from below, from the railroad managers themselves, and not from some bureau, static and stagnant, so that business men and inventors, men of imagination, will be attracted into that business, and the American people and the whole world have the benefit of rapid rather than slow progress."

The toastmaster for the evening was H. S. Burkhardt, for 13 years president of the company, and who for 15 years has officiated as toastmaster at its annual dinners. Mr. Burkhardt introduced a number of the "old guards" in the company.

In the course of the evening lantern slides were shown of the various plants at various stages both of prosperity and of calamity with a few merry cartoons of company celebrities.

The secretary of the company, F. F. Walker, supplemented the president's report with historical material of a more detailed character, after which the assistant to the president, Arthur Wyman, introduced a number of friends and guests of the company. Among those who spoke were: Judge J. A. Baldwin, Harry C. Buloup, Willard A. Smith, Frank Wyman, Wm. E.

Clow, Paul Bakewell, Frank W. Noxon, Samuel O. Dunn, Frank D. Reid, Geo. P. Fisher, J. H. Hothbrook, W. E. Seatrice, J. M. Hopkins, L. B. Sherman, Geo. R. Nichols, J. H. Bennett.

American Locomotive Semi-Annual Report

The directors of the American Locomotive Company last week issued to the stockholders of the company a semi-annual report for the six months ended December 31, 1917, in which it was shown that the profits available for dividends in the latter six months of 1917 were \$3,969,251, as compared with \$3,630,834 in the same period of 1916.

An abstract of the report follows:

The net profit for the six months ending December 31, 1917, of \$6,010,009, before deduction of taxes, includes \$439,376 of profit on the munitions business, the remaining profit of \$5,570,633 was made entirely from the regular locomotive business of the company. The net profit for the six months ending December 31, 1916, of \$5,453,334, before tax deductions, included a profit on munitions work of \$3,663,520.

The locomotive output of the company for the six months ending December 31, 1917, was practically all obtained from the Schenectady, Brooks, Pittsburgh and Cooke plants, which collectively represent about 70 per cent of the company's locomotive capacity. The Richmond and Montreal plants of the company, which had been engaged exclusively on munitions work since 1915, finished their munitions contracts in July and August, 1917, and the work of restoring those plants for locomotive manufacture was completed during October, 1917. The cost of this restoration work has been charged to a reserve created for this purpose out of previous years' profits and no part of such cost is charged against the income for the six months under review.

The amount of money in inventories of materials and work in process on December 31, 1917, was \$27,830,295. In the largest year of business prior to the war the amount of such inventories was about \$11,000,000. This very large increase of about \$16,800,000 is due to the higher cost of materials and labor, and also to the rearrangement of our locomotive production schedules, to meet the war requirements of the government, which resulted in postponing the construction of locomotives, the material for which had been delivered to our plants.

The company received from the United States government on July 24, 1917, a contract for 150 locomotives to be used in France for the transportation of our troops and supplies. These locomotives were completed during the months of September and October.

Due to the unsettled conditions in Russia the management thought it wise to obtain an adjustment of the contract made in July, 1917, with the Russian government for 250 locomotives, and with the aid of the United States government an adjustment has recently been effected, which, in view of all conditions, is satisfactory to the company.

The company has had numerous inquiries from its stockholders as to dividends paid during the calendar year 1917 in relation to income tax returns. The preferred and common dividends paid by this company in January, 1917, were declared in November, 1916, out of the surplus profits arising from the business of the company for the period ending December 31, 1916. All other dividends paid during the year 1917 were declared out of the profits of the year 1917.

The company had on its books on December 31, 1917, unfilled orders amounting to \$75,624,849.

CONDENSED INCOME ACCOUNT OF THE AMERICAN LOCOMOTIVE COMPANY AND ITS SUBSIDIARIES.

	Six months to Dec. 31, 1917	Six months to Dec. 31, 1916	Increase or decrease
Gross earnings.....	\$35,959,126	\$37,863,594	\$1,904,468
Manufacturing, maintenance, administrative expenses and depreciation.....	29,851,294	32,326,743	-2,475,449
Interest, etc., on bonds of constituent companies, notes, etc.....	86,07,832	\$5,536,851	\$570,981
Profit.....	97,223	83,517	14,306
Reserve for United States Income and Excess Profits taxes and Canadian Business Profits tax.....	\$6,010,009	\$5,453,334	\$556,675
.....	2,040,758	1,822,500	218,258
Profit available for dividend.....	\$3,969,251	\$3,630,834	\$338,417
Dividends on preferred stock for six months.....	875,000	875,000	.....
Dividends on common stock for six months.....	625,000	625,000	.....
Surplus profit.....	\$2,469,251	\$2,130,834	\$338,417

Financial and Construction

Railway Financial News

FITZGERALD, OCILLA & BROXTON.—J. A. J. Henderson, president of the Ocilla Southern, was the highest bidder for the Fitzgerald, Ocilla & Broxton at a receiver's sale on February 5. This is the third time the road has been offered for sale, the court declining to confirm previous sales.

NEW YORK, NEW HAVEN & HARTFORD.—This company is further reducing its note indebtedness by calling for redemption on April 12, of \$241,000 5 per cent collateral trust notes of certain designated numbers, at 101 and accrued interest. This is in accordance with indenture providing that if any collateral is sold notes must be retired with proceeds. The company has already bought in \$1,000,000 face value of these notes, and with those now called for redemption, the amount maturing on April 15 is reduced to \$43,759,000 from the original \$45,000,000 issued last April.

WARASH-PITTSBURGH TERMINAL.—See comments elsewhere in this issue.

Railway Construction

CHICAGO UNION STATION COMPANY.—This company will build a 14-story warehouse, 328 ft. by 151 ft., on Canal street between Washington and Randolph streets, Chicago. The building will be erected for Butler Bros. and W. R. Linn to take the place of a warehouse which was acquired by the Union Station Company in order to meet the requirements of its terminal plans. The new building will be constructed by John Griffiths & Sons, contractors, and will cost about \$2,500,000.

BLOCK SYSTEM NOT NECESSARY.—From a report printed in Montreal it appears that on the Hudson Bay Railway—or that portion of the line on which track is laid—a train is now run every two weeks. It is for the accommodation of fishermen who have taken fish from the lakes of Northern Manitoba and who otherwise could not find a market. The railway is still in the hands of the contractor; but the government has undertaken to guarantee that the running of the trains shall not be done at a loss.

LOCOMOTIVE DEVELOPMENT IN SOUTH AFRICA.—In his report for 1916 the general manager of the South African Railways and Harbors makes the following comments upon locomotive development: The further improvement of the locomotive boiler is a subject that has engaged the attention of mechanical engineers for some time. The superheater has added greatly to the steaming efficiency, and has neutralized the difficulties associated with the firing of large engines to maintain the pressure of steam necessary for the work required of a modern locomotive. But increased steam pressures are still desirable, and experiments are being conducted in different parts of the world with new boiler designs and other improvements calculated to develop the steaming efficiency and the steam pressure of the locomotive. That very high pressures can be raised and maintained by means of tube or pipe generators has already been established, but it has yet to be proved whether a generator of this type can be successfully adapted to locomotive practice. A generator on these lines has been designed by the superintendent (mechanical), Johannesburg, and inquiries are being made as to the practicability or otherwise of his proposals. The design involves a radical departure from present practice, and will require most careful investigation and consideration before further action is taken. In the experimental stage oil fuel may have to be used, but the object in view is to adapt the engine to burn coal dust, and, that being so, the result of the advance that is being made in the United States with engines designed to use pulverized fuel is being watched with special interest, especially in view of the fact that the use of such fuel eliminates fire hazard.—*Engineering, London.*

Railway Officers

Executive, Financial, Legal and Accounting

Milton Smith has been appointed general solicitor of the Denver & Salt Lake, succeeding **Tyson S. Dines**, resigned.

E. D. Levy, first vice president and general manager of the St. Louis-San Francisco, with office at St. Louis, Mo., has resigned, effective May 1.

W. C. Yarborough, cashier of the Atlantic Coast Line, with office at Wilmington, N. C., has been appointed assistant treasurer, with headquarters at Wilmington.

C. C. Michie, chief clerk in office of vice-president of the Chesapeake & Ohio at Richmond, Va., has been appointed an assistant secretary, with headquarters at Richmond.

Gaston Craig Hand, who has been elected vice-president of the Kansas City Southern, with headquarters at New York, as has already been announced in these columns, was born on July 2, 1870, at Belmont, N. C., and was educated at St. Mary's (now Belmont Abbey) College, Philadelphia Law School and New York University. He began railway work in February, 1891, and served successively as station agent and telegraph operator on the Atlantic Coast Line until September, 1893. He was then despatcher's apprentice and tram despatcher on the same road to June, 1896, and later served as assistant in the superintendent's office. In July, 1901, he went to the Pennsylvania Railroad as a clerk in the transportation department. From August, 1902, to September, 1904, he was engaged in transportation and other work with bankers in Philadelphia and New York; then was statistician with Ladenburg, Thalmann & Co. bankers, New York. In February, 1908, he was appointed examiner for the Interstate Commerce Commission, Washington, and in December, 1909, he was appointed secretary of the Kansas City Southern, with office at New York, which position he held until his recent appointment as vice-president of the same road, as above noted.



G. C. Hand

J. W. McCullough, auditor of the lines east of Houston, 1st of the Gulf Coast Lines, has been promoted to general auditor, with headquarters at Houston, Tex., effective January 15.

W. H. Wright, superintendent of the Wisconsin & Michigan, with office at Peshtigo, Wis., has been appointed auditor, with headquarters at Menominee, Mich., succeeding **M. F. Schulze**, resigned. **W. J. Moriarty**, cashier, has resigned.

Decatur Axtell, vice-president of the Chesapeake & Ohio, the Reading Valley, and the Chesapeake & Ohio of Indiana, with office at Richmond, Va., resigned from those companies in February 8.

M. P. Blauvelt, controller of the Lehigh Valley, has been elected vice-president with offices at New York and Philadelphia, Pa. A photograph of Mr. Blauvelt and a sketch of his railway career were published in the *Railway Age Gazette* of June 29, 1917, page 1508.

W. H. Hough, auditor of receipts and disbursements of the Susquehanna & New York and the Tionesta Valley, with office

at Williamsport, Pa., has been appointed assistant auditor and **C. F. Bower** has been appointed manager of receipts and disbursements, succeeding Mr. Hough.

The election of **William P. Kenney**, vice-president of the Great Northern, with headquarters at St. Paul, Minn., as president of that road is announced elsewhere in this issue. **Ralph Budd**, assistant to the president, with headquarters at St. Paul, has been elected executive vice-president.

Charles Molony, assistant to the president and general manager of the Central of Georgia, with office at Savannah, Ga., has been elected president of the Wrightsville & Thomas, with headquarters at Terminal, Ga. **Henry D. Pollard**, resigned to accept service with another company.

Operating

W. C. Zeigler has been appointed car agent of the Susquehanna & New York, with office at Williamsport, Pa.

W. C. Barnwell, first truck despatcher of the Georgia, Southern & Florida, has been appointed chief despatcher, with office at Macon, Ga.

T. J. Regan, trainmaster on the Northern Pacific at Livingston, Mont., has been transferred to Forsyth, Mont., succeeding **L. W. Martin**, transferred.

M. Eady, chief despatcher of the Georgia Southern & Florida, has been appointed superintendent of the Hawkinsville & Florida Southern, with headquarters at Askeon, Ga.

W. A. Todd, general roadmaster of the Charleston & Western Carolina, with office at Augusta, Ga., has been assigned the duties also of trainmaster, with the title of trainmaster and general roadmaster.

E. B. Fisher was appointed superintendent of the Minnesota, Dakota & Western, with headquarters at International Falls, Minn., succeeding **F. L. Birdsall**, resigned, effective January 1.

M. L. Phelps, superintendent of the Denver & Salt Lake, with office at Denver, Colo., has been appointed general superintendent, with headquarters at Denver, in charge of transportation, mechanical, roadway and engineering departments.

R. J. Carmichael, division passenger agent of the Illinois Central, at Chicago, Ill., has been appointed to the newly created position of instructor of passenger train and station employees on the entire system, with headquarters as before at Chicago, effective February 16.

A. E. Fillmore, superintendent of car service of the Kanawha & Michigan, with office at Colfax, W. Va., has been appointed superintendent of freight transportation, with the same headquarters. **F. H. Young** has been appointed superintendent of car service with office at Colfax, succeeding Mr. Fillmore.

H. E. Newcomet, superintendent of the Pennsylvania Lines west of Pittsburgh, Southwest system, with office at Louisville, Ky., has been appointed superintendent of the Louisville division, with office at Louisville, Mo., vice **George Le Boutillier**, transferred, and **Taber Hamilton**, succeeded at that office at Decatur, Ill., has been appointed superintendent of the Louisville division, vice Mr. Newcomet.

W. C. Copley, freight trainmaster of the Pennsylvania Railroad, with office at Albion, Pa., has been appointed special agent; **W. B. Moore**, passenger trainmaster, with office at Altoona, has been appointed trainmaster; **J. B. Phelan** has been appointed freight trainmaster and **L. L. Banks** has been appointed passenger trainmaster. **H. DeHuff** has been appointed assistant freight trainmaster, with office at Pittsburgh.

J. H. Owen, superintendent of transportation of the Florida East Coast, with office at St. Augustine, Fla., has been appointed general superintendent of transportation. **A. L. Pooser**, superintendent at New Smyrna, has been appointed superintendent of transportation, Northern division, with office at New Smyrna, and **E. L. Klein**, superintendent at Miami, has been appointed superintendent of transportation, Southern division, with office at Miami.

J. K. Johnston, superintendent of the Philadelphia division of the Pennsylvania Railroad lines east of Pittsburgh, with office at Harrisburg, Pa., has been appointed superintendent of the Tyrone division, with headquarters at Tyrone; F. W. Smith, Jr., acting superintendent of the Conemaugh division, at Pittsburgh, has been appointed superintendent of the Philadelphia division, with office at Harrisburg; J. B. Hutchinson, superintendent of the Tyrone division, at Tyrone, has been appointed acting superintendent of the Conemaugh division, with office at Pittsburgh; R. H. Pinkham, division engineer of the Pittsburgh division, at Pittsburgh, has been appointed assistant superintendent of the same division, with headquarters at Cresson; Thomas A. Roberts, agent at Erie, has been appointed assistant superintendent of the Philadelphia division, with office at Glen Loch; G. M. Smith, freight trainmaster of the Maryland division at Wilmington, Del., has been appointed assistant superintendent of the same division, with headquarters at Lamokin, and W. M. Post, assistant signal engineer in the office of the signal engineer, at Philadelphia, has been appointed assistant superintendent of the Middle division, with headquarters at Mifflin.

Traffic

H. A. Jordan has been appointed general freight and passenger agent of the Wadley Southern, with office at Savannah, Ga.

M. J. Curry has been appointed commercial agent of the El Paso & Southwestern, at Detroit, Mich., succeeding D. A. Davies.

C. Dowling has been appointed traffic manager of the Edmonton, Dunvegan & British Columbia, with office at Edmonton, Alta., succeeding A. Campbell.

G. I. Martin, traveling freight and passenger agent of the Denver & Rio Grande, at Salt Lake City, Utah, has been promoted to general agent, at Reno, Nev.

P. A. Marr, district passenger agent of the Illinois Central, at Cincinnati, Ohio, has been appointed division passenger agent, at Chicago, Ill., succeeding R. J. Carmichael, promoted, effective February 16.

Ferdinand G. Lantz, assistant general freight agent of the Erie, with office at Chicago, Ill., has been appointed general agent of the Chicago and Hammond terminals, vice Charles D. Ward, transferred to New York.

Jonas Waffle, general freight and passenger agent of the Chicago, Milwaukee & Gary, at Chicago, Ill., has resigned and his office has been abolished. R. E. Owen has been appointed assistant general freight and passenger agent, with office at Chicago, Ill., effective February 1.

H. T. Duffy, general agent of the Minneapolis, St. Paul & Sault Ste Marie, at Toronto, Ont., has been appointed district passenger agent at Duluth, Minn., succeeding W. H. Lennon, who has been appointed city passenger agent of the Duluth, South Shore & Atlantic and the Soo Line, with the same headquarters. The Toronto office has been closed.

Engineering and Rolling Stock

V. B. Wagner has been appointed chief engineer of the Cripple Creek & Colorado Springs, with office at Colorado Springs, Colo., succeeding M. J. Burgdorf.

V. N. Potts has been appointed general foreman of the locomotive department of the Chicago, Rock Island & Pacific, with headquarters at Liberal, Kans.

H. C. McCullough and W. P. Murphy have been appointed road foremen of equipment of the Chicago, Rock Island & Pacific, with headquarters at El Reno, Okla.

W. W. Lemen has been appointed superintendent of the motive power and car departments of the Denver & Rio Grande, with office at Denver, Colo., succeeding W. J. Bennett.

J. M. Kerwin, master mechanic of the Chicago, Rock Island & Pacific, with headquarters at Estherville, Ia., has been transferred to newly opened headquarters at Silvis, Ill. R. J. McQuade, general foreman of the locomotive department, at

Chicago, Ill., has been appointed master mechanic to succeed Mr. Kerwin, with headquarters at Estherville, Ia.

J. H. Roach, valuation engineer of the New York Central lines west, has been appointed valuation engineer of the lines east and west, with headquarters at New York and Cleveland, Ohio.

W. B. Steeves, locomotive foreman of the Canadian Northern, with headquarters at Saskatoon, Sask., has been promoted to assistant master mechanic of the western district, with headquarters at Edmonton, Alta.

E. M. Sweetman, master mechanic of the Southern Railway with office at Spencer, N. C., has been transferred to the Coster shop, Knoxville, Tenn., as master mechanic, succeeding N. N. Boyden, resigned to go into other business.

F. O. Walsh, superintendent of motive power of the Georgia Railroad, has been appointed superintendent of motive power and equipment also of the Atlanta & West Point and the Western Railway of Alabama, with office at Montgomery, Ala.

W. F. Kuhlke, assistant trainmaster of the Charleston & Western Carolina, has been appointed superintendent of motive power; the position of master mechanic at Augusta, Ga., made vacant by the death of T. B. Irvin, has been abolished.

R. Faries, division engineer of the Williamsport division of the Pennsylvania Railroad lines east of Pittsburgh, with office at Williamsport, Pa., has been appointed division engineer of the Pittsburgh division, with headquarters at Pittsburgh; E. J. Ayars, division engineer of the Allegheny division, at Oil City, has been appointed division engineer on the Williamsport division, with office at Williamsport; C. M. Wisman, division engineer of the Elmira division, at Elmira, N. Y., has been appointed division engineer of the Allegheny division, with office at Oil City; W. E. Brown, assistant division engineer of the Pittsburgh division at Pittsburgh, has been appointed division engineer of the Elmira division, with office at Elmira; C. W. Richey, master carpenter of the Pittsburgh division, at East Liberty, has been appointed assistant division engineer of the Pittsburgh division, with office at Pittsburgh; C. E. Zortman, division engineer of the Conemaugh division at Pittsburgh, has been appointed division engineer of the Delaware division, with office at Wilmington, Del., and S. L. Church, division engineer of the Delaware division, at Wilmington, has been appointed division engineer of the Conemaugh division, with office at Pittsburgh.

Purchasing

W. E. Allen has been appointed purchasing agent of the Gulf, Florida & Alabama, with office at Pensacola, Fla.

M. Velasco has been appointed local purchasing agent of the Constitutionalist Railways of Mexico, with office at New York, vice F. E. Carrero, resigned.

J. L. Diessl, division storekeeper of the Atchison, Topeka & Santa Fe, at Riverbank, Cal., has been transferred to Calwa, Cal., succeeding J. A. Brackett, who was transferred to Bakersfield, succeeding W. H. Bunch, who has entered the National Army. J. W. Riddings has been appointed storekeeper at Richmond, Cal., succeeding H. I. Heath, who has also entered the National Army.

Obituary

W. H. Guerin, formerly general agent of the Chicago & North Western, at Detroit, Mich., died at Monterey, Cal., January 30, aged 59 years.

Nathan A. Sims, general freight and passenger agent of the Ulster & Delaware since 1887, with office at Kingston, N. Y., died on February 7, at the age of 62.

F. T. Lasier, formerly general agent of the passenger department, of the Chicago Great Western, at Chicago, Ill., died at his home in that city on February 4.

J. W. Bushnell, formerly chief engineer of the Florida Railway & Navigation Company, now a part of the Seaboard Air Line, died on February 4 in his home at Tallahassee, Fla., at the age of 66.

EDITORIAL

Railway Age

EDITORIAL

The express companies are being hard hit as is indicated by the returns for the ten months ended with October. The

Express Companies Hard Hit

Adams had an operating deficit of \$1,880,000 as against operating income for the corresponding ten months of 1916 of \$933,000. American and Wells-Fargo suffered almost as much; the former had an operating income of \$940,000 in 1917 as against \$2,125,000 in 1916, and the Wells-Fargo an operating income of \$699,000 in 1917 as against \$2,634,000 in 1916. The express companies' gross business was very much larger in 1917 than in 1916 and the amount they had to pay out for express privileges (amounts paid to the railroad companies) increased only in proportion, so that the amounts available to pay operating expenses were much larger in 1917 than in 1916. The expenses mounted up out of all proportion, however, to the increase in business handled. It is well known that a great many shipments which would under ordinary circumstances have gone by freight have been, during the past year, sent by express. The express companies' organization has not been capable of handling this business economically; loss and damage claims have amounted to unprecedented figures; correspondence has in some cases more than doubled. Everywhere the bad effects of congestion have been reflected in increased expenses; hay and grain have increased greatly in price; and the efficiency of express labor has fallen off until the average with some companies is probably not much above half what it was two years ago. The reason for this labor situation is two-fold. Even if the express companies had not had to handle the great increase in business, the depletion of their employees' ranks through the operation of the draft, and the more attractive offerings made by other industries, would have necessitated the hiring of so many new men, that the standard would have been very much lowered. There is added to this, however, the great increase in business. This still further diluted the old carefully trained forces with new inexperienced men. Because of these conditions, it is not surprising that there is so little opposition on the part of shippers to the requests of the express companies for higher rates.

Commissioner George W. Anderson of the Interstate Commerce Commission is one of the closest advisers of Director

The Alleged Disloyalty of Railway Men

General of Railroads McAdoo. He is at the same time a public official who, while he means to be fair, is not disposed to give railway owners and officers any more than their due. Therefore some remarks he made before the Traffic Club of New England on February 12 are significant as indicating not only his own attitude but that of government officials. He referred to the fact that "there are all kinds of nasty remarks afloat as to bad faith on the part of railroad officials and railroad employees—of an alleged desire that federal control be a failure—stories that they are holding up trains, allowing congestions to take place and doing other things to impede traffic." "I want to make my position on that entirely clear," said Commissioner Anderson. "I do not

believe those stories." Mr. Anderson's remarks on this subject are published elsewhere in this issue. He recognized the fact that "the men operating the railroads will make mistakes. They must reorganize their mental processes and their mental habits and readjust them to the new status during the war period. Some of them will not do it easily. He had no doubt, however, that practically all railway officers and employees are loyal. It would certainly be a remarkable thing if railway officers and employees were not loyal. Many of the officers of the railroads have sons in the army. All of them have many friends and acquaintances "over there." The same thing is true of railway employees. The railway regiments, composed of railway officers and employees who voluntarily enlisted were, we believe, the first American soldiers actually under fire in France. The officers and employees who have stayed on the railways are as loyal and patriotic as those who have gone into the army. They showed their patriotism before government control was adopted by exerting themselves to move the maximum possible amount of business. They have shown it since by giving the best support they could to the Director General of Railroads. No baser or falsier charge ever was made than that either from disloyalty or desire to discredit government control railway officers and employees have been "lying down."

With the approach of Engineering Week, as the third week in March is known among railway men, with its annual meeting of the American Railway Engineering Association, its stated meeting of the Railway Signal Association and the annual exhibit of the National Railway Appliances Association, more

Conventions in War Time

than the usual amount of interest is being displayed in these meetings this year. Never have these organizations met under as unusual and as strenuous times as the present. Approximately 100 members of the American Railway Engineering Association, or almost ten per cent of the membership, have entered the military or naval service of the country since the last meeting and similar records have been made by the other associations. This exodus has occurred at a time when the demands for trained men on the railways are the greatest ever experienced. As a result there have been a larger number of changes in personnel and more men have been installed in new positions than in any previous year. This condition not only presents an opportunity for these associations to be of real educational service to these men and to the roads which employ them but it places a heavy responsibility upon these organizations to perform this service. The need for relief is not, however, confined to the novices in the field, for the older and more experienced men are also confronted with experiences which are equally new to them. Problems have arisen during the past 12 months which are without precedent in character or in severity. There is no more loyal group of officers in railway service than those in charge of the maintenance of way department. Since the government has taken over the operation of the roads as a military measure to help win the war, the spirit of loyalty to country is now added to that to employer. To serve both most loyally now requires the

maximum of efficiency and this can only be secured by the freest exchange of ideas regarding the best methods and appliances. The American Railway Engineering Association and the Railway Signal Association are preparing programs designed to be of the maximum service to their members in meeting the new conditions and sufficient opportunity will be offered for a discussion of present day problems, which should be of great value. The exhibitors at the Coliseum have an equal opportunity to further the interest of the railways in this time of stress by making their exhibits as educational as possible and by placing special emphasis on those of their products which will aid the roads in maintaining their properties under existing conditions. With these meetings definitely assured, we believe that the railway engineers of the United States and Canada can be of no greater service to their roads than by availing themselves of the opportunities of attending these meetings.

While the subject of standardization of locomotives and cars is being discussed, railway officers and railway supply

Standardization and Existing Equipment

men who are concerned about the outcome should keep in mind one very important fact. This is, that, regardless of the standards adopted for new equipment, there are already in service 66,000 locomotives and about 2,500,000 freight, passenger and work cars. The maintenance of these existing cars and locomotives, and the installation of devices, especially in the case of locomotives, to make them more serviceable, will necessitate a very large part of the total expenditures made by the railways for materials and supplies for years to come. The materials and devices bought for the maintenance or improvement of existing equipment will be much the same as they would have been if government control had not been adopted; and in the main the same railway officers will specify and buy them who heretofore have done so. There will be supervision of all purchases from Washington, as there will be supervision of all parts of management and operation; but that there will be revolutionary changes in the relations between the railroads and the railroad supply business in general is improbable. In fact, without distributing business widely among the plants of the railway supply manufacturing concerns, the railways even under government control could hardly get all the materials and supplies that will be required by them.

The Report on Stresses in Track

THE ACTION of tracks under traffic is complex. Even the distribution of the load of a single pair of wheels through the rails, ties and ballast to the roadbed is accompanied by complications. For this reason track design has generally followed empirical lines while the various analytical treatments advanced from time to time, have not received general acceptance since they have usually suffered from a lack of rigid mathematical proof or the support of reliable experiments. The need for a thorough establishment of the mechanics of track has been sorely felt by students of rails, ties and other component parts of the track structure, and expressions of opinion along this line by interested committees of the American Railway Engineering Association and the opinions of others vitally concerned, crystallized about five years ago in the establishment of a Special Committee on Stresses in Track composed of members of the American Society of Civil Engineers and the American Railway Engineering Association under the leadership of Professor A. N. Talbot, of the University of Illinois.

The efforts of this committee have now borne fruit in a report published in the Proceedings of the American Society of Civil Engineers for January, 1918, which is abstracted on another page of this issue. While not complete, it is sufficiently conclusive to demonstrate that the committee had been working in the right direction. Introducing a mathematical analysis of track action that is unusually simple, considering the complex subject, the committee has directed its efforts, through a comprehensive series of tests, to an evaluation of the several variables encountered in this analysis.

The results are illuminating, for definite numerical values are submitted to express variations in the rigidity or stiffness of track with different weights of rails, sizes of ties, kinds and depths of ballast, etc. One particularly interesting discovery is that the distribution of wheel-loads to the ties is much more uniform than was generally supposed. The data are not sufficiently complete as yet to cover all classes of conditions, but sufficient information is now available to indicate what may be expected with a continuation of this work.

The Government Locomotives

ECONOMY IN TRAIN OPERATION demands that careful study be given the design of the hauling unit, the locomotive, that it may be made to best suit the conditions under which it is to operate. Among the conditions which affect the design of a locomotive may be mentioned grades, curvature, weight of rail, strength of bridges, clearances, speeds, service (freight, passenger or switch), fuel and facilities for handling the locomotives at the terminals. It is obviously impossible to evolve one design of locomotive which will economically meet the variations in all of these conditions. Nor can even a few designs be made to cover them without a serious loss in operating efficiency in some cases. The government in its desire to provide locomotives must give these facts serious consideration. To build locomotives suitable for operating over a wide range of conditions, a sacrifice must be made in operating efficiency on some roads over which they will operate, and this will reduce the net income of those roads.

Granted that now, and perhaps next year, there will be a need for locomotives that can be sent indiscriminately throughout the country to relieve congestion wherever it may occur, the fact remains that where specific roads need new locomotives in any large numbers, far better results will be obtained by providing those roads with locomotives of a design that is best adapted to their particular needs. These locomotives, if built of existing designs, would serve their purpose better than any locomotive of a compromise design that it would be practical to build for a certain set of operating conditions. The number of any general service locomotives ordered by the government, therefore, should be held to a minimum—to a number which will be considered necessary to relieve congestion caused by a lack of power. The danger is in ordering more than is absolutely necessary and thus holding up orders for locomotives of special design for those roads that need them most. As conditions again become normal, and the railroads have an opportunity to adjust themselves to the new conditions, there will be no great need for these general service locomotives, and if there are too many of them it will be difficult to find places in which to use them economically.

In the development of the designs for government locomotives it must be remembered that the railroads will operate them. A locomotive builder's design is not necessarily a locomotive user's design. There are questions of operation and maintenance with which the builder only comes in in-

direct contact. These questions are particularly important in locomotive design—a great deal more so than in car design. Past experience has shown that many locomotives built strictly to the builder's designs have not proved entirely satisfactory when placed in operation. Any new design of locomotive is always sure to require some changes which will be indicated by its performance in service. The question of maintenance is very important. The experiences of this winter have clearly demonstrated this. No one is better able to suggest improvements in design from a maintenance standpoint than the railroad man—the man who maintains them. It is plainly evident that the railroad man's opinion should be given serious consideration in the design of the machine he is to operate and maintain, if he is to be expected to do it efficiently. He is more familiar with the conditions under which locomotives operate. He knows what is needed to alleviate the shortage of power. He is the man that is living with it and suffering for the lack of it. His counsels are necessary to the satisfactory solution of the problem.

The Standard Car

ACCORDING TO REPORTS from Washington the railroads are to have a standard freight car at last. For more than three years the American Railway Association has had a sub-committee working on designs for a standard box car. These standards have been developed by the best car designers in the country, coming from both the builders and the railroads. Every question of design from the construction and maintenance standpoint has been thoroughly discussed and on only but a few features of these designs have all the members of the sub-committee agreed. The lack of agreement on these few features is the reason that the designs have not been submitted to the American Railway Association for its acceptance, for it was felt that it was useless to submit designs without the unanimous approval of the entire sub-committee. This, of course, was right, but the sub-committee is to be criticised for not adjusting the differences of opinion among the members so that an agreement could be reached. Now the matter is to be brought to a conclusion by the Director-General of Railroads, who has appointed a committee of car builders, with S. M. Vauclair as chairman, to produce the standard car. This committee should give full consideration to the deliberations of the A. R. A. sub-committee, for there it will find important points that affect materially the maintenance of the car and the requirements of service.

The purpose of freight car standardization is to provide a car that can be maintained at a reasonable cost, that will be strong enough to fully meet the present operating conditions and that can be built economically by the builders. The proper standards must therefore be in the nature of a compromise between the builders and the railroads. By the nature of his business the builder knows which designs can be constructed most economically. Likewise the railroads know which designs better meet their needs and which can be maintained most economically. The arguments of both must be given consideration. The final design must be such that the interests of both will be properly taken care of.

In every problem of standardization the vital question is how far it should be carried. It is very important that it should not be carried to such an extent that it will discourage any designer or inventor, whether inside or outside the railroad, from seeking to improve existing designs. This would throttle development, which is absolutely foreign to American ideals. Opportunities must be left for improvements that will make the car cheaper in first cost and cheaper to maintain. Insistence must be had, however, on interchangeability and adequate strength. Our railway

equipment would not be as highly developed as it is today if it were not for those who have worked hard and spent money to produce improvements over old or existing designs. Much has been done in this respect and much still remains to be done. The gates should be left open for improvements and it is very necessary that provision be made to encourage anybody to make them. It is only right that those who do this receive remuneration for their labors, expenditures and ingenuity. To put a stop to invention, or to even discourage invention by forming rigid standards for the entire car would be a decided step backward.

How to Improve the Power Situation

THE PRESENT LOCOMOTIVE SHORTAGE may be improved in two ways—by building new locomotives and by putting the existing locomotives into better operating condition. By far the best results for immediate relief will be obtained by improving the condition of the existing locomotives. As was pointed out in these columns last week, the shortage of power is not so much the lack in the number of locomotives as it is the condition of the locomotives. To be sure, new locomotives are needed, the supply from the builders for domestic use last year being practically cut in half by the demands of our Allies. The government fully realizes this and is seeking to supply them speedily, but for immediate relief every possible step must be taken to improve the condition of existing power.

The railroads went into the winter with practically no reserve of power. The extreme traffic demands which had to be met during the past year made it impossible for them to put the locomotives in as good condition for the winter as usual. Furthermore, the labor conditions the country over were in such a state that the shop forces were constantly changing, the efficiency of the men decreased and the output of the shops was reduced. Coupled with this the severe winter with low temperatures and heavy snows made operation very difficult, increasing the wear and tear on the locomotives and greatly hampering the men in making repairs. This has led to an accumulation of locomotives at the shops for repairs to the extent that the shops of those roads which have been congested most badly are overtaxed and locomotives which should go into the shops for repairs are being operated at a sacrifice in efficiency.

The problem is—what may be done to speed up the work necessary to get the locomotives back into shape. On a satisfactory answer to this question depends the speeding up of our industrial machinery and the speeding up of the war. With the backbone of winter broken and the labor situation perhaps becoming a little more stable, an increase in efficiency in the shops may be looked for. In some cases the government will find it necessary to issue priority orders for repair material. So great is the importance of the transportation system at the present time that no road should hesitate to demand prompt deliveries, if by so doing locomotive repairs may be speeded up. In some cases it may be possible to work the locomotive shops in day and night shifts, if the necessary help can be obtained. In all cases, they should be worked to the limit. It should be possible to send locomotives from the eastern territory to western shops on roads that have not been as badly congested. Some of the locomotive builders could perhaps render assistance by taking locomotives in from adjacent roads for repairs, although if such a practice will interfere to any great extent with the production of new locomotives which will be badly needed next fall and winter, this practice is open to question. An opportunity for a great improvement is in the supervision and inspection at the shops, which, even under normal conditions, has not been adequate. With a new class of labor in the shops, which is more or less un-

familiar with railroad repair shop practice, it will be necessary to provide competent instructors or supervisors in greater numbers than has ever been the practice. Needless to say, the quality of this supervision should be of the highest. Without competent and aggressive leaders the work cannot be done efficiently. The remuneration must be sufficient to attract the best men available.

The repairing of existing equipment is the question of the hour; designs for new equipment is a question of the future. Concentrate on improving the condition of the existing locomotives.

Railroad Control Legislation

THE COMMITTEES of both houses of Congress have reported, with some changes, the railroad control bill drafted for the administration. The discussion of the proposed legislation is under way in Congress. Action by the Senate is expected this week. The original bill, which was drafted chiefly by Commissioner George W. Anderson, of the Interstate Commerce Commission, has stood criticism well. Both the Senate and the House bills are founded on it, and neither of them differs greatly from it. This is a compliment to the author, as the hearings before both committees have been thorough, and the members, while manifesting a desire to support the administration, have also shown an inclination to deal both fairly and independently with the problem.

Both committees have accepted the sound principle that, in the circumstances, the President's representative, the Director General of Railroads, should be given a very free hand so that he may control management and operation as the exigencies of commerce and of war may demand. Without a free hand the Director General would be hampered, as the Railroads' War Board was, and could not get the best results or fairly be held responsible if he did not get them. The three points which received the most attention from the committees, and to which the most discussion is being given in Congress, are the basis on which the railway companies shall be compensated for the use of their properties; what authority shall exercise the rate-making power during the period of control, and the duration of control after the war.

The original bill provided for an annual guarantee to each company equivalent to its average annual net operating income during the three years ended June 30, 1917. Attention was called to the fact that in the six months from June 30, 1917, to January 1, 1918, there had been added a substantial investment in the railways on which the proposed basis provided for no return. The house and senate bills have remedied this defect by providing for a return upon this additional investment, the rate of which shall be fixed by the President. Both bills provide, as did the original one, for a different basis of compensation to be fixed by agreement between the President and the carriers in cases where the President may find that the "standard return" would not be equitable.

The original bill provided that a reasonable return, to be fixed by the President, should be paid upon any additional investment in additions and betterments or extensions which might be made by the companies out of their own funds during the period of control. The senate committee has added a provision which reads, "that there shall be no increase of compensation for any additions, improvements or betterments constructed out of or purchased by the earnings for investment or surplus earned during the period of federal control." What does this mean? Many roads after paying out of their guaranteed standard returns their usual interest and dividends, as permitted by the bill, will have

surpluses. Under private control when a company has net operating income in excess of that paid out in interest and dividends it usually invests practically all of this surplus in its property. Does this provision mean that if the companies invest the surplus parts of their guaranteed returns in the properties they will not be paid any return upon this investment during the period of government control? If so, they will have no incentive to invest the surpluses, and the government probably will have to furnish all the new capital put into the railways. But the provision says "surplus earned during the period of federal control." Probably some roads during the period of control will earn their guarantees and something besides. Perhaps the word "surplus" as here used refers to this "something besides." This can hardly be, however, for in another place the bill provides that any net operating income in excess of the standard return shall be paid into the government treasury, which presumably means that it will belong to the government.

The provision regulating return upon invested surplus should be made clear, or, better still, stricken from the bill. While its effect is doubtful, the reason why it was inserted is known. It is a favorite theory of two or three members of the senate committee that railways should not be allowed to pay a return on surplus earnings invested in their properties. This may or may not be correct. But to try to give effect to the principle by adopting a provision which during the period of federal control would prevent any surplus from being invested and thereby force the government to raise all the capital needed for additions and betterments would be a mistake. It would needlessly increase the investment of the government in the railways and render it more difficult to disentangle their relations after the war. It would save the government almost nothing, because if the government has to borrow and invest capital which the railway companies might furnish from their surpluses, it will have to pay almost as much interest on this capital as it would have to pay the companies on the same amount of invested surplus.

The senate and house bills differ in their provisions regarding rate-making. The house bill gives the President—in other words, the Director General—authority to fix rates during control. The senate bill confers the authority on the President, but gives a right of appeal to the Interstate Commerce Commission. The house bill is the more logical in this respect. Under the senate bill the Director General would be held responsible for the operation and the expenses of the railways, but would not have authority to make the earnings equal the expenses. However, it is probable that the final results will be the same, no matter which provision is adopted, for it is not likely that the Interstate Commerce Commission would follow a policy in rate-making antagonistic to that favored by the President.

Perhaps the most significant provisions of the house and senate bills are those relating to the continuance of control after the war. The original bill provided that control should continue until Congress ordered otherwise. This provision was advocated and opposed upon various grounds, but the controversy over it developed into one chiefly between the advocates and the opponents of government ownership. Those opposed to government ownership criticized the provision on the grounds that if adopted it would tend to make it difficult to get the railways out of the hands of the government and that this should not be done because so great a question as government ownership should be fought out in time of peace with the result uninfluenced by legislation enacted to meet a war emergency.

This argument prevailed in both committees. The senate bill provides for control for not more than 18 months and the house bill for not more than two years after the war, and each specifically declares, "Nothing herein is to be con-

strued as expressing or prejudicing the future policy of the federal government concerning the ownership, control or regulation of carriers or the method or basis of the capitalization thereof." These provisions are mainly the expression of a preponderant sentiment against government ownership which was manifested in both committees, and the passage of either provision would be the expression of a similar sentiment by Congress. That a majority of the members of the present Congress are opposed, and strongly opposed, to government ownership has become clearer every day that the railroad control bill has been under consideration. This is a very interesting development.

The consideration of the railroad control bill has presented a marked contrast to that given to most bills relating to railroads that have come before Congress during the last ten years. Perhaps the change is largely due to the fact that Congress has considered this bill in the atmosphere of war. We hope and believe it is due still more to an awakening on the part of many members to the fact that the present plight of the transportation system of the country is mainly due to an unwise policy of regulation for which Congress itself has been mainly responsible, and to a realization that the time has come when the welfare of the country demands that the railway problem shall be dealt with very differently from the way in which it has been dealt with in the past.

New Books

Principles of Ocean Transportation, by Emory R. Johnson, professor of transportation and commerce and Grover G. Huebner, assistant professor of transportation and commerce at the University of Pennsylvania. 513 pages, illustrated. Size 6 in. by 9 in. Bound in cloth. Published by D. Appleton & Co., New York. Price, \$2.50.

An up-to-the minute and exceedingly timely book on a subject which is becoming of greater and greater interest from day to day.

The United States by being compelled to build ships to combat the submarine peril is rapidly obtaining a new merchant marine and with leaps and bounds is striving for a position in ocean shipping such as it occupied before the Civil War. What are our possibilities of ultimately attaining that position and of keeping it after the peculiar economic conditions of war have given way to those of peace? The reader will find many elements of optimism in this book. He will find that a nation's ocean shipping is primarily economic. Subsidies or subventions, however much they may help or hurt, will not give a country a merchant marine, unless economic conditions are favorable to that end. In our own case, economic conditions encouraged a merchant marine until just prior to the Civil War. The destruction of American shipping in that struggle and the great transfer of ships to other flags started a decline that was assisted, or rather furthered, by our laws and by the fact that we were still using wooden ships and sails after England had gone to iron ships and steam. For 40 or 50 years after the war, America practically turned from the sea, invested her capital in the West, in the railroads, in iron and steel and other industries. In the legislative halls, ocean shipping was neglected. Neglected, nay more, it was discriminated against with navigation laws that hung like a millstone around a ship owner's neck. The law prohibiting the return to American register of ships transferred to foreign flags during the Civil War, was only one example of what was done.

But now conditions have changed. America has become a world power; she is becoming more and more interested in export trade, and if the United States has not already

reached that point, it is fast attaining a position economically favorable for a standing in ocean shipping in keeping with its export interests and industrial prowess. The United States, to take some of the examples so well brought out in "Principles of Ocean Transportation" can now produce ship plates as cheap as England. We are giving more attention to our navy; construction of naval vessels is of great advantage in the way of economies in ship building costs. We have already on the stocks the beginnings of a new merchant marine. If things go as well as they are going now, and everyone hopes that they will soon be going even better, we shall soon be able to realize the advantages of large scale standardized production of efficient merchant ships. Our tonnage rating laws no longer discriminate against American ships. We have cheaper coal. We have the Panama canal which gives us a direct route to the Western coast of South America and which brings Australia nearer to New York than to Liverpool. And what is most important, the American business man is showing a very lively interest in the possibilities of export trade and American capital is ready and available for investment in ships and shipping. Everything is not ideal, of course, for we still have the "full-crew law" of ocean shipping in the regulation that 75 per cent of a vessel's crew must understand the language of its officers—just that law that Japan must have been unbelievably pleased to have our Congress pass. The cost of operating a vessel under the American flag is higher than under most other flags, but with an industrial America interested in shipping that obstacle should not prove altogether insuperable.

The book is not a thesis, but it points irresistibly to one conclusion. That is, that the time has now come when we must take advantage of the conditions that lie before us. The book tells how—by means of favorable laws, by private ownership and by a careful and well worked out scheme of subventions. General subsidies paid indiscriminately to shipping will not do. Subventions in the form of payments for carrying the mails, let us say, to particular lines on condition that their ships meet certain high standards of size, speed, convenience and frequent sailings, have produced the desired results in England and Germany, and should do so here. The authors suggest that \$10,000,000 yearly for subventions and payments to encourage a naval reserve would be required and would be sufficient for the United States.

Concerning the question of government ownership of shipping, the following quotation may be taken:

"Should the bulk of the shipping industry in the future devolve upon the government, then the public welfare would be greatly concerned with the relative efficiency of government steamship services; with the danger of political considerations in the employment of officials and employees, in the fixing of charges and in the selection of ports. There is, moreover, no assurance that the government steamship services would in normal times be any less costly to the government than an effective subvention program. There is much in the past experience of the United States government and of the governments of foreign countries that points to the danger of an annual deficit without the assurance of an efficient service."

"Principles of Ocean Transportation" fills the same position for ocean transportation that "Principles of Railroad Transportation," by Professors Johnson and Van Meter, fills for railroads. The subject matter includes a brief history of ships and shipping, brief references to the various kinds of ships, and descriptions of the methods of conducting freight and passenger service. Part III details the organization of the ocean carriers and the relations of the carriers with one another and the public, and Part IV relates to the government aid and regulation of ocean commerce and transportation. The book is interestingly written and after each chapter there is given a brief bibliography for the use of those who may wish to go further into the matters in question.

Letters to the Editor

Breaking in Engines

HALLEYVILLE, Okla.

TO THE EDITOR:

It is the practice of some railroads when an engine is turned out of the shop to break it in by running it out on the road fifty miles or more. This necessitates furnishing a conductor for a pilot. It seems that the engine crew alone could run the locomotive through the yard between the yard limit boards and the same purpose would be served, although some claim this is not sufficient. Some roads use an engine just out of the shops in regular drag freight service with about half tonnage over the division and as a general thing when the other terminal is reached the engine is good for service at its regular rating.

If nothing else will do than to run the engine light over the division, or a part of it, why not put on a full crew and let them unload any material there may be along the line, handle any bad order cars, or do other work of a light nature? There is nearly always some work of this sort to be done and there should be very few times when the engine would not reach the next terminal and be in condition to handle a full train on the return trip. If for any reason the engine is not able to make the next terminal and has to be returned to the shop there is very little lost, whereas by running it out fifty or sixty miles and then returning to the shop the fuel and wages of the engine crew and pilot are wholly lost. At this particular time when it is desired that every cent possible be saved it occurs to the writer that there might be a chance for economy in this direction.

J. L. Coss.

What Is Value?

St. Louis, Mo.

TO THE EDITOR:

In the report of the hearings on the valuation of some railroads in Washington on December 10 to 13, 1917, Pierce Butler made the following statement, which, I think, is interesting: "Professor Adams, in a case in which we were both interested, said that it was impossible to define value, but, he said, in a rate case involving the question of confiscation, that it was an 'equitable conclusion' to be reached in a practical way so as to promote the public welfare, and he held that that 'conclusion' was the original cost of the property; for rate purposes, value would be original cost. That is to say, the concrete question put to him was this: If about the time the Indians left the vicinity of Chicago, a railroad company bought a terminal area for \$5,000 that today is worth \$5,000,000 for sale for business purposes, what would be his conclusion? And he said that his equitable conclusion was that for rate-making \$5,000 was the base; that for taxation \$5,000,000 was the base, and that if the carrier were to sell it and get \$5,000,000 and take \$4,500,000 and buy a substitute, that the \$4,500,000 would be the value of the substitute."

I mention these things to illustrate not what may happen, but what has happened when the personal conceptions as to fairness, as to right and wrong, of arbitrators or experts in particular cases are substituted for the principles which have controlled the determination of value in the courts ever since that question first arose.

C. D. PURDON,

Chairman Valuation Committee, St. Louis Southwestern.

Politeness and Intelligence Combined

SECAUCUS, N. J.

TO THE EDITOR:

Every passenger who appreciates the attentions of enlightened and truly Golden-Rule brakemen when he takes a journey in a day coach, must endorse warmly your little editorial lectures on civility. Really intelligent and efficient courtesy cannot be had without a vast amount of lecturing—by you or by somebody—and also a vast amount of teaching on the spot, and "follow-up" work. How absurd to exhort your employees, time after time, by placards displayed on the screen, by trainmaster's talks and in other ways, and yet do so little by way of inspection to see how well these supposed students assimilate the lessons so industriously poured into their ears!

As an example of what is needed in some situations I want to quote a note which I read recently in the New York Tribune. Referring to a place not far from New York City the Tribune said:

"Most of those who got off the 5 o'clock train yesterday at M— emerged from a car whose door was opened by a passenger. There was no trainman at hand, and when the trainman's attention was whispered to the fact that there was nobody to open the door, he said, 'Go ahead and report it. We can't be everywhere at once. . . .'"

That brakeman gave a reply which was all right in substance but all wrong in style. According to the letter and spirit of the instructions which I suppose are given to passenger trainmen on the best roads, this man should have said something like the following:

"I regret that you have been inconvenienced; but I have no authority to improve the situation, and if you are seriously aggrieved I shall have to refer you to the passenger traffic manager. He, no doubt, will adjust the matter to your satisfaction; at least, he has done so on all previous occasions of this kind, so far as I can recall. The trouble, you see, is that we are short handed. To this train of eight cars only two trainmen are assigned, and as one of these men must remain at the rear end to flag, or to be prepared to flag, I alone am left to attend to the vestibule doors of four or five cars. Usually I get around so as to open them all before we reach the station platform, but today I was delayed because one of the doors stuck and caused me a lot of trouble. I assure you that we are doing about as well as you have a right to expect."

Now, in all seriousness, is not that about the course of reasoning which the brakeman is expected to employ?

You suggested, sometime ago, that Harvard University ought to establish an "extension" course to educate freight conductors how to enlighten farmers on matters of public policy as related to railroads. That is very well; but why not begin on something easier?

What are our smartest trainmasters doing to make their passenger brakemen—the individual brakeman—wake up sufficiently to be really pleasing and satisfactory to every passenger he deals with, throughout one whole day?

B. G. S.

"THE FIFTH ARM."—We notice, says the London Globe, one notable omission in the scheme of the Imperial War Museum, and that is railway transport. Marshal Joffre called the present conflict "a railway war" as long ago as 1914, and when its history comes to be written, it will be found that the railway weapon has been of the most essential importance. For instance, the whole of the original German plan of campaign was based on the facilities of the Boche railway system, which again has made possible the constant "see-sawing" of large bodies of troops between the Western and Eastern fronts. "The Fifth Arm," as it has been called, certainly deserves a section to itself in any representative war museum.

The Railroad Control Bill in the Senate

Vote Expected This Week. Compensation, Rate-Making
and Period of Control Debated at Length

WASHINGTON, D. C.

BY A UNANIMOUS CONSENT AGREEMENT reached on Tuesday unlimited debate on the railroad control bill in the Senate will continue until Thursday, February 21, after which debate will be limited to five-minute speeches and it is expected that a vote may be reached possibly by Friday night. Administration leaders have been making every effort to expedite consideration of the bill in order to remove the uncertainty which will exist until it is passed.

Director General McAdoo has urged Congress to act as promptly as possible both for the purpose of enabling him to proceed with his plans for the railroads and also so that the financial situation may be cleared up sufficiently to pave the way for the next issue of Liberty Bonds, which has been postponed.

Senator Smith endeavored on Monday to secure a unanimous consent agreement for a vote on the bill not later than five o'clock on Thursday, but after some discussion this plan was defeated by an objection from Senator Poin Dexter. Senator Smith read a communication from Director General McAdoo, saying:

"May I take the liberty of expressing the hope that the Senate may soon be able to take action upon the pending railroad bill?"

"I can not overemphasize the urgent necessity for prompt action in this matter. This is the time of the year when the railroads should be placing orders for essential equipment and making preparation for those improvements in their facilities which will enable them to meet the great and urgent demands for transportation for which they now not only have insufficient motive power and equipment but in many cases inadequate facilities. It is a great task to do the required work in time to get the benefits this year. It is my earnest conviction that every day's delay in setting this work forward is imperilling the success of the war, limiting the industrial efficiency and jeopardizing the general prosperity and welfare of the country. We can not go forward with many matters of vital moment until the pending railroad bill becomes a law."

A similar letter was read in the House by Chairman Sims of the House Committee on Interstate and Foreign Commerce and debate was begun in the House on Tuesday by Mr. Sims.

In announcing his intention to make an effort to secure an agreement for a time for final vote, Senator Smith objected because there had been such difficulty during the past week in keeping a quorum on the floor of the Senate, because so many senators have been attending the hearings in the investigation of the War Department. He declared that this bill is the most important measure that has been before the Senate in a generation or longer and that it is not receiving the attention that its importance entitled it to receive because senators have got into the habit of paying more attention to something that is sensational than to fundamental principle. Senator Cummins announced that he would oppose unanimous consent to fixing the time to vote on the bill until there had been a fair opportunity to debate it.

Discussion of the railroad control bill was begun in the Senate on Monday, February 11, and during the week several speeches were made on the subject by members of the Committee on Interstate Commerce, but with very little debate. The opening speech was in the nature of an explanation of the bill by Senator E. D. Smith of South Carolina,

chairman of the committee. He was followed on February 13 by Senator Kellogg of Minnesota, who declared that in his opinion it was unnecessary to take over the railroads for government operation, but that as the railroads have been taken over the country is confronted with the necessity of making payment for the use of the property thus taken and rendering as effective as possible the operation under government control. Senator McLean of Connecticut opposed the present plan of government possession under private management as a "half-slave, half-free policy that can be justified only at a time when the life of the nation itself is at stake," and declared that it has all the defects of government ownership and none of the benefits of private management under private ownership. He said he would vote for the bill, but that continuation of the condition would be neither justifiable or necessary at the close of the war. Senator Cummins of Iowa opposed the basis of compensation proposed in the bill as being entirely too liberal and urged that at the close of the war the roads be turned over to a board of control to be appointed by the President so that the "one-man authority" would not continue any longer than necessary. On Saturday Senator Robinson of Arkansas spoke, urging early passage of the bill. Senator Watson of Indiana delivered an address emphasizing the importance of guarding against the plan of government control being made a step toward government ownership, which he vigorously opposed and urged that a definite time limit be fixed for the termination of government control. Senator Pomerene also spoke, urging liberal treatment of the roads during the period of control.

Prompt Disposition of the Bill Urged by Senator Smith

Senator Smith urged that so far as possible all other business and subjects of debate be laid aside until a disposition is made of the bill, because of the vital necessity of stabilizing the financial situation, which is seriously affected until the status of railroad securities under the new condition is determined. The action precipitating the necessity of legislation, he said, has already been taken. The roads are in the control of the government, while the property is still in the hands of private owners and the situation creates uncertainty and doubt, which is reflecting itself in embarrassment in the financial world. He outlined the events which led up to the decision to take over the railroads, saying that the result of the efforts of the Railroads' War Board was not satisfactory, or at least did not give the relief which the circumstances imperatively demanded.

"This failure, in part at least," Senator Smith declared, "grew out of the restrictive laws in the interstate commerce act forbidding the pooling of cars and of freight. It may also be noted that the interstate commerce act gave to the shipper the right to route his freight over whatever lines he chooses. This also was an obstacle in the way of distributing freely and fairly the traffic of the country."

The proposed guarantee, he said, seemed to the committee to be a fair basis of compensation when it is considered that while all other enterprises, not being subject to federal regulation in regard to rates and charges, were the beneficiaries of the extraordinarily high prices pertaining during the war period, the railroads could not during this period increase their revenues except as they were increased by increased traffic. While there was an increase in certain rates in the eastern district, in the main the roads were

practically operating under ante-war rates and the increase was not put into operation in sufficient time to be reflected to any appreciable extent in the returns of the roads up to June 30, 1917.

The question of the real value of the property was not considered by the committee as a proper subject for the emergency legislation because the value of the properties is not now definitely ascertainable. The committee has, therefore, taken the aggregate net earnings of the properties resulting under the regulating power of Congress as a just basis on which to compute their compensation in time of the emergency.

Senator Cummins asked whether the government had taken over as a part of the railroad property the cash or non-railroad property not used in the operation of their systems. This, he said, amounted to more than \$800,000,000 for 17 roads. Senator Smith replied that neither the language of the bill, the proclamation of the President, nor the discussion during the hearings contemplated taking over such property. Senator Thomas, author of the act of August 29, 1916, under which the railroads were taken over, interjected here that he certainly had no intention of making it so operate as to invest the President with anything more than the power to control the possession of the physical property of the railroads for war purposes.

Senator Smith quoted figures showing the net operating income of the Class 1 roads, showing that for the year ending June 30, 1917, this was approximately \$36,000,000 more than in the year 1916, and \$337,000,000 more than in 1915, so that the average for the three years is \$124,000,000 less than earned during the fiscal year ending June 30, 1917. Of course, he said, it was a matter of speculation as to whether this increase would have been maintained, but it is reasonable to suppose that the roads would at least have maintained the income of 1917.

Discussing the amendment added by the Senate committee providing that there shall be no increase of compensation for any additions, improvements or betterments constructed out of or purchased by the earnings during the period of federal control, Senator Smith said this question represented one of the greatest difficulties presented to the committee. "I confess that at this stage of my investigation of this question I cannot see the difference between the money thus earned under rules and regulations that we have established and which, when earned, is being invested in further increasing the facilities of the property and money not earned but borrowed from the bank and invested in the property."

The rate-making question, Senator Smith said, gave the committee the greatest difficulty because of the two conflicting principles, one to maintain as far as possible the stability of rates, the other to grant the power to change rates to meet the changing conditions, but upon complaint the commission is still vested with the power to review the rates as heretofore and make its finding of orders as heretofore. The progressive stages of rate regulation, he said, had in the interest of rate stability gradually taken away from the carriers in practical effect the power to initiate rates except upon the prior approval of the commission. That power is now restored to the Director General, subject, however, to the review of the commission.

Senator Cummins' Address

Senator Cummins declared that the compensation proposed in the bill is from \$175,000,000 to \$200,000,000 annually more than it ought to be and that this vast sum is to be taken from the people who are already over-burdened to be given to the railway corporations "without a shadow of right, reason or justice." Also, he said, in his judgment the compensation would be nearly \$200,000,000 a year more than the roads would earn during the next few years if the

property were to remain in their possession. He said he had no objection to the act of the President in taking over the railroads because, although the railway managers under the Railroads War Board "accomplished almost a miracle in the better use and in the higher co-ordination of the transportation facilities of this country," it was not within the power of the railway companies to do the things which this country required to be done under the conditions which confronted and surrounded us. He regretted, however, that the President was not more specific and definite as to which railroads have been taken over. He thought the President should have taken over all of the railroads as a unit and if it was not necessary for him to do that, in his judgment, the President acted without authority.

In discussing the proposed compensation Senator Cummins read a letter sent out by a broker advising the purchase of railway securities and giving figures showing the percentage of earnings on the stock of various roads under the proposed guaranty, which Senator Cummins considered excessive, and he expressed the opinion that if the roads were offered "only fair and just compensation so that they must endure some of the consequences of the war," the railroads would accept it as loyal citizens convinced that a lesser compensation than the bill proposes is, under the circumstances, fair and just, and he also insisted that whether the railroads are given \$1,000,000,000 or from \$750,000,000 to \$800,000,000 annually, as he proposes, cannot in the slightest degree affect the strength of the United States in the war. The proposed basis, Senator Cummins declared, introduces into governmental railway operation "the same abominable profiteering which disfigures other fields of government activity." The amount required annually to pay interest charges, he said, was about \$400,000,000 a year and deducting this amount from the proposed guaranty would leave approximately \$550,000,000 of the guaranty available for the stockholders. He did not say that the railroads would distribute \$550,000,000 in dividends, because they have not done so in the past and he had no reason to believe they would do so in the future, but the entire sum inures to the benefit of the stockholders. This, he said, amounts to $8\frac{1}{2}$ per cent on all the stock of all the railroads in America without taking into consideration the other sources of income which many of the companies have. Senator Kellogg disputed this statement, saying that according to figures he had received from the Interstate Commerce Commission the amount would be 8.26 per cent on the outstanding capital stock of \$6,314,000,000.

Senator Cummins then separated the railways into two classes, one group operating 110,000 miles of line, which he thought the bill would not guarantee more than they should receive, and another consisting of 86 systems of railway operating 140,000 miles and which carry from 75 to 80 per cent of the traffic. As to these 86 roads, he presented a table showing the percentage on the capital stock which would be guaranteed under the proposed plan. The Pennsylvania Railroad, he said, would be guaranteed 8.92 per cent, the Philadelphia & Reading 25.7 per cent, the Delaware, Lackawanna & Western 32.9 per cent, the Illinois Central 11.33 per cent, the Louisville & Nashville 16.75 per cent, the Norfolk & Western 12.51 per cent, the Atchison, Topeka & Santa Fe 9.7 per cent, Chicago & North Western 10.18 per cent, Chicago, Burlington & Quincy 22.05 per cent. For the roads in his table in the eastern district the average would be 11.48 per cent, in the southern district 12.37 per cent and in the western district 9.96 per cent. The roads in this table were those which had in the three years earned more than 5 per cent upon the capital stock. Senator Cummins proposed that any excess over the amount required to pay the usual dividend and interest on the indebtedness, should be taken by the government for use in the development and betterment of the property with the

condition that the company would never be permitted to charge the public for a return upon the value so created. He said he would offer an amendment which would not interfere with the payment of interest upon all the railway securities, including whatever dividends have been paid, whether it be 5 per cent or 8 per cent, but that if the excess were deducted the guarantee would be reduced substantially \$175,000,000 a year.

Senator Kellogg's Address

Senator Kellogg declared that this bill involves "the most far-reaching and momentous economic transition that has ever taken place in so short a time." "What effect it will have upon our industrial and political structure," he said, "no one, of course, can accurately tell, but, judging from other things and from the political experiences in our own country, it cannot be anticipated that it will meet with success."

Senator Kellogg denied that the railroads had broken down and presented statistics showing the enormous increase in traffic owing to the increase of exports on account of the European War which followed a long period of depression. It is not denied, however, he said, that there has been tremendous congestion in certain sections of the country, principally in the district east of Chicago and north of the Ohio river, but principally east of Pittsburgh and very largely on the lines of the Baltimore & Ohio, Pennsylvania and other lines in their immediate territory. One of the principal causes for the congestion, he said, was government priority orders, "a most glaring example of abuse of governmental power through separate branches of the service in no way co-ordinated."

"The result was," he said, "that thousands of freight cars were rushed to a point and tied up because materials were shipped in advance of necessity. For instance, 700 cars of material for construction of government buildings at Washington stayed upon the tracks for weeks because they could not be unloaded. Anchors were shipped under priority orders for ships not yet built and a thousand cars were tied up carrying shipyard materials. I believe it was for Hog Island, which could not be unloaded and used faster than about 15 cars a day. It shows that a transportation system run by executive orders through non-co-ordinated departments is an absolute impossibility. As a matter of fact, in spite of the Sherman law and non pooling law and the laws authorizing a shipper to designate the route, and in spite of priority orders unwisely issued, the railroads did accomplish a great deal during the first six months of the war."

"This railway committee undoubtedly co-ordinated the facilities of various roads and enormously increased the amount of transportation. My own opinion is that it was unnecessary to take over the railroads for government operation, and that transportation, in order to be most effective, must proceed in its usual and natural channels, without too much arbitrary interference. That all that was necessary for Congress to do was to authorize the President to appoint a director or agent of the government, who should have authority to see that the railroads were operated as a unit, in order to facilitate, so far as possible, the transportation of those articles absolutely necessary to the life of the people and the prosecution of the war, and that if the transportation of any class of products or articles, such as luxuries, pianos, automobiles, and so forth, became inadvisable, this transportation could be stopped and preference given to necessities for the Army and the public. This could have been done without material injury to any of the railroads, but if they were injured by any such action a tribunal might have been created to assess the damage to be paid by the government. As a general proposition, private management is far more successful and efficient than management

through government agencies. The railroads were undoubtedly hampered by certain law and restrictions which should have been abolished. They should have been supported by government authority to operate as a unit, to route freight over lines least congested, and to transport the largest amount of materials necessary for the maintenance of the public and of the Army. Bearing in mind that this congestion was simply in the eastern and northeastern territory, I am constrained to believe that as great service could have been obtained through the government's co-operation as by taking over the entire railroad system of the United States and operating it as a government institution. By allowing the railroads to operate their own property we would have maintained the personal interest and preserved the enterprise that goes with great organizations of this kind. One of the most valuable features of a railroad, as in all other private enterprises, is the organization and the personal interest that each employee feels, where there is an opportunity for promotion, and the highest position is within his grasp. By doing this I believe the government would have obtained a guarantee to the railroads of an income by way of compensation for the use of the properties thus taken over. But the President and his advisers thought otherwise, and I bow to that decision, and I am going to do, as is my duty, everything I can to strengthen and facilitate the government operation and to insure justice to the people and the railroads and the vast army of security holders vitally interested in this great measure."

Discussing the question of compensation, Senator Kellogg said it is not only a legal necessity for Congress to provide the means for determining and paying a just compensation, but it is of the highest importance to the country that this should be speedily determined. A further decline in railroad securities, which ought to be the best investment in the country, would threaten a public disaster.

Senator Kellogg declared that, considering the fact that 1915 was an extremely low year in net earnings and further, that there had been an investment in the property of large sums between 1914 and 1916, he was inclined to think that it was a fair offset to the very prosperous years of 1916 and 1917. While undoubtedly some roads are excessively over-capitalized, there are many that are under-capitalized and it was his judgment that it will be found, if the railroads of the country are valued, that their value is a figure not far from the present capitalization, and that 5 or 6 per cent on the actual money invested could not be called excessive.

"But if we are to concede that the earning capacity is not a reasonable basis for the value of the use of the properties, I know of no way to arrive at an accurate rental value without years of investigation and litigation. It is said that the standard return, after paying interest on the bonds of all the railroads in the country and after deducting an estimated \$70,000,000 excess-profits tax, would pay about 7.15 per cent on the net capital stock; I mean net capital stock outstanding in the hands of the public. Before deduction of this excess-profits tax it would amount to about 8.26 per cent. But this, of course, would allow nothing for betterments and improvements, which represents one of the most important questions in railroad management. Every year the railroads in this country must spend millions of dollars in betterments and improvements in order to properly serve the public. Many of these betterments and improvements are such that they will not pay a return on the investment, such as new stations, elevation of tracks, safety appliances, elevated or depressed crossings, and very many other improvements."

Senator Kellogg also took occasion to reply to statements made by Senator Cummins in his minority report, in which he had included a table of about 10 railroads which he said would be guaranteed from 21 to 647 per cent on their stock after paying interest on the bonds. Senator Kellogg

said he had submitted this table to M. O. Lorenz, statistician for the Interstate Commerce Commission, and had received from him a reply which he put into the record, showing that the Bessemer & Lake Erie, for which Senator Cummins had calculated a return of 647 per cent, owns but 8.81 miles of road, but operates 205 miles, and that while its capital stock is nominally \$500,000, the property account of the roads operated is over \$45,000,000 and the proposed standard return earned is only a little more than 10 per cent of this amount. Senator Cummins had included in his table the Chicago & Erie with a return of 70 per cent. Mr. Lorenz' letter showed that this is a subsidiary of the Erie Railroad and with only \$100,000 capital stock reports a property investment for the 250 miles of road which it owns of nearly \$30,000,000, on which the proposed standard return is less than 1 per cent. Similar statements were made for the other roads included in Senator Cummins' table. Senator Cummins took no part in the debate on this point.

"My opinion is that if the roads had been left in the hands of their owners," said Senator Kellogg, "with authority vested in the President to appoint a director who should regulate their operation during the war, with power to divert traffic to lines least congested and to co-ordinate all their facilities and equipment, the injury any road would suffer would be small and would occur in only a few instances. We would thereby have avoided consideration of this very complicated question of guaranty. As I have said, however, the President and his advisers thought otherwise, and I bow to that decision. It is our duty to determine as best we can a fair and reasonable basis of guaranty." Senator Kellogg also opposed the proposal to give the President power to initiate rates. "It is appalling," he said, "to say that because we are at war, this entire rate structure and the absolute power to change a rate affecting the billions of dollars of railroad property and hundreds of millions of dollars of commerce shall be placed in the hands of one man, without right of appeal, be he ever so great and though he possess the wisdom of Solomon. It is not the business of an executive."

Senator Kellogg also declared that the bill ought to provide a definite time after the termination of the war when government operation shall cease and that it ought not to be left to the uncertain result of future congressional action. To keep the roads an indefinite time and pay rent therefor is obtaining property under false pretenses, so far as the American people are concerned. "I am quite aware," he said, "that it will receive the approval of those who believe in government ownership and operation because they see, without squarely meeting the issue, an opportunity to get permanent possession of the railways and carry out their ideas or to experiment with the railroads with this end in view. Though I do not believe it was wise or necessary to take over the railroads, I am prepared to go to the full limit to make government operation as successful as possible and to grant all the powers necessary to that end, but I am not yet prepared to take a step that will vest such powers in government ownership advocates and force government operation of railroads upon the people of this country. That question should be met by the American people squarely and fairly, unhampered by any other issue." Considering the result of experience in government ownership and operation in other countries, Senator Kellogg said in part:

"I believe there is no question that the result of experience has shown that government operation of railways is more expensive, less efficient, and less beneficial to the people generally than private operation. We have a splendid system of railroads, with cost of construction and capitalization the lowest, in comparison, the leading countries of the world, with the best equipment, the cheapest service, and, in most respects, the best service.

"It is true that in one respect our service is not as good as that of Great Britain, Prussia, and France, and that is in the number of accidents to employees and passengers. But this is principally due to the training of the employees. In those countries, under the law, there are severe penalties accruing in the event of errors and mistakes by employees, which are enforced. There is no reason to believe that there will be fewer accidents under government operation than under private. It is impossible for me, in the time at my command, to go through all the statistics and comparisons between government and private ownership operating side by side. But experience has undoubtedly shown in Canada, France, England, Austria-Hungary, Italy, Australia, and New Zealand that government operation is less effective, less efficient, and more expensive and subject to all kinds of political interference. This is especially true in the countries where the railroad management is responsible to parliaments and congresses.

"Over and over again has it been shown where railroads are nationalized operating expenses immediately advance, the number of employees is increased, and the efficiency is decreased. Political influence is exercised over construction, betterments, and extensions to meet the demands of the people, and, with the exception of Prussia and Japan, there is not a government system in the world that pays its operating expenses and a fair rate of interest on the cost, and in many cases there are very large deficits. It is true that even the German states, outside of Prussia, do not make their railways pay, and the result in Austria has been exceedingly disappointing and disastrous.

"One of the most serious objections to government ownership and operation is the political influence and pressure brought to bear. One of the difficulties with railroads of this country has been that in many instances they have been too valuable as a political asset. But this is nothing to what it will be if the government takes over all the railroad properties, valued at more than \$17,000,000,000, and makes government employees of over 1,700,000 men.

"One of the scandals of our government occurs in connection with its appropriations for internal improvements, such as rivers and harbors, post-office buildings, drainage projects, and so forth, where Congressmen and Senators deem it perfectly legitimate to obtain any kind of an appropriation for the benefit of the people of their districts in utter disregard of whether it is necessary for the national welfare or not. If all railroads of the country were placed in the same category, improvements, extensions and betterments to meet the demands of the people of the various communities would be obtained through political influence; the running of trains, freight and passenger, furnishing facilities, would be constantly subject to political pressure through Congressmen, Senators and public men generally. It has already commenced and the people of this country are demanding that they have a right to have their Congressmen and Senators intercede with the Director General of Railroads in behalf of their particular section of the country. Their Senators and Representatives can not do otherwise than present these matters, and will not do otherwise.

"I do not say that this is objectionable other than as to the system involved. The building of railroads to meet the great commercial conditions of a growing country ought not to be constantly the subject of political pressure.

"But there is another serious objection. In turning the railroads over to government operation the employees and officers will be divested of the incentive and enterprise essential to any great undertaking. Today the highest positions with the railroads of the country are within the reach of the humblest boy in the service. I know most of the railroad presidents today controlling the destinies of this vast property and they advanced from very humble positions, and the value of the organization of the railroad company

is derived largely from motives of self-interest and individual enterprise which opportunity offers to every man in railroad employ.

"Hope of preferment and opportunity are the guiding stars which have made this country foremost in the industrial and commercial fields of the world. Nationalizing the railways makes all of the men mere government employees. There is no hope that they can reach the position of president of the railway and enjoy the power and influence which goes with that position. They are mere clerks. They lose interest and ambition. Men with capacity, ability, and authority to employ their own men could run the departments in Washington for very much less money and very much more efficiently. It is, of course, one of the things that go with a democracy. I do not wish to see it changed, except to see it bettered. I am not in favor of turning over the vast railways of this country merely to reduce men to the dependent influences of government operation."

Senator McLean's Address

Senator McLean declared that the only possible justification for the bill is the fact that it is a war measure. Regular and sufficient transportation is the great and prime necessity which cannot be met without unity of action and perfect co-operation and this cannot be had unless the power to secure it is placed beyond interference by private interests. As a war measure, therefore, he was willing to confer upon the President all the power and latitude of action necessary to enable him to make fair and reasonable agreements with the carriers for the use of their properties during the war emergency and for a period thereafter long enough to permit the carriers to readjust themselves to peace conditions. To extend the operation of the act until Congress shall otherwise order, he declared, would be to give to the law all the permanency and length of life that it is possible for Congress to give to any law and, considering the ease with which attempts to repeal it could be delayed and ultimately defeated, he could not escape the conclusion that those who vote against fixing a time within which it shall cease to operate, vote for permanent government ownership. Certainly those who favor government ownership would have every advantage, and beginning from the date of the enactment of the law they would endeavor to convince the people of the country that government regulation had failed and that the only possible solution must be found in government ownership.

"It is my guess," he said, "that a large percentage of the carriers of the country, smarting under the injustices inflicted by the system in vogue prior to December 28, 1917, will join forces with the government ownership advocates of every name and nature, including socialists and Bolsheviks, and those of us who disagree with them and want cheap, regular and safe transportation would best begin to drill for the coming onslaught."

"Putting aside for a moment the wicked things that managers of the railroads have done in the past, or would have done but for the interposition of the government, what has the capital that has been put into the railroads done for the country, and what do the railroads themselves stand for today as a national asset? The 400,000 miles of track in the United States have been put down for less than half the average cost per mile in other countries. Transportation in the United States costs less than half the average cost in other countries. The wages paid are more than double the average wage in other countries. The average tonnage per car and the total tonnage per mile is greatly in excess of that in other countries. The regularity, safety and comfort of the service provided by the American roads is far better than that of the roads in other countries. For every dollar that the railroads have taken from the public more than a dollar has been returned. Is it not time to quit

visiting upon the railroads the sins of the nineteenth century and do to them as we would be done by?"

"Railway supplies and equipment—new cars, engines, and nearly everything that is required to sustain the roads and meet the increased demands upon their carrying capacity—cost nearly three times today what they did three years ago. Congress and the Interstate Commerce Commission have stubbornly refused to authorize or permit the railroads to charge self-sustaining rates, or to unify and consolidate control in the interests of economy. No business on earth could survive such treatment. The farmer who, for want of hay, put green goggles on his horse and fed him shavings was a magician in the solution of transportation problems compared with the American Congress.

"And after all, has it been the fault of Congress or the fault of a distorted public opinion which has sustained Congress in its efforts to teach the railroads to live without eating? If the American people will demand an intelligent regulation of railway rates when peace is restored, the carriers will meet every need at constantly decreasing comparative cost.

"Why should the government assume this colossal burden, a burden that will constantly increase in weight and finally result in constantly increasing cost of transportation?"

"Why should we expect results very different from those which have inevitably inflicted government ownership in other countries? In the Utopia of government-owned railroads policies will be dictated by politicians. Employment will depend upon the favor of the Director General and his subordinates. Qualifications for service will depend on ability to get votes rather than ability to avoid accident or secure regular and sufficient transportation. New lines of road will be paid for out of the annual congressional pork barrel. Rolling stock will soon compare favorably with the sorry rigs which the rural free-delivery carriers use to deliver mails. An utter lack of incentive and initiative will exist in every department. Incompetency and 'red tape' and a rapidly increasing number of employees will inevitably result. The people will not only be taxed to pay the interest on the original cost of \$20,000,000,000, but the annual deficits will constantly increase. In Italy, where the chief railways were nationalized in 1905, the number of employees increased within three years from 97,000 to 137,000, and the systems do not earn enough to pay one-quarter of the interest on the investment in them.

"It is quite probable that the managers of the great transportation lines, circumscribed and crippled as their organizations will be at the close of the war, will beg the government to buy their roads and end their sufferings. I put this question to the president of one of the leading roads of the country, and his reply was: 'As an American citizen I am very certain that a time limit should be fixed, but as a railway manager I would welcome permanent government possession and operation with a fair guaranty on the investment.' I am already receiving postal cards from railway stockholders, all printed and exactly alike in terms, urging me to oppose a time limit on the operation of the carriers by the government.

"It is claimed that, because the system in vogue prior to the 28th of December last was a failure, government ownership is the only alternative. If it is true that the system which failed was clearly unintelligent and unjust, it would seem to be clear that an intelligent regulation of the railroads of the country, under private control, should be given a trial before we adopt a system which both experience and reason tell us will result in unsafe, irregular, insufficient service, to say nothing of the opportunities for political chicanery and graft.

"I have tried to set forth some of the reasons which compel me to oppose government possession and control of the

railways 'until Congress shall otherwise order.' I hope the Senate will insist upon fixing a time limit. I hope the American people will give this subject the attention it deserves before it becomes a national issue at the polls."

Senator Pomerene's Address

Senator Pomerene declared he had no apology to make for the shortcomings of the railroads in the past, but that, in his judgment, the Congress of the United States ought not to approach this subject now as if it were going to penalize the railroads for the wrongs which they committed many, many years ago. The railroads of the country, he said, are owned by the people of the country and he quoted figures showing the number of stockholders and estimates of the number of people interested directly or indirectly in railroad securities. He also quoted figures showing the enormous shrinkage in the market quotations of railway securities amounting to 31 per cent from 1912 to 1917 and a list of stocks whose total par value is approximately 75 per cent of the total. He said that a few days ago a prominent business man had told him that he had seen the balance sheet of one of the great colleges of the country which had bought certain railroad stocks at 113, which had recently fallen to less than 60. "If we will remember this decline in market values as affecting the financial conditions of the business institutions of the country, the insurance companies, the savings banks and savings societies," he said, "we can understand what this tremendous shrinkage in values means" and he thought the time had come to give more liberal treatment to the railroads. According to the plan proposed by Senator Cummins, he said, the total of all money earned over and above dividends and interest would be passed to the government, but, in his judgment, Congress has no authority whatsoever to adopt such a course of action in fixing compensation to be paid. He also contended that there should be a definite time limit for the period of government control. If it is the judgment of the majority of the Senators and of Congress that government control should be continued or that we should have government ownership, he said, the principles of common fairness and honesty suggest that Congress shall tell the roads now what it will do, so that they may get their house in order.

Senator Robinson's Address

Senator Robinson of Arkansas also urged the Senate to give serious consideration to the bill, saying that the important questions at issue should be determined just as quickly as their importance and nature will permit. With the bill out of the way, he said, the financial plans and policies of the administration can be much more readily formulated and consummated and the enormous funds necessary to be secured through Liberty loans and otherwise for the prosecution of the war can be much more readily obtained when the questions as to the policy of the government respecting control and operation the transportation lines have been definitely fixed by law.

Senator Robinson declared that, in his opinion, federal control and operation were almost inevitable, but that the President had acted wisely in not exercising his powers until the necessity for such action had been recognized by public opinion. In explaining the reasons for his belief that government control was necessary, he pointed out that in recent years railroad extensions and construction have not kept pace with the requirements of commerce. He said it would not be profitable to enter upon a discussion of the reasons, but the railroads were unable to increase their facilities to correspond with the increased traffic and the military operations of the government were being greatly embarrassed. The railroads were restricted by the laws and while the service which the War Board rendered was in many respects admirable and highly commendable, it could not make or

repeal laws and, most important of all, it could not remove the natural obstacles to unified operation created by the desire and obligation of every railroad manager to secure for his line all the business he could obtain.

Furthermore, he said, the railroad representatives were fearful of a decline in railroad credit. They claimed to need the financial support of the government to strengthen and stabilize railroad securities, in the absence of which the railroads were threatened with ruin. Whatever may be our views concerning the wisdom and necessity of federal control, he said, it is an accomplished fact and the taking possession of the roads creates a legal liability on the part of the government to the owners to pay for the use of the property taken. He then entered upon a lengthy discussion of the proposed basis of compensation to show that the provision in the bill is fair and just and approximates the basis upon which the courts would determine it. No other plan has been suggested, he said, which, in his opinion, so nearly meets the requirement of fairness and justice to both the public and the carriers as the proposed standard return and if the roads had continued under private control it is quite probable that the amount which the public would have been required to pay for transportation would have exceeded the amount that will be paid to the railroads under federal control. He discussed at length the British plan of control of the railroads. Senator Robinson concluded as follows:

"The railroads of the country are a material and necessary factor in the successful prosecution of this war on the part of the United States. We must operate them during the war under unified control; we must speedily hasten to France the troops and supplies which are necessary to enable us successfully to maintain this combat. This measure is a part of the administration war programme. It has been found necessary in the public interest, and the administration and the public await with anxiety the final disposition of this bill."

Senator Watson's Address

Senator Watson particularly opposed the idea of an indefinite period of control.

"From the financial standpoint," he said, "this is the most colossal proposition ever presented to any legislative body in the history of the world. It involves taking this vast property from the hands of those who made it and those who own it, and committing it to the operation and control of the government. It involves transferring the authority to make rates from the legislative to the executive branch of the government. And, if the time limit set forth in the last section be stricken out, it may prove to be the first step in the government ownership of all the transportation facilities and all the methods of communication of the entire land.

"I do not believe that the railroads of this country will ever be permitted to return to the old competitive system which we have compelled them to pursue for the last 30 years. I believe that they will be nationalized; that they will be operated as one transportation system; that they will be permitted to pool their traffic and their earnings; that useless lines will be abandoned; that all the property and all the equipment which every railroad has heretofore provided for its own operation and its own use will be used in common by all the other railroads in the nationalized system. I believe that the government will control and finance this unit, and that private ownership will be continued in the future as in the past. In short, complete governmental control with private ownership of the property controlled.

"Suffice it in this place to say that the tremendous success achieved by the Railroads' War Board in the nine months of its control is a most forceful illustration of what can be done under a unified railroad system properly managed. It

may safely be predicted that the American railroads will never return to the old system of competition. I believe that it is gone forever; that the Sherman anti-trust law so far as it affects railroad combinations will be repealed; that anti-pooling laws directed at railroad operations will, in so far as they affect the transportation system of the country, be abrogated, and a plan will be adopted which will give the government practical control of American railroads, without the weakness and the inefficiency incident to government ownership."

In discussing section 1 of the bill, which provides for compensation to the railroads for their use while under government control, Senator Watson said in part:

"It is better for us under existing circumstances to deal generously with the roads than to have eighteen billions of properties plunged into litigation with all that such litigation would mean to the country at the present time."

In discussing the rate-making power, Senator Watson said in part:

"This bill is a war measure. It deals with an unusual situation and therefore confers unusual power. The President by the provisions of this act is authorized to guarantee the roads a fixed dividend to insure the maintenance of every railway system at its present efficiency and to finance improvements and additions.

"It may be necessary, therefore, successfully to carry out this vast project, for the President to raise the rates and he should be given power to assume the initiative in this undertaking. It follows that their control and operation should be placed in the hands of the executive department of the government. While in time of peace the authority to make rates may remain lodged in the legislative branch of the government, yet, in order properly to finance the operations of all the railroads, it seems to me there is no escape from the conclusion that it must be done by the executive branch of the government alone.

Government Ownership

"But, Senators, government control is not government ownership, although the two are frequently confounded in the public mind; and, although they are used interchangeably by many bodies in drafting resolutions, in reality they are as wide apart as the poles.

"Government control means the adoption of a plan that would enable the government to have charge of the operations and the financing of all the roads without being compelled to buy them. Government ownership would necessitate the purchase of all the property valued at approximately eighteen and one-half billions of dollars. It would at once deprive the states of something more than a hundred and fifty millions by way of taxation. In Indiana the railroads paid in 1917, \$5,888,000 in taxes, state and local, on a valuation for taxation of \$240,000,000, or approximately 11.6 per cent of the total assessed valuation on the property in the state for taxation. The elimination of this great sum would seriously cripple other forms of industries that would be compelled to bear this increased burden of taxation under government ownership. Proper governmental control would not involve this relinquishment.

"If the government owned the railroads they would be directly administered by the President and his Cabinet. But I believe it to be far preferable that some plan should be devised that would mean advisory control, exercised very much as England is handling its railroads today.

"Governmental control will undoubtedly enable the railroads of the country to handle all the traffic in any time of peace and practically all of it in this time of war. It is not necessary that a policy of government ownership should be adopted in order to secure this desired end.

"My objection to returning wholly to private management is that in the time of peace the railroads might not be oper-

ated as they were under the Railroads War Board, that the old competitive methods might be readopted, and that all the old systems with all of their evils might again be foisted upon the public. Therefore, I favor such public control as will preserve the good and prevent the evil of private management, and at the same time avoid the dangers and pitfalls of government ownership.

"Government ownership of railroads would undoubtedly be immediately followed by the government ownership of the telegraph and telephone systems and express companies. We have already gone to great lengths in experiments with government ownership. We have a government owned railroad in Alaska; we have a government owned nitrate plant; we have a government owned armor plate plant, we are erecting two government owned ammunition plants and in my judgment, without any authority of law; we have a government owned merchant marine, and we are so far committed to that policy that it is time for us to pause long enough to see whether we are drifting as a nation.

"I believe that the government ownership of all the methods of transportation and all the means of communication, adding four millions of people to the pay roll and converting them into federal employees, will ultimately result in the destruction of our form of government. Undoubtedly it means a letting down in efficiency, it means a lowering of all the standards of effectual workmanship, and it means a vastly increased outlay of money for a vastly inferior service. Everyone who is familiar with the operations of the government knows these things to be true.

"I am opposed to indefinite extension of government control because it opens up the way for, if indeed, it is not intended as the first step toward government ownership. Certainly it is in complete harmony with the purpose of all socialists, national and international—the force that is asserting itself so tremendously in all nations at the present time.

"This means other millions working for the government. It means the extension of civil service over this vast number of citizens; it means that the civil service system, regardless of its merits in the past and of the high purpose of those who conceived and those who have since enforced it, is quite likely to break down, because of the power it will be required to exercise. It means the inescapable temptation to use this force as a political machine to raise the wages of all employees before election, and to use all the other means of control and methods of subordination known to the American people and sometimes used by politicians in the stress of a campaign.

"I do not believe we can stand that strain. I do not believe we should place such dangerous power in the hands of any man. I do not believe that we should confer such extreme authority over such a vast number of American citizens upon any individual. It is contrary to the very purpose of our theory of government.

"If we take the first step along this socialist highway, who so wise as to prophesy what the last may be? Who so bold as to deny what the next will be? Unquestionably, we are face to face with the settlement of this stupendous problem, and we should not commit ourselves even to the first of its doctrines without preparing to accept them all or to fight them all. For, if we inaugurate this programme, in the end it will all be forced upon the country, and, in my judgment, forced upon it to the destruction of our form of government.

If we have in this country the government ownership of railroads, telegraphs, telephones, and express companies, immediately the demand will come to take over the mines. In fact, we are told that the administration is even now preparing to take charge of the mines and of the oil fields. This may now be, or may hereafter become necessary, as a war measure. But if the control of all these public utilities

shall continue in the time of peace, as it is now proposed that the authority invested by this bill shall, there is the gravest danger that any President, backed by the power his position naturally gives him over the press and over the people; that any President, backed by all the tremendous agencies he can use for the formation of public opinion and the vast influences he can bring to bear for the creation of public sentiment; might make himself the Chief Executive of this country so long as he chooses to do so, and that would ultimately mean the overthrow of the form of government created by the fathers and preserved to us by the countless sacrifices of succeeding generations.

"I am decidedly in favor of the time limit imposed in this bill. There is no occasion for further extending it. The Congress in existence at the close of this war will meet the exigencies of the occasion. The American people will demand that this question be dealt with wisely and patriotically and bravely, and the American Congress will heed that demand.

"I early offered an amendment providing for a six months' limitation on governmental control after the proclamation of peace. The committee has seen fit to extend the limit and while I very much prefer the shorter period yet I am content to see the latter imposed.

"All the other authority conferred upon the President is for the period of the war. This, too, is a war measure. There is no possible justification for it on any other theory. The President's proclamation recites that this step is taken because of the compulsion of war; he sets forth specifically that he took this action under the statute of August 29, 1916, which is nothing but a war enactment and wholly for war purposes; this very bill recites that this legislation is rendered necessary as a war proposition.

"Why, then, should not the powers it bestows, cease at a specified time after the war? On what theory can it be definitely extended? Who is willing to contend that it is necessary, in order to win this war, to permit Mr. McAdoo, or any other man, to control the railroads long after the war shall have ceased?"

Senator Johnson's Address

Permanent government ownership of railroads, rather than government control for the period of the war, was advocated by Senator Johnson of California.

"I would now take the inevitable next step in government control of our railroads," Senator Johnson declared, "and do whatever might be essential to make that government control permanent government ownership, or at least leave the way open so that immediately upon the determination of the war, we might follow to its logical conclusion what already we have partly done."

The California Senator protested vigorously against the proposed rate of compensation to be paid the railroads under the provision of the bill, and also opposed the Senate's plan to turn the roads back to private management 18 months after the conclusion of peace.

In support of his declaration for government ownership Senator Johnson said that the railroads had broken down under the stress of the last few months; that, if the country is to have efficient national transportation, the roads must be nationalized and operated by one directing head; that the American people have "paid the price of private ownership" and that "despite barriers or obstacles, the nation is marching straight to the goal of public ownership and the people at last will come into their own."

Senator Robinson of Arkansas has submitted some amendments to the bill for the purpose of clarifying certain language in it and to omit the provision for paying compensation for the new investment from June 30 to December 31, 1917. Senator Townsend has submitted in the form of an amendment a substitute for the bill, prepared outside

of the committee, but he said not particularly with the idea of securing its adoption.

A minority report was filed on February 15 by eight Republican members of the House committee, declaring their intention of supporting the bill, but that it should be amended to provide that the rate-making power of the Interstate Commerce Commission shall remain unimpaired and that a definite date for the determination of federal control should not be more than one year after the proclamation of peace. The report is signed by Representatives Esch, Hamilton, Parker, Winslow, Dillon, Sweet, Stiness and Cooper.

Various amendments to the bill have been submitted by Senators McLean, Saulsbury and Thompson, the latter providing for a continuation of government control until Congress orders otherwise.

Members of Congress are receiving numerous telegrams from chambers of commerce and other similar organizations in the interest of various short line railroads which they do not want to have left out of the list of roads taken over by the government. Many other telegrams and resolutions are being sent in by shippers' organizations protesting against any disturbance of the rate-making powers of the Interstate Commerce Commission.

The Nebraska State Railway Commission has sent the following:

"We protest proposed basis of compensation to railroads under government operation as excessive. Railway operating income plus income from other sources gives percentage returns on capitalization of three principal roads in this state as follows: North Western, 12.04; Union Pacific, 14.14; Burlington, 25.63. Suggest limitation to regular dividends of last three years. By all means, strike words 'reasonable compensation' from first section of bill. They surrender all that has been gained in rate regulation. We also protest giving the President power to initiate or make rates; should be left where it now is."

Representatives of the railroad brotherhoods and other labor organizations have addressed a petition to both houses of Congress asking them not to fix a time limit for the return of the railroads to their owners, leaving the question for further determination.

FILMS TO BOOM BRITISH TRADE.—Latest advices from London say that a scheme has been formulated by British Industries, Limited, for furthering British trade in foreign markets by means of the films. The company is arranging a tour which will begin next June, or as soon thereafter as international affairs permit, and will embrace the principal cities in western Europe, North and South America, Canada, India, South Africa, Egypt, Australia and New Zealand. In 85 of the principal cities of the world films are to be exhibited illustrating leading British industries and manufactures, and to these exhibitions representatives of the principal firms in the cities visited will be invited. A British manufacturer may have films of his industry prepared by the company, and these will be exhibited in such places included in the tour as he may select.

A commercial reference book entitled "British Industrial Expansion," is also to be prepared for distribution during the tour, and in this each exhibitor will be entitled to two pages of descriptive matter in one or more of four languages. In addition to the film of any particular industry, there will be supplementary and descriptive slides giving the names, address and business of the different firms. The tour is estimated to last 18 months.

MAIL BY AIR IN SWEDEN.—The Swedish Government is considering proposals for the establishment of an airplane postal service between Noortelje and Abo, beginning during the latter part of February or the early part of March.

A Scientific Study of Railway Track Under Load

Progress Report on Investigations and Extensive Tests Extending Over Five Years

AFTER FIVE YEARS of investigation a special joint committee of the American Society of Civil Engineers and the American Railway Engineering Association, organized to investigate the stresses in railroad tracks, has presented a report which has been published in the proceedings of the American Society of Civil Engineers for January, 1918. The report covers nearly 200 pages, and the large amount of work done by the committee is indicated by the statement that the tests involved 250,000 observations in rail strains alone. Although the committee calls attention to the fact that the investigations are to be continued, much progress has been made in ascertaining the action of track under wheel loads and the report affords a fund of knowledge on a subject concerning which very little tangible information had been available previously. An abstract of this report follows:

Fundamental Considerations

A proper conception of the fundamentals underlying the action of track under load may be had only by considering the track as an elastic structure under load: The wheel loads are applied on the top of the rails; the rails act as flexible beams which rest on flexible supports (ties); and the ballast and roadway on which the ties rest are themselves yielding or flexible. Due to the stiffness of the rail and the yielding of its supports, the load from a wheel will be distributed over a number of ties. It is evident that the amount of yielding of the supports affects the values of the moments and stresses developed in the rail. The properties of elasticity and stiffness in the rail, the tie, the ballast, and the roadway enter in a complex manner into the development of the stresses in the track structure, the relative stiffness of the various parts affecting the results in any one part. The spacing of the wheels of locomotives and cars longitudinally along the track also influences the division of the load, as pressures on the various ties, and hence influences the value of the stresses developed in rails, ties and ballast.

A number of writers have obtained expressions for the bending moment and stresses in a rail by considering the latter as a simple beam supported on the two adjacent ties, with the wheel load at a point half way between. Other writers assume the beam to be fully restrained over the adjacent ties. In these and many other ideas it is virtually assumed that the load is taken only by the two ties adjacent to the load.

If we consider a rail with an indefinitely large number of evenly spaced wheel loads, the tie spacing being, say, not more than one-third of the wheel spacing, it can be shown mathematically that, for a given wheel spacing, there is relatively little difference in the tie reactions until the wheel spacing becomes quite large. The foregoing refers only to an indefinitely large number of wheel loads. For a small number the results will be greatly modified.

Analysis of Track Action

It is concluded that the method of analysis which is based on the assumption of a continuous elastic support under the rail is by far the most convenient, most easily applied, and most comprehensive in its application to the questions involved in the work. The assumption of a continuous support in place of tie supports is not an element of serious inaccuracy for the close tie spacing and large rail sections

used on American railroads. The method has been found to be more general and to have fewer limitations than the methods based on concentrated tie loads.

The term, modulus of elasticity of rail-support, is introduced as a measure of the vertical stiffness of the rail-support. It may be defined as the pressure per unit of length of each rail required to depress the track one unit. It represents the stiffness and yieldability of tie, ballast, and roadway, but does not involve the stiffness of the rail. Applied to ordinary track, the load on one rail required to

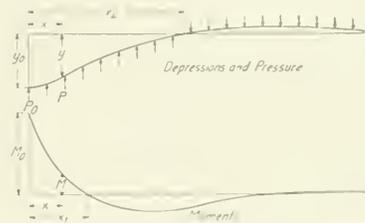


Fig. 1. Distribution of Depression and Bending Moment for a Single Load

depress one tie one unit, divided by the tie spacing, will give the modulus of elasticity of rail-support.

The method of analysis will be developed, first for a single wheel load and then for a combination of wheel loads. Assume that the rail is supported continuously on an elastic support and that the support has a constant modulus of stiffness; that is, that the depression of the track and the resulting upward pressures on the rail are directly proportional to each other. Assume, further, that the track construction is such that negative pressures may be developed. The following nomenclature will be used (see Fig. 1):

- P = wheel load on a rail at the point which will be used as the origin of abscissas;
- E = modulus of elasticity of steel;
- I = moment of inertia of section of the rail;
- y = depression of rail at any point, x , it being assumed that there is no play or loose lash in the track; downward displacement of a rail is negative, however, in the applications to track, the ordinary downward depressions of track will be taken of as positive;
- p = upward pressure against rail per unit of length of rail at any given point;
- u = an elastic constant which denotes the pressure per unit of length of each rail necessary to depress the track (rail, tie, ballast, and roadway) one unit, for the system of units ordinarily used, it will be expressed in pounds per inch of length of rail required to depress the track 1 in.; u represents the stiffness of the track, and involves conditions of tie, ballast and roadway; it is termed the modulus of elasticity of rail-support;
- M = bending moment in rail at any point.

The fundamental condition on which the analysis is based is that the track depression at any point and the upward pressure on the rail per unit of length at the same point are directly proportional to each other. In other words, $p = uy$.

It will be recalled that, in the mechanics of beams, the derivatives of the elastic curve (first, second, third, and fourth), in their order, represent or are proportional to (1) the slope of the elastic curve, (2) the bending moment in the beam, (3) the shear, and (4) the intensity of the load. In the case in hand, the fourth derivative (the intensity of the load) has the unique relation of being directly propor-

tional to the original function, given by the equation of the elastic curve or curve of depression of track.

From the fundamental condition, the differential equation of equilibrium is

$$E I \frac{d^4 y}{dx^4} = u y \dots \dots \dots (1)$$

This differential equation is satisfied by the following equation:

$$y = \frac{P}{\sqrt[4]{64 E I \bar{v}}} \left(\sqrt[4]{\frac{u}{4 E I}} \cos \times \sqrt[4]{\frac{u}{4 E I}} + \sin \times \sqrt[4]{\frac{u}{4 E I}} \right) \dots \dots \dots (2)$$

From this, formulae may be obtained for the bending moment in the rail, the shear and the intensity of the pressure (*p*) against the rail, and with the aid of these the characteristics of the curves for bending moment and rail depression shown in Fig. 1 may be determined for any set of values assigned. To find the effect of a combination of wheel loads on the track depressions and the pressures and the bending moment in the rail, as may occur with a given type of locomotive, the equations and diagrams for a single wheel load may be applied by the use of the principle of superposition; i. e., by considering that, at a given point along the rail, the combined effect of two or more wheel loads is the algebraic sum of the effects of the individual wheel loads.

Special Apparatus Used

Nearly all instruments used in the tests were designed especially for the work. In the tests with static loading, longitudinal strains in the rails under bending load were measured with a Berry strain gage. A level-bar was used to measure the deflection of the rail and the depression and bending of the ties. For measuring the pressure transmitted to various parts of the ballast a pressure-capsule was used in which the elastic deflection of a thin steel diaphragm is transmitted to an indicating dial micrometer.

A flat car loaded with from 25 to 50 tons of rails was used in connection with special load-indicating screw-jacks to apply loads equivalent to a one-axle or a two-axle load. The rails on the car were supported on H-beams placed crosswise of the car, and the bottoms of these H-beams rested on the upper ends of indicating screw-jacks. The lower ends of the screw-jacks bore against the rails through curved bearing blocks having a radius approximating that of an ordinary car wheel, but not coned. The construction of the load-indicating screw-jacks is shown in detail in Fig. 2. To measure the strains in rails under moving locomotive loads an instrument involving the general principle utilized in the stremmatograph developed by Dr. P. H. Dudley was devised. In moving-load tests, the deflection of various points of the rail was measured by using double-exposure photograph of small pieces of black paper with small white crosses on them that were glued to the rail at intervals along the outside.

The Test Track

The track of the Illinois Central used in the test work is on the double-track main line, about two miles north of Champaign, Ill. The stretch of track used is on an embankment, from 4 to 8 ft. high, composed of loam and clay. A single-track road was built in 1854, and the second track was added in 1900. Age has given compactness to the embankment, and it was in dry condition throughout the tests. The ballast at this place consists of crushed limestone; it usually has an average depth under the ties of about 12 in. The rails are A. S. C. E. 85-lb. section. The rails on the south-bound track are 33 ft. long, and

laid in 1902; those on the north-bound track are 30 ft. long, and were laid in 1900.

To provide uniform known conditions of track for the tests, four stretches were specially prepared. For these test sections special oak ties replaced the original ties. Four such sections were prepared within a short distance of each other. On one section the ballast had a depth of 6 in. below the ties; on another, 24 in.; and on two others, 12 in. On one of the last-named sections the ties were 7 in. by 9 in. by 8 ft.; on all others they were 6 in. by 8 in. by 8 ft. In locating the test sections, depths of ballast closely approximating those desired were found, and the track was raised to make the proper depth. The special ties had been prepared accurately to size, and were of uniform quality. When first prepared, these special test sections were laid

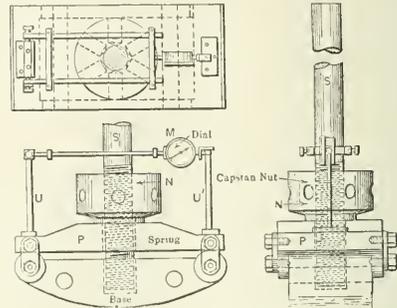


Fig. 2. Details of Load-Indicating Jack

with the 85-lb. rail which had been in the track originally. Later, when it was desired to use heavier rails in the tests, these were removed and replaced by the heavier ones. The sections used were chosen because they were readily available, and give considerable range in weight.

In placing the ties used for the special test sections, the old ties were removed and the new ones put in without disturbing the ballast below the bottoms of the ties. This was done by the regular section men of the Illinois Central. For each test section, the depth of ballast was determined by excavating to sub-grade, near the ends of the ties on each side of the track at two points in each rail length. The track was raised sufficiently to give the required depth of ballast under the ties, and in no case was it necessary to raise the track more than two inches. Whenever the track had been in use long enough to need it, it was tamped and put in good surface. After such resurfacing, tests were not run until sufficient time had elapsed for traffic to compact the ballast which had been disturbed; generally 10 days or 2 weeks were allowed.

Static-Load Tests

The typical procedure of the static-load tests, when the loading apparatus for one-axle and two-axle load was used, was as follows: The car, loaded with rails, was taken to the test section and carefully spotted over the points where the load was to be applied. The brakes of the car were then set and the engine was uncoupled and run away from the test section far enough not to affect the results. After the load indicating jacks had been put in place, ready to apply the load, zero-load readings were taken with the strain-gage and the level-bars. Load was then applied with the jacks, and a set of load readings were taken. The next load increment was applied and the load readings taken. After the desired number of increments of load had been applied (usually four), the load was removed and the zero-load

readings were again taken. To take a complete set of readings, including two sets of zero readings and four load readings, required from 1½ to 2 hours.

The typical procedure in static-load tests with a locomotive was practically the same as when the loading apparatus was used. The locomotive was then run on the test section and spotted at the desired point. Load readings were taken, and then the locomotive was spotted at a new position and load readings taken. After taking load readings with the locomotive at the number of points desired, the locomotive was run off the test section and zero-load readings were again taken.

Moving-Load Tests

Tests in which the load on the test track was produced by a locomotive running over the section are designated as moving-load tests. On the tests on the Illinois Central three types of locomotives were used in moving-load tests, a Mikado, an Atlantic, and a Pacific. The same types were used on static-load as on moving-load tests, except that the

of the locomotive produced an appreciable effect on the rail stresses which was somewhat variable and it was decided to eliminate this variable at first and to study only the effect of speed, leaving the effect of traffic for investigation later. In order to have the counterweight of the locomotive drivers in the same position in all tests, the drivers were slipped to cause the counterweight to come to a definite position for a given position of the locomotive on the test section.

Tests were also made on the tracks of the Delaware, Lackawanna & Western at a point near Dover, N. J., during the fall of 1916. The section of track chosen was on the east-bound main line, about one mile east of the station at Dover. The tracks here are laid with 101 lb. D. L. & W. rails on 7-in. by 8 ft. 6-in. crosstied ties, tie-plates and screw-spikes being used on every tie.

The ballast consists of trap rock having a depth of about 18 in. under the ties. Directly beneath the ballast there are 2 ft. of cinders, which were originally used as a ballast. Beneath the cinders is a light embankment of clay mixed with boulders. For purposes of the tests, the original rail at this point was replaced by new 105-lb., D., L. & W. rail section for about ¼ mile. This change was made and the track was put in good line and surface about September 1, a month before the tests were started. Tests were made with a Ten-wheel, a Mikado, and two Pacific locomotives. The method of making the tests was the same as that followed on the Illinois Central.

Depression of Track

In Fig. 3 are given track depression profiles for one-axle and two-axle loads (the axles being 66 in. apart), for tests made on the test sections of track on the Illinois Central. At the place where the tests with loading apparatus were made, the ties were 22 in. from center to center. The load was applied near the middle of the length of a rail, in order to avoid the effect of rail joints.

Little difference is to be found in the depression for the load over a tie and for the load midway between ties. The depression is generally somewhat greater for the load over a tie. This is true of both one-axle and two-axle loads. There is a marked difference in the magnitude of the track depression according to the condition of the track, freshly tamped track having a smaller depression under load than track which has been subjected to the action of traffic for a considerable time after being surfaced. In this report the term "after tamping" is applied to track on which trains had been run for, say, from one to two weeks after the track had been tamped. The term "before tamping" is applied to track which had been subjected to traffic of passenger trains for, say, from two to six months. It should be stated, however, that in all these tests the track was in excellent condition.

For freshly tamped track the magnitude of the depression of the track is directly proportional to the load applied. This property of direct proportionality in track depression corresponds to a constant modulus of elasticity of rail support. It will be found that the relation between the magnitude of the applied load and the magnitude of the track depression (corresponding to the quality of stiffness in properties of materials), is an important property of track, and has an influential bearing on the stresses developed in the rail under applied load.

In tests of track before tamping a light load produced a relatively greater depression than was given by later increments of load. It thus appears that the stiffness of the rail-support is smaller for the lighter loads. This may be thought to be in the nature of play or looseness in the track. It is probably nearer correct to say that for the smaller loads the depression produced is not proportional to the load applied. If there is play in the test sections of track it would seem

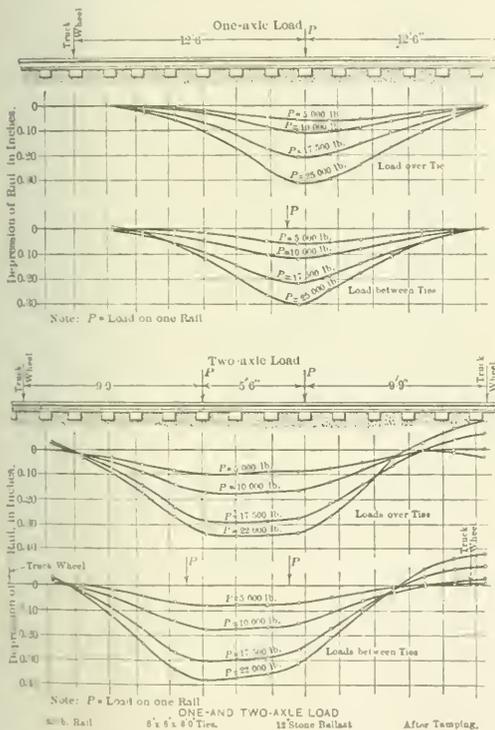


Fig. 3. Track Depression Profiles

switching locomotive was used only on static-load tests and the Pacific locomotive only on moving-load tests. The Mikado locomotives were used at speeds up to 35 m. p. h., that being the maximum speed permitted by the regulations of the Illinois Central. The Atlantic and Pacific locomotives were used at speeds up to 60 m. p. h., a few tests being made at higher speeds.

In all moving-load tests (except at very low speeds), steam was shut off as the locomotive approached the test section of the track. It was found that the tractive effort

most likely to be between the tie and the ballast immediately under the rail and adjacent thereto, so that the tie must bend before it comes to a full and even bearing along its length, and part of the resistance for the lighter loads may be that of the flexural resistance of the tie.

Stresses in Rail; One-axle Load and Two-axle Load

Fig. 4 gives load-stress diagrams for gage lines at the point of application of load in the case of one-axle load and at the points of load in the case of two-axle loads, the average of the stresses at the two points being taken in the latter case. Little difference is to be found in the rail stress under the load for a load over a tie and for a load midway between ties. The stress is generally somewhat greater for the load between ties, though the difference is smaller than the variations found in different tests.

It is seen that the rail stresses differ markedly according to the condition of the track, freshly tamped track giving smaller stresses than track which has been subjected to the action of traffic for a considerable time after receiving a general surfacing. This is found to be true in tests for both the one-axle and the two-axle loads. In general, for freshly tamped track the stress developed in the rail is di-

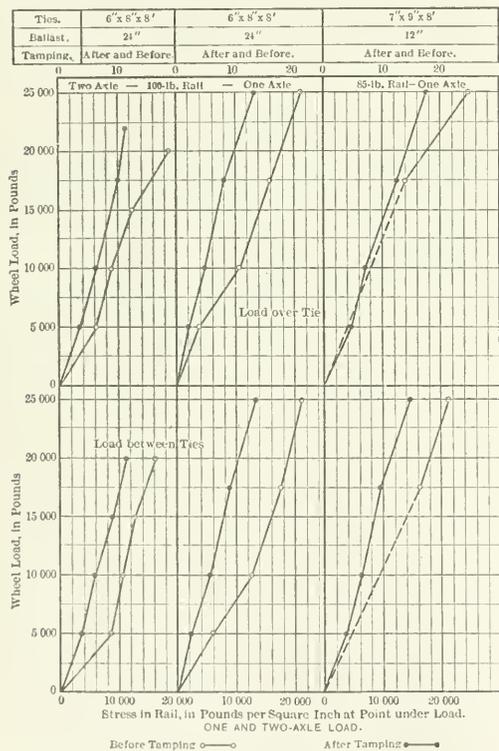


Fig. 4. Load Stress Diagrams

rectly proportional to the load applied. For the track "before tamping," the stresses appear to increase proportionately to the load; but, to the stress found on this assumption must be added a constant stress in order to obtain the stress which is developed at the given load. It would appear, also, that the rate of increase of stress with increase of load is approximately the same in track "before tamping" as in freshly tamped track, the lines in the load-stress

diagrams being approximately parallel for the two cases. For a rail of 85-lb. section the stress in rail in an untamped track was found to be as much as 6,000 lb. per sq. in. more than in freshly tamped track, and this was true whether the load was 10,000 or 50,000 lb. per axle, or whether the stress for the freshly tamped track was 5,000 or 20,000 lb. per sq. in. Tests have not yet been made to determine what the effect would be on track in poor condition.

Stresses in Rail; Static-Load Tests with Mikado Locomotive

In Fig. 5 are given stress-distribution profiles for static-load tests with the Mikado locomotive on rail of 85-lb. and 100-lb. sections on the test sections of track on the Illinois Central. For the 85-lb. section, tests were made on three depths of ballast and two sizes of ties; for the 100-lb. sec-

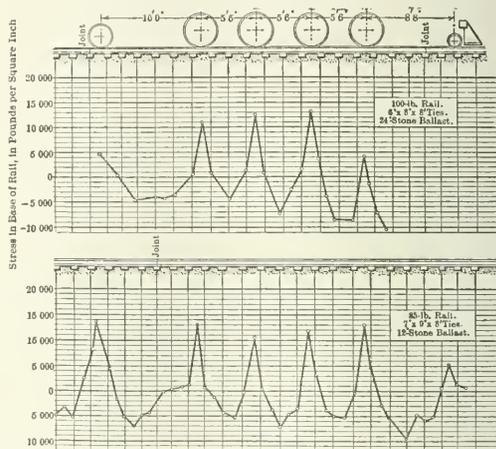


Fig. 5. Stress Distribution Diagrams. Static-Load Tests with Mikado Locomotive

tion, tests were made on one depth of ballast. In all these tests the track was in a freshly tamped condition.

The maximum stresses in the rail are directly under the wheels, positive moment being developed at these points. Negative moments occur at points between the wheels. The stress under the inner two drivers is generally less than that under the outer drivers, and that under the front driver is generally somewhat greater than that under the rear driver. The tests on rail of 100-lb. section gave lower stresses, as might be expected, but the general distribution of stresses along the rail was much the same. The effect of the increased section of rail on the bending moment developed will be discussed later.

Modulus of Elasticity of Rail Support

The table gives the values of the modulus of elasticity of the support as calculated from the track depressions expressed in pounds per inch of rail length to depress the track one inch. The conditions of track are not stated very definitely, but even in track marked "before tamping," the track was in good surface, and only in a few instances was it in need of tamping. The values derived from the tests for the different methods of loading on the same track agree very well. There seems to be some tendency toward a higher value of the modulus in the track having the heaviest rail. It is apparent that the character and condition of the track greatly influence the magnitude of the modulus of elasticity of rail-support. The value for the

modulus on the track of the Illinois Central with 24-in. ballast may be taken as about 1,600 lb. per in. per in. For the track on 6-in. and 12-in. ballast, the values are approximately 1,000, except for the track on 7 in. by 9 in. ties, where the values are higher, say, about 1,200. Although the embankment for the two tracks was built at different times, it is not known that the two parts of the embankment have any special differences in condition. In all these test stretches, there is a tie spacing of 22 in. where the tests were made. For track used for freight service, which was ballasted with 6 in. of cinders in not very compact condition, the value of the modulus of elasticity of rail-support is about 750. For the track of the Champaign and Havana branch of the Illinois Central with about 6 in. of fine cinder ballast above a light embankment of loam, tie spacing varying from 22 to 26 in. (50-lb. rail), the modulus of elasticity of rail-support found was about 550. At the time, the track was not in good condition at the point where the test was made. Some of the ties were partly decayed.

For the track of the Delaware, Lackawanna & Western information on the depression of track and the condition of the track is not complete, and only an estimated value of the modulus of elasticity of rail-support can be given. This

from the smaller value of this stress and the greater variations of conditions to which it is subjected.

Influence of Rail Section

The heavier rail gives a much higher bending moment coefficient than the lighter. It will be most convenient to use in the discussion the bending moment coefficient K_b , which the wheel load, P , may be multiplied to get the bending moment at the load or at a point between loads. If the difference in the track condition is taken into account, the 125-lb. rail being on track with 24 in ballast, which gave a higher modulus of elasticity of rail-support than that of the track on which the tests of 85-lb. rail here used were made, the contract becomes greater. That the bending moment coefficients should be greater for the heavier sections is evident from analytical considerations, especially in the case of the trailer, which is at some distance from other wheels, and in the case of outer drivers. The increase due to increase of section, however, is greater than may be expected from the analysis of track action herein given, or for any known rational analysis. For the drivers and trailer of the three types of locomotive used on the Illinois Central, the values of the bending moment coefficient derived by the

VALUES OF MODULUS OF ELASTICITY OF RAIL-SUPPORT

Depth of ballast, in inches	Size of ties, in inches	Condition of tamping before	85-lb. Rail			100-lb. Rail			125-lb. Rail		
			Loco-motive	One-Axle	Two-Axle	Loco-motive	One-Axle	Two-Axle	Loco-motive	One-Axle	
24	6 by 8		.....	1,170	1,180	.....	.....	1,090	.....	1,640*
			.....	1,190	.....	.....	1,080	1,100	.....	1,820*
			.....	1,640	.....	.....	1,030	.....	.....	1,600
			.....	.....	.....	.....	880	.....	.....	.....
		
24	6 by 8	After	Average	1,330	1,180	.....	1,000	1,090	.....	1,690
			.....	1,650	.....	.....	1,510	.....	1,540	1,900
			1,600	1,430	1,420	1,840
			1,570	1,800	1,560
			1,830	1,610
Average			1,630	.....	.....	1,510	1,370	1,090	1,830	

track was evidently stiffer than that of the Illinois Central. The value, 2,200 lb. per in. per in., is probably representative of this track. The track had 18 in. of trap rock ballast below the tie, and the material of the roadway below was such that it was very solid. The spacing of the 7-in. by 9-in. by 8 ft. 6-in. ties averaged about 22 in.

Effect of Increased Speed

From tables arranged to show the effect of speed as a percentage of the stress in the rail at 5 miles per hour for each mile per hour increase of speed greater than 5 miles per hour, it is found that the values for the increase for positive moment range from about 0.3 to 1.2 per cent increase for each mile per hour increase in speed. Values higher than 0.9 per cent are found in a number of cases. The increases found in the tests on the Delaware, Lackawanna & Western were of the same character, but the values were somewhat smaller than those found in the tests on the Illinois Central.

The heavier rail section appeared to give a somewhat higher proportional increase of stress with increase of speed than the lighter. The indications in the tests on track of the Illinois Central were that the Mikado locomotive gave a rate of increase somewhat greater than the Atlantic and the Pacific. The tender trucks gave a still higher rate of increase, though, of course, the amount of the stress was less than that under the drivers.

The proportional increase in the stress for negative moment was large and rather irregular, as would be expected

analysis are less than 10 per cent higher for track with the 125-lb. than for track with the 85-lb. section. For the tests at 5 miles per hour, the values of the bending moment coefficients average nearly 30 per cent higher with the 125-lb. than with the 85-lb. section, considering the drivers and the trailer of the three types of locomotive. For the tests at the higher speeds, the increase is still greater.

CALCUTTA IMPORTED RAILWAY EQUIPMENT to the value of \$1,409,211 in the year ended March 31, 1917, as compared with \$3,968,611, in the corresponding period of 1916, according to the report of Consul General James A. Smith from Calcutta, British India.

CANADIAN VESSEL STATISTICS FOR 1916.—The total number of vessels on the Dominion register at December 31, 1916, was 8,660, measuring 942,598 net tons, a decrease of 97 vessels, and an increase of 13,280 tons, compared with 1915. During 1916, 432 vessels were removed from the register of which 260 were broken up, reported out of existence, condemned, dismantled or dandoned, 26 were wrecked, 22 were sold to U. S. Government; 1 to French Government; 1 to Russian Government; 20 stranded; 7 lost, 7 abandoned at sea; 2 lost by collision, 14 foundered, 18 burnt, 25 transferred to Newfoundland; 17 to Barbadoes; 5 to Great Britain; 1 to Australia, 2 registry no longer required; 8 sunk by mines and 1 by torpedo. It was estimated that 42,566 persons were employed on vessels registered in the Dominion during 1916.—*Canadian Railway and Marine World*

Canadian Railways and the War*

THE CRISIS in the American coal situation made it necessary to assure the United States that coal supplied to Canada was being used for necessary purposes only and . . . the formation of the Canadian Railway Association for National Defence resulted (October, 1917). To that date the domestic traffic of the Dominion had been kept moving expeditiously, despite war conditions, with the exception of one brief period in the winter of 1916-17.

The Canadian railways had already carried 400,000 troops from recruiting points to concentration centres and from concentration centres to training grounds, and training grounds to ports of embarkation, and these men had been fed and "slept" better than were the troops of any other belligerent nation mobilizing over such an extended area.

Over 70,000 laborers [from Asia] for Europe had been carried across the continent. These also had been fed and "slept" under railway management.

There had been a colossal new burden due to the taking of coal vessels from the St. Lawrence and the lakes for ocean service; to the reduction of staffs to furnish army recruits and many sudden shiftings and reversals in the tides of traffic . . . including the flow of Canadian raw materials, some of them never before exported from Canada, into the United States. The passenger train service had been reduced to the extent of 10,000,000 passenger train miles a year, saving 500,000 tons of coal.

The Association has made marked progress. The speed of all trains has been so regulated as to give the maximum of tractive effort from a given amount of coal. Passenger train service has been reduced still further so as to effect a saving of another 2,000,000 passenger-train miles yearly.

The American railways, to equal the Canadian record, would have to cut off 110,000,000 passenger-train miles instead of 20,000,000. The Canadian reduction means a saving of 600,000 tons of coal yearly. Further reductions are under way.

The Railway War Board took charge, in a supervising way, of all traffic difficulties. Potato cars were loaned from one road to meet the shortage on another. Calls for refrigerator cars, apple cars, engines, box-cars—all kinds of equipment—were met through the direction of the Board. A special officer was sent to supervise the coal handling at the Niagara Frontier, with excellent results. A campaign for economy in the ordering of cars and in using their space has been promoted. The surplus of Canadian freight cars in the United States is being steadily reduced through pressure applied. Of these cars 1,300 have come in loaded with anthracite to relieve the coal shortage.

The Outlook

The car shortage, which has been ameliorated, will, it is hoped, be entirely relieved by persuading shippers to load cars to their maximum capacity instead of to less than half their capacity as has been the practice in the past. Steps will be taken also to impress upon shippers and consignees the seriousness of holding cars longer than necessary. The sympathetic co-operation of the Canadian people—shippers, consignees and the travelling public—is a prime necessity. . . . Although it is true that the Canadian railways are organized as nation-wide enterprises, and so have escaped the difficulties experienced by the American lines, and that, being large and few in number, they are able to work to-

gether successfully, nevertheless, congestion on lines outside of Canada, labor shortage and extreme weather conditions, coupled with abnormal traffic demands, make it necessary to load cars to full capacity; to load them promptly and quickly, and to release them at the earliest possible moment.

Embargo Rules of the Railroad Administration

W. C. KENDALL, manager of the car service section of the Railroad Administration has issued circular No. C. S. 1 giving instructions to be observed in the handling of embargoes, in addition to those conveyed in General Order No. C. S. 17 issued by the Commission on Car Service. The instructions, which are issued by authority of the Director General of Railroads and are effective immediately, are as follows:

1. Embargo promptly consignees who do not unload freight promptly on arrival, subject, however, to the approval of the regional director.

2. When a complete embargo is not an essential, the following list of exceptions must be observed so far as practicable and in the order named.

(a) Live stock, perishable.

(b) Coal, coke and charcoal. Acids, alcohol, ammonia, light oil (benzol and toluol), petroleum and its products in tank cars. Empty tank cars.

(c) Food, domestic (not export), for human consumption, including wheat, corn, oats, rye, barley, rice, cereal products, salt, canned goods, sugar, syrup, molasses, peanuts, vegetable oils. Feed, domestic (not export), for animals and poultry, not including hay or straw.

(d) Materials consigned to the United States Government or its authorized agents, including the Public Printer, the Bureau of Engraving and Printing, the Post Office Department, the Navy Department, Navy Yards, and Navy Stations, the Marine Corps, to the American Red Cross, the Imperial Munitions Board, Canada, and shipments of steel, lumber, ties and piling consigned to the United States Shipping Board Emergency Fleet Corporation. (Shipments to the War Department will be more fully dealt with in instructions subsequently to be issued.)

(e) Railroad material and supplies (other than coal or coke), when consigned to an officer destined to a point on his own line.

(f) Printing paper and printing ink. Scrap and waste paper when consigned direct to paper mills or manufacturers.

(g) Agricultural implements and farm machinery required for preparing the soil. Binder twine; canning machinery; carbide; carbon black; chrome, graphite, manganese, and pyrites ore; fertilizer, fertilizer materials, including agricultural lime and pulverized lime stone; field and garden seed, seed grain; food containers (glass, wood, tin or paper); fullers earth; laundry soap and soap powder; medicines, drugs and surgical instruments; mine props, mine wagons, powder, and other materials and supplies necessary for the operation of coal mines; oil well supplies; spraying materials, including arsenic (basis for insecticides), and spraying implements; sulphur; tanners' extract; tin plate for manufacture of tin cans.

3. It should be understood that an embargo placed against carload freight includes less carload shipments of things which are ordinarily forwarded in carload lots.

4. Cars must not be loaded in violation of embargoes. When this is done, agents are not permitted to issue bills of lading and if cars are not unloaded they will be held at point of origin, subject to current demurrage charges until unloaded or until embargo is lifted.

* Abstract of War Board Bulletin No. 1, issued by the Canadian Railway Association for National Defence. The executive committee of this association consists of J. Ed. Stanchessy, Howard Kelly, Sir William Mackenzie and Alfred H. Smith. The administrative committee consists of U. E. Gillen, D. B. Hanson, C. A. Jewes, Sir George Bury, E. F. Backus, E. D. Bromner and J. H. W. Ould. The general secretary is W. M. Neal, 263 St. James St., Montreal.

A Japanese View of Railway Exports to the East

An Interview with Akio Kasama of the Railway Commission
Which Has Been Visiting This Country

"THE UNITED STATES AND JAPAN will secure the bulk of the railway supply business in China after the war," said Akio Kasama, secretary of the Imperial Government Railways of Japan to a representative of the *Railway Age*, who called on him at his New York office. Japan and the United States will develop this business, working side by side, at times independently and at times in close co-operation, but always peacefully and without resorting to the mailed fist method of commercial expansion, was the idea hinted at rather than bluntly stated by the diplomatic Japanese representative.

Mr. Kasama has been in this country several months as a member of the Japanese Commission of Inspection which ostensibly has been investigating our transportation system, our mining and our iron and steel manufacturing facilities, but in fact has also been interested in the establishment of a friendly basis of co-operation between the United States and Japan in the Far East. Consequently his viewpoint of American and Japanese co-operation in the Far East in the future may indicate that this understanding was reached on one of the frequent trips this commission made to Washington. Continuing on the subject of future railway business in China, Mr. Kasama pointed out that:

The first need of China is for railroads. Capital must be provided before these railroads can be built, as China is unable to finance them herself. The United States will have the greatest surplus of capital of any nation. Japan will also have capital to invest. Germany will be shut out of the railway supply business in the Far East by unfriendly feeling—to China Germany is virtually an enemy country—and because German capital will be employed in building up her own territory and that of her allies. The English railroad supply industry will be fully employed at home and in her colonies. India alone will be in imperative need of so much equipment that it would take the entire output of the whole English railway supply industry for one year to furnish it. Belgium is no longer a factor in export of railway supplies. France will have her hands more than full at home.

In short, according to Mr. Kasama's ideas, and they are those of the commission of which he is the secretary, the bulk of the railway supply business in China must be taken care of by Japan and the United States, as there will be no other country in a position after the war to handle this kind of business. With the field in China practically abandoned by all save American and Japanese railway supply interests arises an interesting question as to which one will get the lion's share of the business.

The Possibilities of American Export Trade

Japan, said Mr. Kasama, has a large steel plant at Wakamatsu on the island of Kyushu. This plant imports a large portion of its ore or pig iron from China. It is in a position to make all kinds of steel, but its capacity, despite its steady increase, is still insufficient even to care for the domestic demands of the empire. Some two-thirds of Japan's raw steel has to be imported and no less than four-fifths of its steel plates have to come from steel mills in other countries. Mr. Kasama expressed his belief that the United States was the country which should most logically be expected to supply such raw material.

Concerning Japan's railway supply industry, Mr. Kasama said that Japan's car and locomotive plants were well organized and should see a steady development. Unlike

the big steel plant at Wakamatsu those plants are in private hands. They now produce one third in terms of Japan's own demands, this one third being available for export to China or other countries. Mr. Kasama did not believe that there would be a great market in Japan for American cars and locomotives or in railway supplies generally except in such things as lubricators, injectors, gages and spring steel which Japan does not supply in sufficient quantities.

On the basis of this situation Mr. Kasama thought that the United States would furnish much of the capital for development of the railways of China and would get its reward largely through the sale of steel and iron-steel plates, shapes, rails, and other semi-manufactured or bulky commodities. Japan's car and locomotive plants with their surplus capacity would fabricate the raw material into cars and locomotives and Japanese labor or Japanese "genius," as he expressed it, would build the railroads and presumably help the Chinese to operate them. Japan he further added, has adopted the firm policy of encouraging industry in China, particularly iron and steel mills. Presumably it would also encourage the railways there to build their own cars and locomotives. The South Manchurian railway in which the Japanese already have an interest has made many of its own locomotives for some time.

The *Railway Age* representative expressed his doubts as to whether American bankers would desire to invest capital on the basis outlined. Mr. Kasama did not doubt that China is so vast and its needs for new railroad lines so great that undoubtedly American and Japanese interests would find plenty of room to work independently.

The Siems-Carey Railway & Canal Company, the protégé of the American International Corporation and the National City Bank, furnishes an example of an independent American project, that company now having all plans made including those for financing, for construction of 2,600 miles of railroad built to American standards practically throughout and equipped naturally by American railway supply companies. This railroad will serve a territory with hundreds of millions of inhabitants and of untold wealth in undeveloped resources. Other and similar entirely American projects are in contemplation.

The Commission's Personnel

The commission representing the Imperial Government Railways of Japan came to this country last October. It was headed by Dr. Shima and consisted of two other members and an accompanying staff. All three of the members stand high in the affairs of the Japanese railways. Dr. Shima is the director of the machinery and rolling stock department of the Imperial Government Railways and professor of mechanical engineering of the College of Engineering of Tokyo University. Akio Kasama, the secretary of the commission, occupies a position less important than that of secretary of the Imperial Government Railways and on the commission represents the national department. J. Nakamura, the third member, is a civil engineer, holding the position of assistant traffic manager in charge of the passenger section, a position similar to our general passenger agent or passenger traffic manager. Dr. Shima has since returned to Japan. Mr. Nakamura expects to return shortly, while Mr. Kasama will remain in this country to observe particularly the working out of the government control of railroads under Mr. McAdoo.

When speaking to the *Railway Age* representative Mr.

Kasama outlined the commission's three extensive trips over the railroads of almost the entire country, the commission's mission in the United States, the possibilities of the American railway supply industry in the Far East, and he also expressed some opinions on American railroad operation.

The Commission's Three Trips

The commission's first trip was from San Francisco to Washington and New York. On the Pacific coast some time was spent inspecting the terminals and water front facilities at San Francisco and Los Angeles and in examining the methods of train dispatching, signaling and yard operation. The commission then came east to Colorado and a stop was made at Pueblo to visit the plant of the Colorado Fuel & Iron Company, with which company the commission has since placed an order for 20,000 tons of standard American 75-lb. rails. From thence the party traveled east through Denver, Ogden, Omaha, Chicago, reaching New York early in November. At New York some time was spent in looking over the extensive terminals, particularly those of the New York Central and Pennsylvania, in inspecting the waterfront, including the Bush Terminal and other facilities, and considerable interest was shown in the construction and operation of New York's subway lines. The party then went on to Washington and considerable time was spent in visiting the Department of Commerce, the Railroads' War Board, the Interstate Commerce Commission, the Bureau of Railway Economics, the Bureau of Standards and other organizations and bureaus. Mr. Kasama expressed the commission's appreciation of the courtesy shown its members in Washington and commented on the co-operation extended by all with whom the members came in contact.

The commission then returned to New York, spending some time in Baltimore to inspect the Baltimore & Ohio's terminal facilities and particularly its coal handling plants.

The extensive western trip followed soon after. The commission first went to Schenectady to visit the plants of the General Electric Company and the American Locomotive Company, whence it went to Buffalo where considerable time was spent in examining the terminal facilities. From there the commission went to Chicago, from there to Duluth, Hibbing, Minneapolis, Sault Ste. Marie, Detroit, Cleveland, Ashtabula, Youngstown, Pittsburgh, Johnstown and Philadelphia. Railways, railway terminal facilities, iron mining, ore and coal handling and steel manufacture received their due consideration. At Sault Ste. Marie the commission showed particular interest in the canal and at Detroit in the automobile manufacture.

The third trip was that taken by the party on Dr. Shima's return trip to Japan. First, the commission went to Washington. From there its members went to Norfolk, where the coal handling facilities were inspected, thence to Bluefield where the Norfolk & Western's electrical installation came in for attention. Thence the commission went west over the Chicago, Milwaukee & St. Paul's electrification and over the Great Northern to Seattle where the handling of lumber was looked into. The party arrived in San Francisco late in December and Dr. Shima sailed on December 28, the day that Mr. McAdoo received his appointment as Director-General of railroads.

The Mission

One of the commission's purposes in coming to this country was to look into American railroad practice, the other to secure plates and other railway materials for export to Japan. Japan at the present time is contemplating the conversion of its lines to standard gage. The mileage of the empire totals about 10,000 of which 5,600 is directly operated by the Imperial Railways. The gage of nearly all of Japan's mileage is 3 ft. 6 in., but there are small sections

of 4 ft. 8½ in. gage and the railways operated by the Japanese government in Chosen are all of standard gage. The project of standardization is now in contemplation. The commission, said Mr. Kasama, expected that a bill providing for its carrying out would be introduced in the Diet this year, but recent advices to the commission announce its postponement until the next Diet which convenes next December. On account of this proposed standardization of gages the commission was particularly interested in the methods employed in parts of this country which were visited for transferring freight from narrow to standard gage railroads.

The commission was particularly on the lookout for ideas in American railroad operation that might prove worthy of adoption in Japan. As one result of the investigations, the Japanese railway administration is going to equip a complete train with American standards practically throughout with a view to observing the adaptability under Japanese conditions of automatic couplers, M. C. B. journal boxes, etc.

One of the results of the mission's visit has been the placing of the order for 20,000 tons of rails mentioned above. As a matter of fact, the commission has had in mind the securing of some of the tonnage previously decided on for the rails for the Russian railways. But further than that the commission has been trying to secure licenses for car plates and other materials for cars, locomotives and other railway equipment. This is not the same thing as the ship plates, Mr. Kasama emphasized, as the ship plates matter is in the hands of another commission.

Amazed at Passengers' Patience

Mr. Kasama was asked to express an opinion on American railroad operation. The commission, he said, was impressed by the size of the American cars and locomotives and the extensive terminals. "But," he added, "Dr. Shima and the rest of us were simply amazed at the patience of the American traveler. When a train is two hours or three hours late, the American just folds his hands and says, 'I wonder what's wrong. Well, I suppose something has happened and it can't be helped,' whereas if a train is late in Japan, the papers print long articles about it and the government is held responsible." Mr. Kasama did agree, however, that the tremendous strain on the railroads and the extremely bad weather conditions may have been largely responsible for some of the delay. Mr. Kasama also commented on the great number of competing and only partly filled passenger trains, but added that the taking off of so many trains lately had undoubtedly largely eliminated the waste in passenger service. He also complained about the lack of care in indicating the destination of trains. In Japan, he said, the trains always left and always arrived on the same track and signs were displayed on the trains themselves. Here, he noted, the trains are often changed from one track to another, sometimes at the last minute, and he commented on the fact that, according to his observation, passengers always asked the conductor whether the train was bound. Of course, he agreed that the present war-time conditions may have had considerable to do with the lack of smoothness in passenger train operation.

ALL AMERICANS CAN SERVE.—Every man, woman, and child in this country, who wants to serve the country, can serve it and serve it in a very simple and effective way, Secretary McAdoo says. That service is to lend your money to the government. Every 25 cents loaned to the government is a help at this time and practically every man, woman, and child by making some trifling sacrifice, some denial of a pleasure, or giving up some indulgence, can render the government that support.

Hearings Before Railroad Wage Commission

Representatives of Employees Complete Testimony. Railroad Officers Concede Need for Higher Wages

WASHINGTON, D. C.

THE RAILROAD WAGE COMMISSION on February 14 finished taking the testimony of representatives of labor organizations and of unorganized employees who had asked to be heard regarding their requests for increased wages and adjourned subject to the call of the chairman. Meanwhile the boards of statisticians and examiners appointed by the commission will continue their work of investigating the entire wage situation from the available statistics supplemented by the testimony and exhibits that have been presented by the witnesses. Testimony of railroad officers was begun on February 13.

Among the witnesses heard on February 13 was W. G. Edey, representing train dispatchers on the Seaboard Air Line, who asked for the same scale that had been requested by other dispatchers. He denied charges made by brotherhood officers that the railroad officers were trying to prevent transportation efficiency and he cited examples of engineers on the Seaboard who were receiving high wages.

James A. Hennessey, representing dining car stewards on the Pennsylvania, asked for an increase of 20 per cent in wages, with a minimum of \$150 a month, and shorter hours, with at least four days a month off.

A. B. Jenkins, representing the International Union of Molders, asked for increases of approximately 33 1/3 per cent.

E. T. Thompson, appearing on behalf of colored helpers and laborers of the southeastern roads, asked for a 20 per cent increase.

The testimony of Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers, on February 13, was only briefly referred to in last week's issue. He told the commission that at the time the railways were taken over by the government the engineers had no concerted wage movement in progress, that he had advised against it because he did not want to do anything that would jeopardize the country in keeping the lines of communication open. He said that the brotherhood had furnished men for the engineering regiments for service in France and he expected his men to make sacrifices on account of the war and that the lower paid employees should receive first consideration, but that the engineers as a class were not highly paid and that they should have an increase to partly meet the increased cost of living, to a minimum of \$6 a day.

He read sworn statements from engineers in various classes of service showing their wages for the month of January for eight hours' work a day for 30 days and their family expense accounts. The examples he cited were all of men with families of five or six, and the earnings ranged from \$103 to \$184, while in many cases the expenses for the month amounted to more than the earnings. All were making payments on Liberty Bonds. The man who earned \$184 ran 4,500 miles in passenger service. The engineer who runs the Congressional Limited train, he said, a picked man, who has to read correctly nearly 400 signals in 100 miles, is paid \$4.25 for 100 miles while unskilled negro laborers on government buildings in Washington receive \$5 a day. He quoted the various rates paid to engineers for eight hours or 100 miles, saying that if a man earned more than the daily rate it was by working overtime or making excess miles and he cited a table in the report of the Eight-Hour Commission showing the number of men receiving various amounts. This indicated, Mr. Stone said, that 50 per cent of the engineers earn less than \$150 a month.

About 95 per cent of the men in yard service had been put on an eight-hour basis, he said, but when the wage movement was started by the conductors and trainmen the roads began to increase their hours in order to show higher average earnings.

When Chairman Lane asked if the longer hours were not due to winter conditions Mr. Stone replied that he did not think so, and that there would be no shortage of men if the railroads would pay more. Engineers were remaining in service when they could get better pay elsewhere, rather than lose their seniority rights.

Referring to charges made by Mr. Shea that railroads were increasing their violations of the 16-hour law, Mr. Stone said one of his local chairmen had seen an order signed by Regional Director A. H. Smith directing the roads to disregard the law and to run engines to their terminals. This resulted, he said, in men working 20 to 30 hours. He had wired Director General McAdoo about the order and had received a reply: "No authority has been given for violation of hours of service law. I have so instructed the Regional Director."

Commissioner McChord remarked that an investigation is being made of reports of disregard of the law and a report is to be made to Mr. McAdoo.

Referring to questions put to Mr. Shea regarding the possibility of the firemen saving coal, Mr. Stone said that hundreds of thousands of tons of coal are wasted on the railroads but that the waste is "all down the line" and it is necessary to begin "back of the firemen." "It is no use to talk to the firemen about saving coal," he said, "when his engine is in such poor condition that it is wasting coal every minute. The roads have got to get their power in shape and their terminals and roundhouses. Some roads last year made no provision for winter at all." He said that the railroads had never before entered the winter season with power in such bad condition but he denied that it was due to shortage of men so much as failure to pay enough to attract good men. He also criticized the practice of employing women for heavy work, saying that England had not done so until after it had been in the war for a long time but that in this country the plan had been adopted "before we even got started in the war."

Chairman Lane, who has tried to bring out from most of the witnesses some idea of the proper relation between wages in various classes of employment, asked Mr. Stone about the relation between the wages of engineers and other employees. Mr. Stone said there was no definite relation but that the firemen's pay had been increased in greater proportion than that of the engineers because the larger engines had increased his work. Chairman Lane remarked about the responsibility of the dispatcher. Mr. Stone said he did not want to disparage the dispatchers but he did not think their responsibility as great as that of the engineer. He told the commission that of 100 firemen only 17 become engineers and of the 17 engineers only 6 become passenger engineers.

B. F. Richardson of the American Federation of Railroad Workers, appeared on behalf of men in the mechanical and bridge and building departments.

J. A. Franklin appeared on behalf of the railroad department of the American Federation of Labor, representing men in the mechanical trades, helpers and apprentices and railway clerks. He asked for \$6 a day for skilled em-

ployees and \$4.50 for helpers and described how these men had left the railroad service for higher wages elsewhere.

A. E. Barker, for the International Brotherhood of Maintenance of Way Employees, asked for \$3.25 to \$3.50 a day for section men and \$110 to \$140 a month for section foremen.

J. B. Parsons and F. R. Weller testified on behalf of civil engineers in construction and maintenance of way work. They did not ask for specific increases but that their case should be taken into consideration. Mr. Parsons contrasted the pay received by draftsmen, transmitters and other technically educated men with the wages of trainmen and mechanics.

Chairman Lane made a rough calculation when Mr. Franklin was speaking that the increases he asked would amount to \$82,000,000 a year. He pointed out that the increased wages would probably have to be paid by shippers but said he did not think the possibility of an increase in rates should be a bar to reasonable wages.

Railroad Officers Testify

The necessity for increased wages for a large proportion of the railway employees was conceded by the representatives of the railroads who appeared before the commission on February 18. They appeared at the invitation of the commission and said their purpose was not to oppose requests made by the employees, but merely to aid the commission by giving information. No one is more keenly aware than the railroad managements that many employees are not properly compensated, said J. G. Walber, secretary of the Bureau of Information of the Eastern Railroads, but he denied that the railroads had intentionally discriminated against organized and unorganized employees and said they had attempted to do what they could with their available resources to improve the condition of labor. Railroad officials need no evidence that the cost of living has increased and that the lower paid men need assistance during the war, said J. W. Higgins, chairman of the Association of Western Railways. Mr. Higgins expressed the opinion that all men receiving less than \$150 a month needed an increase and that perhaps the figure should be placed at \$2,000 a year, this being the amount exempted from the income tax by the government. Of course, he said, men drawing less than \$100 a month are entitled to greater consideration than those paid as much as \$150 a month.

Mr. Walber outlined the history of concerted wage movements in eastern territory and explained the necessity for an organization on the part of the railroads to deal with such movements and he described in a general way some of the wage schedules and their development for the purpose of showing that their effect upon wages is measured not merely by the rates, but also by the rules which affect the earning power of the employees. After railroad traffic began to pick up in 1915, he said, there was a general movement on the part of the railroads to increase wages among their unorganized employees without concerted demands. This began even before the railroads felt to any considerable extent the competition of munitions plants and other industries and went on all through 1916 and 1917. He had been unable to compile comprehensive statistics covering these individual increases because there was such a shortage of clerks that it was difficult to secure statistical information from the railroads, but he thought that skilled labor and clerks had received increases averaging about 15 per cent and that unskilled labor had received increases from 25 to 100 per cent. Meanwhile, the train employees continued under their former scales except as modified by the Adamson law settlement. He mentioned these things to show that the railroads had endeavored to take care of their employees in the best way that they could, but said they were unable to take care of all the employees. The telegraph operators, he said, have

received more adjustments since 1910 than any other organization and he submitted a tabulation showing the wages of 24,000 men on the eastern railroads averaging \$79 a month.

Mr. Walber said it was true that when rates of wages are increased the railroads often try to readjust their operating conditions in order to reduce the cost and to avoid the penalties, but to show the effect of wage adjustments he presented figures showing that if the 1909 basis had been in effect in 1915 the pay of the engineers on the eastern railroads would have been approximately \$6,000,000, or 18.3 per cent less than it was, and 3.57 per cent of the increase was due to changes in rules rather than the changes in the rates. Firemen had received an increase of \$5,205,000, or 25.61 per cent, of which 21.68 per cent was due to changed rates of pay and 3.98 per cent due to changes in the schedule rules. The conductors had received an increase of \$5,439,000, or 23.32 per cent, of which 3.54 per cent was due to the rules. Other trainmen had received an increase of \$12,300,000, or 29.91 per cent, of which 8½ per cent was due to the rules.

As to the effect of the Adamson law settlement, he said, the report of the Eight-Hour Commission speaks for itself, but in reply to some criticisms of it made by representatives of the brotherhoods he wished to state that with the exception of one statement dealing with delays between terminals, the statements in the report were made up by compilation of the time slips prepared by the men themselves. The railroads had merely compiled the information and the brotherhoods had had representatives at every conference and had the opportunity to check all the figures. Because the commission was allowed only \$25,000 for its expenses, the railroads had had to assume the expense of printing forms and compiling information. One form had cost \$20,000 to print. He said it was unfair to criticize the information because it was furnished by the railroads, because no one else could furnish it.

H. B. Perham, president of the Order of Railway Telegraphers, had told the commission about some station agents on the Central Vermont paid from \$30 to \$45 a month. Mr. Walber had made an investigation and found that the man paid \$30 a month was merely a caretaker of a very small station and his main business was that of a farmer. The men receiving \$45 a month were either mere caretakers or received additional income from commissions on express business. Mr. Walber also replied to statements made by Timothy Shea, assistant president of the Brotherhood of Locomotive Firemen and Enginemen, that railroads have tried to avoid paying increased wages awarded by various boards to the hostlers and that on one eastern road the road foreman of the engineers had written to a hostler changing his classification to that of engine repairer and giving him an increase from \$65 to \$70 a month instead of giving him the pay awarded to hostlers. Mr. Walber said he thought the eastern railroads had settled all controversies regarding the hostler question and on looking the matter up had found that the arrangement with this hostler had been the result of a mutual agreement between the railroad and the brotherhood, of which Mr. Shea had been advised, and that the man concerned was at an outlying point where he merely had to clean the fire and take care of one engine during the night.

Mr. Walber also submitted to the commission a large amount of statistical information regarding wages on the eastern railroads and information regarding their wage contracts. All the roads, he said, have contracts with the four brotherhoods. Most of them have contracts with the Order of Railway Telegraphers, only a few have contracts with the shopmen, but many have agreements with the employees on their roads if not with an organization. He thought that probably about 25 per cent of the employees were organized.

Mr. Higgins apparently caused some surprise when he advocated increases for employees earning less than \$2,000

a year. Chairman Lane remarked that that would include a very large proportion of the employees. Mr. Higgins said it would leave out many of the engineers and conductors. To show the trend of wages of the train employees, Mr. Higgins presented a compilation taken from the Interstate Commerce Commission reports showing that the average wage of the train employees for all roads had increased from \$810 a year in 1900, to \$884 in 1905; \$993 in 1910, and \$1,249 in 1914. Since 1914, he said, the statistics have not been on a comparable basis. Combining ton miles and passenger miles and referring to them as traffic units Mr. Higgins showed that in 1900 the number of traffic units per train employee was \$24,000; in 1905, 793,000; in 1910, 902,000; and 1914, 1,037,000. The wages per train mile were 17.46 cents in 1900, 22.58 cents in 1905, 25.89 cents in 1910, and 31.86 cents in 1914. For each dollar paid in wages to train employees the railroads had received 1,018 traffic units in 1900, 896 in 1905, 908 in 1910 and 830 in 1914. In other words, while wages per employee had increased 54 per cent and wages per train mile had increased 79 per cent, the number of traffic units per employee had increased only 26 per cent and the number of traffic units per dollar had decreased.

Mr. Higgins outlined the concerted wage movements in western territory and then, to show the amount of recent increases in wages, mainly to the unorganized employees, he gave figures for nine western railroads, representing about 75,000 miles of line, which he had received by telegraph since he came to Washington. He had asked for these because the representatives of the employees had apparently given the commission the impression that the railroads had done nothing for their unorganized men. In 1916 these nine roads employed 319,185 men and their increase in wages during the year 1916 amounted to \$11,073,094, or an average of \$34.69. This figure does not represent the increase in wages per man for a full year, but is simply the average of the increases actually paid that year, some of which extended through only a small part of the year. In 1917 the same roads had 340,436 employees, an increase of about 6.7 per cent, while the payroll for the year increased \$39,013,612, an average of \$114.89 per man. While this included the effect of the Adamson law, Mr. Higgins said, that was a small matter, compared with the other increases paid. The total increase in wages for 1916 and 1917 on these roads amounted to \$50,186,706, an average of \$149.58, and if the same proportion of increase had been paid by all roads in the country it would amount to approximately \$250,000,000. The bulk of the increases were made in the latter part of 1917 and have only recently been reflected in the figures.

The largest recent request for an increase in wages was that of the conductors and trainmen. He had made a compilation for 63,000 miles of road, for which he had received returns, showing that the men included in this request in the month of October, 1917, had received in wages \$4,425,000 and that in their proposed schedule, without the request for time and a half overtime which they have since submitted to the government, the increase would have amounted to \$1,362,415 for the month, or 30.8 per cent.

Mr. Higgins said that in replying to his telegrams some of the nine roads had included their entire payroll, including officers, while others had omitted the officers, but he gave the figures by individual roads to show that the average increases per man on some of the roads that had omitted the officers were higher than the averages on the roads which had included the officers. Commissioner McChord remarked about the inclusion of officers' salaries, but Mr. Higgins said he thought that would make but little difference as he did not think officers' salaries had been increased recently, although many of the lower paid officers ought to have an increase.

"Do you think any of these officers ought to have their salaries reduced?" asked Commissioner McChord.

"I am not in a position to answer that," Mr. Higgins said, "but I think that after a man has spent his lifetime acquiring the knowledge and the capacity to handle a railroad, he is entitled to fair compensation."

F. W. Brown, assistant to the vice president of the Southern Railway, testified regarding wage schedules in the southeastern district.

Chairman Lane asked that information be filed for the eastern, southern and western districts, showing all increase in wages since January 1, 1916. The Wage Commission has also addressed a circular letter to all of the roads, asking for information regarding the number, wages and hours of their employees by classes, showing the number of men receiving wages classed by \$10 a month grade, and also showing the number of men and the amount of wages that would be required to put all employees on a basis of eight hours a day and 26 days a month.

E. T. Whiter, assistant general manager of the Pennsylvania Western Lines, described the work and conditions of employment of train dispatchers and operators and the operation of trains. He said train dispatchers receive about \$150 a month, work eight hours a day, usually have one day off a week, and two weeks' vacation, and in reply to statements that there is little opportunity for promotion, he mentioned that four vice-presidents of the Pennsylvania were formerly train dispatchers and a large number of other officers. Regarding the demand of dispatchers for an extra rate of pay for overtime and on Sundays, he said it would be feasible to provide that they should have one day off a week, but that to give the men Sundays off would require an additional set of dispatchers and as the railroad runs every day the pay should be the same for Sundays as for any day. He said the Pennsylvania System had never dealt collectively with employees' organizations except with the train employees and had not made a contract with them until 1910, but to show how it had treated its employees, he said that since 1900 the Pennsylvania Lines West have made horizontal increases to all employees of: 10 per cent in November, 1900; 10 per cent in December, 1906; 6 per cent in April, 1910; the latter increase including train employees. Train dispatchers had received an increase in 1913 of 6 per cent, in 1916 of 4 per cent, 1917 of 8 per cent. Telegraph operators in addition to the horizontal increases had received 5 per cent in July, 1911; 4½ per cent in July, 1914; \$5 a month on February 1, 1916; \$5 a month on February 1, 1917, and another \$5 a month on November 1, 1917. Other employees received an increase of 6 per cent in 1916 and of 8 per cent in 1917. Station agents and their forces receiving less than \$250 a month were given two increases in 1917 amounting to about 14 per cent and now receive from \$50 to \$200 a month, the majority from \$75 to \$125. Telegraph operators receive \$70 to \$114, averaging \$85.70. Yardmasters receive from \$140 to \$185, averaging about \$160. Yard clerks receive from \$60 to \$125, averaging about \$75. Various adjustments were also made with the shop employees in the year 1917, and in many cases the piece-workers receive more than their foremen.

In 1918 the payroll of the Pennsylvania Lines West was \$12,000,000 greater than in 1916, and \$5,500,000 representing the increase on account of the Adamson law for 15,000 employees and \$8,500,000 representing the increase to 55,000 other employees. To illustrate the difficulty in securing men for railroad service, Mr. Walter said that on the lines west in September 1, 1917, there were in service 67,790 men in maintenance and transportation departments as compared with 65,169 on September 1, 1916. At 40,000 had been in the service of the company for over a year, but to secure the 27,000 new men in nine months 88,000 men had been employed. In other words, three men were employed

for every vacancy because the men stayed such a short time, being attracted by the higher pay offered by industrial concerns.

Other railroad officers testified regarding the wages and working conditions in various departments, including F. G. Nicholson, assistant to the receiver, Chicago & Eastern Illinois; P. T. Latimer of the Chicago, Burlington & Quincy; C. H. Niemeyer, assistant engineer, maintenance of way, Pennsylvania Lines West; E. L. King, superintendent of telegraph of the Southern Pacific; E. C. Wills of the Missouri Pacific; C. P. Conklin of the New York, New Haven & Hartford; W. J. Tollerton, general mechanical superintendent of the Chicago, Rock Island & Pacific; D. R. MacBain, superintendent of motive power of the New York Central; E. F. Potter, assistant to general manager of the Minneapolis, St. Paul & Sault Ste. Marie; and J. R. W. Davis, engineer maintenance of way of the Great Northern.

Railroad Officers Not Disloyal

THE FOLLOWING is an extract from Interstate Commerce Commissioner George W. Anderson's speech to the New England Traffic Club at Boston on February 12, 1918:

There is one thing more I want to say to you. Of course there are all kinds of nasty rumors afloat as to bad faith on the part of railroad officials and of railroad employees—of an alleged desire that federal control be a failure—stories that they are holding up trains, allowing congestions to take place, and doing other things to impede traffic. I want to make my position on that entirely clear. It is this: I do not believe those stories. We in Washington are going to assume good faith and loyalty until the contrary is ascertained to be the fact. We are not going to assume that railroad officials and railroad employees are playing double with the American people in time of war until it is proved that they are playing double. And let me add that in my opinion, if disloyalty and double-dealing are ever proved, they will be proved against a very small number of men. But there will be no dealing with alleged disloyalty and bad faith by any brash guesswork. We propose to know what we are doing before we charge men—whether they be highly paid officials or moderately paid wage earners—with disloyalty. But if we find there is disloyalty, God help the men against whom it is proved.

And so when you see newspaper reports indicating that the railroad service is as "honey-combed with treason and disloyalty" as this region is "honey-combed with German spies" according to the Boston Herald and the Boston Transcript, you need not assume that it is true or that we in Washington are to work on the assumption that it is true. On the other hand, if you find evidence—real evidence—which indicates to a reasonable fact-respecting mind that there is disloyalty, let us have that evidence.

For my part, I have a profound belief in the loyalty and patriotism of the American citizen. And I care little whether he or his father or his grandfather was born in this country or was not born here. If there is anything that we in America need to keep in mind at the present time, it is that we are all immigrants. The only difference is as to the date of our immigration. It is high time that we had an end of charging disloyalty and treason simply because some of our best citizens have names which are not as nasal and as Yankee as some of our names. I will go further and say that I believe that a large share of the men with German names and Austrian names are just as good American citizens as those that have Scotch names like my own. Because my ancestors came over here a couple of hundred years ago it does not follow that I am any better an American citizen than those who have come here more recently. The Germans that came over here

after the '48 revolution because they could not stand in Germany the sort of thing that has now involved the whole world in war—the sort of American citizens typified by Carl Schurz—are just as good citizens as any of us, and they are not to blame because their names are German names. I am bitterly indignant at a denunciation of American citizens grounded simply upon the fact that their names are not what their denouncers would best like. I regard that attitude of mind as a menace to our public safety—as a threat against success in the cause into which we are putting the best of our American youth. I regard the propaganda of hate and denunciation emanating from some of our newspapers and magazines as a distinct public danger. This is no time for ill-grounded, vituperative, prejudiced denunciation. Wholesome criticism helps. Wild, lurid denunciation never helps.

What I am saying as to the broader question applies to the railroad situation. There will be plenty of mistakes made. We who are in office will make our share of mistakes. We expect to be criticised for our mistakes, but we don't expect to be denounced for them. We need enlightenment. Nobody realizes it better than we who have to make decisions on questions that it is almost impossible to decide. The men operating the railroads will make mistakes. A great many officials will have difficulty in comprehending the new national status and in forgetting that they are not working for the same old corporation, bound to get traffic for it and the most lucrative return for it. They must reorganize their mental processes, their mental habits and readjust them to the new status during the war period. Some of them will not do it easily. But if they act in good faith, are loyal to the cause, are genuine American citizens, deal with the problem and with us frankly and honestly, they will get a square deal. We who have official responsibility are going to give a square deal if we know how, and we expect a square deal. In a word, the administration assumes good faith—the American people demand of us and of everybody else in the public service good faith—we believe we shall have good faith.



New York World.

Reduce Dynamic Augment for Heavy Locomotives*

The Need for Reducing the Weight of Reciprocating Parts; How the Reduction May Be Effected

By E. W. Strong

American Vanadium Company, Pittsburgh, Pa

IN no decade in the history of the American locomotive have there been more and greater improvements in design than in the last 10 years. What is rightly called the modern American locomotive is a very different machine from that of 10 years ago. Through the development of correct boiler and cylinder proportions; by the application of fuel-saving and capacity-increasing devices, and by refinements in detail design, the modern locomotive has been brought to a high degree of efficiency in operation and maintenance.

Through these means, and the introduction of new types of wheel arrangements, tremendous progress has been made in the construction of more and more powerful units to meet the never-ceasing demand for greater hauling capacity.

But in one respect there has been, generally speaking, no progress; to the contrary, approved practice is not on a par with that of 10 years ago. This is in regard to the weights of the reciprocating and revolving parts per unit of load. H. A. F. Campbell in his series of articles on "Reciprocating and Revolving Parts," which began in the Railway Age Gazette, Mechanical Edition, March, 1915, presents data which discloses this fact very forcefully. And this condition exists in face of the fact that never before has there been greater opportunity for betterment by taking full advantage of the developments in locomotive materials.

The present heavy moving parts result in a large unbalanced weight in the wheel counterbalances. This, revolving at high speed, has a great centrifugal force (commonly referred to as the dynamic augment), alternately increasing and decreasing the rail pressure on a wheel point. The principle is the same whether the dynamic augment is due to the overbalance of the weight added to partly balance the reciprocating parts, or that due to the lack of balance to fully balance the revolving parts, which condition sometimes exists in the case of the main wheel with relatively small drivers and long stroke.

While it is perfectly true that with the enormous increase in wheel loads the ratio between the dynamic augment at diameter speed[†] and the static weight per wheel is no greater today in high speed engines than it was 25 years ago, it is equally true that present tremendous static wheel loads more nearly approach the capacity of the track. There is less margin of track capacity and less opportunity for increasing it. Furthermore, it is no longer the high speed engine which requires the most serious consideration, but the freight engine. And in the latter class it is not the dynamic augment due to the weight required to balance the reciprocating parts, but that due to lack of weight in the main counterweight to balance the revolving weight on the main crank pin.

This is particularly true of the 2-10-2 type locomotive. In most existing engines of this type the lack of balance for revolving weight in the main wheel causes a much greater dynamic augment than the excess balance in the other wheels for the reciprocating parts. The dynamic augment in the main wheel is, of course, directly opposite to that in the other wheels.

Fig. 1 gives a graphical representation of the dynamic augment in the main and other wheels of a representative 2-10-2 type locomotive at diameter speed. The curves represent the action of the unbalanced weight throughout a complete revolution of the respective driving wheels. In the example selected, the engine had the following proportions:

Boiler pressure	250 lb.
Cylinders	31 in by 32 in.
Drivers, diameter	63 in.
Total weight in working order	401,000 lb.
Weight on drivers	335,000 lb.
Weight of reciprocating parts per side	2,604 lb.
Ratio of weight of reciprocating parts to total weight of engine	1/152
Piston thrust per pound of reciprocating weight	57.9 lb.
Revolving weight on main wheel	1,912 lb.

In this case, only 35 per cent of the reciprocating weight was balanced. The main counterweight lacks 691 lb. of balancing the revolving weights on the main pin. The average excess balance in the other wheels was 408 lb. Fig. 2 represents graphically the maximum dynamic augment in

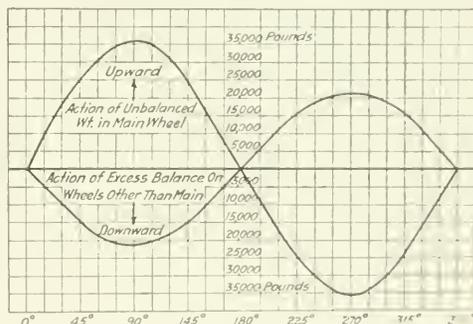


Fig. 1. Action of Unbalanced Weights in Wheels of a Representative 2-10-2 Type Locomotive

the main and other wheels of the same engine at various speeds from 15 miles per hour up to diameter speed. At 40 miles per hour, which is probably the maximum speed which this engine would ever attain, the dynamic augment in the main and other wheels is respectively 14,200 lb. and 8,400 lb., or 42½ per cent and 25 per cent, respectively, of the static weight of the wheel on the rail. Further, when the pressure of the main wheel on the rail is at its maximum the pressure of the other wheels is at a minimum. The charts and the above figures refer to the dynamic augments in single wheels only and not to the combined augments of the counterbalances in the corresponding pairs.

The above example is not extreme. The engine selected is a very appropriate example, because it was built largely to the railroad's designs. It is the mechanical departments of the roads that must be impressed with the necessity of improvement in existing counterbalance conditions.

Fig. 3 is a chart similar to Fig. 2, representing the dynamic augment in a representative 4-6-2 type locomotive with 60 per cent of the weight of the reciprocating parts

*From a paper read before the February, 1918, meeting of the New York Railroad Club.

[†]Speed in miles per hour equal to the diameter of the drivers in inches.

balanced. In this case, of course, there was no difficulty in fully balancing the revolving weights on the main pin. This engine has the following proportions:

Boiler pressure	200 lb.
Cylinders	27 in. by 28 in.
Drivers, diameter	73 in.
Total weight in working order	305,500 lb.
Weight on drivers	197,300 lb.
Weight of reciprocating parts, per side	1,880 lb.
Ratio of weight of reciprocating parts to total weight of engine	1/162
Piston thrust per pound of reciprocating weight	64 lb.

The factor which made possible the development of the Pennsylvania Class E6 engines was the use of especially light reciprocating parts. With 66,500 lb. on a single pair of drivers, these engines established a record. By so reducing the weight of the reciprocating parts as to keep the dynamic augment within 30 per cent of the static weight on a wheel point, it was possible safely to use this enormous axle load. In fact, these engines produce less strain on track and bridges than many having 10,000 lb. to 12,000 lb. less weight on drivers.

The locomotive impact tests made by the Chicago, Burlington & Quincy point very clearly to the possibilities of using heavier and more powerful units on track that is at present loaded to capacity, through simply lightening the reciprocating and revolving parts, with consequent reduction in the dynamic augment. Four locomotives were tested, two of the 2-10-2 type and two of the Pacific type. In each pair, one engine had especially light reciprocating parts made of heat-treated alloy steel and the other parts made of ordinary steel. The two 2-10-2 type engines had approximately the same weight on drivers, while the reciprocating parts in one weighed 16 per cent less than in the other. With the Pacific type locomotives, the one with light reciprocating parts was 16,600 lb. heavier on drivers and had 6,600 lb. greater tractive effort, while the weight of the reciprocating parts was 5 per cent less than in the other.

The results showed that, in the case of the 2-10-2 type engines, the maximum impact on the rail of the one with light reciprocating parts was 35 per cent less than that of the other. In both cases the speed was about 40 miles per hour. In the case of the Pacifics, the one with the light reciprocating parts, though 10 per cent heavier on drivers than the other, produced less stress on track and bridges.

By taking advantage of the greater strength of alloy and special steel forgings and castings to use increased unit stresses, by using hollow bored crank pins and piston rods, rolled steel or alloy and special cast steel pistons, and by special care in the design of all details, a large percentage of saving can be effected in the weights of reciprocating parts.

TABLE I.—WEIGHT OF RECIPROCATING PARTS OF THREE CLASSES OF PENNSYLVANIA LOCOMOTIVES

	4-6-2	4-6-2	2-8-2
Total weight	240,000 lb.	305,000 lb.	315,000 lb.
Weight on drivers	133,100 lb.	200,000 lb.	238,000 lb.
Cylinders	23½ by 26 in.	27 in. by 28 in.	27 in. by 30 in.
Diameter of drivers	80 in.	80 in.	62 in.
Piston thrust	89,000 lb.	114,000 lb.	114,000 lb.
Weight of reciprocating parts per side	1,014 lb.	1,376 lb.	1,470 lb.
Piston thrust per pound reciprocating weight	87 lb.	83 lb.	77 lb.

By far the great majority of roads using alloy steel forgings have been content to utilize them to provide an increased factor of safety. The few cases in which advantage has been taken of high tensile steels to reduce weights of reciprocating parts serve to show the possibilities. The Pennsylvania Railroad was the first to use especially light reciprocating parts; and still furnishes the most conspicuous example of such practice.

The weights of the reciprocating parts and the general proportions of three of their standard classes of road engines are given in Table I. For main and side rods, piston rods, pins and valve motion parts they use carbon steel, heat-

treated to give a minimum elastic limit of 50,000 lb., and 80,000 lb. tensile strength. Rolled steel pistons are employed; while the crossheads are made of .40 carbon electric furnace cast steel, having a tensile strength of 70,000 to 80,000 lb. per sq. in. By using sections which take full advantage of the greater strength of the materials employed, combined with the greatest care and attention to detail design, exceptionally light reciprocating parts have been attained.

The Pacific and 2-10-2 type locomotives on the C. B. & Q. previously referred to, are other well known examples of the application of especially light reciprocating parts. On these engines, heat-treated Nichrome steel was used for the piston rods, connecting rods, stub straps, pins and eccentric cranks. Pistons and crossheads were made of .40 carbon cast steel. In the 2-10-2 type engines, the weight of the

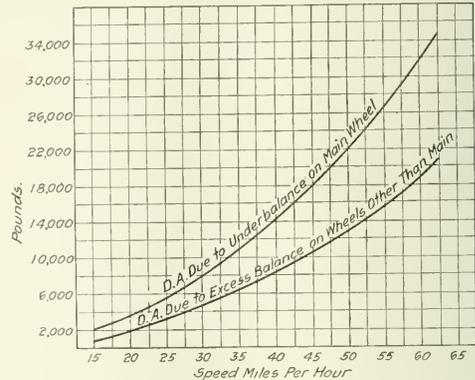


Fig. 2. Dynamic Augment in Wheels of a 2-10-2 Type Locomotive at Various Speeds

reciprocating parts was reduced 16 per cent. In addition, the weight of the revolving parts on the main pin were so reduced as to make it possible to omit counterweight bobs on the main axle. In previous sister engines with ordinary carbon steel parts, it had been necessary to follow such practice. A total saving in weight of 1,023 lb. per side was effected. The increase in the various calculated maximum stresses in the main and side rods as compared with the builders' standard practice for plain carbon steel averaged 21 per cent.

One of the most recent instances of utilizing higher tensile steels to lighten reciprocating parts is furnished by the powerful Pacifics built for the El Paso & Southwestern. For this purpose, heat-treated chrome-vanadium steel was specified for the main and side rods, piston rods, crank pins, eccentric cranks and crossheads. The engines had the following general proportions:

Boiler pressure	200 lb.
Total weight in working order	311,500 lb.
Weight on drivers	190,000 lb.
Cylinders	27 in. by 28 in.
Diameter of drivers	73 in.
Piston thrust	114,500 lb.
Weight of reciprocating parts	1,628 lb.
Piston thrust per pound reciprocating weight	71 lb.

By an increase in unit stresses of only 10 per cent as compared with the builders' standard practice for ordinary carbon steel, and by the use of hollow bored crank pins and piston rods, and a double bushing solid back end on the main rod, a total saving of 369 lb. per side, or 13 per cent of the weight of the parts affected, was obtained. Of this, 128 lb. was in the reciprocating parts. This meant 1,880 lb. reduction in the dynamic augment per wheel at 73 miles per hour.

In each of the above instances of weight reductions, heat-treated forgings have been the means selected for that end. But most roads lack equipment for heat-treatment. This has been the chief obstacle to the general adoption of heat-treated forgings. It operates particularly in repair work, where for any reason the forging has to be locally heated, thereby destroying the effect of the heat-treatment. The more simple a steel and the more simple its treatment, the better adapted it is to American railroad conditions.

To meet all the special conditions entering into locomotive design, construction and maintenance, the American Vanadium Company, about five years ago, developed a type of vanadium steel that without heat-treatment other than the usual simple annealing gives all the physical requirements for heat-treated (quenched and tempered) plain carbon steel. This steel, known as carbon-vanadium, is one of the simplest types of alloy steels, being a plain carbon steel with vanadium alone added.

Tests of solid driving axles 11 in. in diameter of this type of steel, annealed, gave the following physical properties:

Elastic limit, lb. per sq. in.....	59,260	60,430
Tensile strength, lb. per sq. in.....	88,270	92,520
Elongation in 2 in., per cent.....	25.5	24.5
Reduction of area, per cent.....	48.9	50.0

Compared with ordinary annealed carbon forgings, carbon-vanadium steel has over 25 per cent higher elastic limit, or useful strength. When higher physical properties

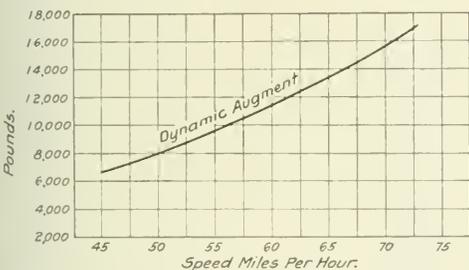


Fig. 3. Maximum Dynamic Augment in Wheels of a Pacific Type Locomotive

are desired than can be obtained by simple annealing, results can be obtained by heat-treatment that approximate those from the more complex alloy steels.

A study was recently made of the amount of weight that could be saved in the reciprocating and revolving parts through an increase in unit stresses over approved practice for plain carbon steel, equal in proportion to the increase in the minimum elastic limit of annealed carbon-vanadium steel as compared with plain carbon steel. Several representative heavy locomotives were selected for investigation. The builders' adopted practice for maximum allowable unit stresses for plain carbon steel was taken as the base; and new sections worked out, keeping within the limit of 25 per cent increase over these stresses.

Two of these locomotives were the ones for which the dynamic augment curves shown in Figs. 2 and 3 were plotted. In the case of the 2-10-2 type, the results show a reduction of 326 lb. in the weight of the revolving parts on the main pin. This would mean a reduction of 6,700 lb. in the present dynamic augment in the main wheel at a speed of 40 miles per hour, due to the existing lack of 691 lb. in the main counterweight. The above saving in weight, and the reduction of 296 lb. in the reciprocating parts gives a total reduction of 622 lb., or 155 lb. per wheel, in the excess balance that had to be added to the counterweights

of the other wheels. This means a reduction of 2,200 lb. in the maximum rail pressure at 40 miles per hour on any one of these wheel points, assuming that all the weight saved in the reciprocating parts would be taken out of the counterweights.

By the use of vanadium cast steel for crossheads and pistons, or rolled steel pistons, and by special care in design, considerable additional weight reduction could be effected, probably 250 lb. at a very conservative estimate.

The total estimated saving in weight in the reciprocating and revolving parts through the modified designs is 921 lb. per side.

Apart from its relation to the dynamic augment, this weight taken out of the running gear could be added to the boiler. The above amount combined with what could be saved by using hollow bored axles of carbon-vanadium steel, would make it possible to add 1½ in. to 2 in. to the diameter of the boiler, without increasing the total weight of the engine.

In the case of the Pacific type locomotive, the results show a saving of 260 lb. in the weights of the piston rod and front end of main rod. This means 86 lb. reduction in the excess balance in the wheel counterweights, which would result in 3,900 lb. decrease in maximum rail pressure on a wheel point at diameter speed.

Piston thrust was taken as full boiler pressure times the area of the piston. The stresses were calculated by the formulae in use by the builders.

Extended piston rods were applied to both the 2-10-2 and Pacific type. In the modified designs the extensions are eliminated. The use of the ordinary piston rod with a piston having an extended wearing shoe is considered good practice and is rapidly supplanting the use of the extended rod. Hollow bored extended rods of the Pennsylvania type could be used with almost as much saving in weight.

Discussion

A number of members took part in the discussion. Marked advantages of the alloy and special steels in making it possible to reduce the weight of the parts, and thus the dynamic augment, were not questioned. James Partington, estimating engineer, American Locomotive Company, stated, however, that the use of these steels was not progressing as rapidly as the advantages seemed to warrant, because of the commercial and manufacturing conditions which confront the railways and the locomotive manufacturers. A number of months is now required for the delivery of the special heat treated parts and, even under normal conditions, a much longer time is required than for carbon steel forgings. This is a bad handicap when it is necessary to replace forgings, because of defects, in the erecting shop or in making regular running repairs. Mr. Strong, in replying to this criticism, suggested that the automobile manufacturers were using the alloy steels to the greatest possible advantage and that the difficulty in question could be overcome if the railroads would carry extra parts in stock.

W. E. Symons called special attention to the advantages of the four-cylinder compound locomotives in reducing the dynamic augment to a minimum. J. J. Yates, bridge engineer, Central of New Jersey, commented on the disastrous effect of an excessive dynamic augment upon the bridges and said that heavier wheel loads would be permissible in the proportion to which the dynamic augment could be reduced. The discussion also developed the fact that the high speed locomotives could be fairly well balanced but that the slow speed heavy freight engines were unbalanced to a very considerable degree because of the small diameter wheel and the fact that an adequate amount of counterbalance could not be provided. The use of the lighter parts would, of course, prove a very distinct advantage in such cases.

Joint Conference of Capital and Labor

IN THE COURSE of the reorganization of the Department of Labor, a joint conference committee, representing capital and employers on the one side and labor unions and employees on the other side, has been appointed to work in conjunction with Secretary of Labor Wilson. The National Industrial Conference Board has chosen the following to represent the employers:

Loyal A. Osborne, New York, vice-president of the Westinghouse Electric & Manufacturing Company and chairman of the executive committee of the National Industrial Conference Board.

Charles F. Brooker, Ansonia, Conn., president of the American Brass Company.

W. J. Vandervoort, East Moline, Ill., president of the Root & Vandervoort Engineering Company.

L. F. Loree, New York, president of the Delaware & Hudson, chairman of the board and executive committee of the Kansas City Southern, president of the Hudson Coal Company, Northern Iron & Coal Company and Schuylkill Coal & Iron Company.

C. Edwin Michael, Roanoke, Va., president of the Virginia Bridge & Iron Company.

The American Federation of Labor has appointed the following as representatives of labor:

Frank J. Hayes, president of the United Mine Workers of America, Indianapolis, Ind.

William L. Hutcheson, president of the United Brotherhood of Carpenters and Joiners of America, Indianapolis, Ind.

J. A. Franklin, president of the Brotherhood of Boiler-makers & Iron Shipbuilders of America, Kansas City, Kan.

Victor Olander, representative of the International Seamen's Union of America, Chicago.

T. A. Rickert, president of the United Garment Workers of America, Chicago.

These ten men are to choose two additional members as representatives of the public.

Secretary Wilson, in announcing the appointments of members of this committee, wrote them in part as follows:

"Agreements of members and policies, which would govern the relations between employers and workers during the war, will greatly facilitate the formulation of a national program and will contribute largely to a successful administration of that program."

Among the questions to be considered by the conference committee will be those dealing with the basis for wage determination, strikes and lockouts, piece work prices and

price fixing, means of eliminating improper restrictions on the output of war materials, methods of promptly adjusting disputes at their source through boards containing equal representation of employers and employees, etc.

The first meeting of the conference will be held at the office of Secretary Wilson, February 25.

Standardization of Purchases

HENRY WALTERS, chairman of the Atlantic Coast Line and the Louisville & Nashville, who is acting as special adviser to Director General McAdoo, is in charge of the studies being made for the purpose of establishing standard designs of cars and locomotives to be adopted by the railway administration. Mr. Walters has held numerous conferences with car and locomotive builders on the subject and expects to have several more before anything has been decided.

The committee on cars appointed last summer by the Council of National Defense, at the time when it was proposed to have the government buy freight cars for the railroads, has been delegated to investigate the question of freight car standards and a new committee on locomotive standards is to be appointed by Mr. McAdoo. The car committee consists of S. M. Vaulain, vice-president of the Baldwin Locomotive Works; W. H. Woodin, president of the American Car & Foundry Company; J. M. Hansen, president of the Standard Steel Car Company; N. S. Reeder, vice-president of the Pressed Steel Car Company and Clive Rannels, vice-president of the Pullman Company.

John Skelton Williams, director of the divisions of finance and of purchases, is to organize a staff of assistants which will be in the nature of a central purchasing board for the railway administration. Samuel Porcher, purchasing agent of the Pennsylvania Railroad, has been temporarily assigned as assistant to Mr. Williams to conduct a general investigation of the general subject of handling railroad purchases with a view to working out a plan, and other railroad officers will be called in to assist from time to time as occasion may require. It is understood that the administration intends to take charge of the purchase of cars, locomotives, rails, oil and other important items of railway supplies which are to be standardized, but it is not the present intention to take over all railway purchases and undoubtedly most kinds of supplies will continue to be purchased by individual railroads as at present. The extent to which the administration will take charge of railway purchases will depend largely on the result of the investigation.



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One of the Heavy Mounted Guns on the Western Front



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Using a Light Railway to Bring Up a Big Gun.

Mobilizing Intelligence on American Railways*

Labor Turn-Over Problem. Functions of the Corporation School. Vital Necessity of Such Schools

By Norman Collyer
Southern Pacific Company

THE RAILWAYS OF THE UNITED STATES engaged in interstate commerce employ about 1,800,000 persons. If we include interurban and street railways the number is increased to over two million. Now conceive, if you will, a great map of the United States on which each of these employes is represented by a tiny electric light. Some are moving along the familiar tangled lines indicating railway systems, but the greater number are stationary and grouped about the large terminals. Everywhere lights are being extinguished, sometimes by the death, more often by the resignation or discharge of an employee; and everywhere new lights are appearing as new employees are hired. Five times a minute, 300 times an hour, 7,200 times a day, employees are being lost and replaced. These figures are assumptions only, but they are conservative and probably far below the facts.

No one knows what the labor turn-over in the railroad industry amounts to, and as employment statistics are now kept—or rather, not kept—there is no way of getting at it. I base my data on the number of time vouchers issued by the Southern Pacific Company during a normal year, for although time vouchers are occasionally issued to persons not leaving the service, these rare instances are more than offset by those leaving the service who do not receive time vouchers. The avoidable cost of this labor turn-over likewise is unknown, but is certainly staggering in its magnitude. Probably \$40,000,000 a year would be too low an estimate. Magnus W. Alexander, of the General Electric Company, analyzed a group of 12 factories employing some 40,000 hands, and by certain reasonable and perfectly defensible assumptions proved that 22,031 employees were hired during the year 1912 in excess of their apparently necessary requirements at a cost of \$831,000, or an average of \$37.72 for hickacking in each man hired. The Ford Motor Company by giving the subject attention reduced its labor turn-over from 400 per cent to 23 per cent; the Cleveland Foundry Company from 240 per cent to 125 per cent. These are special instances, cited merely to show that labor turn-over can be reduced and that in each case the diagnosis precedes the cure.

Let us consider what takes place when a new light appears upon our map—that is to say, when a new employee is hired. He wants the job, else he would not have taken it, but before he can make a beginning he must understand what is desired of him. He needs instruction. If he has some ingenuity and initiative, and especially if he can interpret his job in terms of previous experience, he is likely to attempt self-instruction—to experiment, "cut and try," spoil his work, break his tools, and hurt himself or his fellow-workmen. After his task has been explained to him he will be awkward and forgetful, hence instruction needs to be repeated as training. Even when he clearly understands the requirements of his position he is apt to become lazy and careless unless checked up by constant supervision. But supervision alone is weak and ineffectual, and requires the backing of an adequate system of discipline. Whenever men are gathered together for any large undertaking, these four elements follow each other as surely as the phases of the moon—first *Instruction*, then *Training*, then *Supervision*, then *Discipline*.

Under the corporation school plan the beginner does not learn by self-instruction; nor by watching others and taking hold when he is allowed to; nor by the casual instruction of his associates, who are too indifferent, too busy, and too unskilled as teachers to make such instruction effective; nor by the competent but hurried and infrequent instruction of a foreman or supervisor whose time is more profitably occupied in directing the work of skilled employees. He learns by none of these methods, but is made ready for his work by acquainting him with its requirements and drilling him in its performance in an orderly, carefully preconceived manner, to the end that waste of time and effort may be eliminated.

The Corporation School

The purposes of corporation schools are three-fold: (1) to teach a particular task involving a short series of closely related duties, such as comptometer work, or the operation of a telephone switchboard; (2) to teach a trade, as in the case of mechanical apprenticeship systems, or schools for dining car chefs; (3) to teach subjects related to a task, a trade, or a business, thus presenting an opportunity through voluntary study to increase present efficiency or prepare for advancement.

The methods used vary with the purposes of the schools: We have the recitation method used by the Southern Pacific board of examiners on train rules, which is without doubt the oldest method used in any kind of school, dating back to the days of Greece and Rome; the lecture method, likewise a survival from the medieval period when books were scarce and their contents had to be dictated to the students; the supervised study method, popular in shop apprentice and telegraph schools; the laboratory method, which is the method of learning a thing by doing it—not necessarily in a laboratory, but wherever it is normally done; and the correspondence method, which is of special interest to railroad companies, whose employees work on such irregular hours and are scattered over such a vast territory that they can frequently be reached in no other way. It is quite possible that entirely new methods of instruction may be discovered, just as the correspondence method was invented about 25 years ago.

These different methods are applied in a great variety of ways: There are schools in which the employee spends all of his time in learning and is not expected to do any productive work whatever during the period of his training, as in the case of the educational trips given by the Southern Pacific to selected groups of ticket clerks, or a more recent and striking illustration—the Reserve Officers' Training Camps of the National Army; schools in which study and practice are blended, as in the Southern Pacific agency school; schools in which the employee's time is made as productive as possible, no related instruction being given on company time; and continuation schools, which as the name implies, are designed to afford the employee an opportunity to continue his general education under the company's guidance while earning a livelihood. These last may be maintained either by the company or by public or private institutions in co-operation with one or more corporations. The manufacturing industries of Fitchburg, Mass., Akron, Ohio, and

* Abstract of an address before the Pacific Railway Club, January 10, 1912.

Providence, R. I., have attained a degree of co-operation with public instruction that eclipses that of any railroad company I know of.

If we are to meet the needs of the future; if we are to maintain our roadway and equipment in a manner satisfactory to the Government; if we are to weather the present shortage of labor and survive the further loss of thousands of skilled workmen to ship-yards, factories and mills to the shops of the ordnance department, to the Governmental offices at Washington; above all, if we are to contribute our necessary and patriotic quota to the battle-fields of Europe—it must be through a better use of our man-power, a more intensive training of our employees. The corporation school offers a means through which this can be accomplished. It is past the experimental stage. Whatever your problem, be assured that some other corporation executive, somewhere, has met the same problem and tackled it. The fruits of his experience it is your duty to obtain. I am not so fatuous as to believe that the corporation school can whistle up employees where none are to be had, or that it is a panacea for all the labor troubles to which the harassed railway manager is heir; but it is a proven assistance in getting new men quickly into their stride and holding them in the service.

What Are You Doing?

"But," you exclaim with pride, "we already have a corporation school. Look at our mechanical apprentices—look at our airbrake instruction rooms—look at our office work schools."

Are you really doing these things, or are you merely going through the motions? Are you supervising your students, and are you supervising the supervisors to see that the students are not pulled off their studies and diverted to other work to meet the local convenience of a department? Are they getting the instruction and training which it was the intention they should get, or does the caption "student" or "apprentice" on the payroll satisfy you? Are you correlating your educational work with employment, safety and welfare activities? Are you developing and extending your educational work so that when once the employee has formed the habit of learning, it will follow him through his railroad career? Have you established relations with the educational institutions in your territory? Have you started such records as will enable your management to know at any time the results of your educational system, including particularly the failures and those who leave the service, so that their number may be reduced? Have you formed alumni associations where enough employes have completed formal training to justify them? Above all, have you adjusted your organization so that the graduates of your corporation schools, if competent, will have opportunity to do the work for which they were trained, at the full wage, with the support of their superiors, the respect of their fellows, and the loyalty of their subordinates? If not, you have not made even a beginning.

I claim no novelty in the ideas here advanced, for they have long been dwelt upon by gifted writers and eloquent speakers. Thirty years ago Dr. W. T. Barnard, assistant to the president of the Baltimore and Ohio, published an extensive report entitled "Technical Education in Industrial Pursuits, with Especial Reference to Railroad Service," which was widely circulated; and the plan for a railroad college proposed in 1887 by Walter G. Berg, chief engineer of the Lehigh Valley, caused considerable interest and comment in that year. Looking back from this distance, it appears that neither of these gentlemen realized the prime importance of making the training of railroad employees a function of the railroad itself, by, for, and within the railroad, rather than a detached activity perhaps to be supported by the railroad. At any rate, the Barnard plan, for which the directors of the Baltimore and Ohio had appropriated \$20,000

per annum, suddenly collapsed, and the Berg plan never got beyond the stage of discussion.

As early as 1898 the American Railway Master Mechanics' Association adopted a Recommended Code of Apprenticeship Rules, and in 1905, following the publication of Geo. M. Basford's historic paper before that association on "The Technical Education of Railroad Employees" re-awakened interest resulted in the establishment on a number of roads of mechanical apprenticeship systems designed along modern lines. Nor is this movement confined to the motive power department; the 1915 edition of the Manual of the American Railway Engineering Association, page 131, refers to methods of educating section foremen, and in fact in almost every department of the railroad industry there are examples of similar undertakings. Alas, the failures far outnumber the successes! Some were born of the enterprise of a single individual and perished when for one reason or another his support was withdrawn; some were founded upon incorrect principles and hence were predestined to failure; some were without provision for an adequate supply of new recruits, while others turned out graduates faster than positions could be found for them, causing a back-wash into the school with consequent discouragement and demoralization; many were started with good intention, but lacked definite educational program, competent instructors, well-defined policies—in short, their failure was a failure in management. All honor to the mechanical department of the Santa Fe, which instituted an apprenticeship system in 1907 and stuck to it! With 622 of its graduates in service, many in official positions, that road is reaping the benefits of its steadfast and progressive policy.

Vital Necessity of Corporation Schools

This problem, however, because of its importance transcends the boundaries of any one department; it affects all departments, and hence should command the attention of the highest executive officers. If you will allow me to revert to the subject of relations with public instruction, in which we are some twenty years behind the cash register, the rubber and the electric manufacturing industries, I shall give you an illustration. Would you, Mr. Purchasing Agent, enter into a contract to buy material from a concern the excellence of whose product you had grave reason to doubt? Would you place orders to the tune of three and one-half million dollars a year, waive inspection of material, accept whatever was offered you, and make no effort to get your money's worth? You would not—not if you expected to hold your job. And yet that is what you are all doing with respect to the public education system of California. In 1916 the railroads of this State paid in operative taxes \$7,151,583. Of this sum 51 per cent, or \$3,647,500, was used for purposes of public education. The boys and girls sent you from the public schools you take into your service, sometimes after a perfunctory mental examination, generally with none; you waive inspection, and then complain of the character of the material after it has reached you and been paid for.

How did the Southern Pacific engineers reduce rail failures per 100 miles of track from 31.10 in the first six months of 1911, to 5.16 in the same period of 1914? Not by standing idly by and deploring the product of the mills. They collected their data with respect to steel rail performance, decided which mills were the most reliable and which methods of manufacture gave the best results, then followed it up by sending their metallurgists and inspectors to the mills themselves to see that such methods were observed insofar as their own rails were concerned.

Where is the railroad that has tried to improve the product of the schools? The school-masters would resent your counsel as an intrusion, say you? From my own experience, I know they would welcome it. What are they working for, if not the usefulness, the success, and the material welfare

of their graduates? Are they not interested in what becomes of the twelfth part of their product that is normally destined for the railroad industry? Every school with which you establish helpful relations will then become a recruiting station for your lines, and you can get the cream of its output, if you will. I look forward to the time when representatives of the railroads will sit in the councils of the National Education Association, not as railroad men soliciting passenger business, but as educators charged with the training of an important fraction of the population of the United States. Such representation will require a broad vision of the needs of all departments, because public instruction is of necessity the common denominator of all forms of human industry—it is not intended to serve one industry alone, much less this or that department of a single industry.

It may perhaps be suggested that corporation schools are all very well for concerns under private management and control, but that the railroads, since they are for the time-being an arm of the Government, could not with propriety undertake to usurp the functions of another arm of the Government. The argument is fallacious, because education being a governmental function, should be assumed by whatever agency can best accomplish it. For 70 years the British Admiralty has maintained a splendid system of apprenticeship, from which selections are made through competitive examination for Keyham College, whence a still smaller number reach the Royal Naval College at Greenwich. The

Great Eastern Railway, the London & Northeastern Railway and Great Western Railway of England have had educational systems nearly as long, and are not now so engrossed in the bitterness of war as to neglect them.

Certainly it costs money to train men properly—it takes equipment, furniture, tools, and plenty of instructors to develop them fast and make them productive as quickly as possible. It costs more money not to train them—it costs millions in accidents, injuries, broken tools, spoiled work, loss of their own time and of the time of foremen and others, careless habits allowed to go uncorrected, and the needless heavy labor turn-over. These vast sums may be buried in the accounts, but they are there, just the same.

Hasten the day of that American railroad whose vigorous and far-sighted management will give these questions the consideration they compel! They require time, patience, professional skill and managerial capacity of the highest order for their solution. We have in the railway men of America an army twice as large as the army which Xerxes marched down from the plains of Cappadocia, and which was, until the present war, the largest army in history. If this great army of railway men is to be counted among the resources of America, we must enlist their co-operation, train their muscles, energize their faculties, mobilize their intelligence, and unite their powers into one great organization that will be a determining factor in the patriotic enterprise of winning the war.

More Data Required on Transverse Fissures*

A Discussion of Some of the Conditions Surrounding the Development of This Form of Failure

By C. W. Gennett, Jr.

Manager, Rail Inspection Department, Robert W. Hunt & Co., Chicago.

SINCE THE LEHIGH VALLEY ACCIDENT transverse fissures have become a source of constant anxiety to railroad officials because such defects, only infrequently detected by the trackmen, may first appear under trains entirely without warning. The number of actual accidents resulting from rails containing fissures is no doubt a small part of the whole, but the large losses that have been directly attributable to fissures, coupled with the continual possibility of repetition creates an alarming situation that demands a full investigation of the cause of fissures apart from other types of rail failures. Mr. Howard's position gives him a field for action and opportunity for laboratory examination and research that is unsurpassed, and the results of his investigations must be received with the utmost attention and respect. His admirable paper, summarizing his previously published studies and analyses of the transverse fissure problem, constitutes a convincing treatment of the subject chiefly from the standpoint of stress and strain to which rails are subjected. The intricacies of the problem are so great that seemingly any theory advanced for the cause of fissures may be attacked from some angle; and although Mr. Howard's deductions are logical in the direction followed, there is the apparent necessity for considerable work along other lines before his theories can be fully accepted.

It is doubtless a generally conceded fact that fissures,

whether fundamentally due to fatigue or something else, are of a progressive character, their ultimate size being the result of growth from an originating nucleus or point of rupture. Abundant proof of this lies in the variable sizes of the fissures found, and there can be no doubt but that their development or growth is the result of the strains to which rails are subjected in the track. Obviously, therefore, the most important factor in investigating the cause for fissures lies in determining the conditions that exist at the point of original rupture, that is where the separation of the metal at the nucleus occurs. The composition of the steel chemically and structurally in this small area thus becomes of vital interest, and it is not sufficient to place too much credence in the manifestation of the good conditions that may be found elsewhere in the sample under investigation. The inferior conditions that may be present not only at the original point of rupture, but at other places, are manifold and minute, and examination of them requires careful and skilful work by trained metallurgists and microscopic observers. Absence of results of critical examinations of various specimens in many of Mr. Howard's government reports, including his present paper is surprising and disappointing and does not carry conviction to the statement that "Critical examinations have shown transverse fissures to have their origin in metal microscopically sound and normal in structure." In fact, the results of some chemical analyses of steel containing transverse fissures that have been reported are such as to direct suspicion quickly to the quality and consequent structure of the steel and that "Neither chemical analysis nor microscopic examinations

*A discussion of a paper on Transverse Fissures by James E. Howard, engineer-physicist of the Interstate Commerce Commission, which was presented before the American Institute of Mining Engineers at New York this week. Mr. Howard's paper was published in the *Railway Age Gazette* of November 30, 1917, page 997.

have shown a definite cause for the development of transverse fissures" is due perhaps to insufficient chemical and microscopic work having been done to permit establishing such connection. The question is whether Mr. Howard's studies have been directed along certain metallurgical lines far enough to justify beyond argument those statements of his which plainly eliminate the chemical and physical condition of the steel from any responsibility regarding the origin of fissures.

Several reports have been issued by the Interstate Commerce Commission giving the results of Mr. Howard's work in connection with accidents caused by transverse fissures. The following table gives the average results of the various chemical analyses made on rails containing fissures mentioned in those reports.

Rail	C	Mn	P	S	Si	Ni	Cr
A	0.843	1.20	.042	.032	...	...	...
B	.86	.67	.050	.033	.016	...	...
C	.69	.79	.095	.025	.005	...	...
D	.83	.79	.062	.041	.165	.066*	.05
E	.84	.79	.059	.040	.152	.28	.02
F	.801	.91	.015	.041	.125	...	...
G	.71	.77	.121	.030	.093	...	...

*Probably incorrect.

None of the above rails, possibly excepting "F," are acceptable under the requirements governing the chemical composition laid down by recognized specifications for rail steel. The "slender deficiency" by which most of these steels fail to fulfill common rail specifications is not apparent and although "it is not always clear that the most suitable steel for the purpose is asked for in specifications" (probably meaning rail specifications) still the burden of thought is largely against the advisability of using steel of the hardness and brittleness indicated by the above. That such steels have been accepted and put into track, of course unknowingly and in spite of the specifications, is a criticism of the methods of procedure and by no means a defense for that steel when later fracture occurs.

Aside from being chemically defective in a general sense for use in rails, the above steels offer other significant features for consideration. High carbon coupled with high phosphorus makes a hard non-ductile steel to start with, but the effect that large amounts of these elements, singly or together, may have in small local areas deserves study. Further, the low amount of silicon in some of the steel above mentioned indicates the liberal use of aluminum at the time the steel was cast into ingots. Large amounts of aluminum added to steel, especially in the molds, has often been regarded as of doubtful practice, while the resulting presence of alumina in soft steel has been identified and the good qualities of the steel questioned. Recently alumina has been microscopically found in rail steel, and incidentally in rails containing transverse fissures.

Basic open hearth steel such as used for rails is easily subject to the many vicissitudes of heat treatment; in fact, rails are virtually heat treated by the action they undergo when cooling on the hot beds. The influence there of cold winds and contact with the cold skid rails may be marked. Some effects of unusual heat treatment may be and doubtless are confined to short longitudinal lengths of rail, and it is almost inconceivable that austenite or cementite does not exist locally in many cases. The presence therefore of distinctly non-ductile localities or regions is plainly predicted. All rails containing these hard spots caused by either chemical or physical conditions must be subjected, of course, to the damaging blows of the straightening presses long before they ever reach the track and apparently opportunity is thus offered for interior injury to occur.

Slag inclusions are held responsible by Mr. Howard for the chief type of rail failures, i. e., those known as split heads, the theory being that the inclusions are elongated in the process of rolling and become streaks in the metal which are unable to resist the shearing action of the traffic later.

But hard spots of a non-ductile character, originating perhaps from chemical causes or possibly minute globules of a distinctly foreign nature or the physical effects produced by the methods by which rails are cooled, are not regarded as menacing the integrity of the metal, merely because the presence of such conditions has not been even perfunctorily identified in the rails examined notwithstanding the indications, and the definite proof of their existence in certain other cases.

Thus it seems inconsistent now to attribute the cause of fissures to a type of purely fatigue fracture for which wheel loads are mostly responsible and the suggestion is advanced that as further microscopic work proceeds the effects of somins, non-ductile spots and chemically unsuited steel for the purpose used may be more fully established, while in the meantime the situation emphatically warrants a suspension of judgment until these painstaking studies can be made.

It seems regrettable that with a subject as important as that of transverse fissures no particular effort has been made to accumulate systematically the important historical data pertaining to the various cases. Obviously this is a work for the American Railway Engineering Association whose engineer of tests should have a complete index of the different cases with such information on each as would render unnecessary the need for dealing with generalities now so often the case. Such cataloging of the fissures that have occurred should show as accurately as possible among other things:

1. Name of manufacturer and railroad.
2. Dates of rolling and occurrence.
3. Heat number and chemical analyses (complete).
4. Location of rail in the ingot (and if possible the ingot in the heat).
5. Location of the fissure in the rail with respect to the branded side of the rail.
6. Location of the fissure in the rail with respect to the track gage side of the rail.
7. Was rail on high or low side of curved or straight track.

With the results of such tabulation covering a large number of cases the study of certain matters concerning fissures could be much better approached than now when comparatively few rather isolated cases must often be considered.

LOAN AUTHORIZED FOR RAILWAY CONSTRUCTION IN PERU.—Commercial Attache William F. Montavon at Lima, under date of January 15, reports that a bill passed by the Peruvian Senate authorizes the government of Peru to contract with the Banco Italiano, of Lima, for a loan amounting to 3,000,000 soles (\$1,500,000) to be employed in the construction of a narrow-gauge railway connecting the present line of the Central Railway of Peru with the coal fields of Jatunhuasi. The loan is to bear an interest of 7 per cent and an amortization of 1 per cent. The term of maturity is not fixed in the bill.

TRADE OPPORTUNITIES IN SERBIA.—At a luncheon given by the Council of the British Engineers' Association to the members of the Serbian Industrial Mission in London on January 21, some interesting speeches were delivered, in the course of which mention was made of the many excellent opportunities for trade which would present themselves in Serbia at the conclusion of the war, particularly in connection with the reorganization of railway and river communications. Mr. Doushan Tomich, secretary of the Serbian Industrial Chambers, said that Serbia is very rich in raw materials, which had hitherto been developed by the Central Powers, and that in order to develop these, Serbia required machinery, tools, locomotives, electrical apparatus and other supplies. The suggestion was made by Sir Wilfred Stokes, of Ransomes & Rapiers, Ltd., that after the war Serbia would want railways and that England must be prepared to equip and finance them.

General News Department

Two passengers were killed and four seriously injured in a derailment of a Chicago, Burlington & Quincy passenger train near Curtis, Neb., on February 19.

J. Rothschild, has been made secretary of the American Association of Railroad Superintendents, succeeding E. H. Harman, who resigned in December when he was appointed superintendent of the Wiggins Ferry Company. Mr. Rothschild's office is at room 305, Union Station, St. Louis, Mo.

"Safe Practices" in the management of shafting, couplings, pulleys and gearing is the title of the National Safety Council's illustrated Pamphlet No. 8, which has just been issued. It consists of eight pages and the price is 10 cents. No. 9 deals with engine guarding and engine stops, automatic governors, etc., 16 pages; No. 10 is on oiling devices and oilers, eight pages. All of these are to be had from W. H. Cameron, general manager, National Safety Council, Chicago.

The Nevada-California-Oregon, south of Hackstaff, Cal., is now operated by the Western Pacific, the contract having gone into effect on January 30. This portion of the road includes the main line from Hackstaff, southward, to Reno, Nev., 65 miles, and the line from Plumas Junction, Cal., to Davies Mill, 40 miles. A large part of this mileage lies parallel to the main line of the Western Pacific. This arrangement leaves in the hands of the officers of the N.-C.-O., 171 miles. Hackstaff northward to Lakeview.

On the Great Western Railway of England there are torpedo-placing machines at over 1,500 signal cabins; and about one-third of these have been installed during the past year. This statement is found in the annual report of the signal department of the road. This report says that 13 additional signal cabins were put in use during the year and the total number of working levers now is 46,857, an increase of 603 during the year. These new installations have been made necessary by the establishment of government manufacturers, etc.

Jacob M. Dickinson, former receiver of the Chicago, Rock Island & Pacific and Secretary of War in President Taft's cabinet, is the head of a new law firm recently organized in Chicago. The new firm of Dickinson, Wetten & Keehn will include Jacob M. Dickinson and his son, J. M. Dickinson, Jr., Emil C. Wetten, Roy D. Keehn, William J. Matthews-Arthur J. Eddy, and C. H. Pegler. Mr. Pegler having previously been general counsel of the Aurora, Elgin & Chicago, is now the acting manager during the absence of the general manager in Washington on special war duty.

The shopman of the Grand Trunk are to have a general increase in pay, aggregating it is said, more than \$500,000 on all of the company's lines. The advance is in accordance with the decision of a board of conciliation which has recently made a unanimous report. The men affected are the machinists, the boilermakers and the blacksmiths, said to be about 1,300 men in all. The report also provides that grievance committees shall be established in the shops; the working day is to be 9 hours and the rate of pay is to be advanced 50 per cent for overtime and for work done on holidays. The agreement runs one year from the first of March.

The state of New Jersey has taken action looking to the construction of a bridge across the Delaware river between Camden and Philadelphia, and a tunnel across the Hudson between Jersey City and New York; this in the shape of three laws, approved by the Governor on February 14, looking to the appointment of a commission, the preparation of preliminary estimates, and providing for a tax to cover that part of the cost of the two projects, which, in the opinion of the legislature, should be borne by New Jersey. The commission called for by these laws will consist of eight members, to serve without compensation; and this body will be expected

to make the necessary arrangements with the officers of the states of New York and Pennsylvania.

The urgent deficiency appropriation bill, to supply deficiencies in the appropriations for the fiscal year ending June 30, 1918, as reported to the lower House of Congress on February 14, carries an item of \$125,000,000 for transportation at the army and its supplies. It also contains an appropriation of \$100,000,000, asked for by Major General Goethals, acting quartermaster general, for a chain of quartermaster storehouses at the seaboard and at interior points to be used for army supplies. It is proposed to spend \$23,000,000 on storehouses at Norfolk, Va.; \$16,500,000 at Charleston, S. C.; \$12,970,000 at Philadelphia, \$10,700,000 at Boston, and other sums in the vicinity of New York. The gulf ports have not been included because of the long additional voyage to Europe.

Promptness in extinguishing fires by employees of the Pennsylvania Railroad is the salient point in an annual review by the insurance department of the company which has just been issued. By extinguishing fires before the arrival of the public fire companies they saved last year \$10,445,196 worth of company property. Altogether 334 fires were thus put out. The total loss sustained was only \$12,575. The total fire loss of the Pennsylvania Railroad System (east and west) including those cases in which the public fire companies responded, was \$306,465, showing the very low loss ratio of 8 1/2 c. for each \$100 of value at risk. The regularly organized fire brigades extinguished 66 fires at which the loss was less than \$59 per fire. Chemical extinguishers checked 30 fires, resulting in a total loss of \$630 on property worth \$197,156. Fire pails were used 53 times to extinguish fires on property worth \$664,622, at a loss of \$1,292. Locomotive fire apparatus was used in 19 fires in which the combined loss was \$1,176, the property threatened being valued at \$332,420. Fire hose was used 18 times, and chemical engines proved their value in four fires. Sand pails, extinguishers and tug boats were utilized in ruttng out other fires. By following the general instructions given, the employees of the company, without the aid of apparatus extinguished 107 fires at a total loss of \$2,064 on property worth \$355,500. Fifty-one fires were due to causes wholly beyond the control of the company or the employees.

Examination of Railroad Improvement Plans

Director General McAdoo has appointed a committee consisting of Francis Lee Stuart, chairman of the port terminals committee of the Council of National Defense; A. T. Hardin, vice president and chief engineer of the New York Central; A. C. Shand, chief engineer of the Pennsylvania; and H. A. Lane, chief engineer of the Baltimore & Ohio, to go over the budgets of desired expenditures for improvements for the eastern railroads which are being filed at Mr. McAdoo's request, and to make recommendations to him.

Charge of Sabotage Denied

At its regular quarterly meeting on February 12 the Cincinnati Railway Club passed a resolution refuting the imputation that the railroads of this country are not doing their full duty in supporting the government in the war effort. The resolution was passed after spirited addresses by Dan Judson Harrison and Col. Brent Arnold. Judge Harrison had an eloquent tribute to the loyal support given by the roads to the President in the strenuous work of prosecuting the war, and Col. Arnold declared that charges to the effect that the roads were attempting to hamper the administration were "gross and untrue and calculated to do injury to an industry which has been particularly conscientious in its efforts to promote the war program of the nation."

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER, 1917

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Operating revenues, Total revenues, Way and structures, Maintenance of equipment, Traffic, Trans- portation, General, Total, Operating ratio, Net from railway operation, Railway tax, Operating income (or loss), Increase (or decr.) income comp. with last year.

*Begin operation June 1, 1917.

REVENUES AND EXPENSES OF RAILWAYS

Name of road.	MONTH OF DECEMBER, 1917—Continued									
	Average mileage operated per period.		Operating revenues.		Total (inc. taxes).		Maintenance of way and equip.		Operating expenses.	
	Freight.	Passenger.	Freight.	Passenger.	Freight.	Passenger.	Way and equip.	Traffic.	Traffic.	
International & Gr. N. (North.)	375	\$798,941	\$377,924	\$13,929	\$19,029	\$13,929	\$18,029	\$454,551	\$36,111	\$833,797
Kan. City, Mex. & Orient.	706	96,119	13,927	115,292	30,210	14,232	20,310	5,098	52,911	109,544
Kan. City, Mex. & Pac.	465	93,761	11,537	115,292	22,138	13,038	16,338	4,534	10,318	24,784
Kan. City, Southern.	755	768,324	297,844	1,072,302	90,331	172,092	22,563	4,324	34,750	71,314
Lake Erie & Western.	900	535,988	57,769	677,956	83,642	148,033	30,757	3,205	1,864	430,485
Lake Erie & Western (N.Y.)	929	346,951	4,376	158,315	21,360	32,066	1,474	65,560	7,001	137,660
Lake Erie & Western (Pa.)	929	346,951	4,376	158,315	21,360	32,066	1,474	65,560	7,001	137,660
Long Island	308	355,179	834,448	1,133,860	318,941	12,383	784,394	28,726	1,272,551	6,671
Los Angeles & Salt Lake	1,154	747,114	295,372	1,412,794	253,833	21,276	164,762	36,019	2,066,613	6,671
Louisiana & Arkansas.	303	91,721	40,601	142,794	253,833	21,276	164,762	36,019	2,066,613	6,671
Pa. R. & N. Co.	342	160,671	78,980	51,534	26,331	24,177	5,604	89,366	2,158	114,009
Pa. R. & N. Co. (N.Y.)	342	160,671	78,980	51,534	26,331	24,177	5,604	89,366	2,158	114,009
Pa. R. & N. Co. (Pa.)	342	160,671	78,980	51,534	26,331	24,177	5,604	89,366	2,158	114,009
Michigan Central	1,861	2,919,170	1,241,513	4,777,395	1,852,912	1,171,943	38,501	4,353	3,405	169,518
Minnesota	1,861	2,919,170	1,241,513	4,777,395	1,852,912	1,171,943	38,501	4,353	3,405	169,518
Missouri & Arkansas	386	180,859	64,409	257,002	28,370	54,652	20,910	115,343	9,915	241,311
Missouri & North Western	1,30	7,753	87,393	14,961	15,340	61,8	55,422	1,567	88,416	7,134
Missouri & North Western (N.Y.)	1,30	7,753	87,393	14,961	15,340	61,8	55,422	1,567	88,416	7,134
Missouri & North Western (Pa.)	1,30	7,753	87,393	14,961	15,340	61,8	55,422	1,567	88,416	7,134
Missouri & North Western (W.Va.)	1,30	7,753	87,393	14,961	15,340	61,8	55,422	1,567	88,416	7,134
Missouri & North Western (Ill.)	1,30	7,753	87,393	14,961	15,340	61,8	55,422	1,567	88,416	7,134
Missouri & North Western (Mo.)	1,30	7,753	87,393	14,961	15,340	61,8	55,422	1,567	88,416	7,134
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Missouri & North Western (Ind.)										

REVENUES AND EXPENSES OF RAILWAYS

CALNDAR YEAR 1917

Table with columns: Name of road, Average mileage operated per period, Freight, Passenger, Total, Maintenance of way and structures, Operating expenses (Traffic, Transportation, General), Total, Operating ratio, Net feet operation, Railway tax, Operating income (or loss), Increase comp. with last year.

*Begin operation June 1, 1917.

Car Safety Appliances

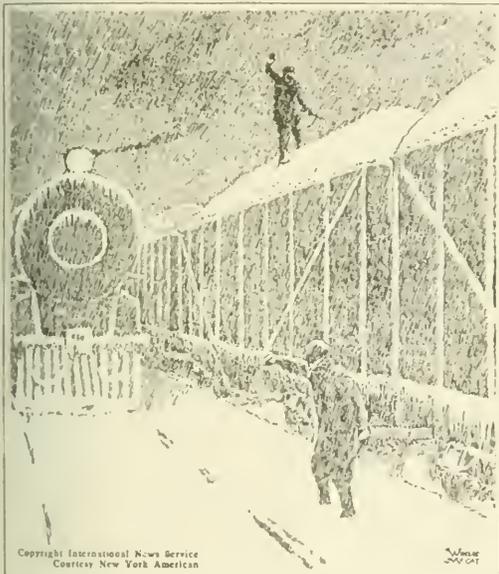
The executive committee of the Master Car Builders' Association has issued Circular No. 26 announcing that the Interstate Commerce Commission has extended the date effective for the application of safety appliances to cars to September 1, 1919. To conform thereto, paragraph (m) of Rule 3 of the Rules of Interchange should read: "After September 1, 1919, no car will be accepted in interchange unless properly equipped with United States safety appliances or United States safety appliances, standard."

"Heroes at Home"

This is the title of a circular which has been issued by F. E. Loomis, president of the Lehigh Valley, addressed to all employees of the road and accompanied by a picture reprinted from the New York American. The picture and circular are copied below.

"Never have I seen more splendid devotion to duty than that manifested by Lehigh Valley Railroad men in the trying days we have experienced this winter.

"With the temperature for weeks below zero, blizzards and



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blasts seemed only to spur you on to greater efforts. There have been few slackers.

"I want to express to you my sincerest thanks. That you fought a winning battle is proved by the quick recovery of the Lehigh Valley has made from each fearful assault of the weather—by the fact that we are now in shape to give the government the co-operation it rightfully expects.

"This would not have been possible but for the loyalty and untiring work of officers and men"

Boats for New York Barge Canal

One hundred boats of modern type, with necessary motive power, ought to be built at once for use on the New York State barge canal, which probably will be open throughout its length by May 15. This is one of the main recommendations in the report of Gen. W. W. Wotherspoon, superintendent of public works of the State of New York, which has just been sent to the legislature. Gen. Wotherspoon has had no visible success thus far in getting the authorities at Washington to take action looking to the construction of boats by government money or under federal authority. He says that

600 or more of the old style canal boats still in existence ought to be repositioned and put into service on the canal this year. To show that under present conditions canal boats can make even better time than is made by the railroads, Gen. Wotherspoon has compiled records of a number of freight shipments from Buffalo to New York and of six cars which were traded the average time was 11 days (440 miles) and the quickest movement was in 8 days.

Regional Directors Appoint Assistants

R. H. Ashton, regional director in charge of the operation of western railroads, with headquarters at Chicago, has appointed M. J. Gormley, assistant in the president's office of the Chicago & North Western, operating assistant, and J. G. Woodworth, second vice-president in charge of the traffic of the Northern Pacific, traffic assistant.

C. H. Markham, regional director in charge of the operation of railroads in the South, with headquarters at Atlanta, Ga., has appointed L. W. Baldwin, vice-president and general manager of the Central of Georgia, his operating assistant, and Charles R. Capps, first vice-president in charge of traffic of the Seaboard Air Line, his traffic assistant.

Mail to Be Sent by Airplane

The Postmaster General proposes to establish aerial transportation for letters, on one route as soon as practicable, and has asked for bids for the construction of five airplanes for an aerial route for the delivery of first-class mail between Washington, Philadelphia, and New York, making one round trip per day. The contract will be awarded to the bidder whose airplanes have stood satisfactory service test in the war and navy departments. It is the purpose of the Post Office Department to make this a permanent service. An appropriation of \$100,000 is available. The call for bids requires airplanes capable of carrying 300 pounds of mail a distance of not less than 200 miles without stop, at a maximum speed, full load, of 100 miles an hour, a minimum speed, full load, of 45 miles, climbing speed of 6,000 feet in 10 minutes. The planes must have the Hispano-Suiza motor, 150 h. p.

The intention is, as soon as the authority of Congress is received, to establish a through aerial route to Philadelphia and New York, carrying 300 pounds of first-class mail, for the transmission of which a special postage rate will be charged, not exceeding 25 cents an ounce.

Conference on Conservation of Railway Fuel

A conference recently was held in Chicago under Major Schmidt, representing the Fuel Administration, and a number of representatives of the railways regarding methods which should be adopted to promote greater conservation of fuel by the railways. Major Schmidt, who was formerly professor of railway engineering in the University of Illinois, has been assigned by the War Department to the Fuel Administration, and a conference was called by him. Almost a year ago the International Railway Fuel Association appointed a committee to hold and render its services to the Government for the purpose of bringing about cooperation regarding the use of fuel by railways. The members of this committee participated in the conference with Major Schmidt. They include Eugene McAlilly, chairman, former general coal agent of the Frisco System, who is now in the coal business; W. L. Robinson, Baltimore and Ohio; L. W. Pratt, Chicago & North Western; L. R. Pyle, Seaboard; and D. E. Hart, Railway Educational Bureau. Others who participated in the conference were M. K. Berry, Baltimore & Ohio; John Crawford and A. W. Wilson, Burlington, and Charles Tool, Indiana Coal Operators' Association. One subject brought up at the conference was as to the possibility of a uniting system of fuel conservation on all the railways. It is an important question whether the matter of fuel conservation on the railways will be handled by the Fuel Administration or under the Director General of Railroads.

Following the Chicago conference, the Executive Committee of the International Railway Fuel Association telegraphed the Fuel Administration, and requested the services of the association, its members and its executive committee, to the conservation division of

the Fuel Administration, "to make use of in any manner that can be advantageous to them in their tremendous and most important undertaking." The message was signed by E. W. Pratt, J. G. Crawford and W. H. Averell.

Congestion on the Pennsylvania

The daily statement issued by Commissioner McChord on February 18 of reports of the Interstate Commerce Commission inspectors on congestion of freight traffic, contains the following as to conditions on the Pennsylvania:

"The report of cars stored between terminals shows that on February 13 there were 4,285 loads and 9,799 empties, or a total of 14,084 cars, stored between terminals, while on February 4 there were 6,233 loads and 20,259 empties, a total of 26,492 cars stored between terminals. During the period from February 4 to 14 there was a decrease in the number stored between terminals of 1,948 loads and 10,460 empties, a total decrease of 12,408 cars.

"Comparing the reports of cars on hand for movement in all directions, at the principal yards of the Pennsylvania Railroad, there were on February 5 a total of 36,279 cars on hand, while on February 14 there were 40,484 cars on hand, an increase of 4,205 cars."

Be Good Soldiers!

W. J. Jackson, receiver of the Chicago & Eastern Illinois, recently issued an extended statement on patriotism which was sent to every employee of the road. The circular points out that the duty of the railroad employee in this country is no less sacred than that of the man in khaki "over there." Mr. Jackson's statement reads in part as follows:

"We all know that if our boys now in France are to accomplish anything; if the sacrifice of the lives in the sinking of the transport *Tuscania* the other day is to be avenged; if the outrages on humanity committed by the enemy are to be stopped—it will be by Americans—by us folks at home by our work, and as our efforts either give our soldiers and their allies all they need to fight with or fail to do so.

"If you were 'Over There' in a uniform, you wouldn't be an American unless you were 'on your toes' in doing things. No duty would be too difficult, disagreeable or dangerous for you to undertake cheerfully. This is the report that comes from every one of our boys now there, and it is just as true of those yet to go. The reports of the bravery and energy of the railroad recruits are particularly gratifying.

"Every railroad and every railroad man must 'do his bit' by doing his best to meet this emergency. To do our best is our plain duty; to do any less is absolute treason to those over in Europe risking their lives and sacrificing their life plans and many of them their health, for our account.

"Every extra effort in the repair of engines or cars; every additional car of freight moved; every little delay saved in keeping things going; every little misunderstanding avoided and every little cause for grumbling or dissatisfaction removed, will help just that much—for it is in doing the small things as they should be done that friction is avoided—and we must all try to avoid friction of every nature if we are to build up a proper spirit of co-operation to carry on our work."

New York Railroad Club

The next meeting of the New York Railroad Club on March 15, will be known as Annual Electrical Night. Edwin B. Katte, chairman of the committee, announces the following program for the occasion, the subject being "Recent Electric Locomotives:"

The New York, New Haven & Hartford new 180-ton passenger locomotive, which will be presented by E. R. Hill.

The Chicago, Milwaukee & St. Paul new gearless, bi-polar passenger locomotive under construction by the General Electric Company, which will be described by A. H. Armstrong, illustrated by lantern slides from photographs of the general drawings.

The Chicago, Milwaukee & St. Paul new quill gear locomotive under construction by the Westinghouse Electric & Manufacturing Company, which will be described by F. H. Shepard, of the Westinghouse Company, and illustrated by lantern slides.

The New York Central latest electric passenger locomotive, which will be briefly described by Mr. Katte, and illustrated with lantern slides.

Society for Testing Materials

The twenty-first annual meeting of the American Society for Testing Materials will be held at the Hotel Traymore, Atlantic City, N. J., on June 25 to 28, 1918. Atlantic City was selected as the place for this meeting on the basis of the information received a year ago in reply to a detailed inquiry addressed to the membership which showed a decided preference for this city over others suggested. The annual meetings of this society have been held at Atlantic City for the past 16 years, with the single exception of that in 1903, which was held at Delaware Water Gap.

Traffic News

The National Industrial Traffic League will hold its spring meeting at the Hotel LaSalle, Chicago, on March 21 and 22.

Irving T. Bush, president of the Bush Terminal, New York City, has resigned his position as chief executive officer of the War Board for the port of New York.

In Canada freight cars loaded with export freight must be filled to their full capacity. This is the substance of an order recently issued by the Canadian Railway War Board.

The Boston & Maine has discontinued the use of dining cars on three through trains leaving Boston for Montreal in the morning and on corresponding trains southward.

The Canadian Pacific announces further extensive reductions in passenger train service on its western lines. On some branches of light traffic the single train each way will run every other day instead of every day.

The state commissions of Indiana, Illinois, Michigan, Wisconsin and all but four states west of the Mississippi river have so far issued orders changing the demurrage rules applicable to intrastate traffic to conform with the latest revision of the interstate rules by the director-general of railroads.

Conrad E. Spens, vice-president in charge of traffic of the Chicago, Burlington & Quincy, has been appointed director of transportation for the United States Food Administration succeeding Edward Chambers, who had been serving since the first of the year as director of traffic in the railroad administration.

The Kansas City-Missouri River Navigation Company announces that beginning March 1 its transportation equipment, consisting of two tow boats and nine steel merchandise and lighter barges, will be ready for service on the Missouri River. The company expects to carry 2,000 tons of merchandise a week between East St. Louis, Ill., and Kansas City, Mo.

R. H. Aishton, regional director of western railroads, has asked the roads in his territory to prepare statements showing the location of traffic soliciting offices, both on the line and at outside points, indicating whether an agency is a passenger or a freight office or a joint office, and setting forth the cost of the maintenance of each agency, itemized according to the expenditures for rent, salaries and other expenses.

A large delegation of representatives of New England textile mills called on various government officials at Washington on February 18, to urge the necessity of increased coal shipments. They were assured by Director General of Railroads McAdoo and Chairman Hurley of the Shipping Board that transportation of 600,000 tons of coal by water and 400,000 tons by rail a month to New England was assured. This was more than the New Englanders had asked for.

Six million meals were served on Southern Pacific dining cars and restaurants in the twelve months ending with November, 1917. This is stated in the report of Allan Pollok, superintendent of the commissary department of the company. The Southern Pacific operates more dining cars than any other road in the country, and Mr. Pollok says that it has been complying fully with the suggestions of the Food Administration as to meatless Tuesdays and wheatless Wednesdays.

The buffet observation cars heretofore run on the Union Pacific-North Western train No. 10 from Ogden, Utah, to Omaha, Neb., and from Cedar Rapids, Iowa, to Chicago, have been temporarily discontinued. The Chicago & North Western also announces the following additional reductions in sleeping car service: Through sleepers from Kansas City, Mo., to Minneapolis, Minn., northbound, leaving Kansas City via the Missouri Pacific at 1:55 p. m. and the Chicago, Burlington & Quincy at 11:35 a. m., and southbound, leaving Minneapolis at 6:15 p. m., and entering Kansas City via the

C. B. & Q. and the Missouri Pacific respectively, have been discontinued. The through Kansas City-St. Louis City sleepers, leaving Kansas City via the Missouri Pacific at 11 p. m. and leaving St. Louis City, Iowa, at 8 p. m., have also been discontinued.

The Transportation Club of Louisville, Ky., held its annual meeting at the Old Inn Hotel on February 12; and the following directors and officers were elected: president, Ralph H. Morris, general freight agent, Southern Railway; vice-president, C. B. Stafford, manager traffic department, Louisville Board of Trade; secretary-treasurer, W. T. Vandenburg, commercial agent, Seaboard Air Line; directors, H. H. Hughes, Jr., superintendent, John P. Morton & Co.; Brent Arnold, Jr., division freight agent, Cleveland, Cincinnati, Chicago & St. Louis; Walter R. Hensley, vice-chairman commission on car service and embargo zone chairman; Arthur S. Key, traffic manager, Federal Chemical Company. The speakers at the banquet included Capt. Fernand Renaudeau of the French army, Capt. George F. James of the British army, Brig. General D. B. Devore of the American army and T. C. Mapother, a Louisville attorney.

An officer of the Canadian Pacific says that his road on one occasion diverted by way of the Soo Line 1,000 cars of freight so as to relieve the main line along the north shore of Lake Superior. These cars went from Winnipeg, via Minneapolis, to Sault Ste. Marie, and thence to Ontario. They consisted chiefly of grain for domestic consumption in Canada. One hundred cars of freight per day are being diverted from the Canadian Pacific at Quebec and are sent over the National Transcontinental to Halifax. This relieves the Canadian Pacific main line to St. John for classes of export freight more urgently required there. From Toronto 120 cars of freight eastbound for Montreal are turned over from the Canadian Pacific to the Canadian Northern every day. The Grand Trunk during the winter season has been diverting from 150 to 200 cars of coal per day to the Canadian Pacific and the Toronto, Hamilton & Buffalo, in order to lessen the congestion on the Grand Trunk at the Niagara frontier. The Grand Trunk has also diverted fifty cars a day to the Canadian Northern at Toronto.

Regulation of Railroad Steamers

The Marine Section of the Transportation Division is a new bureau of Director General McAdoo's organization to supervise the operation of coastwise steamship lines owned by railroads which were taken over by the Government. W. H. Pleasants, president of the Ocean Steamship Company of Savannah, Ga., has been appointed manager of the Marine Section and will give special attention to co-ordinating the relations between all shipping, including that on the Great Lakes, and the railroads.

Holiday Traffic Restricted

Director General McAdoo declined to give his approval to a plan for transporting a large body of Pennsylvania National Army troops from Camp Meade to Philadelphia for a parade on Washington's Birthday, holding it an unwarrantable use of engines, cars and tracks in the congested district. He has, however, approved a plan for the movement of two regiments from Camp Upton, over the Long Island road, to New York, the Long Island being in a position to handle the movement.

Campaign to Reduce Accumulation of

Freight at Chicago Freight Houses

The Chicago regional committee of the National Industrial Traffic League, which is co-operating with the Chicago committee of the Car Service Section of the Railroad Administration with a view to conserving transportation facilities in general, has been requested by the carriers to conduct a special campaign among receivers of freight, emphasizing the necessity for calling for shipments promptly upon receipt of notice of arrival. Under the storage rules the receiver of freight is entitled to 48 hours, free time, but some receivers make a practice of permitting their i. e. l. shipments to accumulate at the inbound stations for several days and weeks before arranging for disposition. The railroads are

furnishing the League's committee with the names of consignees who fail to remove their freight within 72 hours after notice, and the committee in turn is taking such cases up with the consignees and asking them to co-operate in the general movement to prevent congestion at the stations.

Drastic Embargo Covering 314 Square Miles

The three principal railroads in Philadelphia, the Pennsylvania, the Philadelphia & Reading and the Baltimore & Ohio, announced last week that, beginning February 18, no freight would be accepted at any point within ten miles of the Philadelphia city hall for movement to other points within that territory—an area equal to 314 square miles. There are 96 freight stations within this territory. Movement of freight from one station to another within the city of Philadelphia was discontinued, by these roads two months ago.

Freight Moving Freely

The congestion of freight in "Eastern" territory has been very materially relieved. By a report issued by A. H. Smith, regional director, it appears that between February 6, when the congestion was at its highest point, and February 19, the reduction in the number of freight cars "above normal" on all of the lines was 44 per cent. Temperatures are now favorable throughout this territory.

The detailed figures on the two dates named and for February 20 are shown below:

Cars above normal	February 6	February 19	February 20
Eastbound—loads	59,784	39,457	38,910
Eastbound—empties	13,345	3,140	4,048
Westbound—loads	39,841	28,287	26,940
Westbound—empties	47,934	19,090	17,400
Total loads	99,625	67,544	65,850
Total empties	61,279	22,230	21,448
Grand total	160,904	89,774	87,298

The movement of food supplies from the West direct to ships in New York harbor by the special system of solid through trains termed "G. O. C. Specials," is now under full headway in large volume. Pig iron production has been increasing rapidly in the past few days as a result of the advent of mild weather, and at many blast furnaces the receipts of coke have been in excess of requirements. The production of steel has not undergone an increase corresponding with the increase in pig iron production, for the reason that steel production has been limited by the ability to ship the finished product. Nearly all mill warehouses and yards in the Pittsburgh region are still filled with steel awaiting shipment.

The Pennsylvania Railroad reports a marked improvement in shipments of soft coal and general freight. In the first 18 days of February 22,620 cars of bituminous coal passed Lewistown Junction. This compares with 18,141 cars in the corresponding period of January, and and 18,661 cars in December. This eastbound bituminous movement for the first time since last summer shows an increase compared with the corresponding period a year ago.

Operating conditions in the West continue to improve since mild weather set in. Special attention is still being given to the movement of grain in the Western States. Statistics of grain receipts last week indicate that the order of the director general of railroads giving priority to the movement of grain in Western States has materially increased the number of cars loaded. Grain receipts at Chicago last week were 7,280,000 bushels, an increase of 4,583,000 bu., or 169 per cent over the previous week, and 3,341,000 bu., or 83 per cent, over the same week a year ago. The increase in the receipts of corn over the previous week was 2,216,000 bu., and of oats 1,418,000 bu. Receipts of grain at all the primary markets for the week ended February 16 totaled 22,104,000 bu., or 54 per cent over the receipts of the previous week, and 51.5 per cent over those of the same week a year ago.

PRODUCTION OF GOLD AND SILVER in the United States during the calendar year 1917 was less than in 1916 as shown by the statistics of the Bureau of the Mint and the United States Geological Survey. Gold produced in 1917 was valued at \$84,456,000 as against \$92,500,000 in 1916, and silver was valued at \$61,140,000 in 1917 as against \$61,280,621 in 1916.

Commission and Court News

Personnel of Commissions

J. E. Benton, of Keene, N. H., has been appointed solicitor of the Bureau of Valuation of the Interstate Commerce Commission, succeeding **P. J. Farrell**, who has been appointed chief counsel of the commission. Mr. Benton was formerly connected with the Bureau of Valuation as valuation analyst and examiner.

P. J. Farrell, who has been appointed chief counsel to the Interstate Commerce Commission, as was announced in these columns last week, was born on May 10, 1861, and admitted to practice in all the courts of Vermont in 1887 as attorney at law and solicitor in chancery. In April, 1906, he was admitted to practice in the Supreme Court of the United States. Mr. Farrell was in the railroad service several years; beginning with the Connecticut & Passumpsic Rivers road, now a part of the Boston & Maine, in 1880. He was station agent, conductor, clerk in general freight office and train despatcher. He was subsequently a railway postal clerk, and in 1888 he was promoted to be chief clerk of railway mail service, with headquarters at Boston. In 1889 he resigned this place and became law partner of Charles A. Prouty, former Interstate Commerce Commissioner and now director of the bureau of valuation of the Interstate Commerce Commission. Mr. Farrell practiced law at Portland, Ore., and Newport, Vt., until 1901, when he entered the employ of the Interstate Commerce Commission, where he has acted as attorney in cases before the commission and in the courts, and as solicitor of the bureau of valuation.



P. J. Farrell

State Commissions

Wasteful Duplication of Facilities

In an order issued on February 4 the Railroad Commission of the State of California dismissed the complaint of the city of San Jose vs. the Southern Pacific and the Western Pacific asking for the erection of union passenger and freight terminals as well as the use of certain tracks jointly. The Commission, however, emphasized the importance of avoiding the wasteful duplication of railroad construction and operation. In anticipation of the termination of its franchise through San Jose, the Southern Pacific some time ago secured the permission of both the city and the railroad commission to build a new line through the outskirts of the city. Permission was also granted to the Western Pacific to build a line from Niles to and through San Jose. The complaint of the city was that the projected lines would surround the principal portions of San Jose, thereby rendering communication between the city and the surrounding territory difficult and dangerous, and would greatly depreciate the value of property in a residence section which the Western Pacific planned to pass through. In order to overcome these objections and also to eliminate the unnecessary duplication of grade crossings, the city asked that the two roads use the same tracks in the city and erect union passenger and freight stations. The commission found that a union passenger station was not particularly needed in San Jose and that the construction of several small freight

houses in various parts of the city would be just as convenient to shippers as a joint station. It was the opinion, however, that in the interest of economy and safety the Western Pacific should use the Southern Pacific line not only in San Jose, but also from Niles to San Jose, with the privilege of building such spurs therefrom as might be thought necessary to develop business for the road.

The testimony offered with reference to the proposed construction of the line by the Western Pacific from Niles to San Jose, about 20 miles, showed that the president of that road had attempted without success to effect an agreement with the Southern Pacific for the use of the latter's line from Niles to Milpitas, 11 miles. On this subject the Commission says: "The attitude of the Southern Pacific in refusing to negotiate on this subject with the Western Pacific does not commend itself to us. This attitude is contrary to the growing realization that our nation must put an end to further wasteful duplication of railroad construction. . . . We assume that the question whether the Western Pacific shall get into San Jose will be passed upon by the Director General of Railroads. If he decides that the proposed construction is not justified, particularly at present, there will be no need for considering further the matter now under consideration. On the other hand, if he decides that the Western Pacific may enter San Jose, we hope he will take steps to have this done in such a manner as to prevent the wasteful duplication now contemplated in connection with the Niles-San Jose situation."—*San Jose vs. Southern Pacific and Western Pacific*. Decided February 4, 1918.

Court News

Exclusive Use of Platforms for Express Business

The New Jersey Court of Chancery holds that railroad station platforms being private property the railroad, for a consideration, may contract to give an express company the exclusive right to do an express baggage and passenger business on and from the platform, and such a contract does not create a monopoly.—*Thompson's Express, Etc., Co. v. Whitmere* (N. J.), 102 Atl., 692. Decided December 31, 1917.

Injuries to Live Stock—Waiver of Notice of Claim

The Mississippi Supreme Court holds that the provision of a contract of live stock shipment that the shipper shall file notice of loss within ten days of delivery is waived where shortly after arrival the railroad's proper agent was orally notified of the injuries and damage, and accepted the notice and inspected the animals and wrote on the way bill a memorandum of the injuries and claim.—*Bernstein v. Y. & M. V. (Miss.)*, 77 So., 146. Decided January 2, 1918.

Landowner's Duty Under Right-of-Way Agreement

The Circuit Court of Appeals, Ninth Circuit, holds that under an agreement that a railroad company might build its road across certain land at such a height as to permit the landowner to build a dam on condition that the company would protect its own roadway by riprapping or building a wall, it was the landowner's implied duty in building the dam to use every reasonable precaution by the construction of a spillway or other suitable device to carry off flood waters.—*Eastern Oregon Land Co. v. Deschutes R. Co.*, 246 Fed., 400. Decided October 1, 1917.

Commission's Order as to Station Facilities

An order of the South Dakota Railroad Commissioners required the Chicago & North Western to provide a suitable station house in place of two box cars, and maintain an agent in a town of 40 inhabitants, with two stores, lumber yard, coal yard, blacksmith shop and insurance office, in a farming community, and at which, during the year previous, the company transacted \$10,000 of business, \$7,000 of which was freight in carload lots. The South Dakota Supreme Court holds that the order was reasonable as to the maintenance of an agent, but that the evidence was insufficient to show that station facilities were inadequate.—*Barnard v. Chicago & N. W.*, 166 N. W., 148. Decided January 18, 1918.

Equipment and Supplies

Locomotives

THE HUDSON COAL COMPANY has ordered one 21-ton four-wheel tank locomotive from the American Locomotive Company.

THE DELAWARE RIVER STEEL COMPANY has ordered one 47½-ton four-wheel tank locomotive from the American Locomotive Company.

THE SOUTH MANCHURIAN RAILWAY has ordered 25 super-heater Mikado locomotives weighing 230,000 lb. from the American Locomotive Company.

THE SOUTH AFRICAN RAILWAYS have ordered 20 super-heater Mountain type locomotives weighing 195,000 lb. from the American Locomotive Company.

Specifications for the following locomotives have recently been determined on orders received some months ago by the American Locomotive Company: Western Pacific, 5 Mikado locomotives weighing 330,000 lb.

Freight Cars

THE UNITED STATES GOVERNMENT has ordered for use on military railroads in France 950 box cars from the American Car & Foundry Company, 500 low side gondola cars from the Cambria Steel Company, 250 box cars from the Mt. Vernon Car & Manufacturing Company, 500 box cars from the Pullman Company, 200 box cars and 750 high side gondola cars from the Standard Steel Car Company, 250 refrigerator cars from the Haskell & Barker Car Company, 100 box cars from the St. Louis Car Company and orders will be placed shortly for 500 additional box cars and 500 additional low side gondola cars.

Signaling

THE DELAWARE, LACKAWANNA & WESTERN has purchased two A. G. A. single-arm railway grade crossing signals from the A. G. A. Railway Light & Signal Company, Elizabeth, N. J.

CEMENT PRODUCTION IN THE UNITED STATES is almost exclusively for domestic use, says a recent bulletin of the National City Bank of New York, the exports having amounted in value to but \$5,822,000 in 1913, the high record year, and \$4,112,000 in 1917.

NEW RAILROAD INTO MONGOLIA.—A. W. Ferrin, acting commercial attaché at Peking, China, writes under date of December 24, 1917, as follows: It is reported that negotiations are on foot for a loan for the extension of the new Supingkai-Chengchiatun railway from Chengchiatun, Manchuria, to Kailu, in Eastern Mongolia. The Supingkai-Chengchiatun line, which was constructed by means of a loan from the Yokohama Specie Bank, is now considered completed, as construction trains carrying passenger cars are running on a regular published schedule between Supingkai and Chengchiatun, though over a temporary wooden bridge across the Liao. The proposed extension into Eastern Mongolia is 130 miles in length, and it is said that 1,500,000 yen (roughly, \$750,000 U. S.) will build it. According to the agreement under which the Supingkai-Chengchiatun Railway was built, the Yokohama Specie Bank must be given first chance to advance any funds needed for extension of line. The new loan will probably be 2,000,000 yen (\$1,000,000). The extension of this railway into Eastern Mongolia was contemplated from the first, as Japan is anxious to get into railway communication with that comparatively undeveloped country. The charter of the Oriental Development Company has recently been amended in order to make it freer to advance money for industrial developments in Eastern Mongolia as well as in Manchuria

Supply Trade News

The Asbestos Protected Metal Company, Pittsburgh, announces the removal of its Boston office to the State Mutual building to be in charge of Wm. H. Cummings.

J. A. McNulty, roundhouse foreman of the Chicago & North Western, at Chicago, has entered the railway supplies department of the Anchor Packing Company, with headquarters at Chicago.

The Pittsburgh Wood Preserving Company, the Ohio Wood Preserving Company, the Michigan Wood Preserving Company and the Acme Lumber Company have moved their general offices to the Century building, Pittsburgh, Pa.

E. L. Marshall, of the railway sales department of the National Carbon Company, Inc., Cleveland, Ohio, resigned his position February 1. A. E. Pratt, for several years signal supervisor of the Erie at Marion, Ohio, will succeed Mr. Marshall and take over his work as special railway salesman.

W. S. King, formerly general superintendent of the Illinois Central, has entered the supply field with offices in the McCormick building, 332 South Michigan avenue, Chicago. He will represent the Danascus Brake Beam Company and the Frost Railway Supply Company, together with general railway supplies.

The Louisville Frog & Switch Company, Louisville, Ky., has been incorporated with a capital stock of \$200,000 to take over the business of the W. M. Mitchell Company, Inc., and to manufacture switches, frogs, crossings and other special track apparatus and fastenings. The officers include W. M. Mitchell, president, and H. O. Wieland, secretary and treasurer. Charles H. Krauss, superintendent of the Weir Frog Company, Cincinnati, Ohio, has resigned to become general superintendent of the Louisville Frog & Switch Company. Previous to his connection with the Weir Frog Company, Mr. Krauss was connected with the Lorain Steel Company, Johnstown, Pa., and with the Kilby Frog & Switch Company, Birmingham, Ala., for a number of years in the capacity of superintendent.

Griffin Wheel Company

The necessity of working out excess profit tax requirements has delayed the publication of the annual report of the Griffin Wheel Company, Chicago, for the year ended December 31, 1917. The company has, however, given out a preliminary statement covering its operations during the past year. After reserving about \$250,000 for extraordinary taxes, a net profit of approximately \$1,100,000 was earned. Net quick assets on December 31, 1917, amounted to over \$6,000,000 of which \$1,007,000 was in cash and \$1,500,000 in United States government and state securities. The company owes no money, and since 1907 has not found it necessary to enter the money market over temporary loans.

While continuing its policy of paying annual dividends out of the previous year's earnings, the Griffin Wheel Company will, on March 1, anticipate its semi-annual dividend of 3½ per cent on the 92,820 shares of common stock outstanding, due September 1, and pay a full year's dividend calling for \$649,740 out of the last twelve months' operations. This action will be taken to clear up the surplus account in preparation for taxes.

The company advanced the price of its wheels in January, 1917, after an uninterrupted period of uniform prices since 1884, with the only exception of the year 1907 when an advanced price was maintained for a short time. Although the company could have profited to the extent of about \$400,000 by increasing the price of its product to conform with the increased cost of the cost of material during the last three years, it has purposely made possible the decrease in advance in price until the time aforementioned. In fact the company did not increase its prices until the cost of raw materials had advanced more than 100 per cent.

Financial and Construction

Railway Financial News

LAKE SUPERIOR & ISHPEMING.—At a meeting of the stockholders of this company R. C. Mann, C. D. Mason and W. P. Beldon were elected to the board of directors, succeeding J. B. Laughlin, T. F. Jones, Jr., and J. H. Hoyt.

MUNISING, MARQUETTE & SOUTHEASTERN.—At a meeting of the stockholders of this company W. P. Beldon was elected to succeed J. H. Hoyt as a member of the board of directors.

PACIFIC GREAT EASTERN.—The suits which were brought in the courts by the British Columbia government against Foley, Welch & Stewart and the railway company have been settled, and the government will take over the property and the contractors will drop out of it. It is expected that legislation will be introduced to provide for the completion of the road from the present end of the line 23 miles north of Clifton, to Prince George, and for the administration of the railroad by the Minister of Railways. The lands and property of the Pacific Great Eastern Land Company and all subsidiary companies will also be handed over. There are now on hand 8,000 tons of rails available for the completion of the road, and also some other material; and there is standing an order for 21,000 tons of rails recently financed by the government, let to the United States Steel Corporation, which, on instructions, must commence delivery.

UNION PACIFIC.—A quarterly dividend of 2½ per cent has been declared on the common stock, together with the regular semi-annual dividend of 2 per cent on the preferred stock, both payable April 1 to stock of record March 9. This puts the common stock on a 10 per cent basis, as the last previous common dividend paid was 2 per cent regular, with ½ of 1 per cent extra.

Railway Construction

SOUTHERN RAILWAY.—Improvements will be made to the facilities at Sheffield, Ala., for handling the increase in traffic incident to the location of the government nitrate plant at this place. The present passenger and freight stations will be enlarged, additional yard tracks will be installed, and additions to the local shop facilities are also contemplated.

GREAT EASTERN RAILWAY'S SEA WATER SUPPLY.—The Great Eastern Railway has announced that it will no longer carry sea water. What is surprising about this notice is, not that the traffic has been stopped, but that, in these times, it should have been continued so long.—*The Engineer London.*

THE COAL SITUATION IN FRANCE.—Before the war France consumed about 65,000,000 tons of coal yearly, of which, in round figures, 41,000,000 tons were of domestic production and 24,000,000 tons were imported from abroad; that is to say, from Great Britain, Germany and Belgium. The monthly consumption in peace times thus amounted to 5,400,000 tons, says a report of Commercial Attaché C. W. A. Veditz from Paris, dated January 5. In 1916 the domestic mines produced only 20,000,000 tons, and the imported coal amounted to only 19,000,000 tons, making the total quantity available for consumption 39,000,000 tons. In November, 1916, a typical month, the French mines produced 1,800,000 tons of coal and the imports amounted to 1,500,000 tons, the available monthly supply being therefore 3,300,000 tons, which represents a deficit, compared with the monthly consumption in 1913, of approximately 40 per cent. It should, of course, be noted that the invaded portions of France contain the principal French coal mines, and that therefore the war has cut off the chief source of supply and has made necessary the more intensive exploitation of the mines in the uninvaded regions.

Railway Officers

Executive, Financial, Legal and Accounting

F. A. Moses, Jr., has been appointed freight claim agent of the Tennessee Central, with office at Nashville, Tenn., vice **H. R. Smith**, resigned.

J. M. Wood, assistant to the treasurer of the Pennsylvania Railroad, and assistant treasurer of the Long Island Railroad, with headquarters at Philadelphia, Pa., has been appointed assistant treasurer of the Pennsylvania Railroad.

James M. Kurn, president of the Detroit, Toledo & Ironton, with office at Detroit, Mich., was elected vice-president in charge of operations and construction of the St. Louis-San Francisco, on February 13, succeeding **E. D. Levy**, resigned.

C. D. Mason has been elected secretary and **R. C. Mann**, assistant secretary, has been elected treasurer, of the Lake Superior & Ishpeming and the Munising, Marquette & Southeastern, with headquarters at Cleveland, Ohio, succeeding **W. D. Pollock**.

Decatur Axtell, who has resigned as vice-president of the Chesapeake & Ohio, the Hocking Valley and the Chesapeake & Ohio of Indiana, with office at Richmond, Va., as was announced in these columns last week, was born at Elyria, Ohio, and was educated at Illinois College. On March 16, 1864, he began railway work as a rodman with an engineering corps on the Pacific of Missouri and later served in various engineering capacities on the St. Louis & Iron Mountain, the Cairo & Fulton and the St. Louis, Iron Mountain & Southern, now forming part of the Missouri Pacific, until July, 1880. He was then appointed general manager of the Richmond & Allegheny and in April 1882, he



Decatur Axtell

was appointed vice-president and general manager of the same road. In June, 1883, when the R. & A. went into the hands of a receiver, he was appointed receiver and manager and in May, 1889, when the R. & A. was acquired by the Chesapeake & Ohio, Mr. Axtell was made second vice-president of the latter road. In addition to serving the Chesapeake & Ohio as vice-president, Mr. Axtell, in December, 1889, was elected president of the Toledo & Ohio Central and vice-president of the Kanawha & Michigan. Three years later he was elected chairman of the board of directors of the Toledo & Ohio Central, serving in that capacity until April, 1909; from 1903 to 1910, he was also chairman of the board of directors of the Kanawha & Michigan. In April, 1910, he was elected vice-president of the Hocking Valley and in August, 1910, vice-president of the Chesapeake & Ohio of Indiana, serving in these capacities until the date of his resignation. Mr. Axtell has been in charge of the accounting and treasury departments and has also been chairman of the Valuation Committee of the Chesapeake & Ohio Lines.

Ralph Budd, who has been elected executive vice-president of the Great Northern, as was announced in our issue of February 15, was born at Waterloo, Iowa, on August 20, 1877, and was graduated from Highland Park College of Engineering at Des Moines, Iowa, in 1899, following which he began railway work with the Chicago Great Western. Until 1902 he was consecutively draftsman, rodman, levelman, instrumentman and assistant engineer, and

from the latter date to 1905 was successively roadmaster, general superintendent of construction on the St. Louis division and division engineer of that division. He was then transferred to Chicago as division engineer. The following year he became chief engineer of the Panama Railroad at Colon, Panama, where he remained until 1909, when he went to the Oregon Trunk as chief engineer. From 1910 to May 1, 1914, he also was chief engineer of the Spokane, Portland & Seattle, and from 1911 to Jan. 1, 1913, also chief engineer of the Spokane & Inland Empire and Spokane Traction Company at Portland, Ore. Mr. Budd was appointed assistant to the president of the Great Northern on January 1, 1913, and on February 15 was appointed chief engineer. On May 1, 1914, he again became assistant to the president, which position he retained until his recent election as vice-president.

Operating

W. G. Choate has been appointed general manager of the Houston Belt & Terminal Railway, with office at Houston, Tex.

J. J. Grosche has been appointed master of trains of the Louisville & Nashville, Kentucky division, with office at Paris, Ky.; vice **J. G. Metcalfe**, resigned.

C. C. Fisher has been appointed trainmaster of the Sacramento division of the Southern Pacific, with headquarters at Sacramento, Cal., succeeding **C. A. Collins**.

J. A. Gordon, general manager of the Chicago Great Western at Chicago for the past four years and an officer of that road for seven years, has resigned, effective March 1.

D. J. Morris, assistant superintendent of transportation of the Wheeling & Lake Erie, with headquarters at Brewster, Ohio, was appointed superintendent of car service with the same headquarters, effective February 1.

F. L. Horton, chief dispatcher of the Central of Georgia, with office at Macon, Ga., has been appointed trainmaster, with headquarters at Albany, vice **H. M. Sours**, resigned; and **W. L. Chandler** has been appointed chief dispatcher with headquarters at Macon, vice Mr. Horton.

F. M. Smith, superintendent of passenger transportation of the New York Central lines west of Buffalo, has been appointed assistant to the general superintendent of the Fourth district, with headquarters at Chicago, and **L. C. Anderson** has been appointed superintendent of passenger transportation, vice Mr. Smith.

W. L. Ekin, division engineer of the Pennsylvania lines, St. Louis System, with headquarters at Terre Haute, Ind., has been promoted to superintendent of the Peoria division, succeeding **Taber Hamilton**, with headquarters at Decatur, Ill., effective February 11. Mr. Ekin entered the service of the Pennsylvania Lines, on July 6, 1900, and was appointed assistant engineer on the Michigan division on September 1, 1905. He was promoted to division engineer of the same division on May 1, 1907, and was later transferred to the St. Louis division, at Terre Haute, which position he held at the time of his appointment.

Frank P. Barr, superintendent of transportation of the Wheeling & Lake Erie, with headquarters at Brewster, Ohio, was appointed assistant to the general manager of that road, with headquarters at Cleveland, Ohio, effective February 1. He was born in Canton, Ohio, in 1878, and received his early education in the public schools of that city. He entered the service of the Cleveland, Canton & Southern, on July 1, 1895, as a car record clerk in the office of the car accountant. He continued in that position until August, 1899, in which year the Wheeling & Lake Erie absorbed the Cleveland, Canton & Southern. He was clerk in the office of the superintendent of car service from that date until February, 1906, at which time he was promoted to chief clerk. He was appointed car accountant in May, 1907, and on June 10, of the following year, was promoted to superintendent of car service. He remained in that position until July 1, 1912, when he was promoted to superintendent of transportation, which office he held until February 1, 1918, when his appointment as noted above became effective. Mr. Barr has been in

railway service for practically 22 years, and as superintendent of transportation of the Wheeling & Lake Erie, was responsible for the successful operation of the lake coal pooling plan, which was made effective at the Huron, Ohio, lake port of that road during 1916, and resulted in the members of that pooling arrangement urging the adoption of the general pooling plan to include all bituminous coal shipments for the upper lake docks during 1917. The position of superintendent of transportation has been abolished.

Frank L. Fletcher, who has been appointed superintendent of the Huntington division of the Chesapeake & Ohio with headquarters at Huntington, W. Va., as has already been announced in these columns, was born on September 21, 1885, at Mount Sterling, Ky., and was educated in the public schools of his native town. He began railway work on September 18, 1901, as a telegraph operator on the Chesapeake & Ohio. He remained in that position until September, 1909, when he was appointed train dispatcher. From March, 1912, to October, 1914, he was assistant trainmaster and then was promoted to trainmaster. Since July, 1916, he served as superintendent of terminals of the Chesapeake & Ohio, the Cleveland, Cincinnati, Chicago & St. Louis and the Louisville & Jeffersonville Bridge & Railroad Company, with office at Louisville, Ky., until his recent appointment as superintendent of the Huntington division of the Chesapeake & Ohio, as above noted.

Andrew R. Macgowan, whose appointment as superintendent of the Pennsylvania division of the Delaware & Hudson, with headquarters at Carbondale, Pa., has already been announced in these columns, was born on January 16, 1883, at Moncton, N. B., and was educated in the high schools. He began railway work on January 19, 1899, with the Canadian Government Railways, and served consecutively as clerk, rodman and trainman until April, 1904, when he became contractor's engineer on the Northern Maine Seaport branch of the Bangor & Aroostook. From January to November, 1906, he was resident engineer of the Somerset Railway, now a part of the Maine Central, and then returned to the service of the Canadian Government Railways as assistant engineer, remaining in that position until April, 1915. He was then to December, 1915, division engineer and from January to June, 1916, was principal assistant engineer. In July, 1916, he was appointed superintendent, which position he held until he left to go to the Delaware & Hudson as above noted.

F. Wear, division superintendent of the Great Northern at Great Falls, Mont., was promoted to assistant general superintendent, with the same headquarters, effective February 20, succeeding **John Sesser**, granted an indefinite leave of absence to join the American Expeditionary Forces in France. **J. Weber**, superintendent of terminals, at Seattle, Wash., was appointed superintendent of the Blaine division with headquarters at Great Falls, Mont., succeeding Mr. Wear. **T. B. Degnan**, superintendent of the Northern division, with headquarters at Crookston, Minn., was appointed superintendent of terminals, at Seattle, Wash., succeeding Mr. Weber. **L. M. Davis** was appointed superintendent of the Northern division, with headquarters at Crookston, Minn., succeeding Mr. Degnan. **R. E. Landis**, superintendent of the Marcus division, with headquarters at Marcus, Wash., was transferred to the Spokane division, with headquarters at Spokane, Wash., succeeding **J. L. Close**, transferred to Whitefish, Mont., succeeding **M. J. Flanigan**, assigned to other duties. **George Wear**, trainmaster at Everett, Wash., was promoted to superintendent of the Marcus division, with headquarters at Marcus, Wash., succeeding Mr. Landis.

Traffic

John L. Coffey has been appointed general agent of the Chicago, Milwaukee & St. Paul, at Cedar Rapids, Ia.

H. G. Powell, division freight agent of the Illinois Central, at Omaha, Nebr., has been promoted to assistant general freight agent, at St. Louis, Mo., succeeding **F. H. Law**, promoted. **C. E. Stailey**, traveling freight agent, with headquarters at Oklahoma City, Okla., has been promoted to division freight agent, at Omaha, Nebr., succeeding Mr. Powell, transferred.

E. A. Farr, city passenger agent of the Gulf Coast Lines, at Houston, Tex., has been promoted to general agent of the passenger department, with the same headquarters, succeeding W. H. Pinnick, resigned.

H. C. Gettier, division freight agent, of the Atlantic Coast Line, with office at Montgomery, Ala., having resigned, to accept service elsewhere, the duties of the Montgomery office will, for the present, be performed by C. R. Jones, soliciting freight agent.

J. A. McDonald, district passenger agent of the Canadian Pacific at Brandon, Man., has been transferred to Regina, Sask., succeeding J. E. Proctor, who has been transferred to Calgary, Alta., succeeding R. Dawson, transferred to Brandon, in place of Mr. McDonald, effective February 1.

A. F. Meyer, general agent of the Cleveland, Cincinnati, Chicago & St. Louis, at Pittsburgh, Pa., was promoted to division freight agent, at Indianapolis, Ind., succeeding C. R. Lewis, resigned, effective February 15. D. H. Hutchinson, commercial agent, at Boston, Mass., was appointed general agent at Pittsburgh, to succeed Mr. Meyer.

Engineering and Rolling Stock

H. H. Tripp, resident engineer of the Canadian Pacific, at Kenora, Ont., has been transferred to the Edmonton division, with headquarters at Edmonton, Alta., succeeding R. C. Harris, who has been transferred to the Calgary division.

J. F. Gildea, division master mechanic of the Canadian Pacific, with office at Montreal, Que., has been appointed master mechanic of the Pennsylvania division of the Delaware & Hudson, with headquarters at Carbondale, Pa., vice J. J. Reid, resigned.

W. H. Erskine, master mechanic of the Chicago Great Western, at Des Moines, Ia., has been appointed master mechanic of the Virginian. Frank Aitken, master mechanic of the Pere Marquette, at Wyoming, Mich., has been appointed master mechanic of the Chicago Great Western, to succeed Mr. Erskine at Des Moines.

H. H. Carrick, assistant master mechanic of the Southern Pacific at San Francisco, Cal., has been appointed master mechanic of the Stockton division, with headquarters at Stockton, vice F. P. McDonald, transferred, and J. T. Slavin has been appointed assistant master mechanic of the Coast division, with headquarters at San Francisco, vice Mr. Carrick.

John L. Conerly, whose appointment as master car builder of the Missouri, Kansas & Texas, with headquarters at Denison, Tex., was announced in these columns on January 18, was born in Pike county, Miss., on November 22, 1869. He entered the service of the Illinois Central in December, 1890, as car repairer at McComb, Miss., and was later promoted to inspector. On December 31, 1900, he was promoted to car foreman and transferred to Jackson, Miss., where he remained until June, 1903, when he was transferred to New Orleans, La. He remained at New Orleans until June, 1910, when he was promoted to general car foreman and transferred to Memphis, Tenn. He left the Illinois Central in February, 1914, to take a similar position with the Missouri, Kansas & Texas, at Denison, Tex., and in September, 1914, he was promoted to general car inspector. He was with the Ft. Worth & Denver City and the Midland Valley from September, 1915, to February 15, 1917. He returned to the Missouri, Kansas & Texas as general car inspector on February 15, 1917, and from this position was promoted to master car builder, effective January 1, 1918, succeeding H. J. Tierney, resigned.

L. B. Allen, whose appointment as superintendent of maintenance of way of the Chesapeake & Ohio system, with headquarters at Huntington, W. Va., has already been announced in these columns, was born April 19, 1879, at Lexington, Ky., and graduated from the Kentucky State College in 1899, with the degree of civil engineer. He began railway work in the same year as a rodman on the Southern Railway, and from August, 1899, to January, 1904, was engaged on location and construction work on the Chesapeake & Ohio. He was then for one year assistant in the office of the engineer of maintenance of way, and

from January, 1905, to May 1910, was division engineer of the Kentucky division at Ashland, Ky. From May 1, 1910 to 1914 he served as engineer maintenance of way of the Kentucky general division of the same road and the Chesapeake & Ohio of Indiana, with office at Covington, Ky., and as assistant chief engineer. In February, 1914, he was appointed superintendent of the Huntington and Big Sandy divisions of the Chesapeake & Ohio. He later served as general superintendent of the western general division until his recent appointment as superintendent of maintenance of way of the entire Chesapeake & Ohio system, with headquarters at Huntington, W. Va., as above noted.

R. C. Miller, division engineer of the Pennsylvania lines west of Pittsburgh with office at Toledo has been transferred to Terre Haute, succeeding W. L. Ekin, promoted; J. K. Sherman, division engineer with office at Zanesville, Ohio, succeeds Mr. Miller, with office at Toledo, and H. W. Brown, assistant division engineer with office at Chicago, succeeds Mr. Sherman at Zanesville.

Railway Officers in Military Service

George T. Slade, vice-president of the Northern Pacific, has been commissioned as Lieutenant Colonel and has been assigned to railroad service in France on the staff of General W. W. Atterbury, director of transportation of the United States Expeditionary Forces.

Obituary

George H. Alexander, superintendent of freight transportation of the New York Central, with headquarters at New York, died on February 15, at his home in Yonkers, at the age of 49.

C. C. Wright, general solicitor of the Chicago & North Western, with office at Chicago, died at his home in Evanston, Ill., on February 14. He was born at Whitehall, N. Y., on April 19, 1859, and was educated at Tabor college, Tabor, Ia., Colorado college, Colorado Springs, Colo., and in the law department of the Iowa State university. He entered the legal department of the Chicago & North Western in 1887, working in the state of Wyoming, and resigned in 1903 to take up the general practice of law at Omaha, Neb. Later in the same year he was elected city attorney of Omaha, and served in that capacity until March 1, 1905, when he was appointed assistant attorney of the Chicago & North Western, with the same headquarters. He was promoted to general solicitor, with headquarters at Chicago, on November 21, 1910, and remained in that position until his death.

J. A. D. Vickers, vice-president and general manager of the American Express Company, with headquarters at Chicago, Ill., died in that city on February 16. He was born at Toronto, Ont., on May 22, 1858 and was educated at upper Canada College in that city. He entered the employ of the Vickers Express Company, in Canada, a company of which his father was the founder, as an office boy, in the Toronto office in 1875. During the seven succeeding years he filled practically every position in the local office, and in February, 1882, was appointed superintendent, acting also in the capacity of treasurer and auditor. On February 1, 1889, this company was absorbed by the American Express Company and he became superintendent of the Canadian division, which position he held until May 1, 1891, when the service of the National Express Company was extended over the New York, Chicago & St. Louis and the Grand Trunk to Chicago, and over the Toledo, St. Louis & Western to St. Louis. He was placed in charge of these lines as superintendent of the National Express Company, with headquarters at Chicago. On July 1, 1905, he was made general superintendent and on November 27, 1906, was promoted to general manager, Western department, which position he held until June 11, 1914, when he was appointed vice-president and general manager of the western lines of the American Express Company. His supervision extended from Buffalo and Pittsburgh to the cities of the Pacific Coast and from Winnipeg to the Gulf, with an aggregate of nearly 7,000 offices, 18,000 employees and 55,000 miles of railroad lines.

EDITORIAL

Railway Age

EDITORIAL

The account of the Pennsylvania Railroad's prolonged contest with King Winter, which is printed in another column, is a record of a campaign of unprecedented magnitude, and one involving many unique problems. The story is of absorbing interest, just as it stands; but it possesses added significance from the fact that it gives, for non-railroad readers, a vivid picture of conditions, scarcely less trying, which have prevailed during the past two months on many other railroads in the frost-bound regions. The Pennsylvania has done those other railroads a service in preparing this comprehensive yet succinct sketch of actual life, under extreme winter conditions, on a railroad where a heavy traffic is pressing for movement throughout every hour of the day and night, week in and week out. This winter has been unprecedented not only in length and severity, but also in the complicated nature of railroad work at this time. Deep snows, low temperatures and baffling winds are not new things; but they can make, at the present time, much more trouble than ever before. On a four-track or a six-track railroad the snowplow does not carry off all the honors, as it did in the old days of single-track; more likely it may find itself impotent. A winter emergency that occurs but once in a dozen years cannot be met by the use of the methods which would be applied in Alaska. The Pennsylvania could have wished for a few miles of Southern Pacific snow-sheds; but this is a situation in which wishes do not go far. In the light of the facts here set forth, the superficial talk about the incapacity of the officers of railroads which have "broken down," and especially the suggestions about how such officers might easily have kept their locomotives in better condition, which have been made so prominent in the newspapers, become puerile indeed.

A Chapter of Railroad History

The trade acceptance, a description of the uses and advantages of which appears on another page of this issue, may be new and something of a novelty to American business men of the present day, but it is in wide and extensive use in England, France and Germany, and in Canada. It was at one time an important factor in our own country, and apparently is by way of becoming such again. The American business man owes it to himself to look into the trade acceptance carefully because it relates directly to his own business transactions and is meant primarily to be of essential service to him. It not only relieves him of all the worry about the payment of bills that is a corollary of the open book account method of doing business, but it means everything to him from the standpoint of his credit and his financial standing. But there is another important factor that should greatly impress the layman, and that is the fact that behind the campaign to extend the use of the trade acceptance in this country are some of the country's greatest bankers and a no less powerful authority than the Federal Reserve Board itself. In fact the Federal Reserve Board is so much in favor of the use of the trade acceptance and regards it of such high standing that the Federal Reserve Banks discount trade acceptances at a

lower rate than promissory notes. But it is our intention to enlarge upon these points here, as they are brought out in detail in the article. One point, however, deserves attention in this place. It is that the trade acceptance is of such standing that what is needed to extend its use now is not nearly so much argument in its favor as plain simple publicity to explain it. The present time has been wisely taken as the moment to do this work. The American business man now is more willing than ever to see the disadvantages of old-time inertia; and he should be particularly willing to realize the advantages of an instrument of credit that will result in business stability and in economy in handling his business transactions.

In a letter to the editor published in another column in this issue W. C. Cushing, chief engineer maintenance of way

The Screw Spike Situation

of the Pennsylvania Lines, Southwest System, takes exception to an editorial published in the issue of February 8 commenting on the report on screw spikes prepared by a committee of the Pennsylvania System and published in a recent bulletin of the American Railway Engineering Association. Mr. Cushing criticises particularly two points made in this editorial, namely, that the report refers almost solely to the service of screw spikes as track fastenings and ignores largely their effect in decreasing the destruction of the wood and that the screw spike is more directly applicable to heavy traffic lines at present. In support of this first criticism Mr. Cushing cites the statement in the report that "no satisfactory device is known for resetting screw spikes after the thread in the wood has been destroyed." He also refers to previous writings of his in the Proceedings of the American Railway Engineering Association which were to the same effect although these writings were not mentioned in the report referred to in the editorial. These refer to the efficiency of the screw spike as a track fastening and do not cover the phase of the question developed by J. W. Kendrick and others relative to the lessened destruction of the timber as compared with the cut spike. As stated in the editorial it has been primarily for the purpose of arresting the spike killing of the ties and of increasing their service life that screw spikes have been adopted on those roads where they are in use today. With reference to the second objection that screw spikes are not suitable for heavy traffic lines the difference arises largely from the definition of heavy traffic lines. If only tracks such as those of the Pennsylvania at Birmingham, Pa., with the enormous movement of 140,000 tons per day or over 50,000,000 tons per year are considered, it is entirely possible that Mr. Cushing's statement may go unchallenged. However, it is believed that the lines of the New York, New Haven & Hartford, the Delaware, Lackawanna & Western, and the Atlantic, Topoka & Santa Fe, in which screw spikes have been installed, are commonly considered as well within the limits of heavy traffic lines when compared to the traffic over the entire country and the fact that these roads use screw spikes in such large numbers deserves serious consideration in determining their merits.

Railway Ownership and Other Industries

THE ADOPTION OF GOVERNMENT CONTROL of railways is causing much discussion of government ownership. The discussion of this subject usually moves in too narrow a circle. It commonly takes account of the direct consequences which government ownership would have but ignores its probable indirect consequences. We have heard much in the recent debates in Congress about the effect which government ownership would have on railway rates and earnings, on railway employees' wages and conditions of work, and on transportation service, but we have heard little about the indirect effects it would have on other business concerns and their employees.

Besides being the largest concentrated class of employers of labor, the railways are also the largest concentrated class of purchasers of commodities. When the man in the street hears the "railway supply business" mentioned he doubtless thinks of it as made up of a comparatively small class of industries which caters to railways exclusively. How many know that the railways are the largest consumers of coal, of iron and steel, and of lumber? How many realize that they are among the largest purchasers of electrical apparatus, and even of office appliances and stationery? How many who know these things have ever considered the effect which government ownership would have on all the great industries from which the railways purchase annually close to a billion dollars worth of coal, lumber, iron and steel, etc.?

The railway equipment and supply manufacturers of the country recently have been getting a foretaste of government ownership. Reports have gone out from Washington that the Director General of Railroads has extensive plans for standardizing railway equipment and supplies. The railway equipment and supply companies suddenly have awakened to the fact that government control has given the government almost the power of life or death over each of their concerns. Consequently, there has been an unprecedented rush of railway supply men to Washington.

The *Railway Age* has been following developments at Washington closely and feels sure that the railway equipment and supply people have been unduly concerned. Director General McAdoo is a sensible man. He has surrounded himself with able men, and has shown no disposition to play politics or run amuck. When he has finally adopted the policies which he intends to follow it probably will be found that everybody who has good devices to sell to railroads can still sell them, and that in the main they will deal with the same railway officers they have dealt with in the past.

But the developments, nevertheless, have been illuminating. Suppose we had government ownership instead of government control, and were at peace instead of at war. The government would have absolute control over railroad purchases, as it has now. In other words, it would be permanently in the position of the largest customer of several of the leading industries of the country. But it would not be subject to the moral restraints in the use of the power this would give it to which it is subject when the country is at war. Under government control in war politics will probably have little or no influence on railway purchases. Under private ownership these purchases heretofore have been made by numerous railway companies and have little or no effect on politics. Under government ownership in time of peace politics probably would have a very great influence.

Imagine the effects which would be produced by throwing into the political scales railway purchases aggregating about a billion dollars a year, which are made from concerns located in every part of the country and employing millions of men. Under government ownership of railways the affairs not only of the railways but of all the concerns they make purchases from would become largely the football of politics.

There are other phases of government ownership of vital

importance which other classes of business concerns may well consider: If the government should acquire the railways, how long would it be before it would begin to enlarge its shops, so as to enable it to make locomotives, cars and supplies of all kinds? How long would it be before the acquisition of the railways would be followed by the acquisition of telegraph and telephone lines? If the government should make armor plate for its navy, why should it not own the mines and produce the coal for its own railroads?

Government control is going to have the good effect of bringing home sharply and in concrete form to many thousands of business men the effects which government ownership would have. It is arousing those who manufacture for and sell to railways to the dangers of the situation as nothing else could and it is causing many persons seriously to consider the enormous acceleration of the tendency toward state socialism which government acquisition of the railways would cause. There are some who think that government control inevitably will lead to government ownership. On the contrary, it will help prevent government ownership, for it will cause the people thoroughly and intelligently to consider the question. Free silver might have been tried if it had not become the paramount issue of a national campaign, which resulted in the public actually considering it on its merits. Predictions are being made that government ownership of railways will be the paramount issue of the campaign of 1920. The *Railway Age* hopes it will be. If government ownership is ever thoroughly and intelligently discussed it will be beaten, just as free silver was; and then we shall be able to get a sane solution of our railroad problem, just as the defeat of free silver made it possible to get a sane solution of the currency problem.

Should Standard Locomotives be Considered as a War Measure?

IN CONSIDERING standard locomotives the most important question to be answered is—will such locomotives provide the necessary power in the shortest possible time? The railroads need all the power they can get at the earliest possible moment. Immediate relief will be best obtained by repairing and increasing the power of existing locomotives. Future requirements demand new locomotives. Can more power, and we mean power not locomotives, be obtained by introducing standard locomotives than by building locomotives of existing designs, which are particularly adapted for the service in which they are to be used for the roads that need them most?

In order to realize the full benefits of a standardization program, the number of standard types of locomotives must be a minimum. The topography of this country and the conditions under which railroads must operate are such that locomotives must be built of at least the Mikado, Mallet, Pacific, Santa Fe and switching types. Two or more designs of each of these types will have to be built to meet the varying conditions. For example, consider the Mikado type locomotives built last year. Of 835 of this type, 127 had a total weight varying from 160,000 to 280,000 lb.; 241 weighed between 281,000 and 300,000 lb.; 130 weighed between 301,000 and 320,000 lb., and 337 weighed between 321,000 and 340,000 lb. The bulk of the orders varied between 281,000 and 340,000 lb. If we neglect the 127 locomotives weighing below 281,000 lb. and attempt to standardize the remainder in, say, two classes, it would be possible to design a locomotive to weigh 281,000 lb. to meet the requirements of the present locomotives weighing up to 310,000 lb. The second design might weigh 311,000 lb. and answer the purpose for those locomotives which have been built weighing up to 340,000 lb.

The 281,000-lb. locomotive would be under the desired capacity on many roads. In some cases it would be under weight by 30,000 lb., and this would represent a deficiency of over 10 per cent in tractive effort, or an average of over 5 per cent for that particular design of locomotive. The same line of reasoning will apply to the second design. This means, therefore, that from a purely tractive effort standpoint, 5 per cent more locomotives will have to be built to meet the demands, than if existing designs were duplicated. This also means that the cost of operation of trains with these locomotives will be increased. The percentage loss in operating economies could be reduced by making three standard designs of this particular type rather than two, but here we begin to multiply the standards. The same reasoning will apply to the other types of locomotives.

In the development of the designs for all these locomotives, whether there be 10, 12 or 15 designs, new drawings will have to be made and new dies, templates and patterns will have to be constructed. This will take time and material and prolong the time in which such standard locomotives may be received from the builders and during which time locomotives of existing standards which have been found to meet successfully the peculiar operating conditions for which they are built, might be constructed. In like manner all the railroads will have to provide themselves with the necessary materials, including drawings, templates, patterns and castings with which to maintain the standard locomotives properly. This will take considerable time and require the services of men in the repair shops who might better be concentrating their efforts on the maintenance of existing locomotives. Furthermore, it will be necessary for the locomotive repair men to become accustomed to these new designs. The matter of repairs will therefore become further complicated by the increase in the number of locomotive classes to be maintained by every railroad. This is a vital point, for the railroads now have not enough labor with which to maintain the present power.

There is no argument whatever in the question of first cost for standard locomotives. As pointed out in the case of the Mikado type locomotives, the standard locomotives must be of compromise designs in order to cover a wide range of operating conditions. The losses in operating efficiency due to locomotives of improper characteristics for the service in which they are to be used, will in a short time overbalance any saving that may be made in first cost. This is well illustrated by the purchase several months ago of Mallet locomotives for a western road at a cost of \$105,000 each. These locomotives made it possible to operate solid trains through one division where previously it was the practice to make two trains into three in order to negotiate a certain grade. A careful study of the economies to be derived by operating the two solid trains showed that the railroad could well afford to pay the exorbitant price for these engines. Therefore, in the long run, the saving in first cost by the standard locomotive is offset by the increased cost of operation. Not only are operating costs increased, but where the standard locomotive is deficient in tractive effort, the number of trains will have to be increased, thus increasing the train density of the line and increasing the congestion.

The standardization of all types of locomotives used in this country cannot be considered expedient as a war measure. The costs are too great. There is, however, an opportunity of designing emergency locomotives of adequate tractive power to use indiscriminately throughout the country to relieve congestion where it may occur, and these locomotives must of necessity be of such weight and dimensions that they can be used under any clearance and weight limitations. There will not be need for a large number of

such locomotives, for which conditions become more stable it will be found easier to route traffic so that congestion may be avoided.

Our railways need power and they will need it badly next winter. If the roads are provided with power which best meets their conditions, with which they are familiar, and for which they have repair parts, then better results will be obtained than if locomotives of a strange design, not particularly adapted to the local operating conditions, are given them.

Facts versus Fiction

About Railway Salaries

THESE continues to be a great deal of loose talk about "fancy" railway salaries. The necessary requisitions for information which the Director General is making are helping to keep the talk going. He first asked each railway to furnish him a list of all its officers receiving more than \$10,000 a year. This was done at the request of Senator Cummings. He has now asked for a list of the salaries paid to all officers in the New York offices of the companies. He has also directed that "with reference to general officers and division officers receiving \$3,000 or more and less than \$10,000 per year, each carrier shall make to the regional director a monthly report showing increases in salaries, appointments to fill vacancies and the creation of new positions (showing salaries therefor), beginning with the month of January, 1918." With reference to general officers and division officers receiving \$10,000 or more per year the monthly reports are to be made in duplicate, one to be for the regional director and the other for the director general.

The public would be warranted in drawing the conclusion from what is being said in some quarters that a railway general officer who is not receiving at least \$10,000 a year is poor indeed, and that no president is receiving less than \$75,000 or \$100,000 per year. But facts often are stranger than fiction, and some facts which stand out in striking contrast to all this fiction are that the average salary paid to all railway general officers in the year ended June 30, 1916, was less than \$6,000, and that the average paid to all general and division officers was less than \$3,000. The detailed facts, as shown by statistics compiled by the Interstate Commerce Commission, are as follows:

In 1916 there were 4,247 general officers who received \$3,000 or more. The total amount they were paid was \$27,442,958, an average of \$6,461.73. The number of division officers who received \$3,000 or more was 1,115 and their total compensation was \$4,140,693, an average of \$3,713.63.

The number of both general and division officers who received \$3,000 or more was 5,362, and their total compensation was \$31,583,651, an average of \$5,890.

The number of general and division officers who received less than \$3,000 was 14,401, and their total compensation was \$23,970,143, an average of \$1,664.46.

The total number of both general and division officers was 19,763, and their total compensation was \$55,553,794, an average of \$2,811.

In view of the talk about alleged excessive salaries, the most significant of the statistics given above are those regarding salaries of general officers receiving \$3,000 or more. This classification includes all officers receiving so-called "fancy" salaries and probably includes every man receiving as much as \$10,000. The total earnings of the railways of the United States in 1916 were \$3,475,000,000, and their total operating expenses were \$2,277,000,000. The compensation paid to all of the 4,247 general officers who received \$3,000 or more was \$27,442,958. This was less than 8/10 of one per cent of the total earnings of the roads and was

1¼ per cent of the total operating expenses. In other words, the total compensation paid to all general officers receiving over \$3,000 a year took less than 8 cents out of each \$10 bill the railways earned, and took 12½ cents out of each \$10 charged to their operating expenses.

There have been cases where railway officers were scandalously overpaid. It is true, as has been alleged, that there are some parasites on the payrolls—men who are receiving large salaries for doing little or nothing. But such cases are extremely exceptional. As a rule, the salaries paid to railway officers are smaller than the salaries and incomes of men occupying comparable positions in other lines of business and professional activity. Usually when large salaries are paid they go to men who have worked their way up from the ranks to positions of the greatest eminence in the business. They are for those who receive them the rewards of many years of arduous and efficient service; and they are for the younger and more ambitious officers, prizes to work for and incentives to put forth their utmost efforts. Remove the large salaries from the railway business, and you will rapidly reduce the number of able and ambitious men who will enter it, and as rapidly increase the number of able and ambitious men who will leave it. For whatever theorists may say is done or ought to be done, the fact is that at least nine-tenths of the able and ambitious men in the professions and in industry are governed in what they do and in the way they do it by the amount of money they expect to receive for it.

The lower ranks of railway officers are paid too little. There ought to be a pretty general increase in the salaries of division superintendents and their staffs, including assistant superintendents, master mechanics, division engineers, trainmasters, road foremen of engines, train despatchers, and so on. But a general reduction in the salaries of the higher officers would be unjust to the officers themselves and extremely inexpedient from the standpoint of the public. It would cost, through reduced efficiency in railroad operation, many times as much as it would save.

The *Railway Age's* understanding is that the director general does not contemplate any sweeping changes in railway salaries. He has repeatedly made remarks indicating that he does not. It is to be hoped, however, that he will soon settle the question definitely one way or the other. There is much uneasiness and uncertainty among railway officers about what he intends to do. Now, railway officers are human, and we have known very few human beings who could work with high efficiency while living in constant fear of having their incomes reduced or losing their jobs.

There is much solicitude being shown by the government regarding the attitude of railway employees. The Railroad Wage Commission doubtless will give them a general increase in their pay, and meantime they are being adjured from high official quarters to be loyal and work hard. Meantime, railway officers are being accused by certain newspapers of "lying down"; they have been given to understand that they must not use publicity to defend themselves or their work; they are reading in almost every newspaper gossip about what is or is not going to be done to their salaries, and there still prevails among them much uncertainty as to just what the government wants and does not want to do.

Railway officers are working as hard as they ever did, but it is inconceivable that with all these handicaps they can work with the greatest possible efficiency. There are almost 20,000 railway officers. At least nine-tenths of them have risen from the ranks to their present positions. They are the brains of the business. As important as is the efficient use of hands to the success of railroad operation, there is something much more important, and that is the efficient use of brains. Now, while under conditions of uncertainty and discouragement a man may use his hands efficiently, no man under those conditions ever did or ever

will use his brain with the greatest efficiency; and when the brains of a business are not used efficiently it is a matter of but a short time until the hands in it will not be used efficiently.

Railway Supply Companies and Standardization

THE OPEN LETTER TO William G. McAdoo, director-general of railroads, from George A. Post, president of the Railway Business Association, which is published elsewhere in this issue, points out clearly the position of the railway supply companies in the matter of standardization. These companies hold a unique position in the development of cars and locomotives in the United States. Due to the extreme competition in the railway supply field, they are forced to use the most scientific methods and avail themselves of the best inventive genius to maintain their business. This has all worked to the advantage of the railway companies, and it is due largely to this competition that our locomotives and cars have been so well developed. The railways under private management have found it necessary to improve their facilities, thereby obtaining more economical operation to meet the competition with other roads. As compared to the state-owned roads of Germany, Emery R. Johnson in his book on American Railway Transportation says: "The technical development of the freight service in the United States is far in advance of that of Germany." The railway supply companies have played a very important part in this development. As Mr. Post says, "In the field of transportation, inventors and developers of special appliances embody the spirit and function of progress." Further, "What they (manufacturers of railway goods) have achieved for the public in safety, comfort, speed and economy of railway operation has been accomplished in an atmosphere of keenest competition." If standardization of either cars or locomotives is carried to the extreme, the incentive for the railway supply companies to still further improve their products and seek new methods for further increasing economies in operation will be removed.

Some persons believe that it is not necessary to use patented articles in the construction of cars and locomotives if sufficient thought and study is given to designs which will perform practically the same functions without the violation of any patent rights. In almost every case, however, those who seek to evade these patent rights, use the patents as a base from which to design similar parts, and through some technicality seek to evade the patent rights. Any wholesale attempt to follow such a practice will defeat the very purpose of all patent law, which is designed to stimulate the exercise of genius. Until we are ready to admit that an absolute state of perfection has been reached we can ill afford to throttle future development.

As a purely economic problem, particularly during time of war, those companies which are well organized to manufacture the special devices applied to cars and locomotives should be held intact. The country needs cars and locomotives. If any attempt is made to have the *entire* car or the *entire* locomotive made at any of the so-called erecting plants, either the capacity of those plants will have to be reduced to provide facilities for making these specialties, or time, money and labor will have to be expended to increase the facilities of the plants for this purpose. In the first case it would mean a decrease in the output of cars and locomotives, and in the second case it would mean a delay for many months in securing the full output of cars and locomotives. At the same time, the plants and investments of those whose business it is to manufacture these parts would be destroyed. Furthermore, the benefits from well organized

and centralized production of these plants would be lost, for if the work is to be done by the car and locomotive builders it would be distributed among the builders' plants, whereas now it is done at the highly specialized central plant of the specialty manufacturer. Some of those builders that have attempted to manufacture special devices under shop rights, have on mature and careful investigation, with a fair charge to overhead expense, found that they were doing so at a net loss.

The plants of the supply companies are essential for the rapid production of cars and locomotives. The ideas, inventive talent and the engineers of the railway supply companies are needed for the further development of our equipment. Justice demands that they be paid for what they have done. The progress of our railways in the further development of cars and locomotives demands that they be encouraged to produce and to develop new ideas which will make cars and locomotives safer to run, cheaper to maintain and more economical in construction.

Mr. Post's letter merits the profound consideration of the governmental authorities interested in the purchase of cars and locomotives.

The Danger of Over-Standardization

SINCE THE GOVERNMENT ASSUMED CONTROL of the railways there has been a great deal of comment regarding the possibility that it would standardize many kinds of equipment and appliances, and require the use of the things standardized throughout the United States. Arguments have been advanced to demonstrate the economies which would follow the reduction in the number of standards now in use. Undoubtedly some important advantages and economies could be gained by increasing the amount of standardization on our railways. But it is easily possible to over-standardize as well as to under-standardize. The former has been an evil in the past. There is danger that the latter will be the tendency under concentrated government control of the railways' and of the two evils over-standardization would be much the worst, because it would interfere with progress.

The history of our railroads has been one of rapid, continuous development. Locomotives, cars, bridges and many other elements of the property have been retired because of obsolescence or inadequacy more frequently than because they were worn out. This development has never been more rapid than in the last few years. The introduction of the Mikado and Santa Fe types of locomotives with the stoker, the superheater and other appliances, the substitution of open-hearth for Bessemer steel rails, the development of the concrete trestle and the use of the section motor car are all so recent as to be familiar to everyone. If a locomotive or a form of road work construction had been adopted as standard for all of the railways of the United States, it is not too much to fear that the red tape which surrounds a government standard once it has been adopted would have held back most, if not all of these developments. With the tremendous demands which are now being made upon the carriers for service and with the handicaps of labor shortage, etc., under which they are laboring, the roads now need the benefit of new developments of all kinds more than at any previous period in their history.

Many of the important developments in the railway field have been the result of the co-operation of railway men and railway supply manufacturers. Practically all of the improvements of any importance have required sympathetic study and observation in service to develop and adapt them to the work they are to perform. In many instances, important devices have been rejected by several roads as impractical, only to be developed successfully on some other road.

Herein lies one of the greatest dangers of standardization for instead of the merits of such devices being passed upon by a large number of men working independently on different roads, they will very naturally be reviewed by a small group working more or less closely in unison, who will determine whether the devices shall be used or not. One need only recall the skepticism of Commodore Vanderbilt when George Westinghouse first presented the air-brake to him, to show the reality of this danger. If Commodore Vanderbilt had been on a standardization committee for all of the American railroads it is entirely possible that the air-brake would have met an untimely end. At least the chances are that its development would have been seriously delayed. A more recent instance of the differing of opinion which is certain to develop regarding any device is illustrated by the rejection of screw spikes by the Pennsylvania while the Lackawanna, operating in the same general territory and with somewhat similar traffic conditions, has made them standard for use over the entire system.

The greatest development in the railway industry comes when men throughout the country and on all kinds of roads are endeavoring to improve conditions. This state of affairs has existed very generally on the American railroads, and new improvements have been developed in the east and in the west, on main lines and on branch lines. The section motor car, probably the most important improvement of recent years in the maintenance of way department, was developed on two or three western roads, where its use was at first confined largely to branch lines of light traffic. On the other hand, the pneumatic tie tamper, which bids fair to become one of the most important labor saving devices in this field, was developed on the multiple-track main line of an important eastern road.

That the railways of the United States are far from the limit of their development will be granted by all. That there is a great demand for further development in all branches of the service if they are to meet successfully the demands of the public for increased and more efficient service, is also evident. This requires the maximum freedom for the introduction and working out of new ideas which in turn require opportunity for progress along a wide diversity of lines. The surest way in which this development can be killed is by over-standardization and railway men and government authorities alike, should realize this to its fullest extent.

Buffalo, Rochester & Pittsburgh

EXTRAORDINARY INTEREST attaches to the publication of the first annual reports for the 1917 calendar year. The report of the Buffalo, Rochester & Pittsburgh is the first one to be made public and if there was any real foundation for hope that it is typical of what others will be, it would be a matter of congratulation both to the public and the railroad security holders. The extraordinary difficulties, under which the Eastern roads especially operated in 1917, are well known. Unnecessarily delayed maintenance, congestion, inadequate facilities and abnormally high costs have been the rule. Notwithstanding this, the Buffalo, Rochester & Pittsburgh made a remarkably good showing in 1917. Except for deferred maintenance of way, the ills enumerated above were effectively offset. The road handled the largest amount of freight in its history; the total ton mileage being 2,697,000,000; an increase over 1916 of 12.74 per cent. Passenger mileage totalled 57,000,000, an increase of 4.26 per cent.

Operating expenses, of course, mounted up, the eight-hour law was in effect, there were necessary increases in rates of pay for employees in other branches of service besides the train service fuel and material cost much more; notwithstanding there was no alarming jump in expenses; the total

being \$11,879,000; an increase of \$2,489,000; whereas revenues amounted to \$14,975,000 in 1917; an increase of \$2,213,000. The decrease in net, therefore, was only \$276,000. Taxes increased nearly 100 per cent; the total being \$506,000 in 1917, comparing with \$262,000 in 1916. After paying interest and rental charges, the Buffalo, Rochester & Pittsburgh had \$1,068,000 available for dividends, or equivalent to 6.47 per cent on the total outstanding stock. In 1916 the surplus was \$1,239,000 or the equivalent of 7.51 per cent. The company is paying 6 per cent on both its preferred and its common.

In a broad way, the reason why the Buffalo, Rochester & Pittsburgh did so well under such trying conditions, was

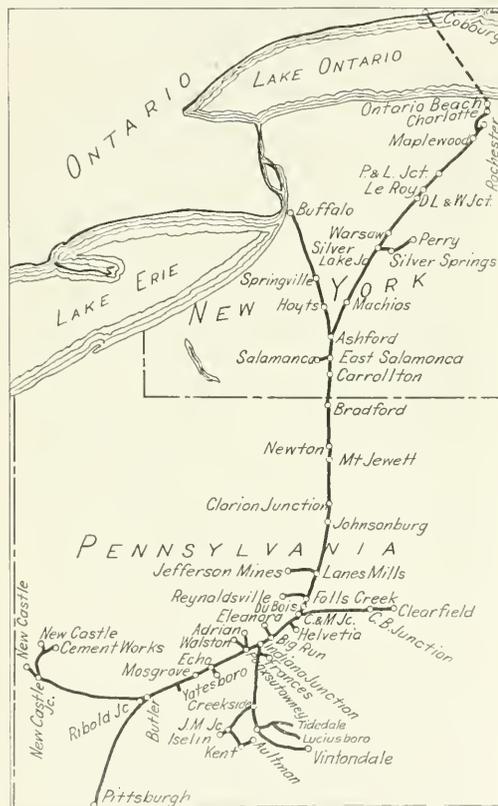
though it is hardly fair to use the word fortunate when the explanation is foresight and liberality. Prior to 1917, the company had ordered 22 locomotives but only 8—all Mallets—have been received and those 8 were received subsequent to December 31. In addition to the 14 to come on this order, 25 additional (of which 5 were for passenger service and 20 for freight and switching) have been ordered and deliveries are expected within the next month.

During 1917, the company spent \$1,724,000 for additions and betterments. The largest items are \$508,000 for terminal facilities at East Salamanca, N. Y.; \$315,000 for terminal facilities at Elk Run Junction, Penn., and \$283,000 for yard and siding extensions.

The Buffalo, Rochester & Pittsburgh bituminous coal moves in large part north. About the only traffic which could be used as an offset to give coal cars a southbound loading is iron ore received at the lakes for shipment to the furnaces at Punxsutawney and elsewhere on the south end of the line. In 1917 the tonnage of bituminous coal carried was 10,216,000; an increase of 909,000 tons over 1916. The tonnage of iron ore was 610,000 tons; a decrease of 125,000. Notwithstanding this fact, which, of course, necessitated a larger empty car movement, the average revenue train load in 1917 was 836 tons as compared with 777 tons, the average in 1916. This is a real achievement in better operation and due largely to supervision which effectively kept after the obtaining of full rating trains for locomotives.

The following table shows the principal figures for operation in 1917 as compared with 1916:

	1917	1916
Average mileage operated.....	585	586
Freight revenue	\$13,119,838	\$11,036,335
Passenger revenue	1,313,594	1,214,352
Total operating revenue.....	14,975,000	12,761,755
Maintenance of way and structures	1,454,770	1,580,862
Maintenance of equipment	4,043,988	3,056,545
Traffic expenses	191,523	152,883
Transportation expenses	5,813,030	4,303,677
General expenses	354,834	278,631
Total operating expenses.....	11,878,566	9,389,793
Taxes	506,000	262,000
Operating income	2,590,075	3,108,518
Gross income	3,900,077	4,231,792
Net income	1,739,820	2,129,539
Appropriations	671,715	890,492
Dividends	990,000	885,000



The Buffalo, Rochester & Pittsburgh

that for some years past the management has exercised, to an unusual extent, foresight in anticipating traffic needs and great liberality in providing facilities beforehand to meet these needs. Deferred maintenance of way will have as little immediately detrimental effect on this road as possibly on any road in the East. When President Noonan says in his report, "Notwithstanding the abnormal conditions prevailing in all directions, the physical condition of your property is excellent and prepared to handle a maximum business," it is not a mere glittering generality. Detailed physical inspection would show it to be strictly a statement of fact.

One of the imperative needs of the railroads in the past year has been more locomotives. In this respect the Buffalo, Rochester & Pittsburgh has been particularly fortunate—al-

New Books

The Calorific Value of Fuels. By Herman Pool, F.C.S. Third edition, rewritten by Robert Thurston Kent, M.E. 267 pages, illustrated, 6 in. by 9 1/4 in., bound in cloth. Published by John Wiley & Sons, Inc., 432 Fourth avenue, New York. Price, \$3 net.

This book, while based on the second edition of the late Mr. Pool's work which was published in 1900, has been practically rewritten to incorporate the latest researches not only on coal, but on fuels which to a great extent have replaced or supplemented coal. Revision has been made of some of the work of investigators which was published in the first edition and which now is generally discredited. It has been prepared particularly to cover every industry which uses fuel. It contains five chapters on the various methods of measuring the calorific value of fuel. Three chapters are given over to the discussion of all kinds of solid fuels, liquid fuels and gaseous fuels. One chapter contains a discussion on the combustion of coal, one on the calorific power of coal burned under a steam boiler, and another on the analysis and measurement of the products of combustion. An appendix is added, in which are included the A. S. M. E. boiler test code and tables of interest in the study of fuels. The book is well illustrated.

Letters to the Editor

Screw Spikes Unsatisfactory for Heavy Traffic Lines

PITTSBURGH, Pa.

TO THE EDITOR:

The editorial on the screw spike situation, which appeared in *The Railway Age* of February 8, page 294, makes it desirable and even necessary to make some additional statements relative to this subject. The writer of the editorial failed to catch the full significance of item No. 2 on page 3 of the report of the screw spike and tie plate test, in Bulletin No. 200 of the American Railway Engineering Association for October, 1917, prepared for the committee by W. G. Coughlin, chairman of the Pennsylvania committee, wherein the very first sentence states that "No satisfactory device is known for resetting screw spikes after the thread in the wood has been destroyed." This vital defect has also been referred to by the writer twice previously in publications of the American Railway Engineering Association; the first time as a prediction, by reason of his studies of European practice, and the second time as a confirmation of the prediction, from the results of trials made. In Bulletin No. 109, dated March, 1909, under the title of "The Question of Screw Fastenings to Secure Rails to Ties," page 33, he made this statement:

"The proof that the screw spike is not a thoroughly efficient rail fastening lies in the devices which have been invented to assist it in its work: the screw plug, the Collet trenail, the Thiollier helical lining, and the Lakhovskiy screw and case."

In Bulletin No. 165, dated March, 1914, under the title of "Experiment with Treated Cross Ties, Wood Screws and Thiollier Helical Linings," the writer made this statement on page 265, after the results of prolonged service tests in the tracks of the Pennsylvania Lines West of Pittsburgh:

"... Some of the same difficulties are arising in the new tests, which clearly show that a screw spike is not a successful device for securing rails to wooden ties, unless a successful method of repairs from time to time can be devised which will enable one to "cure" the screw spike when it becomes loose, which it does inevitably in the course of time in many instances under heavy traffic and severe conditions."

In other words, it is impossible for a screw spike to be either a successful method for fastening the rail to the tie or a successful appliance for prolonging the life of the tie by preserving it from mechanical destruction until a successful method has been devised for enabling the spike to have a firm hold in the tie once more after having become loose. This covers both of the points in the editorial: the one with reference to the spike as a fastening, and the other with reference to its function for the protection of ties from the destructive action of the ordinary cut or nail spikes. The following statement is taken from the editorial:

"While their function as track fastenings is of primary importance, their economy comes about primarily because of their protection of the ties from the destructive action of the ordinary cut or nail spikes. The Pennsylvania appears not to have considered this advantage of the screw spike as it confined its report almost entirely to the service secured as a track fastening in spite of the fact that it is the other object which has led to the introduction of the screw spike in most instances."

The editorial does not tell the entire story in this par-

ticular, because if one will refer to the *Transactions* Bulletin of the American Railway Engineering Association No. 165, for March, 1914, he will find that the writer inaugurated an experiment on the Pennsylvania Lines West of Pittsburgh in 1905, in order to decide upon the value of that very function of enabling a treated cross tie to be used through its entire life, for he realized that it was a question of suitable fastenings. The following is a quotation from page 265:

"The experiments described in the following pages by those who had direct charge of the work, Messrs. Wiggins and McKeon, were undertaken by the writer to determine if it would be possible to find suitable rail fastenings which would enable us to obtain the full life of a preserved cross tie until it should perish by decay. He was fully impressed with the short life of steel products used in track work especially on railroads carrying a large amount of refrigerator traffic, and also with the idea that it might not be possible to obtain the full life of preserved cross ties, because it seemed quite doubtful whether the fastenings heretofore proposed would last sufficiently long for the purpose."

Unless a suitable fastening could be secured it would not be possible to obtain the full length of life of the treated cross tie, because in all probability it would be destroyed by the mechanical action of replacement of fastenings during the period of life of the tie. The test referred to was designed specifically for that purpose and the screw fastenings used were a failure, because they did not meet the conditions. A successful method for rehabilitating the screw hold in the wood after the screw became loose had not been found. Other experiments of a like nature were made over other portions of the Pennsylvania System, which also pointed to the same trouble with the screw fastening; then the elaborate experiments at Birmingham and Wooster under the supervision of a special committee, headed by Jos. T. Richards, and afterwards by W. G. Coughlin, his successor as engineer maintenance of way of the Pennsylvania Railroad, were undertaken, not only for the purpose of determining the economy of the screw spike as an economical and efficient rail fastening, but also to discover by trial a plan for the continuity of the screw spike as a fastening throughout the life of the tie. No benefit to the tie itself can be given by the fastening, unless its defects in service can be repaired as they arise; otherwise, the tie is destroyed by the imperfection of the fastening devised for the protection and prolongation of its life. It was the judgment of the joint committee that, up to the present time, this difficulty with the screw spike has not been met. You will readily see, therefore, that the following statement is incorrect:

"By ignoring this condition, which led to the original introduction of the screw spike, it is not surprising that the Pennsylvania arrived at the conclusion presented in the recent report."

The writer takes exception to another statement in the editorial, as follows:

"The screw spike requires a more expensive form of track construction than the cut spike. For this reason, its use is probably limited at present to those lines of heavy traffic where the destruction of the track is the greatest and the cost of maintenance correspondingly heavy."

This is precisely the condition under which the screw spike is not suitable for use, and the reasons have really been stated in the previous part of this communication. It is the reason for the screw spike being successful on the Delaware, Lackawanna & Western to Atchison, Topeka & Santa Fe, and the New York, New Haven & Hartford. Just as soon as the traffic is sufficiently heavy, over the tracks where screw spikes are used on those railroads, the screw will become loose and the necessity for repairs arise. The track where the tests at Birmingham were made probably carries the heaviest traffic in the country, as the re-

port in Bulletin No. 200 shows in detail, and it is because the traffic is so heavy that the screw fastenings became loose. Mr. Coughlin calls attention to this in the report. The traffic at Wooster, not being nearly so heavy as at Birmingham, does not affect the screw fastenings nearly to the same extent in the same time. As long, therefore, as the fastenings are used where the traffic is not of the severest kind, a certain amount of success can be obtained with this type of fastening, but for the purposes of the Pennsylvania System on those portions of its lines where it is very important to prevent the mechanical destruction of ties, on account of the heavy service conditions, the screw spike will not be successful until the cure for its shortcomings has been discovered.

W. C. CUSHING,
Chief Engineer Maintenance of Way,
Southwest System, Pennsylvania Lines.

The Dispatcher's Responsibility for the Waste of Fuel

SALT LAKE CITY, Utah.

TO THE EDITOR:

In your issue of February 8 there appeared an article entitled "Who Wastes the Fuel," written by a master mechanic. The author states that the train dispatcher wastes more fuel than anyone else, basing his statement on the assumption that the dispatcher is responsible for all unnecessary stops and delays on the line. A careful investigation would show that the great majority of these delays are due to causes over which the dispatcher has no control.

The dispatcher is not responsible for the retention of the "31" form of train order, now ten years behind the times. Neither is he responsible for the stops and broken drawbars resulting from the rule that requires conductors to sign the "31" order. Not infrequently the conductor reports the train ready and receives his orders from the dispatcher 15 or 30 minutes before he actually leaves the yard. In nine cases out of ten the dispatcher has no knowledge of this until the train shows up late at the next office. Other trains are then probably out of reach; this results in bad delays and more unnecessary stops for orders. Other reasons for delays are hotboxes, rebrassing cars, engine failures, and various similar causes. Quite a bit of what is called poor despatching, as well as useless consumption of fuel, could be eliminated provided the conductors were required to give information concerning such delays to the dispatcher so that he could arrange the best possible meeting points and keep other trains moving.

T. G. ANDERSON.

HAILEYVILLE, Okla.

TO THE EDITOR:

"Master Mechanic," writing in the *Railway Age* of February 8, says that "No one person wastes as much coal as the train dispatcher, more especially in a single-track district." This is a rank exaggeration. Train despatching in the abstract is strictly confined to single track. It requires as much skill to successfully despatch trains on a single track railroad as it does to turn engines out of a shop or roundhouse, and I dare say a little more. The telephone is now in use generally for handling trains, and it introduces new complications. Just at the time when the dispatcher's mind is on his trains, trying to figure a good move, someone comes on the wire and wants to get quick action on a car somewhere; or to load a car of stock, get a wire pass, talk to the chief clerk, find out where his pay check is, what conductor will be on No. 56 next Sunday, or something of the like. How could anything but poor despatching be expected under such circumstances? When it takes from 10 to 15 minutes to raise an operator for a "19" order, should anyone be surprised if the train had to

stop to get it? It is on record where an operator was told by the superintendent, while the dispatcher was calling the operator for an order and a passenger train was due in 30 minutes, the operator having a few tickets to sell for that train, not to pay any attention to the dispatcher; he could put his orders out somewhere else; "take care of your passengers." As a matter of fact this was the only station open at that time for a distance of 25 miles, and the only place he could get the train he was after.

What recourse has the dispatcher when an engine fails on an important train and it is necessary to get another engine from the roundhouse in quick time and the roundhouse is unable to give even an approximate figure on when the engine will be ready? Nine chances out of ten the only information the dispatcher can obtain is that the engine is being made ready, "will give you a figure soon." This is repeated several times. There are opposing trains to move against this engine (or train), and, no doubt, with the dispatcher in such a fix some of them will have to stop for further help, and maybe lie in the side track for hours. I would like to see Mr. Master Mechanic handle a situation of this kind to a successful conclusion, and then say who is wasting the coal.

When the shop has a break-in engine to put out on the main track in the midst of a lot of trains (when it could be broken in just as easily in the yard), and it is two or three hours coming out of the house, the dispatcher all the time fighting other trains to move the break-in engine, who is wasting the coal then?

Your correspondent's assertion that unimportant messages are sent to trains at small stations, causing them to stop especially for the message, is not true on the Rock Island.

He asks how many dispatchers make a study of the profile of the road and are thoroughly acquainted with the grades and curvature at important points? There are many of them. The best way for the dispatcher to gain this knowledge is by frequent trips over the road, but how many railroads allow the dispatcher this opportunity unless he does it on his own time? If Mr. Master Mechanic wants to attend an annual meeting of a railroad gathering at such places as Atlantic City or Chicago, his pay goes on, he is furnished a bed to sleep in both ways, and a liberal expense account. The dispatcher is not so fortunate; yet such opportunities to gain knowledge would be as beneficial to the dispatcher as to the master mechanic. The railroad would not lose a cent by it.

Short side tracks, grades, etc., constitute a condition over which the dispatcher has no control; he must make the best of it. If he has to hold back trains to avoid sawing at certain places and trains double hills because there was no sand in the box when the engine left the house, the fuel is being wasted by someone else.

When an engine failure occurs, which is the fault of the mechanical department, the master mechanic becomes very active to see if he cannot prevail on the transportation department to keep the case off the engine failure list. If he is successful in talking them out of it, then where does the full effect of the failure fall? * * * J. L. Coss.

EGYPT AND JERUSALEM JOINED BY RAIL.—A copyright cable despatch in the New York Sun from London, dated February 21, states that Gen. Allenby has completed the railroad connection between Egypt and Jerusalem in the early part of the month, thereby enabling him to simplify his transportation arrangements and to make an attempt to clear the situation on his right flank. The position south-east of Jerusalem remains obscure, but the Turks are in possession of the northern shores of the Dead Sea and hold positions covering Jericho, from which they have communications by the Hedjaz railway.

McAdoo's Instructions to Regional Directors

Outline of Their Functions and of Policy of Director General for Operation Under Government Control

UNDER THE ORGANIZATION of the Railroad Administration the point of contact between railroad officers and the administration in most instances is through the Regional Directors appointed by Director General McAdoo on January 18, A. H. Smith, in charge of operation of the Eastern roads; C. H. Markham, in charge of the operation of the Southern roads, and R. H. Aishton, in charge of the operation of the Western roads. Orders issued by the Regional Directors are issued by authority of the Director General. On February 4, Mr. McAdoo addressed to each of the Regional Directors a letter outlining what he expected of them, which is of great interest as expressing the policy which Mr. McAdoo desires to have carried out under government control. The letter is as follows:

The following is an outline of the functions of the Regional Directors. I shall be glad if you will bring to my attention from time to time any points which are not clear to you or which you think call for modification or extension.

Broadly speaking, I wish to give you power to direct railroad operations in your territory so as to handle traffic with the least congestion, the highest efficiency and the greatest expedition. As far as is consistent with these objects you will, of course, keep down operating expenses.

I have put responsibility upon you for the entire operating situation. I mention the following simply as a few illustrations of the matters which are thus entrusted to you.

You should see that terminals are used to the best advantage and that such changes in established practices are made as will bring this about.

Where minor capital expenditures are needed to establish new connections for the better use of terminals, you will endeavor to get some or all of the interested companies, by their voluntary action, to arrange therefor, and will refer to me cases of expenditures which cannot be so arranged.

You will order such changes in routing of traffic, using any lines or parts of lines in combination, as will avoid uneconomical routes and congestion of particular terminals or railroads, giving due consideration to shippers' interest.

The Commission on Car Service has been replaced by the Car Service Section of the Division of Transportation (the personnel remaining largely the same). The Car Service Section

(a) Will have charge of all matters pertaining to car service, including the re-location of freight cars as between individual railroads and regions.

(b) Will issue instructions through the Regional Director providing, on application of proper governmental authorities, for preference in car supply and movement.

(c) Will receive from railroads such reports, periodical or special, as it may require in order to keep fully informed with respect to car service, embargo or transportation conditions.

(d) Must be promptly informed of all embargoes placed, modified or removed, and will, from time to time, recommend such embargo policies and exemptions as the needs of the government, seasonal requirements, or other circumstances, may demand.

(e) Will deal directly with railroads with respect to matters within its jurisdiction, and will keep the Regional Directors advised of all instructions or orders in which they are concerned.

You will keep fully advised as to the situation concerning the use of locomotives, repairs to locomotives, amount of

shop capacity and amount of shop labor available for locomotive repairs.

You will have power to promote the general good of the transportation situation in your region by making transfers of locomotives from one railroad to another or of locomotives needing repairs from one shop to another and transfer of shop labor from one shop to another. Such transfers should, of course, have reference to any agreements between labor and the company affected and be made with just regard to the welfare and rights of employees. You will, of course, have like duty and power respecting car repairs.

Policy as to Labor

As to labor, you have been advised of the appointment of the Railroad Wage Commission. The general policy as to all labor is that there shall be no interruption of work because of any controversies between employers and employees. All matters relating to wages and living conditions will have the consideration of the Railroad Wage Commission.

Pending action by me upon the report of that commission there ought not to be any radical change in existing practices without submitting the matter to me for approval. But it should be understood that the usual methods of settling by agreement ordinary grievances and complaints shall continue as heretofore and that the companies are free to negotiate as heretofore with their employees and are expected to observe faithfully existing agreements with their employees. In cases of doubt about new negotiations with employees, the advice of the Director General should be sought.

You should bear in mind that labor has the very natural feeling that railroad managers, although now working for the government and on government account, necessarily continue the same conception of and attitude towards labor problems that they had when acting under private management. I am told that labor will have a natural suspicion that any unfavorable action taken by railroad managers indicates a purpose on their part to make governmental control a failure and to use it for promotion or vindication of their own theories. For these reasons, great care should be taken to avoid anything having even the appearance of arbitrary action, and it will be expedient, at least at the outset and until the matter shall take more definite shape, not to dispose, unless by mutual agreement, of any labor claims involving large questions of policy without first submitting the matter to me.

In the central organization in Washington I propose to have a labor man as a member of my staff who will give his special attention to labor problems, not only to the problems of wages and conditions but also to the problem of aiding the railroads in obtaining sufficient labor and of bringing about a better understanding between officers and employees. The morale and esprit de corps of officers and men should be brought to the highest standards.

Special Studies

There are several matters involving broad questions of public policy concerning which I wish you to make careful studies and report to me with your recommendations.

1. To what extent, if at all, should additional passenger service be discontinued in order to save coal, labor, locomotives and shop capacity for freight service. In arriving at any recommendations on this matter it is very important

to give due consideration to public convenience. It is quite probable that I shall wish to take the matter up informally with state railroad commissions as to any reductions in service which you think should be made. In dealing with such matters the local point of view must be considered and the state commissions afford a useful instrumentality for obtaining this point of view, and also, to the extent that we can act in harmony with the commission's views, for satisfying local public sentiment as to what is done. So far the state commissions have evinced a commendable spirit of co-operation.

2. I wish you also to make careful study of the extent to which (a) freight solicitation should be discontinued or diminished and freight and passenger agencies, freight offices, ticket offices, etc., discontinued or consolidated; (b) the extent to which traffic officials, soliciting or otherwise, should be transferred to other service and to what other service they should be assigned, and (c) extent to which, if at all, any portion of these forces should be released from service.

3. I wish you also to make a study of (a) the extent to which duplications of service can be avoided, both passenger and freight; (b) extent to which fast freight service can be discontinued or slowed down; (c) extent to which less-than-carload service can be consolidated or diminished; at all times having reasonable consideration for the public convenience.

4. I would like to have your views as to the extent to which the making of purchases can be unified either for the entire country, or for the separate regions, or for parts thereof, accompanying it with a statement of the advantages which you think would result from such unification.

5. The extent to which standardization may be effected in your region on the railroads in your territory (a) with respect to locomotives—the various types which will be required to effect the best standardization; (b) freight cars, open and box cars, and the various types which will be best adapted for use in your territory.

Your recommendations should be made in reference to the adoption of the same standards throughout the United States except in so far as local conditions can make specific types or designs desirable to meet the peculiarities of such local conditions.

6. In general I shall be glad to have you make a study of the extent to which various classes of operating expenses can be curtailed or eliminated on account of present conditions of government possession and control. Of course, you understand that by virtue of General Order No. 6 it will be necessary for local associations to make applications for the Director General's approval if it is desired that they continue to be supported out of operating revenues. If any such applications are made to you, I shall be glad to have your recommendations in regard thereto, being guided by the principle that no functions should be carried on by associations whose expenses are chargeable against operating revenues except such functions as are reasonably necessary under the existing condition of Government possession and control, and that only the expense appropriate to such functions should be paid out of operating revenues.

On all these matters I shall appreciate your specific recommendations at the earliest practicable date.

General Instructions

In dealing with this whole subject, it is, of course, important for you to view the matter, and to get the various railroad executives of railroads in your jurisdiction to view the matter, from the entirely new standpoint that all the railroads now constitute a single system, to be operated so as to secure the maximum of transportation with the minimum of waste; and that the fact that a readjustment will mean that a particular railroad will lose certain sorts of

traffic must be disregarded as it is not a sufficient reason why the readjustment should not be made, if in other respects it is in the public interest.

Certain general matters are having consideration here and somewhat later will probably be taken up with you. Examples of these matters are additions and betterments, what equipment not already ordered needs to be provided. I shall be greatly interested in any suggestions which you can make to me on these matters at the present time and from time to time.

You will of course have the right to continue or discontinue or create such local committees or representatives as you think proper to insure the best results at particular terminals or in particular subdivisions of your territory. Doubtless at many important terminals you will find it advantageous to select some exceptionally able, aggressive and tactful railroad representative to take charge of the terminal and to co-ordinate, with the railroad activities, the activities of merchants, coal dealers, truckmen, etc., so as to secure the best possible results in the loading and unloading of cars.

I take it that your communications to the railroads in your region should be to the respective presidents, receivers or other chief operating officers with such modifications of that practice as you may think advisable, arranging, however, in case of such modifications, that the president, receiver, or other chief operating officer fully understands the practice which you pursue.

Pending the further shaping of the work, there are various general subjects which you should refer to this office, and in all such cases I shall appreciate your suggestions or recommendations. Among such subjects are financial problems and legal problems.

You should not proceed upon the assumption that it is proper, by reason of the federal authority under which you act, to take, without regard to state railroad commissions, action which under existing laws requires the permission or approval of these commissions. The President's proclamation contemplates that unless and until I shall otherwise order, procedure under existing state statutes shall be observed.

I wish to emphasize that, at least at the outset, I do not consider it expedient for the regional directors to undertake to establish without my approval, policies of a public character, i. e., policies which substantially affect the character of service rendered the public or the rights of the public.

Substantial reduction of passenger service is an example of this character. It is impracticable to define these matters clearly, but practical definition will evolve gradually as cases arise. Meanwhile doubtful questions should be submitted to me.

The controlling principle is that the government being now in possession and control, it is important for the Director General, as the direct representative of the Government, to have a voice in deciding matters which primarily affect the public, because we cannot expect that the public will be entirely satisfied to have these matters settled by the railroad managers, who in the public estimation, will still be regarded as imbued with the attitude of private management, no matter how disinterestedly those managers may be endeavoring to represent the public interest and nothing else.

Generally speaking, you will develop your organization as you think necessary, but it seems to me that in any event you will need a competent traffic representative, who should be selected with the concurrence of Mr. Edward Chambers, who will be in charge of the Division of Traffic with headquarters at Washington. I think you had better treat your organization as tentative until you have submitted the organization plan to me, as I may, upon consideration of tentative plans, wish to make some suggestions upon the subject.

Transportation and Food Supply

A STATEMENT issued by Herbert Hoover, United States food administrator, on February 21, that the United States is facing a critical period as to its food supply and attributing the cause to railroad congestion has developed a slight controversy with the Railroad Administration. While Mr. Hoover's statement apparently refers to the accumulated results of the delays to transportation experienced in December and January, Director General McAdoo has issued a statement saying that "so far as transportation is concerned there is no danger of suffering from a serious food shortage in the eastern part of the country." Mr. Hoover said that since December 1 this country has fallen far behind the agreed food program with the Allies, and by the end of February we will be short 45,000,000 bushels of cereal products as well as in meat products that were to be delivered. "This deficiency," the statement said, "is due solely to the railway congestion. The railway directorate since coming into control on January 1 has made effort to find remedy, but during the month of January the weather was insuperable, and although progress has been made since February 5 the situation is the accumulation of three months' delays.

"We have been unable to transport to seaboard the necessary foodstuffs for the Allies. This has not been due so much to the actual inability of the railways giving priority to foodstuffs for Allied shipping as it has been to delay in bringing the products from the farms to the terminal markets, where it can be aggregated, prepared and purchased by the Allies.

"The economic ramifications of this whole delay in the movement of the national harvest are almost countless, and they present the most critical of situations, of which no solution exists but a continued expansion of the efforts of the railway administration in the movement of foodstuffs in every direction to the exclusion of much other commerce of the country.

"Comparisons of the movement from day to day during the last few days with movements of similar periods last year reflect the efforts being made by the railway directorate. We have, however, a long accumulation to be got over within the next 60 days. The situation calls for every co-operation of the public—through the quick loading of cars, loading them to capacity and discharging them quickly—and in every way reducing the tax on the railways. Co-operation can be given by reduction in consumption of home and local stores to the exclusion so far as may be of transported articles.

"If every interest co-operates we shall supply the Allies and remedy the distribution of our abundant domestic supplies, for our farms are full of foodstuffs. No effort is being spared to move Allied food as fast as it can be accumulated in the interior, and today the railway directorate is arranging special trains to carry meat and packing house products from Chicago to load the waiting ships."

At the office of the Railroad Administration it was stated that the problem is rather one of supply and development of supply rather than of transportation, and that the railroads for some time have not only exceeded the movement for the corresponding period of the preceding year but have handled promptly all grain offered for transportation. Director General McAdoo has even gone so far as to instruct agents to solicit farmers to send in their grain for shipment. On February 21 there were 30,714 loaded cars at North Atlantic ports awaiting ships, exclusive of bulk grain and coal. In a letter to Mr. Hoover, Mr. McAdoo said:

"If you will notify me from time to time of the location of the specific supplies and the port or ports in the United States to which you wish to have such supplies transported,

I will guarantee the necessary transportation subject alone to interruption from blizzards and floods.

The Railroad Administration also issued a statement saying:

"There has now been about two weeks of moderately good weather during which time an extraordinary effort has been put forth by the railroads. For the week ending, February 16, 22,104,000 bushels of grain were received at Western primary markets, which were the largest receipts for one week in two years, an increase of 54 per cent over the previous week, and 51 per cent over the same week last year.

"The average number of cars of grain being loaded is 5,000, which is approximately 6,000,000 bushels daily. This has been done notwithstanding that weather conditions are still severe in a large part of the country, and it will certainly increase in proportion as the weather moderates."

This statement was based on figures gathered by the traffic division of the Railroad Administration. In the eight days between February 11 and February 19, 58,750 cars were loaded with grain, of which 26,549 were in the Western district (or west of the Mississippi), 9,519 were in the Eastern district, and 2,882 in the South.

Forty-two special food trains, containing 1,368 cars, were sent eastward from Chicago and East St. Louis to New York, Philadelphia and Boston for trans-shipments to the Allies between February 12 and 19. This through movement of food trains is still continuing, and six trains of meats are going daily to Eastern ports for export.

Between February 10 and February 21, 9,863 cars of live stock, dressed beef and perishable products have been shipped eastward from Chicago.

The movement of special food trains under fast schedules can be made in any section of the country threatened suddenly with a food shortage, according to railroad administration officials, and this plan will be resorted to if the shortage which Mr. Hoover forecast actually develops.

Reports to Mr. McAdoo on February 25, from Regional Director A. H. Smith, showed that there were no steamers waiting for food supplies on that date and that accumulations of cars at eastern terminals had been greatly reduced, from about 170,000 on January 1, to 43,970 eastbound loads, 4,115 eastbound empties, 31,012 westbound loads and 17,718 empties. In response to requests from Mr. McAdoo as to information as to the location of specific supplies and the port or ports to which he wished such supplies transported, Mr. Hoover has announced a plan for securing daily reports which may be furnished to the Railroad Administrator. An organization of regional transportation agents will be created for the purpose. Reports received by the Railroad Administration show that in many cases where cars are ordered the shipper has failed to load them promptly.

"The Food Administration," Mr. Hoover said, "has now directed the allied agencies to furnish it daily with their requirements, in order that they may be transmitted to the Railroad Administration in Washington.

"The most serious problem is the car needs, due to delayed movement of last year's crops, and of live-stock from the primary country points to the interior terminals, the mills, and the manufacturing centres, where they can be purchased for export and domestic supply. The presentation of these needs to the Railroad Administration is being met by the appointment of regional transportation agents for the Food Administration, already established in Chicago and proposed at New York and Atlanta. Their agencies will secure and furnish information as to car necessities for the primary movement of foodstuffs to the regional railway administration.

"Shippers of foodstuffs should apply in the first instance to the local railway officials, and upon failure to secure necessary transportation, they should, for grain and grain products, apply to the Food Administration zone trans-

agers; while shippers of livestock and perishables in the same difficulties should apply for the present directly to the Food Administration in Washington. These applications for cars will be put before the various Regional Directorates, and will be daily reported to the Railroad Administration in Washington."

At a conference on Monday between Mr. McAdoo and Mr. Hoover and members of their staffs arrangements were made for closer co-operation between the railroad and the food administrations, and Mr. McAdoo designated the following members of his staff to work with representatives of the food administration: C. R. Gray, director of the division of transportation; Edward Chambers, director of the division of traffic; W. C. Kendall, manager of the Car Service Section, and C. E. Spens, who has been appointed by Mr. McAdoo to serve as transportation director of the food administration.

Locomotive Standards Under Consideration

THE COMMITTEE ON LOCOMOTIVES appointed last summer by the Council of National Defense, of which S. M. Vauclain, vice-president of the Baldwin Locomotive Works, is chairman, has made a report recommending several standard types of locomotives to Henry Walters, who is in charge of the standardization investigation for Director General McAdoo. The recommended standards were then referred to a committee of railroad motive power officers, consisting of three appointed by each regional director, for their consideration and report. The railroad committee has been holding conferences on the subject since February 22 and will report back to Mr. Walters.

H. T. Bentley, superintendent of motive power and machinery of the Chicago & North Western, now acting as assistant to C. R. Gray, director of the division of transportation in the Railroad Administration, has been appointed chairman of the committee and the other members are as follows: Eastern district, H. Bartlett, chief mechanical engineer, Boston & Maine; William Schlafge, general mechanical superintendent, Erie; and H. L. Ingersoll, assistant to the president, New York Central; Southern district, R. W. Bell, general superintendent of motive power, Illinois Central; W. H. Lewis, superintendent of motive power, Norfolk & Western, and J. Hainen, assistant to vice-president, Southern Railway; Western district, Robert Quayle, superintendent of motive power and car department, Chicago & North Western; W. H. Wilson, assistant to first vice-president, Northern Pacific; and John Purcell, assistant to vice-president, Atchison, Topcka & Santa Fe. J. T. Wallis, general superintendent of motive power, Pennsylvania, Western lines, has also taken part in the conferences.

The locomotive builders' committee, besides Mr. Vauclain, includes Andrew Fletcher, president of the American Locomotive Company, and H. P. Ayres, vice-president of the H. K. Porter Company.

A "FIRST AID CORPS" FOR UNLOADING FREIGHT is one of the typical features of German railway operation. Attached to each important freight station is a regularly organized "first aid corps" of 100 able-bodied laborers who may be sent at a moment's notice to any point where freight is being discharged, upon advice from the consignee that he has not sufficient help to accomplish the work promptly. Unloading must be carried on day and night. Women and youths of the national auxiliary service may also be called upon to aid in unloading light freight. The service is organized on a military plan, with officers, sub-officers and corporals.

Milton H. Smith Testifies Regarding Political Contributions

THE INTERSTATE COMMERCE COMMISSION has given out a copy of a deposition of Milton H. Smith, president of the Louisville & Nashville, taken at Louisville, Ky., February 4, upon written interrogatories propounded by Joseph W. Folk, chief counsel for the commission, in connection with the commission's investigation into the financial relations, rates and practices of the company. The questions are some of those which Mr. Smith declined to answer at the time of his testimony before the commission and which he was ordered to answer in a decision by the Supreme Court of the District of Columbia recently upheld by the Supreme Court of the United States.

Mr. Smith said in reply to the interrogatories that he knew of no funds of the Louisville & Nashville expended in Tennessee for political campaign purposes during the year 1915 and charged to operating expenses. He also said that there were no such expenditures in Alabama in 1912 or 1913, but that \$30,000 was so expended there in the year 1914 and was charged to operating expenses. Such expenditures were not charged to construction account and no part was charged on the books of the Nashville, Chattanooga & St. Louis.

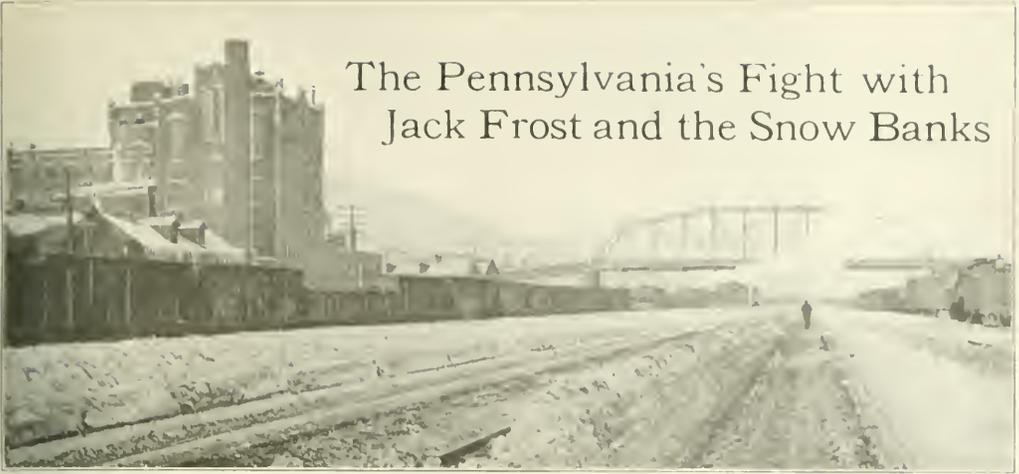
Among the vouchers found by the examiners of the commission in the files of the Louisville & Nashville there appeared one in favor of the Columbia Trust Company dated in February, 1910, for \$20,715, for special fees paid under the direction of the president. The examiners were refused information regarding this voucher. Mr. Smith stated that it was for payments of political agents and was charged to legal expenses, one of the sub-divisions of operating expenses. In reply to a query as to why the entry in reference to this voucher was made in such a way as to give no information as to the purpose of the expenditure, he said: "To be entirely frank, this was because it was not deemed advisable to disclose to anyone, not even to the company's own subordinate officers and employees, that it was making political expenditures."

As to another voucher for \$15,000, dated May 5, 1907, in favor of the National Bank of Commerce, Mr. Smith said this voucher was for money expended in aiding a newspaper "which was advocating certain views upon public questions in which the Louisville & Nashville concurred." He also admitted that the company by his direction had expended approximately \$34,800 in Alabama through an advertising agency in a campaign against rate reductions advocated by former Governor Comer of that state.

He was asked: "Is it the policy of the Louisville & Nashville to make political campaign contributions, if you know?"

"It is not," replied Mr. Smith, "but in the past the company occasionally made campaign contributions to defeat a candidate who was running on a platform of antagonism and injury to this company. In such cases the interests of the company seemed, in the judgment of its officers at that time, to require this as a matter of protection. These practices, however, while customary and conventional with corporations generally in the past, are contrary to the public opinion of today, and have been discontinued by our company. So far as this present proceeding is concerned, I think it proper to add that we appreciate the public nature of the service intended to be rendered by the commission and recognize the duty to co-operate in every way hereafter to the end that there shall be no more cause for complaint of such contributions."

GERMAN TRAVEL RESTRICTIONS.—Germany is to prohibit all traveling to the seaside or to the "cure" resorts during the ensuing summer.—*Railway Gazette, London.*



The Pennsylvania's Fight with Jack Frost and the Snow Banks

View from the Pennsylvania Railroad, looking down the line to a point in a storm.

THE MONTHS OF December, January and February have been truly characterized as the "worst winter" in the history of railroading in the Eastern United States; seven weeks of arctic weather with fifteen-foot drifts on tracks, below-zero temperatures, and blinding gales that made regular running of trains impossible and at times stopped movement altogether. The experiences of the Pennsylvania Railroad in this seven weeks' struggle with the forces of nature have been brought together in a report by Elisha Lee, acting vice president in charge of operation, an abstract of which is here presented.

Surveying all divisions of the lines east of Pittsburgh the features of the weather during the period covered by the report, were not only the record-breaking cold, the heavy snowfalls and high winds, but the unprecedented length of the frigid spells, which gave no breathing time to recover and prepare for the next emergency. In the mountain regions traversed by the Pennsylvania these conditions were practically unbroken throughout the entire time from mid-December until the beginning of February.

Even as far south as Cape Charles, Virginia, there were fifteen days on which it was impossible to operate car floats across the mouth of the Chesapeake to Norfolk on account of the ice barriers, and the passenger service was suspended on three different occasions.

At Cresson, Pa., on the main line on top of the Allegheny mountains, temperatures of 18 degrees below zero were recorded, with high gales and 40 inches of snow on the ground. From December 20 to January 28 the thermometer never registered higher than 33 degrees, and that only for an hour or so on four different days. For eight days from December 28 to January 4, the thermometer continuously registered zero or below, with high winds prevailing, and this was followed by a ten-day stretch, from January 12 to 21 inclusive, on eight of which the thermometer stayed below zero, and on the Renovo division, in northwestern Pennsylvania, it was below zero on fourteen days.

On the Pittsburgh division, Altoona to Pittsburgh, 110 miles, the month of January, 1918, showed a total deficiency of 485 degrees of temperature as compared with the same month last year. There was a snowfall of 21½ inches as against 9½ inches in 1917. The snow drifts at the entrance to the Gallitzin tunnels, at the summit of the mountains, were 15 ft. high.

The Northern (Buffalo) division reported double the snowfall of last year, with several storms during which there was practically no train movement for 24 to 72 hours at a stretch.

The snowfall on the Philadelphia division, from Harrisburg to Philadelphia, in January was 31 in., or two and one-half times as great as in the same month of 1917. The Williamsport division spent five and one-half times as much money as last year in removing snow and ice.

The shopmen stood the acid test of fidelity by shoveling snow, breaking ice and clearing switches, often under weather conditions involving severe hardship. The withdrawal of these men from the shops had a serious effect on repairs and construction; but there was no alternative, as without their aid it would have been impossible to open the lines and restore traffic.

The Altoona shops reported that between December 20 and January 21, their men spent 9,225 ten-hour days in snow-shoveling and switch-clearing. This resulted in the loss to the shops of class repairs to 14 engines, the building of 39 steel freight cars, the strengthening of 23 cars, heavy repairs to 25 others, light repairs to 45 passenger cars and the manufacture of 350 car wheels. In addition, the operation of the shops in general was unavoidably slowed up by the temporary disruption of the forces.

On the Bellwood division, with a shop force of only 750 men, the shopmen spent 11,000 hours in shoveling snow during the same period. This is given in the report as the principal reason for an accumulation of 540 cars awaiting repairs on January 30, the normal capacity of the Bellwood division shops being 150 cars. The Pittsburgh division, for the same reason, reported an accumulation of 3,257 cars awaiting repairs, or 100 per cent above normal.

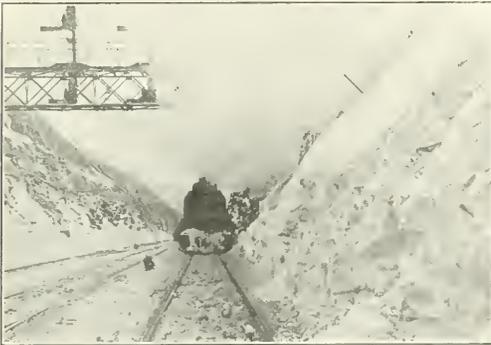
Showing the disastrous results of a winter season, with severe weather, the Sundry division reported that during zero weather a truck broke on a freight car east of Berks, Pa., on the single-track portion of the Altoona. In the time this wreck was cleared, seven passenger and two freight cars had frozen up, the crews had to be released, the road order the same-day late, and the cars were stored and the engine held to the terminal.

Among miscellaneous results reported from the severe cold on all divisions, were air hose freezing, trains stalling, trains frozen, and 16 broken couplings. For Cars 24c to

journal boxes being stripped off by snow and ice, broken rails, frozen signals and signal wires, and failure of interlocking plants. Much trouble was experienced with water-scoops on engines freezing up so that they could not be used. It was frequently necessary to maintain large forces of men at each track tank to remove the accumulation of ice caused by the flying water freezing on the rails and roadway.

The report deals in detail with the effect of extreme cold in lowering the efficiency of unskilled and semi-skilled labor, and in making it impossible in many cases to hold men in the service. On the Cresson division, where conditions were unusually severe, in order to maintain an engine-house force of 149 men, it was necessary to hire 171 new men in four months, making a turnover for that period of nearly 115 per cent or at the rate of 344 per cent for the year. The turnover for the entire force of 495 men directly connected with train operations was at the rate of 218 per cent per year.

In the Pittsburgh district the turnover of engine-house forces was at the rate of 192 per cent per year; for firemen and trainmen 120 per cent and for track forces 351 per cent. Furthermore, 55 per cent of the entire force of freight brakemen and 44 per cent of the entire force of firemen



Cut Approaching the Westbound Tunnel near Gallitzin—
Drifts 15 ft. Deep.

on the Pittsburgh division have been in the service less than six months.

On the Monongahela division, which had a turnover of 540 per cent for the year among track laborers, it was necessary, in order to keep switches open in the yards, for supervisors, assistant supervisors and foremen to work with pick and shovel, as they and a few of the older laborers were the only ones who stuck to their work in times of trouble.

The effect of the weather in reducing the average tonnage carried per freight train was, on the Maryland division, 36 per cent; Philadelphia division, 25 per cent; Middle division, 17 per cent; Pittsburgh division, 38 per cent.

Frozen ash-pans in engines caused thousands of delays over all portions of the system. Reports on the Cresson and Williamsport divisions show that during zero weather from three to four hours were required to clean one ash-pan, which normally would take from 25 to 40 minutes. The Conemaugh division reported delays due to frozen ash-pans totalling 8,392 hours, which was equivalent to the loss of the services of 35 engines for a month of 30 eight-hour days.

Frozen ash-pans are caused by flying snow, and water dripping from boiler appliances, forming a solid frozen mass with the ashes. Condensed moisture and steam coats

the mechanism of the ash-pan so that much time is lost in clearing the working parts, while it is necessary to break up the solid frozen masses with steam jets and iron bars.

Coal freezing in cars and on coal wharves caused great trouble and delay at many points. The coal obtainable for railroad use during this winter was below the usual quality, much of it being pulverized. When saturated with water from rain or melting snow, followed by low temperature, it



A Powerful Tandem

solidified into a mass almost like concrete. Where there were no thawing houses, it was necessary to place pans of burning oil beneath the cars, or place steam jets in the coal, before the coal could be run through the hoppers or could be shoveled out.

Thousands of delays in the very cold weather were due to the lubrication in the journal boxes of cars freezing, especially where the cars were standing in classification yards. In such cases hot oil had to be used before it was possible to move the cars over the hump. It was often found necessary to push cars down the hump grades be-



On a Car-float—After a Trip from Norfolk to Cape Charles

cause the oil in the axle boxes was so stiffened that they would not run by gravity.

The solidly frozen roadbed, which for weeks at a time was as hard and unyielding as a cement pavement, greatly increased the wear and tear on engines and the amount of repairs required. At the Meadows shop, near Jersey City, from December 30 to January 31, 20 engines arrived at the enginehouse with broken frames, which is a greater number of this class of failures than ordinarily occur in

a whole year. Many main and side rods of engines were also broken in the efforts to move cars which had frozen to the rails. The Pittsburgh division reported 576 engine failures in January, 1918, as compared with 398 in January of last year, an increase of 45 per cent. The Conemaugh division reported engines out of service for a total of 4,400 hours in making running repairs, which is equivalent to a loss of 18 engines for a month of 30 eight-hour days.

Much trouble with boilers, especially of engines running on the mountain divisions, was reported from the unavoidable use of water of poor quality, due to the low supply streams, some of which were frozen almost solidly for weeks. This resulted in the failure of thousands of flues and many leaky boilers.

Frozen switches were an almost constant cause of trouble and delay. The Philadelphia terminal division reported that on a single day, January 28, there were 70 switch failures in six hours, due to the snow blowing into frogs and switchpoints. This occurred in spite of the fact that a large force of track laborers was on duty in all yards.

Many specific incidents are given in the report telling of actual experiences with trains stalled in blizzards and the difficulties encountered in starting traffic moving after a tie-up once occurred. A single incident of this kind is typical. On the night of January 27, when a half dozen through express trains were stalled on the top of the Allegheny mountains near Gallitzin, with the temperature at zero, the wind blowing a gale and the snow drifts in the cuts 12 to 15 feet deep, Train No. 9, the Western Express, with three engines, reached a point half a mile west of Gallitzin, when it was stopped by the snow. The seven rear cars were uncoupled and another engine sent to pull them back, but by the time the tunnel was reached the west portal had drifted shut and it was impossible to go any further. The passengers were taken out of the train and sent to a hotel. It was impossible to move these cars until five o'clock the next afternoon, and then five heavy freight engines were required to pull the seven empty coaches.

Meanwhile the other three cars, together with the three engines which were pulling the train when it stalled, remained a mile and a quarter further on in the drift. Five hundred men worked all the night of January 27 and all the next day until afternoon, before these three cars and three engines were dug out and the track cleared for them to move.

Despite the conditions which prevailed during the period covered by the report, of which those cited are merely examples, 2,773 freight trains, with a total of 110,457 cars, were moved over the Allegheny mountains, past Gallitzin station, in January. At the same time all regularly scheduled passenger trains were represented, with very few exceptions, occurring in the worst storms, when some through trains were annulled. Many extra trains were also run to accommodate the unusually heavy travel. At Lewistown Junction, 2,376 freight trains of 117,704 cars were passed during the month.

These results, in the face of unprecedented difficulties, were only accomplished by the self-sacrifice, loyalty and devotion to duty of many thousands of officers and employees who cheerfully performed unaccustomed and arduous work and repeatedly faced hardship, danger and real suffering, in the struggle to keep the lines open so that the public and the government might be served.

WAR-SAVINGS SERVICE.—The government wishes to enlist every man, woman and child of the nation in war-savings service. When an individual buys war-savings stamps he enlists in the production division of the nation, thereby supporting and backing up the fighting division which is in France and on the seas.

General Order No. 8, Governing Labor Conditions

TO CORRECT numerous misunderstandings that have grown up as to the relations between railroad and their employees since the government took over the railroad and as an appeal both to officers and employees to observe the spirit of the new conditions, Director General McArdle has issued in General Order No. 8 a statement outlining his desires as to labor conditions.

The order directs that:

(1) All acts of Congress to promote the safety of employees and travelers upon the railroads, including acts requiring investigation of accidents on railroads, and orders of the Interstate Commerce Commission made in accordance therewith, must be fully complied with. These acts and orders refer to hours of service, safety appliances and inspection.

Now that the railroads are in the possession and control of the government, the statement says, it would be futile to impose fines for violations of said laws and orders upon the government; therefore it will become the duty of the Director General in the enforcement of said laws and orders to impose punishments for wilful and inexcusable violations thereof upon the person or persons responsible therefor, such punishment to be determined by the facts in each case.

(2) When the exigencies of the service require it, or when a sufficient number of employees in any department are not available to render the public prompt transportation service, employees will be required to work a reasonable amount of overtime. So far as efficient and economic operation will permit, excessive hours of employment will not be required of employees.

(3) The broad question of wages and hours will be passed upon and reported to the Director General as promptly as possible by the present Railroad Wage Commission. Pending a disposition of these matters by the Director General, all requests of employees involving revisions of schedules or general changes in conditions affecting wages and hours, will be held in abeyance by both the managers and employees. Wages, when determined upon, will be made retroactive to January 1, 1918, and adjusted accordingly. Matters of controversy arising under interpretations of existing wage agreements and other matters not relating to wages and hours will take their usual course, and in the event of inability to reach a settlement will be referred to the Director General.

(4) In order No. 1, issued December 29, 1917, the following appeared:

"All officers, agents and employees of such transportation systems may continue in the performance of their present regular duties, reporting to the same officers as heretofore and on the same terms of employment."

The impression seems to exist on some railroads, the order says, that the said order was intended to prevent any change in the terms of employment during governmental operation. The purpose of the order was to confirm all terms of employment existing upon that date, but subject to subsequent modifications deemed advisable for the requirements of the service. Any contrary impression or construction is erroneous. Officers and employees will be governed by the construction here given.

(5) No discrimination will be made in the employment, retention, or conditions of employment of the employees because of membership or non-membership in labor organizations.

The order concludes with the following:

"The government is now being in control of the railroads, the officers and employees of the various companies no longer serve a private interest. All now serve the government and

the public interest only. I want the officers and employees to get the spirit of this new era. Supreme devotion to country, an invincible determination to perform the imperative duties of the hour while the life of the nation is imperilled by war, must obliterate old enmities and make friends and comrades of us all. There must be co-operation, not antagonism; confidence, not suspicion; mutual helpfulness, not grudging performance; just consideration, not arbitrary disregard of each other's rights and feelings; a fine discipline based on mutual respect and sympathy; and an earnest desire to serve the great public faithfully and efficiently. This is the new spirit and purpose that must pervade every part and branch of the National Railroad Service.

"America's safety, America's ideals, America's rights are at stake. Democracy and liberty throughout the world depend upon America's valor, America's strength, America's fighting power. We can win and save the world from despotism and bondage only if we pull together. We cannot pull apart without ditching the train. Let us go forward with unshakable purpose to do our part superlatively. Then we shall save America, restore peace to a distracted world and gain for ourselves the coveted distinction and just reward of patriotic service nobly done."

Railway Shop Employees

Director General McAdoo also announced that the railroad shop employees, realizing the necessity of assisting the government in the operating of the railroads on a more efficient basis and to meet the present emergency in the repairing of locomotives, acting through A. O. Wharton, president, railway employees' department, American Federation of Labor, and the international officers representing the machinists, boilermakers, blacksmiths, carmen, sheet-metal workers, electrical workers, and apprentices and helpers, have agreed to the following changes in reference to working conditions:

(1) The hours of labor in shops and roundhouses to be governed by the necessities as indicated by the general condition of equipment. At shops and roundhouses now working one shift which totals less than 70 hours per week, an increase, preferably on a seven-day basis, may be made. Where desired, working hours may be so arranged that men will be released at 4 p. m. on one day each week. Existing working agreements to govern the rate, subject to the action of the Railroad Wage Commission.

(2) All apprentices who have served three years may be promoted to mechanics and paid the going rate of wages for that position. Such promoted apprentices to be given the right of practical experience on work of their respective trades to which they had not been advanced during the three-year period.

(3) Helpers in their respective trades who have had five or more years' experience may be promoted to classification of mechanics; they to receive mechanics' rate and be given an opportunity to learn all branches of the trade. The duly authorized committeeman of each trade in each shop covered by agreement shall be consulted, and mutual understanding arrived at in promoting helpers; and the ratio of helpers to be promoted, to the number of mechanics, in any one trade in any one shop, shall not exceed 20 per cent. The international officers and general chairmen of each trade on each road covered by agreements shall be furnished a complete record of the men promoted.

(4) Mechanics applying for employment will not be denied such employment for any cause other than inability to perform the work; this preference rule to be in effect as long as three-year apprentices or promoted helpers are employed at mechanics' rates.

(5) Where a reduction is made in the force of mechanics, promoted helpers in accordance with their seniority shall be set back first; then advanced apprentices; no mechanics

to be laid off until all such promoted helpers and apprentices have been set back.

(6) The promotions above referred to are to meet an emergency caused by the war, and shall cease at the close of the war.

Letters from Overseas*

"YOURS OF NOVEMBER 1 was delivered to me some days since, mail service being somewhat irregular out here.

"I wish I were able to follow your suggestion in regard to an occasional letter to the *Railway Age*. We are certainly having interesting experiences, but there are various necessary restrictions in the censorship that force us to keep most of them to ourselves.

"However, the many railroad men who are coming over here may be interested to know that we have found our chief wants to be tobacco, woolen socks, and soap and tooth paste. The Railway Tobacco Fund ought to solve the first problem, thanks to you people at home, and if the boys fill up any surplus space in their kits with the other articles, they won't regret it. We also find a knit cap is just the thing for taking the chill out of a shrapnel helmet, which is about as pleasant as a cake of ice in this weather.

"The soap is the least important of the list, for usually there isn't time to wash often.

"All the above may be 'old stuff,' but we had to find it all out ourselves, and it may help some one else to hear about it."

Shunters, Coops and Railheads

Letters recently received by the Santa Fe Magazine from former Santa Fe men contain interesting information concerning railroad equipment and railroad terms in use on the lines behind the front in France. Sergeant N. J. Pierce, of the Twelfth Engineers, says in part:

"The engines and cars here and in England seem like toys compared with our 40-ft. cars. It would make the boys laugh to see a guard (a brakeman) cut a car and push it on to a siding by hand. A passing track over here is a 'coop,' a terminal is a 'railhead,' a switchman is a 'shunter.' Whenever a despatcher gets a message he acknowledges it by 'righto' instead of 'O.K.'"

Corporal W. T. Roberts, of Company F of the Thirteenth Engineers (Railways), writes in a similar vein:

"We took over this part of the French railroad about September 12, cannot mention on what part, but a very busy line, and our work is mostly at night; that is, in the train movement. We are having very good success, although the conditions are far from being perfect, or at least what we used to work under.

"The French engines are all small, half cab, no air and no sand. The cars, or wagons as they are called here, are of small size with bumpers and link couplers. The grades are quite heavy and full of curves, but very good roadbed, all gravel. We are allowed one brakeman to every seven cars loaded, but don't always have them, consequently we have a hard time holding them going down grades.

"The fireman is kept very busy. He not only keeps the engine hot but must also handle the brakes on the tank. Some engines, though, have air pumps on them. I have been lucky enough to fall heir to one and proceeded at once to get my air pump in order. Had quite a time in securing the parts for the repairs, but finally succeeded and am now in fair shape."

*The *Railway Age* expects to publish regularly letters from railwaymen overseas. If you receive a good letter from a railwayman who is now in France, send it in for publication and let the *Railway Age* pass it around for all to enjoy.

The Railroad Bill Passed by the Senate

Few Changes from Form in Which Bill Was Reported;
House Expected to Pass Bill This Week

WASHINGTON, D. C.

THE ADMINISTRATION RAILROAD BILL, authorizing the President to make agreements with the railroads for their compensation during the period of government control, on the basis of their net operating income for the three years ending June 30, 1917, and giving the President and the Director General of Railroads almost unlimited power in administration of the roads, subject to a review by the Interstate Commerce Commission as to rates, was passed by the Senate on Friday, February 22.

The bill was passed without a roll-call and with but two important amendments from the form in which it was reported by the Committee on Interstate Commerce on February 7. An amendment proposed by Senator Cummins to include within the scope of federal control every railroad not controlled nor operated by another carrier company, and which has heretofore competed with railroads taken over, was adopted by a vote of 58 to 14, to prevent the Director General from carrying out his announced intention of leaving out some of the short lines, some of which at their own request had already been notified that they were excluded. An amendment offered by Senator Robinson to reduce the proposed compensation to the railroads by eliminating the provision for a return on new investment during the last six months of 1917 was adopted by a vote of 44 to 34.

In other respects the basis of compensation on which the President is authorized to make agreements with the carriers, which the Senate committee estimated would make the maximum guarantee approximately \$945,000,000 a year, was approved. Determined efforts were made by an aggressive minority to amend the bill but without much success.

Period of Federal Control

The most decisive vote on any of the amendments was that on the proposal of Senator Johnson to reinsert in the bill the provision that government control shall continue until specifically terminated by Congress, instead of for 18 months after the proclamation of peace as provided in the bill. This was lost by a vote of 61 to 10, those who voted for it being Senators Ashurst, Gronna, Johnson of California, Johnson of South Dakota, Jones of Washington, Kenyon, Kirby, Norris, Phelan and Poindexter. It was proposed by Senator Johnson frankly for the purpose of paving the way for government ownership. Senator Poindexter advocated it to prevent the railroads being returned to private ownership without some provision for their permanent unification. Senator Cummins, though an advocate of government ownership, opposed it because he was unwilling that the railways shall be dominated by one man "for a single minute after the war ends." He proposed an amendment to the amendment providing for a board of directors to control the roads after the war, which was rejected. Senator Smith of Georgia said it was all he could do to vote for the bill anyway, but that with a provision for indefinite control he could never do so. Senator Jones said he was for the amendment because he favored government ownership and he did not want the present plan continued for so long as 18 months.

Senator Lodge offered an amendment to shorten the period of government control after the war to six months. This was lost, 47 to 28. Senator King of Utah then offered an amendment to reduce the time to one year, which was also unsuccessful, the vote being 45 to 29.

Director General McAdoo had originally advocated an indefinite period on the ground that no time limit should be imposed by Congress to work out the readjustment after the

war, but in general the wishes of the administration as to the provisions of the bill prevailed without difficulty over all opposition, and practically all efforts to restrict the authority of the President or the Director General were defeated by large majorities.

Senator Cummins made a vigorous fight to reduce the compensation to be paid the roads to an amount sufficient to pay dividends and interest charges. His first amendment on this point, applying to roads that have paid over 5 per cent dividends, was defeated by a vote of 52 to 23.

Senator Kellogg pointed out that to limit railroads to the dividends they have formerly paid would be to take away from the Burlington, for example, a surplus which results largely from the fact that it is capitalized for a low figure, to be expended on some other property by the government, and he said that no railroad could live any number of years without an income above its dividend requirements. He also emphasized the fact that the railroads cannot pay increased dividends out of their guarantee without the approval of the President.

Senator Smith, chairman of the Committee on Interstate Commerce, pointed out that it was not proposed to take money out of the treasury to give to the railroads unless government operation should result in a deficit, but merely to guarantee them the amounts they had earned under rate regulation. No one knows whether the earnings of the roads have been too great or too little, he said, because we do not know the valuation of the roads.

Effort to Reduce Compensation

The senators who voted for Senator Cummins' amendment were: Ashurst, Cummins, Gore, Gronna, Hardwick, Henderson, Hitchcock, Hollis, Johnson, Cal.; Johnson, S. Dak.; Jones, Wash.; Kendrick, Kenyon, King, Kirby, McNary, Norris, Reed, Sutherland, Thomas, Townsend, Trammell, and Vardaman.

On the following day Senator Cummins tried again with an amendment which he said might be more readily understood, providing that in no case shall the net income exceed 5 per cent on the capital stock outstanding on December 31, 1917. When this was defeated, 46 to 19. Senator Cummins offered it again, substituting 6 per cent for 5 per cent. This secured 24 votes and after 7 per cent had been substituted 27 Senators voted for it.

President May Initiate Rates

Senator Cummins' effort to restrict the rate-making power of the President to that now possessed by the carriers was defeated 45 to 24. His amendment provided that the Interstate Commerce Commission should continue to have its present jurisdiction over all rates except for the transportation of troops and government property. Senator Cummins said that under the compromise provision adopted by the committee, allowing the President to initiate rates and to put them into effect subject to review by the commission on complaint, "there is no hope of any practical exercise of power upon the part of the Commission."

Senator Sterling of South Dakota also offered an amendment intended to preserve the authority of the state and interstate commissions over rates, which was lost after considerable debate but without a roll call.

Several efforts were made to provide that the President shall be controlled in the administration of the roads by all existing laws applicable to carriers. Senator Robinson and

others declared that this would nullify the purpose for which the roads had been taken over, and amendments by Senators Hitchcock and Smith of Georgia to provide that the President must have authority of law for his orders was defeated 46 to 25.

"Surely the Senator from Arkansas does not wish the President to issue orders not expressly authorized by law and in violation of law," said Senator Smith of Georgia.

"I certainly do think it may be necessary to issue orders not expressly authorized by law, because you cannot define what orders the President may find it necessary to issue," replied Senator Robinson. As finally passed the bill makes the railroads subject to the laws only in so far as the laws do not conflict with the orders of the President.

In proposing the elimination of a return on the investment after June 30, 1917, Senator Robinson said the additional sum is not necessary to enable the President to reach an agreement with the roads and that it would complicate the situation to require the commission to make the extensive investigation necessary to determine the additional investment. He estimated the amount by which the compensation would be reduced at \$6,500,000. The amendment was adopted without debate.

Senator Frelinghuysen of New Jersey proposed an amendment, which was adopted, "that nothing in this act shall be construed to amend, repeal, impair or affect the existing laws or powers of the states in relation to taxation."

Senator Kirby of Arkansas tried to withhold from the President authority to purchase railroad securities but only 11 Senators supported the amendment. Senator Smith of Michigan proposed to strike out the provisions that the President may not sell securities at less than the cost, but the amendment was rejected. Senator Cummins remarked that if his amendment had been adopted the surplus turned into the treasury would have been ample to take care of maturing obligations. To this Senator Smith of South Carolina replied:

"I am of the opinion that had the amendment of the Senator from Iowa prevailed the government would have had to buy all of these bonds. I think that the persons who held them would have thought them practically worthless."

Senator Cummins tried to amend the provision which had been inserted by the senate committee, to prevent any increase of compensation during the period of federal control as a return on surplus invested, by projecting it into the future and striking out the words "during the period of federal control." This was lost by a vote of 49 to 21.

Senator Townsend offered as an amendment a substitute for the bill which he said was designed to clarify the bill and provide what the advocates of the bill thought they were saying when they wrote the bill, but he secured only 11 votes.

A great many in both houses of Congress apparently accepted the bill without any enthusiasm. Many of them expressed the opinion that the taking over of the roads by the government was a mistake but that as the step had been taken it was necessary to pass the bill and it went through rather more quickly than had been expected in many quarters. Many thought the basis of compensation proposed too liberal to the railroads and 27 senators voted to reduce it. Many more thought it rather liberal, but that as the railroads had been taken over without any provision for their compensation it was necessary to establish a basis of settlement on which an agreement might be reached. On the other hand, there was a much more friendly attitude toward the railroads than has usually been displayed in congressional discussion, and an inclination on the part of many members to stand with the roads as against the advocates of government ownership. The overwhelming vote against leaving the period of federal con-

trol indefinite was considered as some indication of the sentiment on the subject because so many of the government ownership advocates opposed a time limit.

Senate Speeches on the Bill

Following those reported in last week's issue, extended speeches on the bill were made by several senators before the debate on the provisions of the bill began.

Senator Johnson of California, whose address was briefly reported last week, argued that government ownership is inevitable. He asserted that the railroads had broken down, which to his mind demonstrated the failure of private ownership, and he bitterly opposed the proposed basis of guarantee as excessive, contrasting the treatment accorded the railroads, by guaranteeing them approximately 8 per cent on their stock, with the 4 per cent rate paid on Liberty bonds, and with the guarantee to the English railroads, which he said paid only about 4 per cent on their stock.

Senator Norris objected to the compensation as "placing an obligation upon an already overburdened people that cannot be justified." He objected to the provision authorizing the President to initiate rates, saying it is asking a great deal of the Interstate Commerce Commission to expect them to overrule the President of the United States.

Senator Thompson made a brief speech advocating government ownership after the war, in support of an amendment to restore the original Section 13 of the bill providing that the government control shall continue until Congress orders otherwise. He submitted a petition signed by representatives of the four brotherhoods and of other labor organizations urging Congress not to fix a time for the return of the roads to private management.

Senator Townsend submitted a substitute for the bill, intended, he said, to make clear its intent, because he thought the administration bill was imperfectly drawn. He apparently resented the fact that the committee had so little to do with the authorship of the bill, saying "it came to us ready-made, and then we amended it and talked it over to some extent; and then the scrivener, the man outside who had made the bill, took our suggestions home with him and brought back the amendments prepared, and the bill as finally patched up was never before our committee in its present form."

The committee, according to Senator Townsend, was deadlocked on the period of federal control and on the question of rate-making and he thought the resulting compromise was satisfactory to no one. He thought the compensation proposed was too great but did not know whether it is greater than a court would allow under the conditions. He objected to rate-making by the President. "I do not want to be understood as saying that the railroads are not entitled to just and reasonable rates," he said, "they may be entitled to an increase in rates; but I want some tribunal of the people to determine what are just and reasonable rates."

The section restricting dividends to the amount paid in the past except as approved by the President, he thought was of doubtful validity but even if the section is valid it is ineffective, he said, for the penalty of \$5,000 is not severe enough to compel obedience. The authority to order the carrier to make additions, he said, is also of doubtful validity and his substitute contained a provision that the agreement shall contain a clause binding the carrier to conform to all the provisions of the act or orders thereunder, under penalty of suspension or forfeiture of payments under the agreement.

Senator Underwood criticised the "crudeness of draft" of the bill and warned Congress of the dangers of too much surrender to the executive, but he said he would vote for the bill unless it carried an indefinite period of government control.

"We might adopt the present bill with its lack of limita-

tions and its crudeness of draft as a war measure, but when we step one foot beyond the period of this war, when we have carried the transportation system out of its usual channels and turn it over to one man power, we are establishing the machinery of oppression. Then you are building up an organization for the destruction of business, and I say, therefore, unless it is limited to the period of the war I cannot support it."

Senator Underwood declared he had heard none of the representatives of the railways raise a point of objection to the taking over and "it is apparent that they could not have been taken over if they had not agreed to it" because the law of August 29, 1916, was unconstitutional in that it made no provision for compensation.

If the proposed legislation were to be permanent he would not vote for it, but as a temporary war measure he thought the people could afford to commit the question of compensation to the President for its temporary ascertainment, rather than drive the railroads into the courts.

Senator Sherman of Illinois declared that the bill is a temporary measure and that if he were writing it he would probably provide for a shorter period after the war but that he would support the bill. He presented statistics showing the large number of security holders and others who are interested in railroad investments.

"It is not merely a question," he said, "of the railways and of their managers, but it is a question affecting the whole fabric of credit of the country. The impairment of this vast quantity of securities by a small per cent becomes at once an impairment of the credit resources of the entire country. This bill reassures the general public and the holders of shares that there shall be no liquidation."

"The government has broken down as much as the railroads have broken down," Senator Sherman declared. "It was a great undertaking on the part of both," he said, and "some degree of liberality can be exercised in judging of each of them."

He opposed the idea of an indefinite period of control, saying that it was proposed for the purpose of bringing about government ownership, which he opposed. "If the government cannot run the railroads any better than the government has run the state and municipal affairs it has taken," he said, "then I am right in my opposition, for it has universally failed to produce as good results as private control."

Senator Poindexter objected particularly to the provision allowing the President to fix rates and to the time limitation. He said he was not arguing for government ownership, although he would not shrink from it if it should prove necessary, but he thought that there are "other intermediate measures which should first be tried before we resort to that last extreme." He did not believe the government should continue to operate the roads as they are now being operated, but that they should be turned back to private ownership, but not until legislation has been enacted to remedy the existing evils resulting from the competitive system. He ridiculed the idea of the commission exercising supervisory power over the President.

Senator Lewis declared that the bill is not only the forerunner of government ownership of railroads, but also of telegraph and telephone and coal and oil and he predicted that the question would be the great issue in the next presidential campaign.

Senator Johnson of South Dakota argued for an indefinite period of federal control, saying that the time proposed would not be fair to the public nor to the stockholders, "because it would not give a reasonable time to the country to practically demonstrate government ownership, which should be done."

Senator Hardwick of Georgia, declared that it was unnecessary and inadvisable to take over the railroads in the first place and that they have not been taken over against

their will or without their consent. The real reason for this transaction," he said, "is financial. We are taking over the railroads because, in the opinion of the President and railroad people and a great many well informed people, their financial interests require us to do it." For that reason, he argued, if the large roads are to be taken the short lines also should be included.

"Does the Senator really think," asked Senator Vardaman, "that the purpose of the taking over of the roads is to the interest of the roads? I would not charge the administration with that."

"I have not any doubt about it," replied Senator Hardwick. "I am not charging the administration with it, but I would rather lend them the money and let the owners operate the roads themselves."

Senator Vardaman of Mississippi approved the President's action in taking over the roads but supported the Cummins amendment to reduce the compensation.

Senator Thomas of Colorado said he had long ago reached the conclusion that government control or possibly government ownership may be the only solution of our various transportation problems, but he did not think an emergency war measure should be made the vehicle for such legislation and that the bill should contain nothing regarding the time to which governmental possession should extend after the end of the war. He also said that the effort to give the President rate-making power was foreign to the purpose of the bill.

Debate in the House

The debate was begun in the House on February 18 by Chairman Sims of the Committee on Interstate and Foreign Commerce, who explained at length the provisions of the bill. Representative Parker of New Jersey followed with a prepared speech in favor of the bill. Representative Stephens of Nebraska urged that the period of federal control be left indefinite, saying that to insert a time limit would undoubtedly force government ownership, which he feared, except as a last resort, on the ground that the government "might cease to be a government by the people and for the people and become instead a government by the employees for the employees." He criticized private ownership, but thought that some plan of permanent government control might succeed. Representative Dillon of South Dakota said the bill should be considered as a war measure and not for the purpose of establishing a government ownership experiment station. Representative Coady of Maryland declared the President's action was made necessary "by a condition produced by a maximum of regulation and a minimum of increases in rates." "We have not been fair to the roads," he said.

Representative Snook of Ohio said he did not believe he could bring his mind to sanction a law that in times of peace would take over all the roads and guarantee that such a return as is provided in the bill, but that he willingly does so under the circumstances. He denied that the railroads had broken down.

Representative Dewalt of Pennsylvania said the conditions which brought about government control were partly the fault of the railroads and partly the fault of the government and he advocated the basis of compensation proposed in the bill as necessary to prevent financial disaster.

Representative Esch of Wisconsin urged that there should be no interference with the rate-making authority of the Interstate Commerce Commission and opposed the proposed basis of compensation as excessive. The roads should be satisfied, he said, with enough to pay interest and dividends and any surplus ought to go either to the government or be divided between the roads and the government. He urged that the period of federal control be limited to and end after the war.

Representative Burky of Kentucky said it was impos-

sible to imagine the disastrous results to the financial condition of the country if the compensation should be made so low that the railroads should feel it necessary to go into the courts. He advocated giving the President power to make rates because he said it would probably be necessary for him to advance them to pay the large increases in wages. "Unification of physical control is wholly incomplete," he said, "unless the unification of financial control goes hand in hand with it."

Representative Cooper of Ohio supported the bill and objected to an indefinite period. "I believe that to take over the railroads indefinitely means government ownership," he said. "There are some who would have the question of government ownership sneak into this bill. Let us try and be fair with the railroads and give them a square deal and help them when they need helping instead of clubbing them when they are down."

Representative Fordney of Michigan declared that the taking over of the railroads was a mistake but that he would vote for the bill because it is necessary now that the roads have been taken over. But he was unalterably opposed to government ownership and cited examples from other countries which he said showed that it had been a failure wherever it has been tried.

Representative Winslow of Massachusetts opposed giving the President rate-making power, saying he thought Congress was going too far in the direction of granting powers to one or two men.

Representative Decker of Missouri said that no one could tell what the railroads are worth or say whether the proposed basis of compensation is too much or too little. Some members of Congress, he said, are worrying about how they shall explain their action when they get back home, but he thought he had a satisfactory answer. "I am going to say," he declared, "that for 30 years there has been in this country a great body called the Interstate Commerce Commission, whose duty it has been, so far as possible, to determine what is fair compensation for the railroads. That body has the confidence and respect of the people of the United States. In some places there is more confidence in it than in others, but it is the only body we have. We simply took what they had allowed these railroads to receive during the last three years, and divided it by three. Can you beat that system?"

Representative Lenroot of Wisconsin took occasion to assert that he did not believe that the Interstate Commerce Commission can be held responsible for the condition of the railroads nor that it was due entirely to the lack of proper management on the part of the railroads, but that Congress should have repealed the restrictive legislation as soon as

war was declared. He thought the compensation proposed in the bill was liberal but was not certain that it is any greater than the roads would be entitled to under the law. He declared that the bill as drawn was full of inaccuracies and suggested a number of amendments to clarify it.

Representative Rayburn of Texas declared that whether the bill should pass is not a debatable question, but that it is purely a war measure and should terminate as soon after the close of the war as possible. "It is not candid," he declared, "for men to say that since we have taken over the roads under the war power we should hold them after the war to try one nostrum after another." He believed the compensation proposed in the bill is as nearly just as it could be made.

Representative London of New York, who is a socialist, replied to the speech by Representative Fordney with an argument for government ownership and for an indefinite period of federal control.

Representative Hersey said he thought it was unnecessary to discuss government ownership because "when the war is over the question will have been settled forever, for I am sure that the operation of the railroads by the government will result in such a failure that we shall be only too glad to return these roads to their rightful owners."

Voting on amendments to the bill was begun in the House on February 23.

An amendment similar to that proposed by Senator Cummins in the Senate to include short lines was adopted in the House on motion of Representative Esch, after a long debate, by a vote of 73 to 27, after having been modified to apply only to lines which connect with roads under federal control. An amendment offered by Representative Montague of Virginia to include in the classes of roads with which the President is authorized to deal specially those on which recent expenditures by additions or improvements, were not fully reflected in the three years' income, was adopted.

Much of the session on Monday was devoted to amendments offered by Representative Lenroot intended to clarify the bill. Several minor changes resulted.

Several efforts to reduce the proposed basis of compensation were made in the House. Representative Dowell offered an amendment to provide that the standard return shall not exceed 7 per cent on the stock, after payment of expenses and fixed charges. This was defeated by a vote of 40 to 15.

Representative Dillon proposed to change the provision for an appropriation of \$500,000,000 by providing that \$300,000,000 of the amount may be expended only as authorized specifically by Congress.



A Light Railway "Drag"

A Union Package Freight Terminal at Jersey City

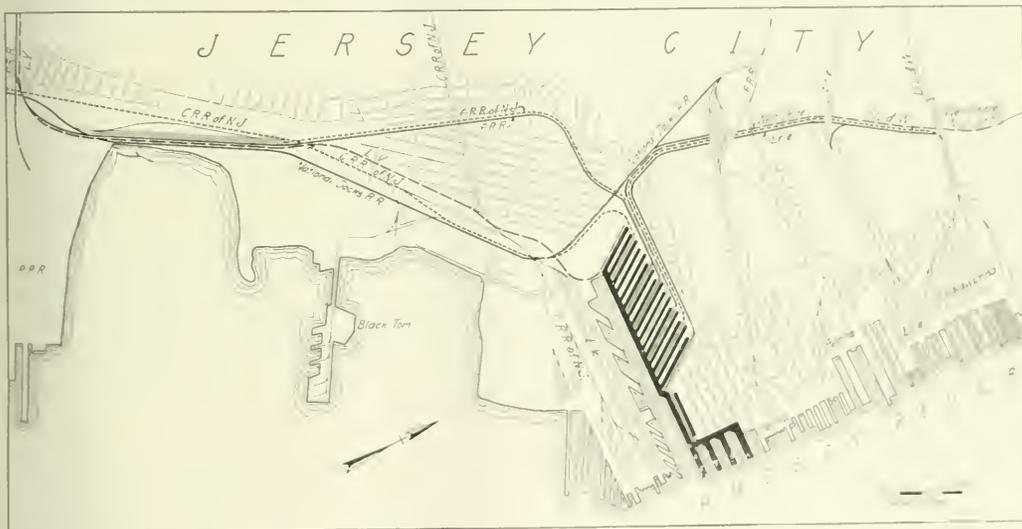
A Plan for the Handling of L. C. L. Freight at New York
to Reduce Congestion and Expedite Movement

THE RECENT ACTION of President Wilson in instructing the Secretary of War and the chairman of the Shipping Board to investigate a comprehensive plan for the handling of l. c. l. freight between Jersey City and New York, which was prepared by the American International Terminals Company of New York City, has directed much attention to this project. This plan contemplates the provision of terminal facilities along the Morris Canal Basin, a short distance north of the passenger terminal of the Central Railroad of New Jersey in Jersey City at an estimated expenditure of \$75,000,000. This terminal, which will be accessible to all of the railroads along the west shore of the Hudson river, is designed for the handling of package freight to and from Jersey City or New York City, for export or for transfer between railroads. These facilities are designed

the north side of the Canal basin. The basin will be widened to a width of from 300 to 450 ft., and will have sufficient depth to accommodate any tug or lighter.

General Description of the Terminal

Along the bulkhead, 15 ft. back from the water front, a ten-story building will be constructed, 85 ft. in width on the first floor, and with the other floors set back 15 ft. further, making them 70 ft. in width. Connected with the bulkhead building, 16 ten-story buildings are projected, of an average length of 1,400 ft. and 75 ft. in width. Each of these buildings will have a 75 ft. driveway on one side and eight railroad tracks on the other side. Each of the driveways will have a separate outlet by an overhead crossing to Grand street, avoiding any grade crossings of driveways or



The Terminal Site and Approaches

to enable package freight to be collected and delivered at a material reduction in cost from that now encountered, while they will also provide a much needed increase in facilities and relieve congestion.

The plans were prepared under the direction of W. H. Lyford, president of the American International Terminals Company and an attorney of Chicago, who has given much attention to terminal problems in various parts of the country, being the promoter of the plan for the joint ownership of the Belt Railway and the development of the Clearing Yard project at Chicago. While the plans were completed somewhat over a year ago, the project was postponed temporarily because of the outbreak of the war. It has now been brought prominently before the public by the action of President Wilson referred to above and also by the consideration which the Joint Port Commission of the states of New Jersey and New York has given to the plans.

The plan provides for four steamship piers along the Hudson river, and a bulkhead about 4,550 ft. in length along

streets over tracks. It is contemplated that the first floors of these 16 buildings will be used as terminal freight stations for handling package freight, and that each railroad will occupy the first floor of two of these buildings, using one as an inbound station and the other as an out-bound station, with two tracks to serve each inbound house and six tracks to serve each out-bound house.

On the first floor there will be no partition walls between these buildings and the connecting building along the bulkhead, so that, by way of the bulkhead building, freight may be trucked from any building to cars at any other building, to any lighter along the bulkhead, or to any steamship at either of the four piers along the river. It is contemplated that substantially all of this trucking will be performed by electric tractors hauling four-wheel trailers, which will have the effect of minimizing the trucking distances.

Rail access to the terminal from the north, for the West Shore, the Lackawanna and the Erie, is proposed by way of the existing salt railroad, formed by the New Jersey Junc-

tion and the National Dock Lines, owned by the West Shore and the Lehigh Valley, respectively. From the south it is proposed to give the Lehigh Valley, the Central Railroad of New Jersey, the Pennsylvania, and possibly the Baltimore and Ohio, three separate ways of access: first, by a four-track line to be laid in the bed of the Morris Canal from its crossing with the Central Railroad of New Jersey opposite Black Tom; second, by the National Docks Line; and third, by existing surface lines from the nearby yards of the Lehigh Valley and the Central Railroad of New Jersey.

Each railroad company will have an unobstructed lead to its station tracks in the terminal area, from the belt line or other approach which it may use, and can move its trains and cars to and from the terminal with its own locomotives without interference from the locomotives of other companies.

General Scheme of Operation

It is proposed that inbound trains of merchandise destined to Manhattan Island be run into these inbound station buildings, instead of being floated to New York, and that the freight be immediately unloaded and (1) trucked to New York by a fleet of motor trucks, using existing or special ferries, and delivered at union freight stations to be located away from the water front, in each shipping district of New York; or (2) transferred by tractors and trailer trucks to outbound cars of other roads in the terminal area; or (3) placed upon lighters along the bulkhead and floated to ship-side or other destination; or (4) trucked to piers for delivery to ships; or (5) elevated to the upper floors for storage.

Outbound freight, instead of being delivered at the pier stations of Manhattan Island, will be delivered at the various union inland stations in New York, and trucked to the proposed Jersey City terminal, where, together with lighterage freight and storage freight from the upper floors, it will be loaded into outbound cars for destination.

As all the freight stations in the proposed terminal will be connected with the bulkhead, and all buildings will be of sufficient width to furnish adequate truck-ways, all of the railroads using the terminal will be able to interchange l. c. l. freight by trailer truck, in a few minutes, from any inbound car into any outbound car in the terminal area, with one handling and at minimum cost. While the volume of this interchange freight is comparatively small, it is growing constantly, and present methods of its interchange between the Jersey roads are slow and expensive.

It is contemplated that each railroad may wish to employ its own freight handlers and have full control of the operations on the first and possibly also the second floors of the buildings which it occupies, but that probably a common trucking force should move the freight along the bulkhead and to and from lighters and steamships. It is suggested that, along the bulkhead, it would be possible to consolidate the lighterage business of all of the roads and to lighter full loads to each destination, instead of moving partially loaded lighters around the harbor for each railroad. As an example of the possibility of consolidating lighterage services, each of the railroads is now sending to the pier station at 130th street a separate lighter for its own business, whereas, at the proposed union terminal in Jersey City it is planned that freight can be received on one lighter for all of the roads and distributed into the cars of each company, and one lighter will handle all of the outbound business delivered at the 130th street pier station in a day, thereby releasing five or six other lighters and as many tugs.

Export Terminal and Warehouse

It is suggested that, in addition to its use for handling freight to and from Jersey City and New York, this terminal might be used as a common export terminal for handling and warehousing export package freight for all railroads.

To that end, it is proposed that such freight be consigned to this terminal and immediately unloaded, thereby releasing the cars. Such freight consigned to ships then in the harbor could be lightered or trucked to them by the Terminal Company, and freight which must be held for incoming ships would be elevated to the upper floors and stored until delivery could be made to the ship's side. The freight from all roads for each ship would then be consolidated by the Terminal Company and delivered to the ship.

It is proposed to construct the Jersey City terminal on such a large scale that about 20,000,000 sq. ft. of floor space will be available for storage, and it is suggested that the railroads may use all of these storage facilities to advantage for the storage of export freight, even during the free time, rather than hold the freight in cars, which are needed for the movement of other freight. If the railroads do not approve the suggestion that they use all of this warehouse space for export freight, it might be leased to private parties, under long-term leases, to be used for warehouse or industrial purposes. As the occupant of each floor would have shipping facilities over all of the railroads using the terminal, without any cartage expense, it is believed that all of the warehouse space could be readily leased to responsible tenants.

An elaborate investigation has been made of the trucking features of these plans, first as to trucking on the floors of the Jersey City terminal, and second as to the use of motor trucks for moving freight to and from the terminal. As to platform trucking, the results of the use of tractors and trailers in two freight stations in Chicago, where this system of trucking has been used for more than three years, and where accurate accounts of costs have been kept, are stated to have demonstrated that one man with a motor truck hauling trailers can do the work of from 11 to 14 men with two-wheel trucks, showing a greater efficiency than by any other method of trucking. With reference to the substitution of motor trucks for car floats for moving freight across the river, it is stated that, if facilities were furnished at the Jersey City Terminal, and at inland union stations on Manhattan Island, for handling, loading and unloading removable truck bodies, motor trucks would move freight between Jersey City and New York with a material saving of time and expense, as compared with present methods of moving freight in cars on floats. As a result of the use of removable truck bodies in Baltimore and elsewhere, it is stated, that one motor truck is able to move three or more removable bodies as fast as they can be loaded and unloaded.

It is assumed in the development of this plan that inland freight stations can be located in the first floors of new warehouse and industrial buildings to be erected on vacant or poorly-improved real estate, away from the water front, to such advantage to the owners of such buildings and surrounding real estate that the cost of securing the use of such stations would be a small fraction of the present cost of leasing pier stations. Such inland stations could be located anywhere on Manhattan Island, in the Bronx, in Brooklyn, or on Staten Island, in places easily accessible from existing ferry landings, or from new landings to be secured for additional ferries. Aside from the economy in time and cost of movement, the use of inland stations could be extended indefinitely, whereas it is practically impossible to secure additional pier space on the water front, and the pier terminals are already congested to their limit.

Capacity of Proposed Terminal

It is estimated that 6,000,000 tons of merchandise is delivered on Manhattan Island from New Jersey railroad terminals per year, and that 4,000,000 tons of merchandise is delivered at New Jersey railroad terminals from Manhattan Island, or a total of 10,000,000 tons per year moved across the river. It is estimated that all of this tonnage and 5,000,000 tons additional, could be moved through the proposed

Jersey City terminal and moved by motor trucks across the river.

The frontage of the proposed Jersey terminal on the Hudson river is about 1,350 ft., which will accommodate 22 ferry slips, each of a width of 65 ft., center to center. New ferry boats should be constructed, which will carry at least 40 5-ton trucks each way. It is assumed that, while the truck bodies will have a capacity of five tons each, they will carry an average of four tons each way. A total of 9,000,000 tons of freight per year would be equivalent to 2,250,000 4-ton truck-loads per year, or 7,500 truck-loads per working day.

Nine ferry trips per working day from each of the 22 ferry slips at the Jersey terminal could carry 7,920 truck-loads each way per day, or 11,904,000 tons each way per year of 300 working days.

There are 13,000 linear feet of westbound freight platform at the Jersey terminal, which would accommodate 722 truck bodies at a time, allowing 18 ft. per body. An average of 10.4 trips per day for 722 trucks, which would equal 7,509 truck-loads per day, would carry 30,036 tons per

day at 4 tons per truck, or 9,010,800 tons per year of 300 days.

While the plans provide for eight railroad tracks, with a car standing capacity of 12 cars each, between each pair of station buildings, it will only be necessary to use four tracks at each westbound station and two tracks at each eastbound station, to handle the estimated tonnage of 9,000,000 tons eastbound and 6,000,000 tons westbound.

A total of 9,000,000 tons eastbound per year of 300 days equals 30,000 tons per day, which would be carried by 1,500 cars, at 20 tons per car. Also 188 eastbound cars could be unloaded at each of the eight eastbound stations, by using two tracks at each station, and setting each track three times per day, or the same number of cars could be handled on one track by setting the track six times per day.

A total of 6,000,000 tons westbound per year of 300 days equals 20,000 tons per day of westbound freight. This tonnage would be carried by 1,000 cars per day, at 20 tons per car. Four tracks set only once a day at each of the eight westbound stations, would carry the entire outbound tonnage of 6,000,000 tons per year.

A Plea for the Railway Supply Manufacturers

An Open Letter to the Director General of Railroads from
the Railway Business Association

GEORGE A. POST, president of the Railway Business Association, under date of February 25, sent the following communication to Director General of Railroads McAdoo:

Manufacturers of railway necessities respectfully invite you to study certain considerations bearing upon mechanical design and practice in the field of rolling stock construction, purchase and maintenance.

The Railway Business Association, of which I have the honor to be president, is a national organization of manufacturers, merchants and engineers dealing with steam railroads. What we have to say from our own experience accurately portrays the problems of the whole railway appliance industry.

It appears from your official announcement that you have delegated to technical committees the work of recommending to you a detailed plan of procedure for the procurement of new rolling stock by the railroad systems. The phases upon which we desire to address you are those which involve the peculiar interest of makers of appliances or parts as distinguished from assemblers of locomotives and cars.

In the field of transportation inventors and developers of special appliances embody the spirit and function of progress. Our interest and the national interest in this respect are identical. What the manufacturers of railway appliances cherish and what the public as a whole is interested in preserving is that flexibility which leaves the way open to mechanical advance. Always we have before us two antagonistic requirements which must be compromised—improvement through change and stability through standardization.

To a certain extent standardization is essential. As transportation became national and interchange of cars among the several roads became common, convenience and economy in repairs required a tendency toward interchangeability of parts. With the organization of the Railroads' War Board last April came for the first time to any extent use of engines on the rails of roads other than the owner. What has long applied to cars affecting repairs now applies in some degree to engines. The drift, as with cars, is toward interchangeability

of parts. The method by which inter line use of cars was made possible was, to be sure, standardization, but it was a standardization of dimensions. If the car frame were uniform a device of any patent could be used upon it. Thus we attained practical current convenience while preserving variety of design and material, of terms, delivery and dealings, and hence reasonable expedition in the demonstration and introduction of improvements.

We earnestly commend to your favorable consideration the fullest adherence to this method consistent with the most effective rehabilitation and maintenance of transportation facilities in face of the enemy. We are ready for any sacrifice essential to winning the war. We would deplore as disastrous to the nation's business any departure, not clearly necessary for national defense, from competition between patented railway appliances.

Manufacturers of railway goods have borne an honorable part in promoting the progress of transportation science. What they have achieved for the public in safety, comfort, speed and economy of railway operation has been accomplished in an atmosphere of keenest competition. We could try persuasion upon one independent railway manager after another until the test was made and a demonstration afforded. Our work has been marked by variety, elasticity, development. The inventor, the executive and the salesman have been inspired by the hope of excelling, roused to effort by the exertions of rivals. Under such conditions our industries and the country with them have progressed and thriven. The man with whom we have hitherto dealt has had a definite responsibility for affording his company the benefit of the latest scientific discoveries.

We believe that the preservation of decentralization in our dealings is not only important for the immediate present, but vital as a precedent for the ultimate adjustment after the war.

Looking especially to the present, many of those engaged in the railway supply industry are profoundly anxious concerning the policy which you will adopt as it may affect them and the scores of thousands of workers whom they employ.

Unofficial statements and rumors have hinted at the possi-

bility of far-reaching standardization, under which large numbers of plants would be swept out of existence or forced to reorganize for some other type of service. A maker produces, let us say, a device which is part of a car. He is one of several who manufacture competing appliances that perform the same function. Will some one of us, he has been asking, be declared standard and all the others thrown into the discard? If so, the conclusion of peace would find the unfortunates whose products had been discarded under the edict of standardization for the period of the war deprived of a large part of the value of their patents through disuse and their business paralyzed through discontinuance of the mechanical and commercial processes which keep any business a progressive living organism.

Established commercial processes are the result of experience and of scrutiny under government regulation, federal and state. We are confident that you will be alert to the desirability of performing your difficult and vital function as Director General of Railroads with the least possible disturbance to those processes. We believe that you will find it practicable to preserve the business and the individuality of the several makers of rolling stock appliances. Cars have now been so far standardized in dimensions that they can travel over any railroad in the United States, as anyone can see who observes upon a freight train the multiplicity of ownership insignia. So far as speed of production is concerned little or no delay is occasioned in changing from one patent to another and substituting on each lot the appliances which have been designated by the particular buyer.

We can see no obstacle to the adoption of a plan under which, whatever the design of the car as a whole, every reputable established appliance for each function would be sanctioned and the several roads directed to exercise, as in the past, their judgment in specifying devices.

What applies to construction of new rolling stock is of more importance in the field of maintaining rolling stock that exists. The largest number of locomotives ever ordered for domestic account in any one year was 6,265. The number of locomotives in use and under maintenance according to the last report was 63,862. The largest number of freight cars ever ordered in any one year was 341,315. The number of freight cars in existence and requiring upkeep as last reported was 2,326,987. Obviously the big end of the rolling stock task and the preponderant consumption of engine and car parts is not in new construction but in maintenance. Apart from repairs made by one railroad upon cars found out of order on its rails a highly important proportion of such work is the thorough overhauling of cars by the road that owns them in its own shops. For replacement of parts broken or worn out each road orders from the makers quantities of whatever appliances are standard upon that road. Stability in the industry during the war will be promoted by permitting in general each road to determine as in the past which of the competing appliances it will use in repairs.

Such a policy, affecting both construction and repair upkeep, will not only give rapidity and certainty to the exigent performance in war and preserve for the time of peace the commercial organizations which have carried on mechanical progress, but it will involve the minimum readjustment of shop operation and production quotas, thus keeping these enterprises in a strong position as payers of war taxes and subscribers to war bonds—these and the tradesmen and the people of the communities wherein their plants are located who draw sustenance primarily from the industrial payroll.

Please permit me personally, and I believe I may say the same thing in my representative capacity, to felicitate you, Sir, upon your manifest determination to form judgments based upon knowledge and upon the opinion of those whose vocation fits them to serve the country through you at this crisis.

Uniform Rules For Marking Freight

AT THE REQUEST of the Director General of Railroads the Interstate Commerce Commission has approved for filing, by all carriers by railroad subject to his authority, schedules containing the following uniform rules and regulations and practices governing marking less than carload freight:

Section 1. Freight, when delivered to carriers to be transported at less than carload or any-quantity ratings, must be marked in accordance with the following requirements and specifications, except as provided in Section 2 (b) of this rule or otherwise provided in specific items in this classification or in the Interstate Commerce Commission's Regulations for the Transportation of Dangerous Articles other than Explosives by Freight. If these requirements and specifications are not complied with, freight will not be accepted for transportation.

Section 2. (a) Each package, bundle or loose piece of freight must be plainly, legibly and durably marked by brush, stencil, marking crayon (not chalk), rubber type, metal type, pasted label (see Note 1), tag (see Note 2), or other method which provides marks equally plain, legible and durable, showing the name of only one consignee, and of only one station, town or city and state to which destined.

When consigned to a place of which there are two or more of the same name in the same state, the name of the county must also be shown.

When consigned to a place not located on the line of a carrier, it must also be marked with the name of the station at which consignee will accept delivery.

When consigned "To Order," it must be so marked, and further marked with an identifying symbol or number which must be shown on shipping order and bill of lading.

Note 1. Labels must be securely attached with glue or equally good adhesive.

Note 2. Tags must be made of metal, leather, cloth, or rope stock or sulphite fibre tag board sufficiently strong and durable to withstand the wear and tear incident to transportation; and when such cloth or board tag is tied to any bag, bale, bundle or piece of freight, it must be securely attached through a reinforced eyelet. Tags used to mark wooden pieces or wooden containers must be fastened at all corners and center with large-headed tacks or tag fasteners. Tags may be tied to wooden pieces when the freight would be injured by the use of tacks or tag fasteners. Tags tied to bags, bales, bundles or pieces must be securely attached by strong cord or wire, except that when tied to bundles or pieces of metal they must be securely attached by strong wire or strong tarred cord.

(b) A shipment that fully occupies the visible capacity of a car, or that weighs 24,000 lb. or more, when shipped from one station, in or on one car, in one day, by one shipper for delivery to one consignee at one destination, need not be marked.

(c) The marks on bundles, packages or pieces must be compared with the shipping order or bill of lading, and corrections, if necessary, made by the shipper or his representative before receipt is signed.

(d) Old consignment marks must be removed or effaced.

(e) Freight in excess of full cars must be marked as required for less than carload freight.

The schedules are to be filed on not less than 30 days' notice.

BAVARIAN RAILWAY TRAFFIC STOPPED BY SNOW.—According to advices to the Dutch press, all train traffic from Bavaria to northern Germany was stopped late in January by snowstorms. Troops have been requisitioned to clear the snow.

Germany's Railway Situation Is Most Serious

Prussia's Railroads Had a Deficit of \$50,000,000 in 1917
Requiring Increased Rates and Fares for 1918

NOW THAT MILDER WEATHER and the approach of spring give us a chance to look up from our worries and glance back upon the railway mishaps of the most severe winter for 50 years, we can console ourselves that, however bad conditions may have been in the United States, they were considerably worse on the railways in Germany.

A deficit of 250,000,000 marks for the Prussian railways in 1917; a possible deficit of more than twice that amount in 1918, only partly to be compensated for by increased rates and fares; congestion; lack of coal; a threatened shortage of cars, and an exceedingly poor and much reduced passenger service represent only a part of the difficulties that have arisen.

The statement that there has been a deficit on the Prussian railways is made on the authority of the Prussian Minister of Finances Hergt. The Prussian railways in the past have contributed no small amount of the revenues in the Prussian budget, so the fact that there has been a deficit of 250,000,000 marks is of more than ordinary importance. Herr Hergt expects that this deficit will double in 1918 on account of the rise in price of coal. In outlining the new budget the minister said that the new incomes of Prussia would exceed those of last year by nearly 1,400 million marks, while the expenses will be higher by 1,239 million marks than those of last year. The net surplus will be 343 million marks.

Following is the text of Minister Hergt's speech before the Prussian House of Representatives as quoted in a recent issue of the New York Tribune. It is given in detail to show clearly the importance of the railway revenues in Prussian finance:

"Assuming that on April 1, 1918, the war will still be going on, all additions to the income and supplementary taxes which had been voted on July 8, 1916, will be repealed. The incomes and the expenses of the fiscal year 1918 will balance without these additional taxes. These favorable results have been obtained in spite of the rising expenses on account of the war—the total salary of officials alone has been raised by 370 million marks because of high prices—thanks to the opening of new sources of incomes. For this purpose the railroad administration, the expenses of which also have risen on account of the war, raised the rates of passenger and freight traffic; it is expected that this will increase the receipts of the railroads by 389 million marks. In addition there remains available for the needs of the State the net proceeds of the State above the margin of 2.10 per cent for the invested capital; this would give about 159 million marks.

"In preparing the budget for 1918 the same methods have been used as in preparing that of 1917. In planning the expenses great moderation was exercised. Nevertheless, it was impossible to keep down the expenses to what they had been in previous years.

Income Exceeds 6,500,000,000 Marks

"The ordinary incomes will amount to 6,538,863,275 marks (that is, 1,381,700,000 more than during the present year). The ordinary expenses for the new year will reach 6,195,091,411 marks (1,239,400,000 marks more than during the present year). The ordinary surplus for 1918 will be 343,771,867 million marks (145,400,000 more than during the present year).

"At the head of the administrations from which a surplus

may be expected stands the administration of direct taxes with a surplus of 184,700,000 marks. Then comes the forest administration with a maximum surplus of 29.1 millions. The administration of custom duties and indirect taxes promises a maximum surplus of 17.8 millions. The Prussian stamp tax can be raised by 10 millions. The maximum proceeds from maritime traffic, it is hoped, will reach 12.5 million marks. From the administration of the crown lands a surplus of 2.8 millions is expected. The surplus of the lottery administration will be higher by 880,542 marks.

"It is natural that there should be deficits during the first years of the war. But these deficits which amounted to 517 million marks have been reduced to 317 millions by means of special taxation. There is no doubt, however, that we have used up our reserves. But reserves are, anyhow, for the purpose of being used up some time. As good householders we must naturally take care that we straighten out the deficit of 317 millions. This will not be easy when we consider the expenses which are continually increasing.

"Prussia's share in the payment of indemnities to Eastern Prussia is 70 million marks. These will have to come out of the Prussian treasury. The forest administration is still a Sleeping Beauty, and it will take a year before it will yield fruit. The mining administration, on the contrary, has so far had 1916 as the most successful year. Had we not borrowed in 1916 the sum of 100 million marks in order to straighten out the old deficits, our incomes and expenses would have balanced, and this would have repeated itself in 1917 and 1918.

"The income of the railroad administration in 1915 for the first time surpassed 4,000,000,000 marks. The increase in passenger as well as freight traffic was immense. The year 1916 meant for the railroad administration the climax of the war times. Since then its incomes have been falling down very rapidly, for in 1917 the railroad administration expects to find a deficit of 250 million marks. Doubtlessly, it will be possible at least partially to straighten out this deficit by means of the surplus income of the mining administration, which has surpassed the brightest hopes.

Why Rate Increases Are Necessary

"On account of the rise in the price of coal, a new decline has taken place in the railroad administration, so that in 1918 the railroad administration will be confronted by a deficit of 500 millions; it will bring nothing to the State, will not lay aside anything, but will have to take a few dozens of millions from the State. Here a radical improvement in the condition of income is desirable.

"We cannot impose new taxes upon the population of the empire and the States as long as there are these extraordinary differences in the communities. Therefore, we must immediately proceed to the equalization of burdens. Without any general State measures this is impossible. We furthermore need tax reserves because of the coming imperial finance reform. Naturally every minister of finances of Prussia must agree that the taxes on incomes and wealth belong to the States of the federation. And no minister of finances could take upon himself the responsibility of yielding these sources unless he received something to replace them. But the empire, the States and the communities form one unit, and this must be taken into consideration. The principle must be not only 'Give to the Kaiser what belongs

to the Kaiser," but also "Leave to the King what belongs to the King." At the present 3½ billion marks of the Prussian taxes go to the Empire. These 3½ billions have to be substituted by other taxes.

"All this makes it necessary to raise the railroad rates—passenger rates, 10 per cent; freight rates 15 per cent; military rates 10 per cent. This rise in rates will bring a total of 389 millions. But even then the railroad administration will be unable to contribute its share to the State. One hundred and fifty-nine millions will still be missing. The new raising of the railroad rates is only temporary; we hope to abolish them after the war, but we must take the liberty of trying their effect upon traffic and State finances."

The Passenger Service

The imposition of higher fares, plus a tax, appears, comments the Railway Gazette of London, to have been undertaken hitherto not with a view to increasing revenue, which had actually risen on a level with the figures for 1913, but in order to discourage travelling as much as possible, and in pursuance of this end, the passenger service has ruthlessly been cut down. Even so, there are limits to what can be done in this direction. As the Frankfurter Zeitung points out, 70 per cent of the passengers in fast trains are soldiers, and although the military authorities curtailed the granting of leave during the autumn in order to reduce congestion, it was found impossible to frame any general rules for the restriction of travelling, such as, for instance, would have been involved in a system of granting permits. The Prussian railways alone issue a million and a half tickets a day, and if it were desired to establish which journeys were urgent or necessary and which unnecessary, the inevitable result would be injustice and the creation of a vast new staff of petty officials. In the meantime, everything is being done to render railway travel as expensive and as uncomfortable as possible. Heating is practically non-existent, food is extremely difficult to obtain even on the longest journeys, and the costliness of travel can be gaged from the following comparative table showing the old fares from Berlin to a number of important centres and those now in force:

	—Old Fares—		—New Fares—	
	3rd Class	2nd Class	3rd Class	2nd Class
	Marks	Marks	Marks	Marks
Aix-la-Chapelle	19.20	29.30	39.20	59.30
Breslau	10.20	15.80	23.20	35.80
Cologne	17.80	27.20	37.80	57.20
Frankfurt-on-Main	16.60	25.50	36.60	55.60
Munich	20.10	30.70	40.10	60.70

The amount of baggage permitted has been severely cut down. This is mainly due to certain obvious operating reasons, such as the desire to reduce both the weight and the length of trains, in order to economize in coal, labor, and the utilization of rolling-stock. In certain eventualities, the unfortunate passenger may also have to choose between being stranded at a junction or going on without his baggage, since a new regulation provides that in order to avoid unpunctual working, facilities can be withheld for the transshipment of luggage between connecting trains.

These restrictions have, of course, not been received with great enthusiasm, and in one quarter they have, curiously enough, even led to a demand for the institution of one passenger class only. The suggestion is made by the Vossische Zeitung, which says:

"It might perhaps be difficult to find a satisfactory method to dam the flood of passengers. But the method chosen simply means that henceforth a well-lined purse is essential if we desire to make long journeys in comfort. . . . Why has the simplest method of lightening express trains not been selected—that of forbidding passengers to travel by them for short journeys? Above all, since it has been believed to be necessary to double the price of tickets, we ought to profit by the occasion and establish one class only. . . . There are eight seats in a third-class compart-

ment, six in a second, and four in a first. If the difference in classes were abolished and eight persons put in each compartment, a considerable alleviation would result in this way alone."

"We believe," says the Railway Gazette, "that some restrictions preventing short-distance passengers from travelling in expresses have been drawn up since the publication of the above comment, but the conservative and respectable Voss's Gazette can hardly be serious in its suggestion for one class only. The idea is unthinkable in contemporary Prussia, where an army officer may perhaps deign to travel in the same compartment with civilians, but will certainly not permit the rank and file of the 'field-grays' to come betwixt the wind and his nobility."

The Freight Situation

The German press does not publish such full details of the freight traffic problem as of passenger difficulties, but extremely significant facts are printed from time to time. We do know that both rail and water transportation have been handicapped by the severe winter weather. The Frankfurter Zeitung recently said of the general situation that "it is not possible to impose any additional restrictions on merchandise traffic. It is hardly possible to institute economies through a better organization of the rolling-stock. On the other hand, traffic necessities continue to increase." In the course of this article it was pointed out that while 4,200,000 tons of potatoes a year were handled as the average before the war, the traffic rose to 6½ million tons in 1916. In August last, it became necessary to "immobilize" 43,000 more cars than in the corresponding month of 1916, while for September the figure had risen to 65,000. And it is not as though the German railways could dispose of a surplussage of working stock. At the outbreak of war, the system as a whole owned about 622,000 cars, and up to the end of last year, approximately 91,000 new cars and 4,153 locomotives are said to have been constructed. These additions are entirely inadequate to meet traffic requirements, especially as the situation is complicated by the necessity for utilizing German rolling-stock and locomotives on the railways of occupied territories. It was estimated that at the beginning of September last, 155,000 cars were in use in Belgium, Poland, Courland and Serbia, and, after making every allowance for cars belonging to the railways of these countries, it is obvious that such an extension of operations, with its attendant long hauls, increases the strain on the working stock at the disposal of the German railway administrations.

Germany has also had difficulties in regard to coal and water transport. The coal problem is mainly one of transportation, and arises out of the congested state of the railways and of inland navigation. The difficulties of the latter have been accentuated by the lack of coal transport facilities, which handicaps the working of the canal and river tugs and barges. "Altogether," the Railway Gazette concludes, "Germany's transport difficulties are incomparably more serious than our own, which is something to be grateful for in a 'railway war,' to use Marshal Joffre's description of the present conflict."

11,300 More Miles to Be Operated

Further details concerning these difficulties on the railways of the Central Powers will be found in an article recently published in the London Times, which says:

"It is difficult to gage the true position, as the newspapers sometimes give prominence to reforms which may be proposed by the authorities, but which are in reality only intended to throw dust in the eyes of the public in Germany to cover up some deficiencies in the service.

"There is no doubt that up to about six months ago the railways were able to maintain a fairly efficient transport service. Gradually, however, with the waning man-power the

service deteriorated. As long as possible the railways kept up a time-table, which was very little behind the pre-war standard. The fares were unaltered except for trifling increases. Of course in the war zone the service was reduced long ago, if not suppressed entirely.

"This make believe efficiency could not last, and the Railway Minister had to show his hand rather suddenly. It is instructive to note that the occupation of so much extra territory has become a burden for the German railways. The drain on their resources has become immense, in spite of the fact that there is no coal shortage in the sense of that experienced by France and Italy. The difficulty is to get the coal to its destination.

Extra Mileage to Be Operated

"In considering the effect of the war on the internal working of the railways, the extra territory served must not be lost sight of. This is what it means in extra mileage to be operated:

	Miles.
Belgium	2,710
France	9,999
Poland and Russia	5,310
Romania	1,490
Serbia	750

In other words, there are roughly 11,000 miles in enemy hands, slightly less than one-half of the railways of Great Britain.

"It is quite certain that not too much rolling stock was left available for the enemy. This is especially the case with locomotives. It has been officially stated that over 155,000 German wagons are running in the occupied zones. Since the beginning of the war the Germans have built 120,000 new wagons and 5,000 new engines, but this supply is not nearly enough for the requirements.

"It will therefore be seen that to keep up the supplies for the armies and the civilian populations over such long distances was no light task. Gradually it became impossible. Public notices were issued asking people not to travel. Still the traffic increased, and the trains became overcrowded and behind time.

"It was in October last, when the harvests were being transported, that the breaking point was reached. The minister was no longer able to carry on the traffic without some drastic move. Suddenly, on the 18th of the month, the fares by all fast trains were doubled. On November 1 a new time-table was issued, by which many trains were struck off.

"The Austrians followed suit on December 1 with a 50 per cent increase in the fares, making 80 per cent with the previous one imposed in February. The Hungarians raised their fares from November 15 on a sliding scale from 70 to 120 per cent.

Marked Reduction in Traffic

"The immediate effect of all this was to reduce the traffic by about two-thirds. The trains that were then running were reduced in weight, and dining cars, which had disappeared from the scheme, were again put into working.

"The Under Secretary of State, Herr Stieger, speaking on December 14 on the question of the coal shortage, stated that the reduction in travel accounted for a saving of 2,000 tons a day on the Prussian railways. What he did not say was how many protests had been received as a result of the suddenness of the introduction of such a ban on travel.

"It is interesting to note that the fares are about equal to those charged in England. Thus, for a journey of 90 miles the third class fare in England is \$2.70; in Germany it is \$2.40, in Austria it is \$2.64 and in Hungary \$3.04.

"To summarize the new time-tables which came into force in November, 1917, is not so easy, as a detailed comparison would occupy too much space. Roughly the whole train service has been reduced by about 55 per cent. Taking at

random the service from Cologne to Berlin, a distance of 362 miles, the fastest trains in pre-war days did the journey in 8 1/2 to 9 hours. There were about 15 in each direction. There are now only nine trains for civilians and four 'leave' trains for the military only. They do the journey in 11 hours.

"There are numerous 'leave' trains all over the country, which are run daily for military purposes to convey the troops between the Eastern or Western fronts and their homes. Thus there is a regular service from and to Vilna, Riga and other Russian stations right up to Berlin. On the Western front there are 15 trains a day for the troops on leave, besides four ordinary fast trains on the main line between the Belgian frontier and Cologne. From Metz during the day there are 11 'leave' trains and eight for civilians for all parts of Germany. Some of these trains are not always run when leave is stopped.

"The time-tables in Belgium and in the occupied territory of France present a sorry picture. Except for the military trains there are but few ordinary trains and these are stopping trains. The journey from Ostend to Brussels takes about five hours instead of one hour and three-quarters as in peace time. Moreover, all sorts of restrictions are in force and no journey can be made without a permit from the military authorities.

"Comparing the German train service with our own the balance is certainly in favor of ours."

Development of the Steel Car*

By Henry P. Hoffstot

Manager of Sales, Central District, Pressed Steel Car Company.

A GOOD MANY YEARS AGO some few all-steel cars were built and placed in operation by some of the steel companies and these cars are, I believe, still in service. The change from the use of wood to steel in the construction of coal cars in America was not brought about at one time but was extremely gradual in its development. In the early 90's C. T. Schoen commenced making pressed steel car shapes in his little plant in lower Allegheny and for years supplied the railroads with pressed steel center plates, side bearings, stake pockets, push pole pockets, etc., for use in connection with the construction of wooden cars. During the same time the Fox plant cut on Penn avenue was furnishing pressed steel trucks and truck specialties to railroads for use on wooden equipment.

About 1895 Mr. Schoen conceived the idea of building steel cars on a large scale. The following year the first steel cars were ordered by the Pittsburgh, Bessemer & Lake Erie, and shortly after by the Pittsburgh & Western and the Pittsburgh & Lake Erie. It is therefore to the credit of the officers of these three companies that a great deal of the credit for the bringing about of the change from wood, or wooden cars with steel trucks and a few steel specialties to the all-steel car must be given. Mr. Schoen conceived the plan but in order to show the public it was necessary to find a buyer on whose railroad a demonstration of the cars in actual operation could be made. The heads of these three companies took the chance, and that they made no mistake in their judgment is now well recognized. The demand for this type of car grew rapidly. Its construction virtually revolutionized railroad traffic of this country. The first helper cars were built to carry coal, and while stenciled 50-ton were hardly of 40-ton capacity so far as present M. C. B. requirements are concerned. Probably 85 to 90 per cent of these cars are still running after 20 years of service.

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in and out of the Pittsburgh district, which with its bituminous coal and ore gives the car as severe service as could be received by them anywhere in this country. Since that time there has been an evolution in the construction of cars as great as that which took place in 1896 and 1897.

The railroads are continually demanding cars of heavier capacity so that the increasing volume of tonnage offered can more economically be handled on our congested railroads. Early in this century the combination of pressed steel and structural steel was used in car construction, and this is the type of construction most commonly used today. I am not here to discuss the benefits to be derived from the use of pressed steel over structural steel, or vice versa. Car companies are in the business of supplying a commodity to railroads and industrial concerns the same as a tailor is in the business to sell clothes to his customer. We sell what the customer wants.

There are steel cars and steel cars—some no better than wooden cars which will last under the treatment now given to cars hardly as long as would good wooden cars—and there are steel cars the life of which as yet cannot be computed. Often an additional ton of steel carefully applied in the designing of the steel car will make the car so much stronger and better able to withhold the shocks and wear and tear received in unfair treatment to which we must expect a car to be subjected in the ordinary course of its life that by the end of 12 to 15 years it can be renovated at a comparatively small expense, while the car of poor design has long since undergone heavy repairs and may again be ready for more. In making this comparison it must be assumed that each type of car has undergone the same general treatment and been kept up in the way of painting and minor repairs in about an equal way. I make mention of this comparison not with the idea of passing along the blame for the failure of a particular type of car to the superintendent of motive power or mechanical engineer of the railroad involved who may have originally designed it, for I realize that in all probability it was the financial limitations of the railroad which limited him in the amount to be expended and that it was to keep within such limitations that he failed to authorize the use of the ton of additional steel which if put into the car at the beginning at an additional initial cost of possibly \$40 per car might have saved \$400 in rehabilitating the car later on.

100-Ton Cars

Now the 70-ton car has come into general use, and several thousand 90-ton cars are in operation on at least one well known railroad which is also experimenting with a 100-ton car. The carrying of this huge tonnage has been made possible only through the use of steel in car construction. Heavier bridges, heavier rails, and heavier locomotives, etc., have all been required and are being put in to enable all roads to carry these heavier cars which have done so much toward reducing the cost per ton mile for handling materials and eliminating more or less of the congestion in our large terminals, for if the 30 and 40-ton cars of 20 years were still in operation, it would be necessary in order to carry the same tonnage to have trains anywhere from 20 to 30 per cent greater in length.

Many 100-ton coal cars are now in operation on short lines about the steel mills, and recently one of the railroads became interested in a 120-ton car. Its officers felt that the concentration of a 120-ton load in one car would not only shorten up the trains, thereby making a less number of units for a given train, but also a less number of operations in the dumping machines at the terminals, and would also reduce the number of wearing parts to be maintained as well as eliminate to a great extent the extra long sidings which would otherwise be required to handle the same tonnage in cars of lighter capacity. In other words, some of

the general reasons which brought about the change from the 30 to 40-ton capacity wooden cars to 40 and 50-ton steel cars are now tending to bring about the use of very much heavier capacity steel cars. The officers of this particular railroad, fearful lest a mistake might be made in the ordering at the present time of a large number of cars in which such a radical change would be made, elected to have four of the large car companies each build a sample car. The engineers of the railroad at that time supplied the car companies with the maximum height and width and approximate length which they felt would carry the required tonnage and left the details of the design of the cars to each of the car companies, their idea being to get these sample cars into actual service, and if experience showed that cars of 120-ton capacity could be more economically used than 50 or 70-ton cars, they would undoubtedly pick out the superior qualities from each of the four sample cars and design a car which in the opinion of their engineers would show as nearly as possible 100 per cent efficiency. These four cars have been delivered, and are now receiving their trial; it will be interesting to know the results. I believe that you will agree that this is a good way to get results.

The Standard Car

All of the car companies employ designing engineers who are at the top of their profession, and while I cannot speak for all of the companies, I can at least speak for the company which I represent and say that we at all times solicit an opportunity to help in the designing of steel and composite cars with a view not of exploiting any particular specialty or type of car, but solely with the view of bettering the steel car, always having in mind that the adoption of a car of standard design for the different classes will mean millions of dollars saved annually in the money expended by the railroads and indirectly by the American public in the first cost of cars and their maintenance. Certain rulings of the M. C. B. Association in the construction of all cars make it necessary to comply with certain regulations so far as clearances, strength, etc., are concerned. These rulings, however, do not go very far toward bringing about standard designs of cars. For many years this question has received more or less attention, and three or four years ago a committee of five builders was appointed by the railroad presidents representing the American Railway Association to go into the matter very carefully. Later ten or twelve railroad representatives were placed on this committee. After three years of labor they made their report and submitted specifications and blueprints covering box cars and gondola cars of several capacities. Shortly after this the committee was dissolved and the work I believe is now being continued in the hands of another committee appointed by the railroad presidents consisting entirely of railroad engineers. It will be interesting to watch the developments along this line, for it is the opinion of many that the greatest advance that can be made in steel car construction at this time will come with the adoption of cars of standard design for use all over the country.

No further progress along these lines can, however, be expected until Congress decides whether the railroads after the war are to remain the property of and be operated by their real owners under the control of an Interstate Commerce Commission, more liberal than heretofore in its views as to rates, or whether permanent Government ownership and operation is to prevail.

Car companies are now in position to take orders and commence delivering cars within three months. If the conditions of this winter are not to be repeated next winter, hundreds of locomotives and thousands of cars must be ordered by some one for use on our American railroads to take care of replacements if nothing else. Let Congress act, then watch the 70-ton steel car develop.

The Trade Acceptance in the Supply Field

The First of Two Articles, Describing the Trade Acceptance and Showing Its Important Advantages

THE OPEN-MINDEDNESS of the American business man as encouraged by the publicity campaigns that have been put behind the patriotic appeal for thrift, economy, Liberty Bonds and War Savings Stamps, is proving one of the greatest helps in favor of extending the use of the trade acceptance.

The trade acceptance is not new; it is not an innovation. It represents an idea in business that is in wide and successful use in England, Canada, France and Germany, in export trade the world over in general; before the Civil War, it was a commonly known credit instrument in our own country. It has attained a new importance to us within the last two or three years, however, because of its sanction and encouragement by the Federal Reserve Board. It is of first importance at the present moment because it will prove one of those things that will help American business most efficiently to do its part in winning this war, and that,

ly, on a more stable and certain basis. Most goods today are bought presumably upon a 30, 60 or 90 day term of credit. Most purchasers—at least those of good credit standing—essay to pay their bills, if they do not discount them for cash, at the expiration of the term, but they are under only such obligation to do so as their desire for a good name in business demands. Many purchasers, on the other hand, let their bills hang over until they may have available funds to pay them or until the seller's credit manager has worried them into sending a check. With the trade acceptance, this is not the case. The acceptance, like a promissory note, is made out for a definite term and, like a promissory note, it is definitely due on its expiration. When accepted by the purchaser and endorsed by the seller, it may be discounted at the bank, and the bank, in turn, may discount it with the Federal Reserve Bank, it being such good commercial paper, in fact, that the Reserve Bank will actually discount it at a lower rate than ordinary single name paper.

In other words, so good is the acceptance that after it has been accepted by the purchaser, the bill is credited as paid in the ledger. The purchaser may if he chooses, default on his payments, but the obligation to pay on a definite date is so plain that the acceptor will think twice before he will take any such chance with his obligation and with his dealings with his bank. The open book account, in other words, is settled or eliminated, the capital that was tied up in the unpaid bill is released and there is stability and satisfaction

TRADE ACCEPTANCE <small>FORM APPROVED BY THE AMERICAN TRADE ACCEPTANCE COUNCIL CHAMBER OF COMMERCE OF THE UNITED STATES NATIONAL ASSOCIATION OF CREDIT MEN</small>	CITY OF DRAWER: _____ STATE: 1917 _____ No. _____		
	ON _____ DATE OF MATURITY: _____	PAY TO THE ORDER OF OURSELVES (DOLLARS \$ _____)	
<small>THE OBLIGATION OF THE ACCEPTOR HEREON ARISES OUT OF THE PURCHASE OF GOODS FROM THE DRAWER. THE DRAWEE MAY ACCEPT THIS BILL PAYABLE AT ANY BANK, BANKER OR TRUST COMPANY IN THE UNITED STATES WHICH HE MAY DESIGNATE.</small>			
TO _____ (NAME OF DRAWEE)	ACCEPTED	BY _____ (SIGNATURE OF ACCEPTOR)	
(STREET ADDRESS)	DATE _____	PAYABLE AT _____ (LOCATION OF BANK)	BY _____ (SIGNATURE OF DRAWER)
CITY OF DRAWER: _____			

The Approved Trade Acceptance Form

today, is the only thing that American business has in its mind to do.

"In times of normal easy money conditions," says Beverly D. Harris, vice-president of the National City Bank of New York, "we are prone to follow the line of least resistance. Radical innovations are unsettling and difficult of accomplishment. It is in a great war emergency like the present, when excessive burdens must be well distributed over a broad area, and limitations are placed upon credit, that we come to a full realization of the true value and efficiency of the trade acceptance, scientifically employed, as a means of opening latent avenues of credit which would otherwise be unavailable, and bringing the entire banking power of the country to the support of the general situation."

Ease of Adoption

The trade acceptance, while it is a new thing as far as we Americans of the present generation are concerned, possesses fortunately as one of its advantages, its ease of adoption. Its use will necessitate practically no change in present methods of doing business; it will necessitate no changes in the present terms of credit. It will not interfere in the least with the firm desiring to discount its bills for cash; with the firm selling on long or short terms of payment, or with deferred dating of bills. It will only interfere with the debtor who declines to pay his bills when they come due.

Its use, essentially, will put business and credit, general-

ly, to all concerned. It is estimated that there are on open book accounts on the average in this country in the neighborhood of \$4,000,000,000. The advantages of converting this or even a part of it into liquid capital are evident. The necessity of so doing at this time when we are working with might and main to win the war should be similarly apparent.

Definition

A trade acceptance is defined by the Federal Reserve Board in regulation A, series of 1917, as a draft or bill of exchange drawn by the seller on the purchaser of goods sold, and accepted by such purchaser; and a bill of exchange, within the meaning of this regulation, is defined as an unconditional order in writing, addressed by one person to another other than a banker, signed by the person giving it, requiring the person to whom it is addressed to pay, in the United States, at a fixed or determinable future time, a sum certain in dollars to the order of a specified person.

It is not hard to see from this definition of what high standing an acceptance must be. "It may be assumed from the attitude of the Federal Reserve Board toward the trade acceptance," says Lewis E. Pearson, chairman of the board of the Irving National Bank and chairman of the American Trade Acceptance Council, "that it is the intention that as an instrument expressing credit value it shall more nearly approximate the condition of actual currency than does any class of paper in the commercial field." It must possess the quality of eligibility. It must be fully and free-

ly negotiable. These qualities are secured by the fact that it fully protects all interests concerned and provides sufficient evidence on its face to justify the confidence of a bank or other purchaser of an acceptance who is not in possession of additional information concerning the transaction out of which it grows. The Federal Reserve Banks regard an acceptance as of better standing than a promissory note. In the note the important element is faith in the ability and integrity of the maker of the note. The acceptance not only has the faith and integrity of the acceptor behind it; it is further supported "by a commercially accepted, fully protected and legally approved theory to the effect that a certain commercial instrument made in a certain form and possessing other characteristics, subject to determination by the Federal Reserve Board, which appear on its face, and known as a trade acceptance, shall be eligible for re-discount at Federal Reserve Banks."

How is this eligibility obtained in the trade acceptance. First it arises from an actual commercial transaction. It is unconditional—an unconditional bill unconditionally accepted. It is for a definite sum of money, and it possesses a definite maturity. These four requisite elements protect the interests of the purchaser of the acceptance.

Its Practical Use

The trade acceptance works out in practice as follows: A seller of goods sends with his invoice an acceptance upon which has been written in the amount of money due, and the date of maturity. To facilitate matters, there is usually attached on a perforated slip a short statement of what the acceptance is with an expression of the seller's desire that it be made use of. The purchaser has one of three choices. If he wishes he can pay his bill at once and take advantage of his discount for cash. Or at the other extreme he can let the bill go over as an open book account. Presumably, however, he will make use of the acceptance. To do so he will write across its face the word "Accepted," the date and bank where payable and his signature, thereupon returning it to the firm from whom he bought the goods. The latter can then credit the account on the ledger as settled; he holds an acknowledgment that the transaction has taken place and if he wishes can bank the acceptance and secure money upon it. He does practically no worrying about overdue accounts and if disputes arise as to the kinds of goods shipped the matter can be settled in a straightforward way without ill-feeling over the fact that the account may be held up without payment.

The natural presumption is, of course, that the acceptance will be paid at maturity. Those who have used the idea are uniform in their agreement that payment is rarely defaulted. Sometimes, but seldom, cases arise wherein an extension of time is desired. This can be arranged for by a promissory note—for an acceptance in theory is meant to cover only a live, commercial transaction.

The seller on receiving the acceptance back from the purchaser of the goods has his choice of holding the paper in his own portfolio until maturity, or if he desires, he can immediately realize upon it by discounting it at a rate lower than a promissory note. As noted above, his bank has good reason to look with favor on his use of the acceptance method of doing business, because the bank in turn is in a position to re-discount a trade acceptance with the Federal Reserve Bank also at a rate below the rate at which other paper of similar character may be discounted. But there is a very important additional advantage to the merchant who desires thus to obtain capital. The bank will lend money on a promissory note to a merchant on a basis equivalent to about 50 per cent of his open book accounts, but on the acceptance the percentage that may be borrowed is not 50; it is 100. No better terms can be obtained on the security of Liberty Bonds.

An actual illustration is here in order to show exactly how the trade acceptance works out and to outline its definite advantages. A merchant, we shall say, has a chance to buy a certain lot of goods at \$5,000 and he has secured a buyer whom he will charge \$6,000. The manufacturer will give him 90 days credit and he is certain that the buyer will also not pay in less than 90 days. In short, there will be a space between the time his bill will be due and the time he is certain of payment taken up by the handling of the goods, etc. Bear in mind that the merchant cannot be absolutely certain that his buyer will pay in 90 days; some authorities have estimated that in over 50 per cent of the cases the term of credit is exceeded. On the open book account, the merchant would find it most difficult, if not impossible, to finance this transaction. His bank in the first place cannot loan him \$5,000 on the \$6,000 sale. It will presumably loan him \$3,000 on the so-called two for one rule, but it will probably demand that 20 per cent be left on deposit, leaving \$2,400 with which to buy \$5,000 worth of goods.

Note the difference in the case of the trade acceptance. The merchant buys the goods from the manufacturer, giving him a trade acceptance with 90 day maturity for \$5,000. The manufacturer then cashes the acceptance, let us say, and has his money. The merchant, in like manner, secures a trade acceptance for \$6,000 from the ultimate purchaser; he can bank that and he also has secured his money and realized his profit. In other words, the transaction has financed itself and the merchant is ready to go ahead on another deal.

Advantages to Seller, Buyer and Banker

"It is difficult to imagine," says Mr. Pierson, "a class of interests in any way related to commercial credit operations which will not be benefited by the general development of the trade acceptance.

The Seller—It will be helpful to the seller. Commercial transactions will be completed promptly instead of being allowed to remain open throughout a possibly long drawn-out credit period, with the attendant evils of extensions, counterclaims, unwarranted return of goods, etc. At the time of settlement all equities between buyer and seller are definitely determined, and the buyer by accepting furnishes an implied acknowledgment of the correctness of the account. If, later, possible objection to payment should be based upon a claim of improper deliveries, the burden of proof will rest where it belongs, upon the buyer, instead of upon the seller, as at present. Business can be transacted and accommodation extended practically without impairment of the seller's capital, as each transaction virtually will automatically finance itself because of the eligible quality of the credit instrument employed. This lessens the need for working capital and increases the ratio of earnings to capital actually employed. Because of the practical certainty that money will come in more regularly and borrowing power be greater, the seller will be able to conduct his business upon a more systematic basis. Business capital will be kept in properly liquid form instead of being tied up as at present in open-book account. The present difficulties attending the collection of accounts will be eliminated, or at least greatly reduced—this, particularly, if the acceptance is made payable at the seller's bank, in which case collection becomes a detail in the machinery of banking and is accomplished, without any effort or action on the part of the seller.

The Buyer—The use of the acceptance should represent substantial value to the buyer, particularly if he belong to the better class. By giving to the seller a negotiable evidence of indebtedness, with the full understanding that it will be negotiated, he virtually serves notice upon the business community to the effect that he has not formed

the dangerous habit of overbuying—that he is prepared to meet his obligations promptly at maturity—and that he expects to receive the fullest measure of consideration as a preferred buyer. By assuming an obligation in this form, he establishes rather than weakens his credit. His paper when negotiated will receive the benefit of the best preferential discount rates and the obligation throughout will be carried upon his own integrity and responsibility, rather than upon a basis of special favors.

The Banker—The general use of the acceptance will help banking generally. Commercial paper will be more soundly based, more nearly uniform in quality; will be presented for discount with greater regularity, thereby avoiding congestion; will progress upwards through re-discount channels more freely; will be more helpful in showing the true credit standing of both seller and buyer. Banking resources will be rendered more flexible and their commercial possibilities for the benefit of the business community materially extended. Loans by banks to customers no longer will constitute a direct drain upon resources, but, in effect, will represent a guarantee by the bank of the soundness of acceptances, which, because of their eligibility, can be converted into cash quickly and economically. Otherwise expressed, the bank will be able to loan credit instead of cash.

Now Is the Time to Encourage the Use of the Trade Acceptance

"The trade acceptance," said Mr. Pierson on another occasion, "is nothing more nor less than an exceedingly simple, direct, economical method of covering credit obligations arising from the sale of merchandise. It accomplishes no miracles—makes no obligations less serious than they should be—disturbs no proper relation between the different parties to business transactions—and has no quarrel with any rational business method now in the field. The idea it expresses is sound from a business point of view—promotes all proper interests concerned—and represents substantial value to the nation in times of stress.

"So, then, the line of duty for us is clear—buyers and sellers and bankers, American business men all, should get squarely behind the trade acceptance and follow this splendid movement in its interest which has been put upon such a definite basis. Let us think in terms of war, and war necessities, and conditions after the war, and not in terms of a business past now as clearly removed as is the past of the Pharaohs.

"Let us realize that there has come into the world, and particularly into this great western world of our own, a new spirit—a new dispensation—new responsibilities—and new obligations, which we dare not disregard. The acceptance is here—is here to stay—is a part of the business and financial life of this community, whether or not the occasional banker or business man would have it so. The only question is: 'How soon will it be possible to bring this fact definitely to the attention of the business of the country?'"

(This is the first of two articles on the trade acceptance in the railway supply field. The second will appear in an early issue.)

THE U. S. OUTPUT OF PORTLAND CEMENT IN 1917 was the largest in the history of its production, amounting to 93,550,000 barrels, while that of the other principal cement producing countries in the latest available year was: Germany 30,000,000 barrels, England 17,000,000 barrels and France 8,000,000 barrels. The production in the United States has grown from 42,000 barrels valued at \$126,000 in 1880 to 93,550,000 barrels valued at \$101,000,000 in 1917.—*Bulletin of the National City Bank of New York*

Railway Officers Who Are Joining the Colors

COL. W. J. WILGUS, formerly vice president of the New York Central, who has been serving on the military railroads in France, recently returned to this country to co-operate with Director General of Military Railways Felton in securing the enlistment of a number of railway men for service as officers of the railway regiments in France. George T. Slade, vice-president of the Northern Pacific and H. C. Nutt, general manager of the Los Angeles & Salt Lake, have received commissions as majors. Both will be deputy director generals of transportation.

C. L. Hinkle, general superintendent of the Toledo, St. Louis & Western, and R. K. Rochester, superintendent of the Northwest System, Pennsylvania Lines, will serve as general superintendents with the rank of major, and J. H. Elliott, general manager of the Texas & Pacific will serve as assistant general manager with the rank of major. J. F. Hickey, superintendent of the Missouri, Kansas & Texas, has been commissioned a major on detached service assisting the personnel. Hugh McG. Taylor of San Antonio, who has been engaged in construction work on the railways in Cuba, has been given the rank of major. H. M. Waite, formerly manager of the city of Dayton, Ohio, who previously was a railway officer, has been commissioned as lieutenant-colonel.

Paul M. La Bach, assistant engineer of the Rock Island Lines, has been made mechanical and water supply engineer with the rank of major.

The following will serve as division superintendents with the rank of captain: H. J. Micksch (Missouri, Kansas & Texas), O. E. Coyne (Missouri Pacific), R. E. Clark, A. W. Woodruff (superintendent Wyoming division, Union Pacific), C. A. Maxwell (superintendent, San Antonio & Aransas Pass), and Edward E. Carter (assistant superintendent, St. Louis-San Francisco, Neodesha, Kan.). C. E. McMillan, and J. W. Highleyman (master mechanic, Union Pacific at Cheyenne), have been commissioned captains and will serve as superintendents of motive power. H. B. Hayes, general roundhouse foreman of the Seaboard Air Line at Savannah, Ga., has been commissioned a captain and will serve as mechanical foreman.

The following have been given the rank of first lieutenant and will serve as division engineers: T. P. Kennedy, R. F. Scott, Jr., M. W. Rust (Virginian Railway), C. B. Harbeson, W. B. Maurer, A. W. Worthington (formerly with the Pennsylvania Lines and now with the Goodrich Rubber Co.), C. H. Jones (Eric). A. H. Scull has been commissioned second lieutenant and will serve as assistant division engineer. The following have been commissioned majors and will serve as deputy engineers of construction: E. W. Clark, N. F. Brown, P. L. Stalker and E. J. Langford. The following have been commissioned captains and will serve as assistant engineers of construction: R. S. Harden, F. E. Craft, J. L. Vogdes, T. B. Watson, E. B. Palmer, C. S. Platt, R. T. Frazier, Jr., and D. P. Beach. A. M. Miller, who has been commissioned a captain, is in charge of mobilization of a railway transportation corps of clerks.

The following have been appointed railway transport officers, with the rank of first lieutenant: L. I. Ballard, F. R. Outerbridge, J. I. Slater, R. S. McElwee. The following have been made railway transport officers with the rank of second lieutenant: F. A. Bourdreau, J. Storey, T. D. Barker, G. N. Richard.

A railway transport officer is described as "a combination of passenger agent, freight agent, bureau of information and diplomat." He is located at practically every junction point and every large station where troop trains stop as well as at points of origin and destination of important

troop movements. He is designated by a brassard and is the means of communication between the department of the director general of transportation and the commanding officer of the troops enroute. Because of the intimate relations that must exist between an officer of this kind and commanding officers of troops and French railway and government officers, he should have adaptability to new conditions and knowledge of general railway conditions, so as to be able quickly to familiarize himself with the making out of transport orders and other French railroad practices, and a basic understanding of French upon which quickly to perfect himself in that language.

Railroad Wage Commission

THE RAILROAD WAGE COMMISSION has practically concluded its public hearings for the purpose of receiving requests for higher wages for various classes of railroad employees and the more important work of investigation of the facts presented and of the available statistical data, together with a consideration of possible bases for deciding as to what increases should be awarded is being carried on by its staff of examiners and statisticians. Over 100 blank forms have been sent to a large number of representative railroads for classified information as to wages and hours of employees and telegrams have been sent to Class I roads asking for less detailed information. In order to secure data promptly the roads to which the blanks were sent were asked to send first the information for five representative divisions.

The blank forms are intended to obtain for the commission, in succinct form:

First—A grouping by rates of pay of the employees coming within each of the defined classes of occupations as established by the Interstate Commerce Commission Classification of Employees, so as to show:

- (1) The number of men having a basic working day of 8, 9, 10, 11, 12, or more hours.
- (2) The number of men working a six-day week, and those working a seven-day week.
- (3) The number of men at different specified rates per month, day, or hour.
- (4) The number of men who, if required to work overtime, receive no additional pay.
- (5) The number who receive pro rata pay for any overtime worked.
- (6) The number who receive time and a half, or better, for any overtime worked.

Second—A basis for an approximate estimate of the aggregate amount involved in any increase of the present rate of wages, that may be recommended.

The commission is also conducting an elaborate investigation into the increased cost of living. To supplement the official statistics it has called on the newspapers of the country to collect up-to-date facts and has sent them blanks for their reporters to use in securing data as to the living expenses of families in their cities.

The advantages of the eight-hour day and "punitive overtime" as portrayed by labor leaders before the Railroad Wage Commission were questioned by railroad operating and mechanical officers who testified on February 20 and 21. W. J. Tollerton, general mechanical superintendent of the Chicago, Rock Island & Pacific, said that when the Rock Island shops were put on an eight-hour basis he found that many men left to work for another road which worked nine-hour shifts with pay for 9½ hours, and when the longer hours were restored the men returned. Another complication was caused when numerous foremen resigned to take subordinate positions because they could earn more money at piece work or by working long hours. Chairman Lane asked him if he be-

lieved that a man does as much work in eight hours as in ten. "That has not been our experience," replied Mr. Tollerton.

D. R. MacBain, superintendent of motive power of the New York Central, said that the eastern railroads would have had even greater difficulties in keeping motive power repaired during the winter if they had not been able to work nine and ten-hour shifts and he said that on a piece-work basis the men worked just as efficiently during the last hour as during the first. Operating officers have been working 15 to 20 hours a day during the winter, he said.

E. F. Potter, assistant general manager of the Minneapolis, St. Paul & Sault Ste. Marie, declared that the plan of paying time and a half for overtime was impracticable in railroad service, because many delays are beyond the control of either the management or the employees but that the amount of overtime depends to such a great extent upon the employees themselves that a premium should not be paid for it. All of the railroad officers who testified were men who had come up from the ranks themselves and were therefore able to reinforce their statements by illustrations from their own experience both as employees and as officers.

Additional representatives of various groups of employees, mostly unorganized, appeared before the commission on February 25. A. L. Rhodes, a Pullman conductor, appeared individually and asked consideration for Pullman employees generally. He described his working conditions, saying he received \$99 a month, this being the standard rate for conductors who have been in service from 5 to 10 years. His last increase was 10 per cent in 1916. George P. Mann appeared on behalf of the clerks employed by the Boston & Maine, and J. R. T. Auston for the telegraphers on the Pennsylvania.

L. S. Hungerford, general manager, and L. S. Taylor, comptroller, of the Pullman Company, also testified.

Other witnesses were: T. M. Maxwell, representing unorganized employees of the Indianapolis Union Railway; J. M. Lynch, president of the Brotherhood of Freight Handlers, and S. E. Padgett, general chairman of the Colored Association of Railroad Employees, who asked that the pay of colored employees be equalized with that of white employees for the same work.

HEDJAZ RAILWAY "MUCH DAMAGED."—The British War Office has made the following announcement about the campaign in Palestine and Arabia: Confirmation has been obtained of the success of the operations undertaken by the Arab forces against the Hedjaz Railway to the north of Maan (which is 60 miles south-south-east of the Dead Sea). It appears that for three days subsequent to January 3, Arab troops were in possession of an important portion of the line, wrecking and burning rolling-stock and damaging bridges. The troops who executed this raid subsequently retired, having suffered very slight losses, carrying off prisoners and booty.

BRITISH LINES IN FRANCE.—In the despatch from Sir Douglas Haig, published in the London press on January 9, the following references to British army transport appeared: "During the year the dock capacity allotted to the British armies in France was thoroughly organized. In the first nine months the number of cranes was more than doubled. The number of imported broad-gauge (standard) locomotives in traffic in France in October, 1917, was nearly ten times as great as at the end of 1916. Many hundred miles of standard gauge track have been laid also, both in immediate connection with our offensives and for the general service of the army. Light railways have grown with a like rapidity, and the track operated at the end of October was already eight times as great as that working at the commencement of the year."

Increase Life and Service of Locomotive Boilers*

Prevent Scale Formation and Corrosion from Bad Water by Treating the Feed Water

By George Austin

General Inspector of Boilers, Atchafalaya, Topock & Santa Fe

FORMATION of mud or salts or both on the water side of the tube sheet of a locomotive boiler covering the copper flue ferrules, a film of slime between the firebox plates and the water, or water in the boiler heavily charged with suspended matter, or scale formation, causes overheating and leaking. It may as well be said at the start that overheating is the principal agent, and other causes are accessory. The first indications of flues and some times other parts being near the leaking point are small light colored beads of sodium salts, mixed with other solids, adhering to the edge of the flue beads. Although flues are tight in the holes, there are small crevices through which the slime works its way and the moisture quickly evaporates on the hot plate, leaving a dry hard deposit, that temporarily plugs up the hole it leaked from. In most cases

sense of the futility of such a remark. Those boilers are clean when they leave the terminal, perhaps freer from mud and scale than boilers on other districts, which give much better performance. The salts from the water being evaporated, precipitate at the points at which evaporation is accomplished. This being nearest to the heating surface, a film of slime grows between the plates and the water causing overheating. That may not be just the right explanation, but, it is not far from it. This slime making water as well as the scale forming water, just spoken of, will always give trouble as long as we let it get into the boilers. Neither case is subject to mechanical improvement, except, so far as adequate facilities may be provided for washing boilers and changing water.

The fillet of scale which forms over the copper ferrule, regardless of its composition, reduces the power of the copper ferrule as a conductor to keep the end of the flue from getting hotter than the flue sheet. It has been suggested that a wider ferrule than is commonly used will require heavier incrustation to impair its efficiency as a conductor and widen the interval between leaks, which reasoning is very plausible.

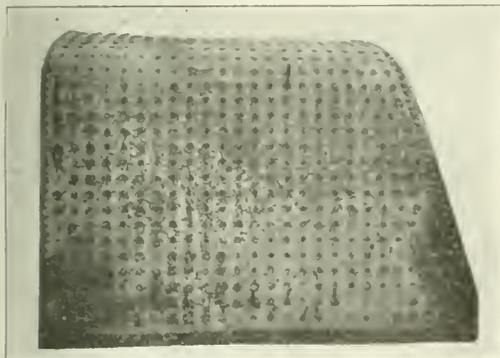
Scale formation in arch tubes and firebox sheets is indicated first by a sand paper roughness of the parts which are becoming affected, and later by clinker, or as it is sometimes called honeycomb, clinging to it. It actually seems as if it was trying to defend itself from injury by establishing a non-conductor of honeycomb on one side to offset the scale formation on the other. The smooth, slightly rounded flatter or bobbing tool in a No. 3 air hammer is effective in most cases in removing this scale. By working on the fire side the jar seems to cause it to flake off. Boilers should be warm when such work is done. There is little danger of cracking the plate by using the methods mentioned to remove the scale; there is great danger of developing cracks if it is not removed. On some divisions we rattle our fireboxes nearly every month, which is our term for the operation.

We must keep fireboxes clean if we are to get service from them. Clean fireboxes and boilers cut down repairs. Some roads have adopted the system of giving the flues a periodical expanding and claim good results; although we wait for the leaking indications, the same thing is accomplished. The expanding removes the scale and maintains the copper ferrule as a conductor.

Simmering Leaks

By simmering leaks, is meant small leaks in fireboxes that leak continually, but not enough to form a stream and run down the plate and give trouble. These should not be permitted, especially where the water in the boiler is heavily charged with suspended solids. These small simmering leaks are just big enough to let the water through a fine enough to keep back the mud and build up a mud fillet around the flue or stay bolt. Overheating is frequently so severe that the flues and staybolts affected become loose in the holes. Many engine failures are due to permitting simmering leaks, especially among the flues. The above class of failure most frequently occurs during seasons when the water is muddy.

The performance may be accepted as a barometer indi-



Side Sheet Corroded by Bad Water

the engine will make another trip; in some districts it will not do so, without leaking pretty badly or failing. A knowledge of local conditions should and usually does govern the kind of work, if any, to be done on flues, showing these pre-leaking indications. The remedy, of course, is to remove the scale which has formed on the water side. To wait until a leak starts is to wait until some damage is done. Leaks caused by overheating damage the parts affected, nor can repairs be made without further injury, that is, nearly every time flues are worked, their life is shortened. Therefore, on account of overheating causing the necessity for repairs, our energies should be directed to keeping the boiler clean and preventing overheating.

Feed waters heavily charged with incrusting solids will form scale among the flues and staybolts where we cannot get at it to wash it off. We couldn't wash it off if we did get at it; it must be knocked off. Scale forms mostly while the engine is working and at those parts which attain the highest temperatures, probably because they evaporate more water and a larger quantity of solids are precipitated.

In the case of waters heavily charged with alkalies, the injunction to keep the boilers clean will create a strong

*The author is General Inspector of the Western Railway Co.

cating firebox performance. If you have no flue troubles, you have no other boiler trouble. If you have small flue mileage, you have small firebox mileage. If you help the flues, you help the firebox.

Keeping Boilers Clean

The wash-out appliances including scrapers and search lights used on the Santa Fe were illustrated in the 1915 proceedings of the Master Mechanics Association on pages 398 and 399. (See also *Daily Railway Age Gazette*, June 12, 1915, page 1296.) We use all the good ideas we can get both as to systems and appliances, which fit our conditions, including hot water boiler washing plants. We wash out locomotive boilers as often as any large railroad in this country, and everything practicable is done to keep boilers clean. Boiler cleaning is a roundhouse job. Dirty, poorly cared for boilers coming in for general repairs, generally need considerable firebox and boiler repairs, indicating poor looking after in the roundhouse.

Treating Feed Water

So far we have dealt with mechanical means of keeping boilers clean, which in certain territories will be found efficient, that is, where the average hardness of the feed water does not exceed six grains per gallon, or road service is not too severe. Excepting perhaps Lake Michigan water I do not know of any water on the Santa Fe, so low in incrusting matter unless accompanied with foaming solids.

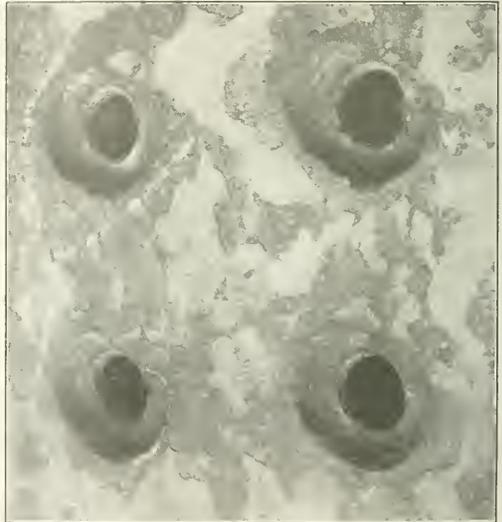
Any water treatment that will dissipate the fillets of scale from the flue ferrules or other parts to prevent its formation, is far and away ahead of any mechanical treatment, for the reason that chemical action anticipates and prevents possible damage and affects all parts, while mechanical treatment is deferred and local only, and follows possible damage and fuel losses. It is, therefore, evident that we may look for the greatest improvement through water purification or treatment, either by treating the water before it is delivered to the locomotive or in the tank and boiler. If the volume of business on a district is small or the water is not bad enough to justify the expense of water treating plants, during these times it may be very profitable to treat the water in the engine tank. Increases in the demands for power, and cost of labor and material and the greater value of the locomotive, have changed and are still changing values; what would have been considered extravagance yesterday may be good business today. The Santa Fe has road side water treating plants, 125 of them; they use anti-foaming boiler compound, and also, a compound to prevent incrustation and foaming as well. We also use soda ash applied to the locomotive tanks. All water treatment is under the direction of the chief chemist. On some districts the water treatment is supplemented to a limited extent by mechanical means, that is, it is found profitable to a limited extent on some districts to use both chemical and mechanical means. For example, if the staybolts show leakage and inspection shows scale forming, a light pneumatic hammer and bobbing tool are used on bolts and plates in the leaking zone and scale knocked or jarred off. When water treatment creates too much foaming, we may obtain better results by allowing a little scale forming, which may be taken care of by mechanical means. Water treatment may be brought to a point where it is better to allow a little scale than have excessive foaming.

Pitting Flues and Other Corrosion

The Santa Fe like other roads in bad water districts has to contend with pitting and corrosion. While corrosion of firebox plates has resulted in short life of many fireboxes, flue pitting causes frequent failures and is most annoying on that account. Just what causes pitting and corrosion is not altogether clear. One may advance a theory for a given case

and be forced to admit that it does not fit some other. The electrolytic theory seems to be most reasonable when applied to flue pitting, which assumes that there is a positive and negative pole, with an electrolyte or carrier. In proportion as the water increases its soluble salts the efficiency of the carrier or electrolyte increases, therefore, anything tending to diminish the power of either pole, or the carrier between them, will weaken the corrosive action.

The company which furnishes the treatment we use to overcome foaming, claims that it prevents foaming by changing the nature of the soluble salts, and that this change also overcomes the tendency to cause corrosion, by making the salts a less active electrolyte. This claim seems to be borne out by the fact that we have had more trouble from corrosion since adopting superheater engines, which require a smaller quantity of treatment to overcome foaming, or that part of foaming which formerly annoyed the engineer. This is on account of the tendency of the superheater to dry up the water that is carried over. We have had cases where by washing and changing the water frequently engineers have been able to run in bad foaming districts without the use



Effect of Corrosion Around Staybolts

of this treatment. While they considered this a saving to the company, it developed that there was damage from corrosion. We are now using this treatment in sufficient quantities to overcome the foaming tendencies of the water, whether the engineers consider it necessary or not, and find that our trouble from corrosion is diminishing.

It has been observed that passenger engines using anti-foaming compound, pitted more than freight engines on the same district; that superheater passenger engines in the same service pitted more than saturated engines, and it has been found that when a small quantity of boiler compound is applied when the boiler is washed, or has water changed, and also applied in the engine tanks wherever water is taken, thus keeping the water in the boiler slightly treated at all times, flue pitting has been reduced. We have not had this continuous treatment in operation long enough to know just how much it is helping us, but reports received from points where the system has been carried out, are all favorable.

Referring to corrosion of firebox sheets, two illustrations are shown of fireboxes that have been removed on account of

internal corrosion. These pictures were taken about five years ago and were not uncommon cases at that time. They seem to be plain cases of allowing scale to form at the junction of the stays with the firebox sheets, just a dirty boiler, that's all. If we feel that it is not practical to try to improve these conditions, the conditions have us beaten. If on the other hand, we call to our assistance the chemist and help him to help us, we will without a doubt beat the condition, which was done in these cases.

Blowing Off Helps Boiler Conditions

Any method of water treatment is benefited by the judicious use of the blow off. Short frequent openings, a short time after the locomotive comes to a stop, or just after starting, give the best results. Starting with the beginning of the trip, frequently blowing a small quantity of water out at convenient times, when it can be just as well done as not, will keep down the concentration of foaming solids and allow greater mileage between washouts. There are occasionally times when it is necessary to practically change the water in the boiler, but these occasions are usually due to failure to anticipate that condition, or in other words, the blow off was not used soon enough to prevent the water becoming heavily charged with foaming matter. When the water in a boiler becomes so bad as to practically need changing and the engineer wants to give it a good blowing out, do not fill up and then blow out; blow out all that can safely be done first, and then regain the usual supply slowly; if necessary, repeat the operation. Filling up before the blow off is opened simply dilutes the foul water and wastes the fresh water.

With muddy or roily water not accompanied by foaming, the boiler is greatly benefited by frequent short blow offs, and the possibilities of mud burning and flue and staybolt leakage are reduced. The water in the boiler is free from suspended matter, and better circulation and steaming is assured. Blowing out from both sides should be the rule. When, as is often the case, more blowing is done from the left than the right side, the effects are shown by more staybolt leakage, cracking and patching on the right than on the left sheet. While it must be admitted there is a point at which blowing out begins to be a waste of effort, water and fuel, and different districts require different treatment, a generally good rule is to use the blow off freely in all districts where bad water prevails. This brings the engine to the terminal in the best possible condition to be turned. If boiler compound is used, the water should be kept saturated with it, thus reducing pitting and foaming and the liability of running short of water on account of working it out through the cylinders and stack. Foaming will lose more water than need be blown out in a trip to prevent foaming.

Water treatment should be installed wherever practical. Stopping leaks is a poor substitute. The cost of water treatment can be determined, but who can say what its absence may cost in the way of deterioration of boilers and failures and delays of power, incident to poor water conditions? If it seems too expensive to install road side treatment, try treating in the boiler or tender. Encourage the chemists to experiment, stimulate them to develop treatment suited to the conditions. Chemical experiments promise results along the lines of conserving steam boilers which can be expected from no other source.

PUTILOFF IRON WORKS CONFISCATED.—Reuter's representative at Petrograd recently telegraphed to London: The People's Commissioners have decreed the confiscation of the great Putiloff iron, steel and gun works in Petrograd, "owing to the indebtedness of the company," and of the motor-car workshops of the International Sleeping Car Company, "owing to the refusal of the management to continue to work."

Discipline in the Signal Department

By Robert B. Elsworth

Engineer of Maintenance of Signals, New York Central Railroad.

ORDINARILY A QUESTION OF DISCIPLINE CONCERNS TWO parties, the employee and the officer charged with responsibility of maintaining proper procedure. In the case of a public service corporation the public must be considered, which introduces a third party. This third party becomes a major one, if there is a possibility of safety being even remotely related.

This point is emphasized by the attitude of public officers and oftentimes the newswriters towards a failure of discipline which may be disclosed during an investigation, although the dereliction may have no direct bearing on the conditions which are being investigated. Consequently, it is necessary that the discipline record be complete. This is especially true in regard to wrong working of signal apparatus caused by inaction or wrong action on the part of a member of the maintenance force.

It should be considered imperative for a signal department to keep a definite record for each man and that all serious derelictions be listed, with a statement of the discipline administered in each case. It is also important that a general office keep a complete record of all reported wrong workings of the signal apparatus whether real or imaginary. In cases where men are at fault a statement as to discipline imposed and reason for same should be added. Perhaps there is not a clear understanding as to what the word discipline means. Many consider discipline on a railroad as suspension from service or discharge. That alone is not correct. Of the many definitions the one which appears most applicable to railroad signaling is "Authoritative Direction and Control."

Not long ago a responsible officer severely reprimanded a maintainer for permitting a condition to occur and then reported the trouble as unavoidable, all of which was done in perfectly good faith. Another officer reported a man as responsible for permitting an unsatisfactory condition, but explained that the man was new in the position and that after being cautioned he realized the fault. The officer then added that in his opinion no discipline was necessary. Now, while in both of these cases the men had been disciplined, it will be agreed that in the first case, if the man was not at fault, he should not have been reprimanded. In the second case the caution was the discipline. In many cases the record is just as important as the action taken. Why be afraid to state the facts?

The question of discipline does not come up very frequently in the signal department, but in fairness to the public, the employee and the company it is important that a consistent policy be established and followed out; and that the men understand both the policy and the necessity for it.

Probably the majority of rules follow the suspension method of discipline, action under which an employee is divided into five degrees.—Cautions, reprimanding, suspending, demoting and discharging.

With the class of men employed in a signal department, cautioning or calling a man's attention to his inaction or wrong action should secure the best results in most cases. This is particularly true in this field because in order to get anything like satisfactory results a man's heart must be in his work, which could not be consistent with a policy which would encourage him to lose faith in the fairness of his superiors. In an operating department a man is generally given the benefit of a doubt; that is, if he can cause any confusion in the mind of his officer or if the

case against him is not absolutely proved the chances are that he may get off. In the signal department the men are expected to, and do, tell the truth; and they are held responsible for physical conditions which it would seem at times required the attention of a superman. The men are also, of necessity, generally held responsible for unknown and unexplained conditions. To get the best results under these conditions a broad-minded man is required and he should be dealt with in a broad-minded manner.

A reprimand should be used in cases where a man is obviously negligent and still the fault and his record are such that a discharge or suspension is not considered necessary.

Actual suspension is a type of discipline which is rarely proper in a signal department. A record suspension where the time is not actually served is not quite as objectionable. Generally the man actually responsible for physical conditions is the man in charge of a gang or section and as soon as such a man suffers public humiliation, his men lose a certain amount of respect for him, and the gang an equivalent amount of efficiency. Neither is the signal department often satisfactorily equipped to get along without the man during the suspension.

He is also a big man who can keep up his spirit and keep his heart in his work after an actual suspension because of some defect or fault in apparatus, fixtures or appliances which it would have been difficult, although possible, for him to forestall. Such discipline should only be applied in cases where drastic action is required, and still the man is worth keeping; and then only if the man is large-minded enough to realize the necessity for the action. In fact it might almost be considered a compliment to the ability and intelligence of a signal maintainer to be suspended.

Demotion is similar to suspension and should only be applied in cases where a young man has been promoted too rapidly and is willing to undergo further seasoning; or in cases where an old and faithful man is losing his grip slightly. A man may be a first-class mechanic, but still not able to handle other men. Men should not be demoted solely as punishment.

Discharge is the cure-all of a discipline system. If a man is habitually careless or deliberately insubordinate, the sooner he is out of the department the better. If he is not amenable to cautioning or reprimanding, or if he makes radical mistakes, the organization is better without him. This also applies to the drink habit. Most of these faults should, as a rule, develop before a man reaches a responsible position; and a railroad company in promoting men cannot afford to play the part of the woman who marries a man to reform him.

Before any of the above degrees of discipline are applied, and before a man's record is altered, the man should, if he desires, be given a hearing by his employing officer and allowed to state his case. The necessity for any discipline should also be explained to him carefully and in such a manner that a reasonable man would understand. This, however, does not mean that the employee should conduct the hearing or dictate the terms.

Sometimes an officer starts out to caution a man and ends by discharging him, because the man is unable to realize that he has done wrong and will not take advice. In other words, the homeopathic dose will not "take," and something stronger is required.

There are strong arguments in favor of the entire abolition of suspensions, and a good deal of the foregoing tends to sustain such arguments. In the system which substitutes demerit marks for reprimands and suspensions, the conditions of cautioning, demoting and discharging would remain the same. Demerit marks would be entered against a man's record when necessary. When the number of these demerit

marks reached a fixed limit the man would be automatically discharged. On the other hand, the demerit marks could be worked off by a period of satisfactory service. This system is not subject to the most serious objections of suspension; that is, humiliation before subordinates and absence from needed service.

As a rule, discipline is not considered of enough importance in the signal department to warrant a separate system, and the policy of the railroad's operating department is followed. On the other hand, it is possible that a better force would be provided, and some good men saved, by the signal department taking the initiative and organizing a discipline system which would be applicable to the class of men required in this department for satisfactory and efficient work.

The fundamental requirements of such a system are that:

- (1) Satisfactory operation be obtained.
- (2) The record be complete and one which the company can stand behind, no matter who questions it.
- (3) The spirit of the men be maintained.
- (4) The officers in charge be responsible for action taken.

The necessity for the first three requirements has been explained. The fourth is based on the belief that, for an organization to be efficient the men responsible for the results must make the decisions; that is, we cannot have "authoritative control" if such decisions are made by men who do not have to obtain results.

As signal department discipline is principally concerned in cases of improper working of signal apparatus we should consider for a minute the vital necessity of recording all complaints, *well founded or ill founded*, that are made, or mentally formulated, in the minds of the enginemen or conductors; and it is for the best interest of the road that the results of investigations be made known to the train crews interested.

A case is recalled where an engineman asked about an improper proceed indication, occurring on a different division, which had been talked about in the enginehouses for a week and still had not been reported. The trouble, which was immediately remedied, was so simple that a formal report was considered unnecessary; but this silence may have had undesirable results in a great many men's minds.

On another occasion a conductor thought he observed an improper indication and spoke about it to a signal maintenance man. An investigation revealed that the conductor was surely mistaken and could not even have seen the signal from where he stood. Still, no report was made and no steps were taken even to tell the conductor that an investigation had been made. Surely, the company would be in poor position to refute this man's testimony in case the matter ever came up in court.

The ideal should be to have all apparatus work properly; but as this may not at all times be possible, the next best course should be followed; that is, report all cases of alleged trouble and settle them in a manner that is fair to the public, to the men and to the company.

Now, one more word about the train crews, particularly the enginemen. Nothing will build up their faith in the signal system so much as a frank and prompt explanation covering irregular operations. If a signal or a switch operates improperly tell the trainmen interested. If a man-failure is the cause advise them as to the discipline. If the apparatus fails, give them that information with a statement as to the likelihood of a repetition, and what, if any, steps are to be taken to improve conditions. These points are often neglected, but it is a conviction based on sound reason, as well as experience, that confidence will go hand in hand with knowledge. An engineman's responsibility entitles him to such information and the railroad service will be correspondingly improved.

Railroad Salaries and New York Offices Under Investigation

THE QUESTION of railroad salaries is under investigation by the Railroad Administration under the direction of C. A. Prouty, director of public service and accounting. Some time ago Director General McAdoo addressed a letter to the railroads asking for lists of officers and directors paid \$10,000 a year, or more, but made it clear that the information was desired to respond to a request made by Senator Cummins of the Senate Committee on Interstate Commerce. On February 23 he issued General Order No. 9, calling for information regarding salaries and providing that a report as to officers receiving \$10,000 or more a year shall be sent to the Director General. It is understood that a plan is under consideration by which salaries above a certain amount may not be charged to operating expenses but will be required to be paid, if they are to be continued, from the sums which the railroad companies will receive under their guarantee. This is on the theory that some of the larger salaries are not paid merely for the work of operating the property but that a part at least is properly chargeable to the interests of the stockholders which under the plan of government control are supposed to be taken care of in the guarantee, and that therefore a part of the compensation of the executive should be borne by the stockholders, if they consider the services necessary, rather than charged to expenses of operation.

General Order No. 9 reads as follows:

"With reference to officers whose salaries are chargeable to operating expenses, it is ordered:

"1. A carrier shall not create an additional office or fill a vacancy in an existing office, except when such step is necessary to the operation of the railroad under the existing condition of government possession and control. In cases of doubt, application, with statement of salary proposed, may be made through the Regional Director for the Director General's approval.

"2. A carrier shall not fill a vacancy in an office of or above the grade of general manager or create such an office without the approval of the Director General. Application

with statement of salary proposed may be made through the Regional Director for the Director General's approval.

"3. With reference to general officers and division officers (according to I. C. C. classification of steam railway employees), receiving \$8,000 or more and less than \$10,000 per year, each carrier shall make to the Regional Director a monthly report showing increases in salaries, appointments (showing salaries therefor) to fill vacancies, and the creation of new positions (showing salaries therefor), beginning with the month of January, 1918.

"4. With reference to such general officers and division officers receiving \$10,000 or more per year, such monthly report shall be made in duplicate, and one duplicate shall be sent to the Regional Director and the other duplicate to the Director General."

The Railroad Administration is also interesting itself in the expenses of New York financial offices. A circular letter was addressed to the railroads on February 21 asking them to furnish at the earliest possible date information as to the number and compensation of officers and employees of offices maintained in New York for financial purposes by companies which have no operating offices in New York City. The information is asked for the year 1917 and an estimate is asked for 1918. The letter also calls for a report showing the location and rentals of offices and the date of expiration of the lease; details as to payments to trust companies, banks or other agencies for services in paying principal and interest of bonds, notes, dividends, etc., making transfers of stock, acting as stock registrar, etc., or acting as agencies for registration of bonds, etc.; compensation and nature of services at New York or in connection with matters handled at New York paid to lawyers by way of fees and not by way of salaries; fees and other compensation paid to directors, and total of principal and interest (separately stated) on bonds and amount of dividends paid at New York.

Where companies have operating offices in New York it is desired that they likewise give information as to their financial offices and in case an officer or employee or an office is not employed solely in the discharge of the functions mentioned a reasonable apportionment is asked. The information is to be sent to the Interstate Commerce Commission.



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British Engineers Reconstructing a Bridge on the Flanders Front

General News Department

Former President William Howard Taft has been selected by representatives of capital as their representative for the public in the joint conferences now being held at Washington between employers and employees to establish a basis of relations during the war.

The Colorado, Kansas & Oklahoma, a fifty-mile Kansas railroad which has run no trains for a long time, is to be dismantled. The contract for dismantling has been let to W. F. Bronson of Franklinville, N. Y. The line of the road is from Scott City, on the Missouri Pacific, northward to Winona, on the Union Pacific.

A large number of switchmen on the Elgin, Joliet & Eastern walked out on February 21 because the road had reinstated switchmen who refused to participate in the wage strike of the men last September. At the time of writing quite a number of the strikers had returned to work, leaving only about 175 out, and the operations of the road were being carried on with relatively little embarrassment.

Twenty-one traveling agents and other employees of the traffic department of the Southern Railway have been transferred to the industrial and agricultural development service of the road; and a list of the names of these men is printed in the Southern News Bulletin for February. The same issue of the bulletin contains the names of 38 representatives of the freight department of the road, heretofore stationed at points off the company's lines, who now have been assigned to duty in the freight traffic service at the larger cities on the company's lines; also 19 men in the passenger department who have been transferred in the same way.

Director General McAdoo has given out a statement regarding published reports intimating irregularity or impropriety in the taking over by the government of the Hudson & Manhattan Railroad, of which he was formerly president. This road was notified the same as all others, and its notices to the public were published promptly. Mr. McAdoo says: "On account of my previous connection with this company, which was terminated when I entered public life, five years ago, I submitted the question to a meeting of the Railroad Advisory Board. * * * After full discussion they were unanimous in the conclusion that the Hudson & Manhattan was an important and necessary part of the terminal facilities of the Pennsylvania, * * * and therefore was included in the President's proclamation.

Accidents at highway crossings are increasing in number every year, and it is more necessary than ever that engineers approaching crossings should keep a careful lookout and sound the whistle or ring the bell in accordance with the rules. Even if this has been done and afterwards persons or vehicles are discovered approaching the track, and it is not certain that they have seen the train and intend to stop, the whistle should be sounded. If the pedestrian or the vehicle is not seen by the engineer, but by fireman or brakeman, such employee should immediately notify the engineer. Where motors approach a crossing on a road parallel with the track, or where travelers appear to be thinking of something else, or talking with some one, and do not notice the approach of the train, such thoughtless persons should be warned by sounding the whistle.—*C. and W. W. Circular.*

A Boston Proposition

Senator Weeks and a number of Massachusetts representatives have laid before President Wilson a "recommendation" that the government adopt and apply to the railroads E. Moody Boynton's mono-rail system. By this system, exploited some 25 years since, Mr. Boynton proposed to convert every single-track railroad into a double-track line. The process was quite simple: throw away the present cars and

engines, provide new ones only 4 ft. wide and build an overhead structure along the track to keep the vehicles from tipping over.

A Safety Section in the Director-General's Organization

A "Safety Section" has been created by Director General W. G. McAdoo, to be a branch of the Division of Transportation. Hiram W. Belnap has been appointed manager of the section, and will have supervision over the safety work on all railroads, utilizing such safety organizations as are already available and suggesting such others as are desirable. Mr. Belnap takes up this work in addition to his present duties for the Interstate Commerce Commission as chief of its bureau of safety.

Western Society of Engineers Will Consider Material Problem

The Western Society of Engineers, Chicago, is preparing a special program relating to the material situation for a meeting to be held on Tuesday evening, March 19. As this is the week of the American Railway Engineering Association convention in Chicago, special attention will be given to the problems of the railroads. A special invitation will be extended to the members of that association to attend this meeting. The program will include discussions of the priority regulations, the influence of transportation facilities on the supply of construction materials, the steel situation, the lumber industry and the cement supply.

Patriotic Pennsylvania Railroad Employees

The Pennsylvania Railroad has issued a pamphlet containing brief articles by a dozen or more employees of the road, telling, from their own experiences, how railroad men may make themselves efficient in the duty of helping to win the war. These writers are Edward F. McKenzie, locomotive engineer; Wm. Parker, car repairman; T. T. Buck, engineman; S. C. Lowrey, engineman; U. S. Shearer, engineman; John Phelan, track foreman; H. S. Meyer, engineman; H. P. Peterson, engineman; H. E. Emery, station agent; Emanuel Shepp, track foreman; Hugh Mulloy, track foreman; H. F. Krear, engineman; Thomas M. Finn, engineman, and P. L. Smith, fireman. Mr. McKenzie's paper is reprinted on another page of this paper.

Mr. McAdoo Commends Patriotic Meeting of Pacific Railway Club

The Pacific Railway Club, San Francisco, Cal., devoted its monthly meeting on February 14 to a discussion of ways of further increasing the efficiency of the railroads during the war. A feature of the meeting was the reading of a message from W. G. McAdoo, director general of railroads. Mr. McAdoo expressed deep gratification that an evening had been devoted to discussing ways and means of making the railroads of the country more efficient for the prosecution of this war, and continued: "If our gallant sons who are fighting for America's sacred rights and universal freedom are to be victorious they must be backed with all the man power and resources of the nation. This cannot be done unless the railroads of the country function in the most proficient manner. Every officer and employee of our railroads owes to our gallant soldiers and sailors the supreme duty of supporting them with the full measure of his energy, patriotism and intelligence, to the end that America's resources may be fully marshaled and used with irresistible effect upon the Kaiser and his military autocrats who seek to dominate and enslave the free peoples of the world."

The speakers of the evening were: W. S. Palmer, president

and general manager of the Northwestern Pacific, who spoke on "How Can Railroad Men Display Their Patriotism"; Edwin O. Edgerton, railroad commissioner of the state of California, who spoke on "The Railroad Commission's Part in Winning the War"; and D. M. Folsom, professor of mining, Stanford University, who spoke on "The Need for Fuel Conservation on the Railroads."

Disastrous Collision Near Columbia, S. C.

Twelve persons were killed or fatally injured, and 37 were injured, in a rear collision of passenger trains on the Southern Railway at Frost, five miles north of Columbia, S. C., on the 25th of February. The leading train, an accommodation, had been stopped because of the failure of an air hose; and, according to the report, the hose had been repaired, the flagman had been called in and the train had been started when it was run into by a following through passenger train, coming on at full speed. All of the dead and injured were on the leading train, and the persons killed were men sitting in the smoking compartment of the rear car, a steel car.

Oregon Timber to Be Sold by Government

Francis K. Lane, Secretary of the Interior, has ordered the sale of nearly 70,000,000 feet of timber standing on lands heretofore included in the grant to the Oregon & California Railroad, in western Oregon. The timber will be sold at the land office at Roseburg, Ore., to the highest bidder after advertisement has been made. These and other lands were granted to the Southern Pacific, to aid in railroad construction, upon the condition that they should be sold to actual settlers in 160-acre tracts at \$2.50 an acre. On account of failure to comply with this condition of the grant, a large amount of land was forfeited. After the timber has been cut and removed, lands are available for agriculture will be disposed of under the homestead laws and mineral lands under the mining law.

Heavier Loading in Chicago Switching District

Recent reports received by the Chicago Committee of the Commission on Car Service show that many shippers are making sincere efforts to load cars more heavily. During the period from February 1 to 13, inclusive, the Illinois Steel Company, South Chicago, shipped 492 cars averaging 100,972 lb. per car, or 105.5 per cent of marked capacity. This is an improvement of 5.6 per cent over the period from January 1 to January 27, inclusive, when 485 cars were shipped by the same company with an average load of 95,377 lb., or 99.9 per cent of marked capacity. In a recent 10-day period the Marquette Cement Manufacturing Company, Chicago, loaded 48 cars to 114.8 per cent of capacity and during a similar period the Portland Cement Association in the same city reported 62 cars loaded to 109.2 per cent of marked capacity. The Michigan Central advises that the average load per car shipped from its Kensington (Chicago) elevator in January, 1918, was 72,052 lb., as compared with 63,620 lb. for the same month of 1917, and 59,120 lb. for January, 1916.

Western Director Concentrates

Attention on Food Exports

In co-operation with the United States Food Administration and the other regional directors of railroads, R. H. Aishton, regional director of western railroads, has made arrangements for the movement of large quantities of flour, grain and meat to the seaboard for shipment to Europe. At the request of the U. S. Food Administration the initial shipment was made early last week from Minneapolis. It develops, however, that the train, which consisted of about 25 cars of flour, had to be broken up at Chicago because the flour was destined to three different seaports. To avoid a repetition of the delay experienced by this shipment, the regional director asked that in the future all cars in each train be destined to one port so that preliminary arrangements might be made for the transfer of the train from western roads to eastern lines. Accordingly, plans were made by the railroads to handle 150 cars of flour from Minneapolis to New York early this week in 50-car trainloads. Likewise, arrange-

ments were completed for the movement of 100 cars of flour from Kansas City to seaboard between February 27 and March 9. The other movements provided for are as follows: 2,000 cars of oats from Minneapolis to an eastern port between February 28 and March 18; 250 cars of oats from Minneapolis to another port between February 28 and March 14; 50 cars of meat from St. Paul to seaboard on February 25, and a like number from Cudahy, Wis., on the same date, and 1,700 cars a week from Chicago.

Transportation conditions in western territory continue to improve slowly, but there is still an accumulation of about 8,000 cars east of the Missouri river and a like number west which are held on account of eastern embargoes. Deliveries of empties to western lines by the eastern carriers are still small.

Additions to the Roll of Honor

Reports compiled by the Texas & Pacific up to February 1 indicate that 463 employees have joined the army or navy, of which 19 have received commissions:

Texas & Pacific

EMPLOYEE WHO RECEIVED COMMISSION			
Name	Railroad Position	Military Rank	Branch of Service
O. B. Freeman	Atty.	Captain	Army, C. P. Bowie, Tex.
L. A. Wright	Atty.	Captain	Army, Jackson Bar
F. B. Laimmons, Jr.	Asst. Eng.	Crit. Res. Corp.	358th Inf., Camp Travis, Tex.
E. A. Wood	Engineer	Captain	Army, C. P. Bowie, Tex.
A. Laird	Engineer	Captain	Army, Camp Stanley
W. F. McHenry	Engineer	Captain	Army, Ft. Riley, Kan.
V. R. Irvine	Engineer	Captain	Army, Fort Leavenworth, Kan.
H. P. Wilson	Engineer	Captain	Army, Camp Grant, Ill.
L. C. Galbraith	Accountant	Captain	Army, now in France
W. E. Ior	Engineer	Captain	Army
H. W. Rieck	Trav. Agt.	Captain Inf.	Camp Travis, Tex.
R. S. Coghill	Engineer	First Lieut.	Camp Bowie, Tex.
W. K. Boggs	Engineer	First Lieut.	Army, C. P. Bowie Tex.
F. B. Garrett	Engineer	First Lieut.	Army, Fort Leavenworth, Kan.
T. G. Gammie	Engineer	Second Lieut.	Army, Camp Stanley
O. E. Galquith	Engineer	Second Lieut.	Army, C. P. Bowie, Tex.
H. E. Pendleton	Computer	Second Lieut.	Army, C. P. Bowie, Tex.
R. J. Gammie	Engineer	Second Lieut.	Army
H. C. Helms	Fuel Insp.	Second Lieut.	Am. Exp. Forces, France

Employees who received commissions— 19
 Number of employees volunteering or drafted— 444
 Total number of employees in government service— 463

Returns have so far been received from 129 railroads representing 211,912 operated miles. These roads have furnished a total of 55,826 soldiers and sailors for the country, of whom 1,504 are commissioned officers.

Unloading Cars with Dynamite

Dynamite, used to loosen frozen cinders in coal cars on the Pennsylvania Railroad, was the means of saving a half hour's time on each car recently, when time was specially valuable and steaming and other expedients had proved unsatisfactory.

Strenuous efforts were being made to put in two additional tracks to relieve serious congestion of traffic, and cinders were being used as ballast. Hopper bottom steel cars loaded with this material were rushed in as fast as they could be unloaded. But in the very cold weather the cinders in the bottoms of the hoppers froze solid, and oil had to be heated under the cars to thaw the mass, but over an hour was consumed in thawing a car. The use of dynamite to break up the frozen material in the hopper outlets gave excellent results. The frozen cinders were swung open, exposing the frozen cinders, and a sharp pointed steel bar about 1 1/2 inches in diameter was driven to the point just barely went through the frost, which in this case was about a foot thick. There were four men on the car, two of whom were in the car, and the bar was used with great care. Dynamite was used with about the following procedure: The cinders were well tamped and then treated with oil. The dynamite was placed in the frozen cinders, being distributed and the cinders stirred so that the car was fairly unbalanced. A careful examination of the cars was made after blasting to ascertain if there were any spring stems or rivets, but the cars were found to be free from any injury or breakage, and ready to be shipped. There was no practical difference of effect, but there was a saving in the time of two men if more than one half hour per car in favor of the dynamite.

Second Tobacco Shipment to Railway Regiments

On February 23 the committee in charge of the Railway Regiments' Tobacco Fund forwarded its second shipment to the railroad regiments in France. The shipment consisted of 10 cases of 12 packages each. Each package contained 240 bags of Bull Durham smoking tobacco and 80 bags of Tuxedo pipe tobacco. The shipment weighed about a ton and a quarter, and will be divided equally among the ten railway regiments now on French soil.

The tobacco is bought at wholesale prices and is not subject to revenue charges because it is consigned to government forces. It is delivered in bond to the Quartermaster's Department of the Army in this country, which takes care of its transportation without expense to the givers. The members of the committee in charge of the Tobacco Fund, of which F. A. Poor, president of the P. & M. Company, is chairman, themselves pay all of the office and postage expenditures, so that every dollar contributed to the fund goes into tobacco for the soldiers.

About 150 railroad supply companies have so far subscribed to the Tobacco Fund, most of them to the extent of \$10 a month for 15 months to January, 1919. The committee now has a balance of about \$6,000 on hand, after paying for the shipment just made, and plans to make further shipments about every three weeks. The utmost care is taken to prevent any loss or delay through the improper packing of the tobacco. Before a shipment goes forward from the point of packing a member of the committee in charge of the fund inspects the cases and their contents, either in person or through a responsible representative.

A letter received by Mr. Poor from Fred A. Preston, secretary and treasurer of the P. & M. Company, and now a captain in the regular army in France, indicates to what an extent "smokes" are appreciated by the American boys in France:

"The cigarettes arrived and I am the most grateful person in the world. Today for the first time in weeks I am having a real smoke. As I have told you before, I simply can't tell you how much smoking means to every one of us. There is something about the climate or the work that makes smoking absolutely indispensable. Whereas I formerly consumed about five a day, I now smoke 25, sometimes more, and because good cigarettes are not obtainable we smoke any d— thing."

Although a large number of supply companies have responded generously to the appeal for subscriptions, there is still a need for additional funds and contributions from other companies are solicited.

The last appeal for funds which was sent to railway supply companies may be taken as applicable to every company in the field, whether it has received the letter through the mail or not:

"The railway regiments now in France have already by their valor under fire, as well as by the service they have given in their chosen occupation, brought honor to themselves and the flag under which they serve.

"The railway supply industry feels an especial interest in the members of these regiments, which include many of our acquaintances and friends. As a slight means of showing our appreciation, and of contributing to their comfort and pleasure, the Railway Regiments' Tobacco Fund was organized. About 150 railway supply companies have already joined this movement, and the first shipment and second shipments of tobacco have been made. In order to make it the success which it deserves at least 100 more subscribers are wanted.

"Will you not 'don your bit' by entering the subscription of your company for \$10 a month for 12 months from January 1, 1918, to January 1, 1919; this subscription to terminate should the war end at an earlier date? Checks should be made payable to John R. Washburn, treasurer, and mailed to Samuel O. Dunn, secretary, the Railway Regiments' Tobacco Fund, 750 Transportation building, Chicago."

The supply companies which have so far subscribed to the fund are as follows:

Adams & Westlake Company, Chicago.
 Ajax Forge Company, Chicago.
 Ajax Roll Anchor Company, Chicago.
 American Arch Company, Philadelphia, Pa.
 American Car & Foundry Company, New York.
 American Flexible Bolt Company, Pittsburgh, Pa.
 American Manganese Steel Company, Chicago Heights, Ill.
 American Steel Foundries, New York.
 American Vulcanized Fibre Company, Boston, Mass.
 Anchor Packing Company, Philadelphia, Pa.
 Anti-Creep Corporation, New York.
 Barco Manufacturing Company, Chicago.
 Belle City Malleable Iron Company, Racine, Wis.
 Bettendorf Company, Bettendorf, Iowa.
 Blackall, Robert H., Pittsburgh, Pa.
 Ross Nut Company, Chicago.
 Bridgford Machine Tool Company, Rochester, N. Y.
 Bronze Metal Company, New York.
 Brown, J. Alexander, New York.
 Breyer Steel Castings Company, Columbus, Ohio.

Bucyrus Company, South Milwaukee, Wis.
 Buda Company, The, Chicago.
 Burden Sales Company, New York.
 Butler Drawbar Attachment Company, Cleveland, Ohio.
 Camel Company, Chicago.
 Carnegie Steel Company, Pittsburgh, Pa.
 Chambers Valve Company, New York.
 Chicago Malleable Castings Company, Chicago.
 Chicago Railway Equipment Company, Chicago.
 Chicago Railway Signal & Supply Company, Chicago.
 Cleveland Frog & Crossing Company, Cleveland, O.
 Corning Glass Works, Corning, N. Y.
 Crucible Steel Company of America, Chicago.
 Curtin Supply Company, Chicago.
 Damascus Brake Rem Company, Cleveland, O.
 Damascus Bronze Company, Pittsburgh, Pa.
 Dayton Malleable Iron Company, Dayton, O.
 Dearborn Chemical Company, Chicago, Ill.
 Detroit Graphite Company, Detroit, Mich.
 Dickinson, Inc., Paul, Chicago.
 Dilworth, Porter & Co., Pittsburgh, Pa.
 Economy Devices Company, New York, N. Y.
 Edison Storage Battery Company, Orange, N. J.
 Elliott Frog & Switch Company, East St. Louis, Ill.
 Empire Steel & Iron Company, Catsaugua, Pa.
 Fairbanks, Morse & Co., Chicago.
 Fort Pitt Malleable Iron Company, Pittsburgh, Pa.
 Fort Pitt Spring & Manufacturing Company, Pittsburgh, Pa.
 Fowler Car Company, Chicago, Ill.
 Franklin Railway Supply Company, New York, N. Y.
 Haskell & Barker Car Company, Chicago.
 Homestead Valve Manufacturing Company, Pittsburgh, Pa.
 Hunt-Spiller Manufacturing Corporation, Boston, Mass.
 Illinois Car & Manufacturing Company, Hammond, Ind.
 Imperial Appliance Company, Chicago.
 Independent Pneumatic Tool Company, Chicago.
 Interstate Iron & Steel Company, Chicago.
 Joliet Railway Supply Company, Chicago.
 Kelly Reamer Company, Cleveland, O.
 Kerite Insulated Wire & Cable Company, New York.
 Keyoke Railway Equipment Company, Chicago.
 Keystone Grinder & Manufacturing Company, Pittsburgh, Pa.
 Lucas & Sponsburg Company, Chicago.
 Laconia Car Company, Laconia, N. H.
 Locomotive Superheater Company, New York.
 MacRae's Blue Book, Chicago.
 Machinery Club, New York.
 Madden Company, Chicago.
 Marion Malleable Iron Works, Marion, Ind.
 Massey Company, C. F., Chicago.
 Meek, J. E., New York.
 Miller Train Control Corporation, Staunton, Va.
 Milwaukee Coke & Gas Co., Milwaukee, Wis.
 Miner, W. H., Chicago.
 Morden Frog & Crossing Works, Chicago.
 More-Jones Brass & Metal Company, Chicago.
 Mount Vernon Bridge Company, Mt. Vernon, Ohio.
 Mount Vernon Car Manufacturing Company, Mt. Vernon, Ill.
 Mudge & Co., Chicago.
 National Malleable Castings Company, Cleveland, Ohio.
 New York Railroad Club.
 Ohio Injector Company, Chicago.
 Ohio Steel Foundry Company, Lima, Ohio.
 Okonite Company, New York.
 Ottenheimer & Co., Chicago.
 P. & M. Company, Chicago.
 Paxton-Mitchell Company, Omaha, Neb.
 Pennsylvania Tank Car Company, Sharon, Pa.
 Pickands, Brown & Co., Chicago.
 Hilliod Company, New York.
 Pittsburgh Wood Preserving Company, Pittsburgh, Pa.
 Poole Brothers, Chicago.
 Pratt & Lambert, Inc., Buffalo, N. Y.
 Prendergast Company, Marion, Ohio.
 Pyle-National Company, Chicago.
 O & C Company, New York.
 Rail Joint Company, New York.
 Railroad Supply Company, Chicago.
 Railroad Water & Coal Handling Company, Chicago.
 Railway Age, New York.
 Railway Materials Company, Chicago.
 Railway Review, Chicago.
 Railway Steel-Spring Company, Chicago.
 Ramapo Iron Works, Hillburn, N. Y.
 Republic Rubber Company, New York.
 Roberts & Schaefer Company, Chicago.
 Rodger Ballast Car Company, Chicago.
 Runnels, Clive, and LeRoy Kramer, of the Pullman Company, Chicago.
 Rynn Car Company, Chicago.
 Ryerson & Son, J. T., Chicago.
 Safety Car Heating & Light Company, New York.
 St. Louis Frog & Switch Company, St. Louis, Mo.
 Sargent Company, Chicago.
 Sellers Manufacturing Company, Chicago.
 Sellers & Co., Wm., Philadelphia, Pa.
 Sherburne & Co., Boston, Mass.
 Shultz, F. K., New York.
 Signal Appliance Association.
 Snow, T. W., Chicago.
 Spencer Otis & Co., Chicago.

Traffic News

Standard Cotton Company, New York
 Standard Franges Company, Chicago
 Standard Safety Bott Corporation, New York
 Standard Steel Car Company, Chicago
 Steel Car Frame Company, Philadelphia
 Stone Steel Construction Company, Chicago
 Swanton Company, T. H., Chicago
 Tappan, Kelly & Co., Chicago
 Terbell, L. B., of America, Shoe & Footwear Company, New York
 Union Drift Gear Company, Chicago
 Union Spring & Manufacturing Company, Pittsburgh, Pa.
 Wagon Smith & Sienal Company, Swissvale, Pa.
 Valentine & Co., New York
 Voss, Car Heating Company, Chicago
 Vesina Tool Works, Pittsburgh, Pa.
 Vossing & Co., H., Chicago
 Waltham Battery Company, Waterbury, Conn.
 Watson-Stollman Company, New York
 Western Railway Equipment Company, St. Louis, Mo.
 Westhouse, H. F., New York
 Westhouse Air Brake Company, Pittsburgh, Pa.
 White Foundry Equipment Company, Harvey, Ill.
 Winton, W. H., of American Car & Foundry Company, New York.

"Engineering" Week in Chicago

The officers of the American Railway Engineering Association have been impressed by the special need of the convention this year as an opportunity for a full discussion of the problems with which the members have been confronted as a result of our participation in the War and the situation presented by Government operation of the railways. The need of an opportunity for discussing these new conditions has been generally felt and with a view to affording its membership a maximum benefit from the convention changes are being made in the program which will afford special opportunities for a presentation of the problems of to-day.

The National Railway Appliances Association has similarly seen the special field for its exhibit this year, and preparations have long been under way for a show that will best meet the needs of the railroads under the present circumstances. Owing to the number of demands made for space in this exhibit the floor plan has been rearranged extensively, reducing the space of some of the larger exhibitors and the area devoted to aisles in a manner that will have permitted of an increase in the number of booths. In all 158 firms have arranged for space and a considerable waiting list is ready to take up any space remaining or released for any reason. There is therefore every reason to believe that the exhibit this year will be one of the most profitable and successful in the history of this organization.

With a view to a presentation of its position in regard to the convention this year the American Railway Engineering Association, through its President John G. Sullivan, chief engineer of the Canadian Pacific, Western lines, has issued a letter announcing the coming meeting to be held on March 19, 20, and 21 from which the following abstract has been taken:

The present railway conditions make it incumbent upon us as an Association and as individuals to co-operate with the Government and our executive officers to devise ways and means of solving present problems and bettering conditions.

While a journey to Chicago for this purpose will involve a certain portion of your time, it is confidently believed that the time will be well spent and more than repaid by the benefit to be derived from contact with men from all sections of the North American continent, all dealing more or less with problems similar to your own.

The program to be arranged will take cognizance of the changed conditions of the present time in the railway world, more particularly with reference to war emergency yard improvements to relieve the freight congestion; ways and means for overcoming or meeting the shortage of material and labor; devising new ways of labor-saving in maintenance work, reclamation and utilization of scrap material; substitution of other materials for wood and steel; conservation of resources; and discovering, if possible, new sources of economy.

Members are therefore earnestly urged to make their plans to attend the Nineteenth Annual Convention of the American Railway Engineering Association, to the end that we may give the best that is in us towards "Winning the War."

The Cape Cod Canal, after being closed for nearly two months, was opened for navigation on February 26.

E. J. Henry, western traffic manager of the Lehigh Valley, has been appointed assistant to W. H. Pleasants, manager of the Marine Section of the Railroad Administration and will have authority over matters pertaining to the Lake lines.

Passenger traffic to and from Washington has increased so rapidly since the war began that additional facilities have been provided in the Union station, in that city. Ticket sales for the month of January, 1918, amounted to \$850,134, as compared with \$389,341 in January, 1917.

On Washington's Birthday, some 10,000 or more soldiers paraded in New York City; and the Long Island Railroad reports that in the five-day holiday period it ran 90 special trains between Camp Upton and the city, with no serious disturbance of the regular traffic; and the total number of passengers on these 90 trains was 49,013.

Fifty-six per cent of the less than carload freight offered to railroads in San Francisco, Cal., for shipment is delivered during the two hours between two and four in the afternoon. This fact has been developed from an actual check made by all the lines in that city. The San Francisco Chamber of Commerce and other bodies are urging on shippers to send their freight to the railroads as early in the day as possible.

For the purpose of avoiding uncertainty regarding projects for road-building the railroad administration has sought information as to the approximate number of open-top cars that will be required this year for the transportation of road-building material. It is expected that it will be possible to give assurance of what car supply will be available so that plans can be made with reference to it.

To conserve the supply of coal at lake docks and to provide for the utilization of a surplus of coal from the Montana and Wyoming mines the United States Fuel Administration is to embargo lake shipments of bituminous coal to North and South Dakota except for public utility requirements. The dock territory is supplied in large part from Illinois and this action will make the dock supply available in many communities where it is badly needed.

The railroad administration has recently had occasion to deny the comfort of private passenger cars to various wealthy people who desired to use them for small parties. The Railroads' War Board had already taken steps to curtail the use of private cars, before the period of government control, and the policy has been rigidly adhered to by the railroad administration, which has declined to approve the use of private cars for less than 40 persons, except in a few inances of cases of illness or for foreign missions traveling in this country. A considerable number of private cars were taken to Florida early in the winter and these will be allowed to be returned.

F. M. Whitaker, vice-president of the Chesapeake & Ohio, has been appointed by Director General McAdoo to co-operate in traffic matters with the Fuel Administration. This completes the organization of representatives of the railroad administration appointed to take charge of traffic matters for various departments of the government and to handle all requests for priorities or preferential movement for the government. The other representatives are H. M. Adams, for the War department; H. P. Anewalt, for the Navy department; J. F. Holden, for the Shipping Board; J. A. Middleton, for the rail division of the Fuel Administration, and C. E. Spess, for the Food Administration.

The Committee on Freight Transportation at New York, of which James S. Harlan, of the Interstate Commerce Commission is chairman, is holding conferences at the office of the New York State Public Service Commission, 120 Broadway, New York, with a view to formulating the New York Public Service Commission, New Jersey Public Utilities Commission, committees

of railroad officers, members of the Merchants' Association, the Traffic Club, the Board of Trade and Transportation, the New York Team Owners' Association, and the Freight Transfer Association. The proposal for a general scheme of store-door delivery, which is being considered by this conference, was noticed in the *Railway Age* on February 1.

Parcel Post Weight Limit Increased

Postmaster General Bursleson has announced an increase in the allowable weights of parcel post packages, effective on March 15. The 50-pound limit in the first and second zones is increased to 70 pounds, which is also extended to the third zone. In the other zones the weight limit is increased to 50 pounds.

Auto Truck Line Between Waukegan and Chicago

In line with the desire of the Government for automobile lines to take over short haul shipments from the railroads, the Chicago, Waukegan & Gary Transportation Company has been organized, with William L. O'Connell, treasurer of the O'Connell-Manly Truck Company, Waukegan, Ill., and former chairman of the Illinois State Public Utilities Commission, as its president. The corporation has been granted a certificate of convenience and necessity by the public utilities commission and expects to begin service between Waukegan, Ill., and Chicago, about 36 miles, within three weeks, starting with from three to five kerosene-burning Manly trucks and trailers. Plans of the new company include the extension of service to other cities within a similar radius of Chicago.

Sailing-Day Plan Extended

The "shipping day" or "sailing date" plan for accepting and forwarding less-than-carload freight has now been extended to cover the service on all of the twenty-five divisions of the Pennsylvania Railroad east of Pittsburgh and Erie. It is believed that further study and longer experience will point the way to additional economies, but the beneficial results already achieved are so satisfactory that the plan is declared successful. Reports from all divisions just compiled show that a total of 654 cars are being saved daily in the transportation of less-than-carload freight on the lines east of Pittsburgh. In addition 25 distributing local freight trains have been discontinued altogether by substituting tri-weekly or semi-weekly "pickup" trains on branches where traffic is light. This "sailing date" plan for handling l.-c.-l. freight was first put into effect on September 4, 1917, in Philadelphia. Five and a half months' experience has shown that the plan not only economizes car space, but gives shippers more regular service and reduces the length of time in transit. Moreover, by eliminating much rehandling at freight transfer stations it has lessened loss and damage costs and the amount of freight going astray.

Export Freight Movement

Freight is moving now with a good degree of freedom throughout "Eastern" territory, as indicated by daily reports to A. H. Smith, regional director. The congestion on the lines of the principal roads leading to the seaboard is being slowly overcome, but with fluctuating results. The number of cars above normal on February 24 and February 27 was reported as follows:

	Sunday	Wednesday
Eastbound loads	47,303	37,692
Eastbound empties	5,149	5,034
West bound loads	30,578	25,285
Westbound empties	17,093	9,492

The United States Steel Corporation reported on Tuesday that the corporation's blast furnaces were operating at 75 per cent of full capacity and the finishing mills at 80 to 85 per cent. These figures represent an important improvement during the last ten days, attributable to normal weather and better transportation conditions.

The movement of coal in New York harbor is still somewhat hampered because of the damage suffered during the severe weather of two weeks ago, 23 tugs belonging to the railroad companies being still laid up for repairs.

Commission and Court News

Interstate Commerce Commission

The Commission has postponed the effective date of its order in the reconsignment case to April 1.

The Commission has authorized an increase in the rate for passenger mileage tickets in southeastern territory from 2 cents a mile to 2½ cents.

The Commission has issued a circular to the railroads for the purpose of securing information for Director General McAdoo regarding the issuance of free transportation in intrastate traffic other than that authorized by the federal anti-pass law for interstate travel. Information is also asked regarding the issuance of transportation in exchange for advertising.

State Commissions

The State Public Utilities Commission of Illinois held a hearing at Chicago on February 27, to consider the petition of William E. Golden, Chicago, for a reduction in passenger fares to not more than one cent a mile between Chicago and Great Lakes Naval Training station; Camp Grant, Rockford; and Fort Sheridan, Ill.

Personnel of Commissions

Hiram W. Belnap, who, as announced elsewhere, has been appointed manager of the Safety Section of the Division of Transportation of the United States Railroad Administration, has been with the Interstate Commerce Commission for 15 years, for the past seven years as chief of the Bureau of Safety, and for the preceding eight years as inspector of safety appliances. Previous to that he had had 14 years' experience in various capacities in train operation. It is announced that, as manager of the Safety Section, "he will deal directly with each railroad, supervising such organizations for safety as are already available, bringing about such uniformity in practice as is deemed necessary, and suggesting such additional organizations and such modifications of practice as are desired. . . . The director general feels strongly that there should be no abatement whatever in the safety work on the railroads, but that there should be centralized supervision, not only to insure proper practices but also in order that each railroad may promptly secure the advantage of experience which other roads have had in the development of safety work." Mr. Belnap will continue to exercise his usual functions under the Interstate Commerce Commission.

Court News

Creation of Relation of Carrier and Passenger

The Supreme Court of the State of Washington holds that where, through permission of a division superintendent, a ticket was sold to the plaintiff from a station where passengers were not taken on, the relation of carrier and passenger with



H. W. Belnap

all its attendant duties was created, and the carrier was liable in tort for not stopping the train at that point, although until the sale of the ticket on special permission no duty to stop existed.—*Fenlon v. C. M. & St. P. (Wash.)*, 169 Pac., 863. Decided January 7, 1918.

Freight Rate Order

The Florida Supreme Court holds that an order of the Railroad Commissioners prescribing a rate for the transportation of a certain class of freight carried in carload lots, which prescribes different charges to be made for different distances cannot be successfully attacked by a railroad resisting the enforcement of the order by segregating one item in the schedule of rates prescribed and showing that the expense incurred by moving the freight for the distance to which the item applies equals or exceeds the revenue derived by the railroad from handling the freight for that distance.—*State v. Live Oak, Perry & Gulf (Fla.)*, 77 So., 223. Decided December 17, 1917.

Through Rates for Freight

The Alabama Court of Appeals holds that where there were two rates applicable to shipments between certain points, one a joint or through rate over one route, the other made up by adding the respective rates of the several roads involved in another route, the initial carrier was at liberty to contract with reference to the former rate, though it shipped over the latter route, and when the terminal carrier accepted the shipment it was chargeable with notice of the rate agreed upon and could not charge a greater compensation than the contract provided for.—*Oden-Elliott Lumber Co. v. L. & N. (Ala.)*, 77 So., 240. Decided December 18, 1917. Rehearing denied January 15, 1918.

Notice of Claim for Damages

The Oklahoma Supreme Court holds that a provision in a contract for an interstate shipment of live stock that as a condition precedent to the bringing of an action for damages for loss or injuries the claimant shall give notice of the data thereof to some general officer, claim agent or station agent of the railroad with 90 days after the loss or injury, and failure to give such notice shall be a bar to recovery is reasonable and valid, and no action can be maintained for such damages without showing a substantial compliance with the requirement of this provision. It is held that the giving of one-day notice at the point of destination to the delivery carrier did not obviate the necessity of complying with the provision by giving notice to the company against which damages are claimed.—*Rock Island v. Mr. Elreath (Okla.)*, 169 Pac., 628. Decided November 6, 1917. Rehearing denied January 8, 1918.

Injury on Right of Way—Contributory Negligence

A right of way adjoined on each side by a street was level and unfenced and was crossed by the public at all points. Opposite the house of a resident, which faced the right of way, there was a well-marked path across the right of way passing close to a turntable and curving slightly around it. A footbridge across a ditch on the right of way and used in connection with such path existed before the turntable was installed, but was reconstructed to facilitate access to the turntable. While the said adjoining resident was crossing the right of way by the path, followed by his daughter, 3½ years old, the latter fell into the turntable pit. In an action for her injuries the Louisiana Supreme Court held that the turntable, being of the usual construction and being on the railroad's own property, where it had a perfect right to be, the company owed the public no duty of fencing the right of way or warning the public away from the turntable. If the danger from the turntable was so obvious that the railroad company should have known of it and guarded against it, then the plaintiff whose house faced it, should have known of it and not left his little child to take care of herself as she followed him. As the accident was not caused by the attrac-

tiveness of the turntable to children, the doctrine of the "turntable cases" had no application.—*Hendricks v. Kansas City Southern (La.)*, 77 So., 130. Decided November 26, 1917.

Dining Car Conductor Not a Brakeman

The Supreme Court of Pennsylvania, on February 25, reversing the decision of the Superior Court, sustained the Public Service Commission of Pennsylvania in refusing to class the dining car conductor as a member of the train crew in counting the individualials in relation to compliance with the "full crew" law of that state. The suit affects the Baltimore & Ohio, the Central of New Jersey and the Philadelphia & Reading, all three of these roads having asserted the right to count the dining car conductor as one of the five men to make up a "crew" of a passenger train to comply with the law. The decision of the court says that, in the case considered, the dining car conductor performed no duties as brakeman; he simply was subject to call by the conductor. In this situation, says the court, the judgment of the conductor, as to when there ought to be an additional brakeman, was substituted for the direct requirement of the law.

Consignor's Liability for Freight and Demurrage

In an action against a consignor for freight charges the Wisconsin Supreme Court holds that where the carrier, on the agreement of the consignee to pay freight and demurrage on goods once rejected, released the goods to the consignee, it merely released its lien and did not release the consignor from liability to pay these charges. In the absence of evidence that acceptance and renewal of a note for freight and demurrage charges given by the consignee was intended as a payment thereof, such note would not release the consignor from liability to pay such charges. And in the absence of evidence that the consignor notified the original or other carriers that he acted only as agent for another in delivering brick to the carrier and that the carrier received the brick on such consideration, the consignor could not escape liability for freight and demurrage charges on such ground.—*Great Northern v. Hocking Valley Fire Clay Co. (Wis.)*, 166 N. W., 41. Decided January 5, 1918.

Trespasser on Trestle—Engineer's Duty

In an action for the death of a boy of 16 years, killed by a train while walking as a trespasser on a trestle, the Kentucky Court of Appeals holds that notwithstanding the reckless negligence of the deceased in starting across the trestle after being told that a train was coming, it was the engineer's duty, after he actually discovered the peril, to exercise ordinary care with all the means at his disposal to stop the train or reduce its speed so as to avoid striking the deceased, but this was the full measure of the duty owed to him. A railroad employee stationed at the trestle, where some new work had been done on the track to observe the condition of the track and give such notice or warning as might be necessary to passing trains, warned the deceased that a train was coming and that he had better look out for it. The deceased was neither ignorant nor drunk, feeble nor helpless, nor so young in years as to need protection. The employee had a right to assume that the boy was capable of taking care of himself and would not needlessly put himself in danger, and the watchman was not negligent in failing to observe the course that the boy pursued or to signal the engineer to stop or slacken the speed of the train. Engineers are under no more duty to anticipate the presence of trespassers on a trestle or to keep a lookout for them than at any other place on the track where travelers have no right to be. Bridge carpenters or workmen were often on the trestle about the time of the accident happened, and the engineer, seeing the deceased on the trestle, thought he was one of the bridgemen and sounded the alarm wholly believing that he would get out of the way, as he could easily have done by stepping on a cap or projecting member. It is held that he was not negligent in so believing or in failing to apply the emergency brakes until he discovered that the boy was not one of the workmen. Judgment on a directed verdict for the railroad was affirmed.—*Lapp v. Louisville, H & St. L. (Ky.)*, 199 S. W. 798. Decided January 15, 1918.

Equipment and Supplies

Locomotives

THE GRAND TRUNK has ordered 25 switching locomotives from the Canadian Locomotive Company.

Freight Cars

THE OIL, GAS & LEASE COMPANY is inquiring for 50 8,000-gal. tank cars.

THE OIL STATE GASOLINE COMPANY, Tulsa, Okla., is inquiring for ten 8,000-gal. tank cars.

THE WARREN OIL COMPANY, Warren, Pa., is inquiring for 100 8,000-gal. capacity tank cars.

THE MILLER PETROLEUM COMPANY, Chanute, Kan., is inquiring for 10 10,000-gal. capacity tank cars.

THE MIDCO OIL SALES COMPANY, Chicago, is inquiring for 200 8,000 to 10,000-gal. capacity tank cars.

THE INDIAN REFINING COMPANY, Lawrenceville, Ill., is inquiring for 150 8,000-gal. capacity tank cars.

THE PEOPLES TANK LINE COMPANY, Coffeyville, Kan., is inquiring for 100 8,000-gal. capacity tank cars.

THE WESTERN PAPER MAKERS CHEMICAL COMPANY, Kalamazoo, Mich., is inquiring for several 8,000-gal. capacity tank cars.

THE INDEPENDENT PACKERS & FERTILIZER COMPANY, Columbus, Ohio, is inquiring for three 50-ton steel underframe tank cars.

THE LA BELLE IRON WORKS, Steubenville, Ohio, has ordered 5 10,050-gal. 50-ton capacity tank cars from the Pennsylvania Tank Car Company.

THE PHOENIX COTTON OIL COMPANY, Memphis, Tenn., has ordered 8 8,050-gal. 50-ton tank cars from the Pennsylvania Tank Car Company.

THE PENN AMERICAN REFINING COMPANY, Oil City, Pa., has ordered 8 8,050-gal. 40-ton capacity tank cars from the Pennsylvania Tank Car Company.

THE UNITED GAS IMPROVEMENT COMPANY, Philadelphia, has ordered 3 10,050-gal. 50-ton capacity tank cars from the Pennsylvania Tank Car Company.

Passenger Cars

THE CANADIAN GOVERNMENT RAILWAYS are reported as having ordered 7 dining and 14 sleeping cars from the Pullman Company.

THE RAILWAY-STORES BRANCH OF THE RAILWAY BOARD OF INDIA (at Simla and Calcutta) makes estimates and designs for rolling stock, plant, and machinery, signaling and interlocking, railway ferries, steamers, etc.; makes allotment of funds in connection with indents for stores; and itself indents for stores for state railways and for some native state railways. It tenders and contracts for coal, ties and cars for state railways, ratifies contracts for supply of materials, keeps a record of surplus stores, and compiles and distributes every quarter the lists of stores purchased by the India office for the state railways. It is the general policy of the Indian railways to make most of their purchases in England. The address of the representative of the board in England is India Office, Whitehall, London. Local offices, however, have considerable to do with the selection of types of material, equipment, etc., so it would seem advantageous to keep the local agent, chief engineers and mechanical engineers, as well as the railway board of India, supplied with catalogues and other information as to articles of equipment or material which might be of special advantage in India, and perhaps superior, cheaper or possibly more promptly supplied than those furnished by English firms.

Supply Trade News

L. A. Larsen, assistant to the president of the Lima Locomotive Works, Inc., has also been appointed secretary-treasurer to succeed Mr. Cloos, resigned, effective February 13.

The Westinghouse Electric & Manufacturing Company announces the removal of its office from Phoenix, Arizona, to Tucson, Arizona. Its representatives, J. H. Knost and W. G. Wilson, will have headquarters in the Immigration Building at the latter point.

W. H. Thompson, for many years prominent in the heavy electric traction work of the Westinghouse Electric & Manufacturing Company, has resigned to accept the position of works manager of the Fairmont Mining Machinery Company of Fairmont, W. Va., makers of coal mining equipment.

P. K. Aldrich, formerly with Edwin S. Woods & Co., Chicago, has formed the Superior Side Bearing Company, with offices at 922 Webster building, Chicago. Mr. Aldrich is president and general manager of the new company, which will manufacture side bearings with an intermediate support, and other railroad specialties.

The L. S. Brach Supply Company, Newark, N. J., announces the following appointments: as superintendent, Henry Keohler, formerly of the Crucible Steel Company; as production engineers, Louis Rist, formerly with the Crocker-Wheeler Company, Ampere, N. J., and Herman Rose, formerly a foreman with the L. S. Brach Supply Company.

T. McCullum, formerly roundhouse foreman for the Duluth, Missabe & Northern, has been appointed railway representative for the Garratt-Callahan Company, Chicago, in charge of the northwest territory, with headquarters in Minneapolis, Minn. William Rollinson, foreman in the mechanical department of the Minneapolis, St. Paul & Sault Ste. Marie, has been appointed railroad representative in the states of Ohio, Indiana and Illinois, with headquarters at Indianapolis, Ind. George DuR. Fairleigh, formerly in the sales department of the U. S. Cast Iron Pipe Company, has been appointed railroad representative in the southwestern territory, with headquarters at Dallas, Tex. G. E. Wilson, formerly master mechanic for the Nevada Consolidated Copper Company, operating the Nevada Northern, has been appointed railway representative for the Pacific Coast territory, and will have his headquarters at San Francisco, Cal.

Baldwin Locomotive Works Have Record Year

The seventh annual report of the Baldwin Locomotive Works for the year ended December 31, 1917, shows that 2,748 new locomotives were built, amounting to \$63,455,574; other regular work was completed amounting to \$13,835,707, and contracts for shells and other special work were executed amounting to \$20,972,583, making a total production of every kind of \$98,263,865. This compares with gross sales in the preceding year of \$59,219,058. Profits were \$11,193,840. After providing reserves for taxes, depreciation, amortization, doubtful accounts, charges to capital and interest charges, there remained as net profit \$8,305,722, out of which there was distributed as dividends to the preferred stockholders \$1,400,000, leaving \$6,905,722 to be added to the surplus carried over from 1916 of \$8,949,624. The balance sheet shows that of the real estate plant equipment, patents, etc., carried at \$44,953,706, the patents and good will represent \$16,699,299. Of the accumulated earnings amounting to \$15,855,346 the sum of \$15,800,000 has been applied to the reduction of this account, leaving the book value of good will, patents, etc., \$899,299, and the amount carried forward as surplus, \$55,346.

President Alba B. Johnson says in part: "The locomotive business at the beginning of 1918 continues to be favorable. The probability that during the continuance of the war the government will become the chief purchaser, presents a new con-

dition, the effects of which cannot be fully foreseen. The consolidated balance sheet of the Baldwin Locomotive Works and Standard Steel Works Company shows a total surplus of \$3,449,816."

Following is a summary of operations of the Baldwin Locomotive Works for the years ended December 31, 1916 and 1917:

	1916	1917
Gross sales	\$51,211,057	\$98,663,865
Cost	51,857,147	86,484,845
Manufacturing profit	\$6,353,910	\$11,779,019
Other income	61,740	961,465
Plant buildings	3,461,135	—
Gross profit	10,505,066	\$12,740,485
Deduct taxes, interest, etc.	1,160,437	1,546,644
Profit	\$9,444,641	\$11,193,840
Less reserve for depreciation, etc.	6,825,175	2,888,118
Net profit	\$2,619,465	\$8,305,722
Dividend on preferred stock	1,400,000	1,400,000
Surplus for year	\$1,219,465	\$6,905,722
Surplus brought forward	4,865,937	8,949,624
Capital surplus	2,864,321	—
Total surplus	\$15,855,346	\$15,855,346
Less amount written off 1916 in patents and gold	—	15,800,000
Surplus	\$8,949,624	\$55,346

Pressed Steel Car Company

The gross sales of the Pressed Steel Car Company in 1917 were \$9,000,000 greater than in 1916 and the greatest in the company's history. The profits, totaling \$2,130,308, were at least up to the average, but they were \$620,844 less than in 1916. Deducting \$875,000 preferred dividends there was available \$1,255,308 for the common stock, equivalent to \$10 a share, as against \$1561 in 1916. The company paid during the year 7 per cent or \$875,000 on its common stock, the largest dividends since its organization, leaving a surplus for the year of \$380,308 and a total surplus of over \$10,000,000.

President E. N. Hoffstot at the annual meeting said that of the \$44,034,843 gross sales more than \$30,000,000 came from car business. The remainder was income from forgings, shell and general repair work. He also stated that wages had increased 50 per cent but that efficiency decreased 50 per cent. The plants are now running at about 70 per cent of capacity.

Mr. Hoffstot in his remarks to stockholders, speaking about gross sales and earnings, says: "It is a disappointment to your management that the percentage of profit has not been greater, but it is largely due to the two contingencies referred to in last year's report—the inability to secure regular supplies of raw material and labor.

"In the manufacture of steel cars it is necessary that component factors reach plants in proper proportion and regular order. For example—the average car requires for its construction approximately 50 per cent plate steel and 50 per cent steel in the form of shapes and bars. Until the middle of October there was received less than one-half the plate steel requirements with the result that inventories were unduly increased to more than treble in value and double in units on account of large quantities of shapes and bars coming in regularly without plates, thus causing additional expense. In order to increase production, fill orders as nearly as possible on time, and minimize loss, there was purchased outside of existing contracts a large quantity of plate steel at a high average price. The establishing, however, of fixed prices prevented utilizing the steel due from the original source of supply at the time deliveries could be secured on basis of the delay in the receipt of complete material postponed the construction of some work over a period in which there were several increases in wages of day workers, and in this period shop supplies including fuel increased in the same ratio. This was serious because a large percentage of the business was taken prior to December 1, 1916. Fortunately, the capacity of your plants were under-scheduled or there would have been a most unsatisfactory situation with our customers.

"As soon as our country entered the war your company offered its facilities to the government for making such material as the plants are fitted to produce, and while your company has undertaken considerable work for their various requirements, your plants have freight car capacity still open, as the equipment for manufacturing freight cars is not adaptable to the more

highly finished products required for war work. We have believed for a long time that the great shortage in cars must inevitably result in placing of large orders and the building in which this equipment is located could therefore be more advantageously used by building cars than embarking in manufacture of material involving large expenditures for new machinery and difficulty of forming new organizations for this work. To win the war requires an efficiently equipped railroad system from the Atlantic to the Pacific and from Canada to Mexico, and the railroads will not only have to make up for what they have not done in the past, but must also prepare to meet extraordinary requirements due to existing conditions.

"It is our firm belief that adequate provision has been made for equipment and terminal facilities in the past to keep pace with the country's increase in tonnage; there would not have been this desperate freight congestion nor would the cost of material and labor have advanced so rapidly. For example, the tonnage capacity for steel ingots has increased from 30,000,000 tons in 1912 to 50,000,000 in 1917, and as far as we are able to definitely ascertain, there were less cars available in 1917 than one year ago. The increase in this kind of tonnage causes serious demands in the way of cars and locomotives by reason of the fact that six or seven tons of limestone, coke, pig iron and other materials are required to be hauled in the production of one ton of steel ingots.

"A matter of the gravest importance in the present crisis which it is hoped our government may promptly correct is the migratory disposition of workmen, as to win the war it will require steady, sober application by everyone. Labor conditions have been most difficult and we can no better illustrate this than by the statement that during the year we employed four men for every job, that is, each employee averaged only three months' service with us. This changing of employment slows down production and tends to make high costs. The taking over by our government, as a war measure, of the railroads of the country, marks an interesting epoch in the history of railroads. It is to be hoped that they will not be tied down by the shortsighted policy heretofore adopted which has so limited the returns that there has been no available income for the purpose of keeping up with the growth of the country in either the equipment or terminal facilities, and that we may never again see such a demoralization of business as has resulted from the failure of transportation facilities.

"During the year \$213,102 was spent about equally on additions to equipment of McKees Rocks and Allegheny plants and in adding to miscellaneous order departments. We have also under construction at McKees Rocks a powdered coal plant, which should be completed early in 1918, which will largely replace fuel oil and gas, and which will use coal much more economically, as both fuel oil and gas very much increased in price last year and were difficult to secure in regular amounts. The increase in stocks and securities shown on the financial statement represents an investment in the Lincoln Gas Coal Company in which your company has a controlling interest, and was made to insure a continuous supply of coal, as the almost prohibitive prices of both gas and oil when used as fuel together with the difficulty in securing regular supplies, have made it necessary to replace with coal as far as possible the use of fuel oil as fuel, which will greatly increase our coal consumption. We hope to have this property in operation and be getting the benefit of the coal during the ensuing year.

"Western Steel Car & Foundry Company has several interruptions in its operations during the year, owing to business losses being inconformable to a continuous production schedule, while overhead charges due to existing war conditions kept increasing. In addition general labor unrest in the Chicago district, particularly during the summer and abnormal weather conditions throughout the year were an added handicap. Deliveries of material supplies, generally greater, were still not in full accordance with production needs. The policy adopted for taking our Government order at this works was the same as that for our Pittsburgh plants. Your management has considered it wise to make no withdrawal of this company's earnings, as increased cost of material and necessary additions to plant to meet the changing conditions of the industry, make this inadvisable. The indications are we should secure a good volume of business for this year, but the war conditions and its successful or not respect favorable results should be obtained."

President Hoffstot, speaking about general conditions in the

industry, added: "The tendency of the Government is to cut off steel for non-essentials, but we are not worrying because we are doing government work and the government will see to it that we are supplied with steel. Cost sheets this quarter will in all probability be very high. For instance, pig iron is quoted around \$36, and yet it cost \$38 a ton to make. I don't think the government will buy any cars for the railroads until the railroad bill is passed. The government ought to buy about 100,000 cars and use them as a floating reserve."

Franklin Railway Supply Company of Canada, Ltd.

The Franklin Railway Supply Company of Canada, Limited, has taken over the business formerly handled by the Montreal branch of the Franklin Railway Supply Company, Inc. The new company will have exclusive rights in Canada to all the products of its parent company and will continue the same policies and business methods that have governed the Franklin Railway Supply Company, Inc., since its formation. The officers of the new company are: J. S. Coffin, chairman of the board; Joel S. Coffin, Jr., president, and Leland Brooks, vice-president. The company's headquarters will be at Montreal.

Joel S. Coffin, Jr., who has been elected president of the new company, brings to this new organization a wide experience in both the railroad supply business and locomotive building. He was born at Waukesha, Wis., and received his education at the public schools in Franklin, Pa., and Stevens Institute. After leaving Stevens he entered the service of the Venango Manufacturing Company at Franklin, Pa., and later served the American Locomotive Company in the erecting shop and as locomotive inspector. In 1912 he entered the employ of the Franklin Railway Supply Company as a service representative. He later went into the sales department and in 1915 was appointed Canadian sales manager which position he held up to the time of his recent election.

Leland Brooks, who has been elected vice-president of the Franklin Railway Supply Company of Canada, Ltd., was born at New York City and received his education in the public schools of that city and Stevens Institute. Upon leaving Stevens he entered the employ of the New York Central, serving seven years in the engineering department. Leaving the New York Central he took a position with the Franklin Railway Supply Company, Inc. For the past year he has been connected with its Canadian branch as assistant manager which position he held up to the time of his recent election.

Trade Publications

THE SPEEDSTER.—The Blaw-Knox Company, Pittsburgh, Pa., has issued a leaflet illustrating and describing the Blaw Speedster Bucket. This is a new bucket of the Blaw type designed primarily for use as a re-handling bucket.

AN INVESTIGATION OF PIPE CORROSION.—This is the title of Bulletin No. 30, issued by the A. M. Byers Company, Pittsburgh, Pa. The investigation was prompted by local agitation on the part of property owners in Pittsburgh, due to the difficulty of maintaining hot water pipe lines. It involved an investigation of the condition of hot water pipes in 125 apartment buildings in the city of Pittsburgh, and the data is arranged to show a comparison of the life of wrought iron and steel pipes.

ARGENTINA EXPORT FREIGHT.—During the first six months of 1917, 32,960 cars entered Buenos Aires loaded with 549,401 tons of export freight, and during this period the total railway traffic of the national capital was conducted in 123,656 cars, containing 1,023,568 tons of freight and live stock.

A ROAD TRANSPORT CONTROL BOARD, needed by reason of the overlapping of government motor transport demands, is being formed for England. Transport experts would like to see a small executive of practical men. "There is as great a need for a Road Transport Executive as there was for the Railway Executive," says the Commercial Motor. "There are committees devoting their attention solely to such questions as canal traffic and horse traffic. But motor transport is left in its unorganized state."

Financial and Construction

Railway Financial News

BUFFALO, ROCHESTER & PITTSBURGH.—See editorial elsewhere in this issue.

PACIFIC GREAT EASTERN.—Negotiations have been concluded for the Canadian Government to take over and finish this line. The company is to pay the Government \$1,100,000, of which \$750,000 will be in cash, and the balance due after the war. The Government will resume the operation of trains, which was recently suspended by the company, and will construct the line from Clinton to Williams Lake, a distance of 100 miles, during the present year.

ST. LOUIS-SAN FRANCISCO.—This company has filed application with the Kansas Public Utilities Commission for permission to issue bonds to the amount of \$2,800,000. Of this sum \$2,064,000 is for reimbursement of expenditures and \$105,000 is for expenditures in equipments and \$721,000 for paying equipment obligations maturing February 15, 1918.

TEXAS STATE RAILROAD.—A bid of \$180,000 from the Midwest Iron Company of Kansas City for this 38-mile line was rejected by the commission in charge of the sale. The Texas State Railroad was incorporated in 1907. It has one locomotive and 38 cars. The funded debt outstanding on June 30, 1916, was \$100,000 first mortgage 5 per cent bonds. The president of the road is E. Stubblefield, with office at Rusk, Texas.

Railway Construction

ALABAMA INTERURBAN.—Application has been made in Delaware by this company for a charter to build a line between Birmingham, Ala., and the Warrior river. The first section to be built will be from the Warrior river towards Birmingham, a distance of 17 miles, at which point connection will be made with existing lines until the 35 miles have been built into Bessemer and Birmingham. T. L. Cannon, president, Birmingham.

EMORY RIVER LUMBER COMPANY'S ROAD.—Plans have been made to build a 10-mile line from Lancing, Tenn., to timberlands in Morgan county. There will be three steel bridges aggregating 200 ft. on the line, also six trestles. The line will be built to carry lumber and coal. J. S. Walker, president; F. J. Roettger, chief engineer, Lancing, Tenn.

PENNSYLVANIA RAILROAD.—This company is making alterations and building an extension to the freight house at River street in Newark, N. J. The cost of the work will be about \$16,000.

PHILADELPHIA AND READING.—A contract has been given to A. L. Carhart, for improvements to be made at Skillman, N. J., including the construction of a brick powerhouse 33 ft. wide by 74 ft. long, on concrete foundations, with concrete coal pocket to one side 16 ft. wide by 34. long. The roof and floor construction will be of steel and reinforced concrete, and the roof covering of asbestos and asphalt. The contract also calls for building a two-story brick signal tower 15 ft. wide by 20 ft. long, with concrete cellar and foundations, and floors of steel and reinforced concrete and slate roof. A contract for all electric equipment has been given to the Union Switch & Signal Company.

PIONEER RAILWAYS IN CHILE.—In the January number of Chambers' Journal, J. M. M. Cunningham points out that this land of mountains, hemmed in between the higher Andes and the sea, has problems in the way of her developments, very different from anything encountered in the wide plains of neighboring Argentina, and claims to possess the first railway ever built in South America. This claim is made for the line of about 50 miles in length, which runs from the small port of Caldera to the mining center of Copiapi, the capital of the province of Atacama. It was begun in March, 1850, and formally opened to traffic in January, 1852.

FREIGHT REVENUES.

The average rate received per ton per mile increased .25 mill, being 4.86 mills as compared with 4.61 mills last year. The average distance each ton was hauled increased 8.59 miles, being 170.42 miles, against 161.83 miles a year ago. The revenue tonnage moved was the largest in the history of the Company, and is as follows:

	1917.	1916.	Increase or Decrease.
Bituminous coal.....	10,215,591	9,296,181	919,410
Coke.....	4,284,845	432,875	—2,900
Iron ore.....	610,236	735,535	—125,299
Pig and bloom iron.....	414,804	436,399	—21,595
Other freight.....	4,161,086	3,862,166	298,920
Total.....	15,825,562	14,783,156	1,042,406

An increase of 7.05 per cent., or..... 1,042,406
 The increase substantially all came from bituminous coal. The small decreases in coke, iron ore and iron products were more than offset by the increase in other freight.
 Tons moved one mile in 1917..... 2,696,983,166
 Tons moved one mile in 1916..... 2,392,310,997
 An increase of 12.74 per cent., or..... 304,672,169
 The result for the year is a gain of 18.88 per cent., or \$2,083,503.40 in gross freight revenue.
 The decision of the Interstate Commerce Commission granting an increase in freight rates became effective at various dates from April 16 to December 20, 1917.
 A careful estimate indicates that such increase added about \$810,000.00 to our revenues this year.

EXPENSES.

There was a net increase of 26.51 per cent., or \$2,488,772.56 in Operating Expenses, as follows:

	Increase.	Decrease.	Per Cent.
Maintenance of way.....		\$126,091.85	8.0
Maintenance of equipment.....	\$987,442.62		32.3
Traffic.....	38,640.03		25.3
Transportation.....	1,509,352.51		35.1
Miscellaneous operations.....	32,266.56		17.8
General.....	76,202.69		27.3
Total.....	\$2,488,772.56		26.5

In general the increases can be attributed to the greater traffic, the marked advance in the cost of fuel, material and supplies, and the continual upward adjustment of wages.

Maintenance of way expenses, the only primary account showing a decrease, would also have increased, if the shortage of labor had not seriously interfered with the regular maintenance program.

Depreciation charges were increased \$112,139.25, due to an advance in the rates applied on rolling stock beginning July 1.

The eight-hour law, effective during the entire year, added approximately \$381,250 to the Transportation Expenses.

Notwithstanding the abnormal conditions prevailing in all directions, the physical condition of your property is excellent and prepared to handle a maximum business.

The operating ratio increased 5.72 per cent., being 79.32 per cent against 73.60 per cent.

The percentage of each group of operating expenses to operating revenue for the past five years is as follows:

	Year ending 6 Mos.		Year ending June 30,			
	Dec. 31	ending Dec. 31	1916.	1916.	1915.	1914.
Maintenance of way.....	9.71	12.39	13.26	13.81	13.37	13.49
Maintenance of equipment.....	27.00	23.95	24.04	23.00	22.53	20.65
Traffic.....	1.28	1.20	1.18	1.19	1.50	1.40
Transportation.....	38.82	33.74	33.52	31.97	33.17	36.15
Miscellaneous operations.....	1.4	1.4	1.3	1.3	1.5	2.5
General.....	2.37	2.18	2.12	2.21	2.44	2.26
Total.....	79.32	73.60	74.25	72.25	73.16	74.20

The average cost per ton per mile is 3.82 mills, an increase of .46 mill over last year.

The average number of revenue tons carried one mile per revenue freight train mile, excluding the mileage of helping engines, increased 59.17 tons, being 835.78 tons, against 776.61 tons a year ago.

The average number of revenue tons carried one mile per revenue freight engine mile, including the mileage of helping engines, increased 48 tons, being 545 tons against 497 tons.

The average for the past ten years are as follows:

YEAR ENDING	TRAIN LOAD.	ENGINE LOAD.
JUNE 30,		
1908.....	530	371
1909.....	597	400
1910.....	638	420
1911.....	635	430
1912.....	647	439
1913.....	710	462
1914.....	694	454
1915.....	707	477
1916.....	786	502
SIX MONTHS ENDING		
DECEMBER 31, 1916.....	792	510
YEAR ENDING		
DECEMBER 31, 1916.....	777	497
1917.....	836	545

The average number of revenue passengers carried one mile per revenue freight train mile is 44, being 4 more than last year.

The non-revenue freight traffic, not included in any of the other figures of this report, is as follows:

	1917.	1916.
Number of tons.....	1,199,571	1,178,492
Number of tons carried one mile.....	107,013,042	104,519,196

FIRE INSURANCE FUND.

The assets of this fund were increased \$38,644.74 and now amount to \$361,169.54 in interest bearing securities and cash.

PENSION FUND.

The assets of this fund, created July 1, 1903, were increased \$5,850.54, and now amount to \$232,387.41 in interest bearing securities and cash. There were 64 pensioners upon the roll on December 31, 1917, a net decrease of 4 during the year.

GENERAL REMARKS.

The Ontario Car Ferry Company, Limited, paid a dividend of 5% for the year ending June 30, 1917. The sum of \$12,500 received on the \$250,000 of this Company's stock was credited to non-operating income account.

The Interstate Commerce Commission began the valuation of your lines on July 1, 1917, and completed about 50 per cent. of the field work. The amount expended to date on this account has reached \$63,123.08.

On March 1, 1917, your Company withdrew from the New York Central passenger terminal in Buffalo, N. Y., and began using the passenger terminal of the Delaware, Lackawanna & Western R. R. Co. The new agreement entered into is dated March 1, 1917, and extends over a period of ten years with the privilege of renewal for a like period.

The officers and employes of your Company subscribed to the two Liberty Loans of the Government as follows:

1st Liberty Loan.....	3,390	individuals.....	\$275,650
2nd ".....	1,738	".....	128,250
Total.....	5,128	".....	\$403,900

of which \$111,950 has been paid in full and the bonds delivered. Your Company has furnished its quota of men to the Nation's military and naval forces. Two of the directors and 370 employes have joined the colors, of whom five have received commissions.

At the annual meeting of the stockholders held November 19, 1917, the By-laws were amended by changing the date of the annual meeting from the third Monday in November to the third Monday in May of each year, so as to correspond with the change in the fiscal year of the Company, which as noted in last year's report now ends on December 31st.

The President of the United States, through the Secretary of War and the Director General of Railroads assumed possession, control, operation and use of your property at 12 o'clock noon on December 28, 1917. It is confidently expected that Federal Legislation will be promptly enacted to provide for the protection of the holders of stock and other securities of your Company and for the improvement and maintenance of your property during the period of Government control.

The acknowledgments of the Board are renewed to the officers and employes for their faithful and efficient service.

By order of the Board.

WILLIAM T. NOONAN,
 President.

Rochester, N. Y., February 6, 1918.

PROFIT AND LOSS ACCOUNT.

DECEMBER 31ST, 1917.

CREDIT.

Balance Surplus, December 31, 1916.....	\$4,330,335.15
Credit balance, transferred from Income Account.....	1,068,105.26
Unrefundable overcharges.....	2,067.29
MISCELLANEOUS CREDITS—	
Adjustment of amounts in appropriated surplus authorized by Interstate Commerce Commission.....	\$217,040.19
Unclaimed wages, etc.....	6,911.74
Withdrawn from Pension Fund.....	5,104.50
Discounts on funded debt retired.....	2,634.01
Profit from purchase and sale of securities in Pension Fund.....	1,011.53
Sundry items.....	196.98
Total.....	\$5,633,406.65

DEBIT.

Dividend appropriations of surplus:	
Preferred stock:	
(No. 47) 3% on \$6,000,000, payable February 15, 1917.....	\$180,000.00
(No. 48) 3% on \$6,000,000, payable August 15, 1917.....	180,000.00
Common stock:	
(No. 34) 3% on \$10,500,000, payable February 15, 1917.....	315,000.00
(No. 35) 3% on \$10,500,000, payable August 15, 1917.....	315,000.00
Total.....	\$990,000.00
Debt discount extinguished through surplus.....	235,131.50
Loss on retired road.....	5,799.65
Miscellaneous debits—	
Premium on funded debt retired.....	\$6,076.00
Loss on securities:	
Pension Fund.....	71.08
Sundry items.....	1,086.27
Total.....	1,238,164.50
BY BALANCE SURPLUS, December 31, 1917.....	\$4,395,242.15

Railway Officers

Executive, Financial, Legal and Accounting

H. R. Williams, vice president of the Chicago, Milwaukee & St. Paul, with office at New York, has resigned.

E. K. Scott has been elected assistant secretary of the Kentucky & Indiana Terminal, with office at Louisville, Ky.

J. P. Nelson, in addition to his duties as valuation engineer of the Chesapeake & Ohio, has been appointed real estate agent with office at Richmond, Va.

Ralph M. Shaw, whose appointment as general counsel of the Chicago Great Western, with headquarters at Chicago, was announced in these columns on February 8, was born in

Paris, Ky., on February 18, 1869. He attended Kentucky University until 1888 and graduated from Yale University in 1890. He then entered the law department of the University of Michigan, taking post-graduate work in law until 1892. He was admitted to the Illinois state bar in July of the same year, and has since been in the active practice of law in that state. He is a member of the firm of Winston, Strawn & Shaw, Chicago, and is a member of the board of directors of the Joliet & Northern Indiana,

the Union Stock Yards & Transit Company of Chicago, the Chicago River & Indiana, the American Creosoting Company, the Federal Creosoting Company and the American Tar Products Company. He was appointed assistant general counsel of the Chicago Great Western in 1915 and, in addition to being general counsel of that road now, is also general counsel of the Chicago River & Indiana, while the firm of which he is a member is counsel for the Chicago Junction Company the Michigan Central, the Chicago, Indianapolis & Louisville, the Chicago & Alton and the Canadian Pacific.

R. M. Shaw

Operating

W. L. Park, first vice-president of the Chicago Great Western with office at Chicago, Ill., will assume the duties of **J. A. Gordon**, general manager, resigned, effective March 1.

J. A. Clancy has been appointed trainmaster of the twenty-seventh and twenty-eighth districts of the Grand Trunk, with headquarters at Durand, Mich., vice **F. A. Rutherford**, promoted.

D. S. Weir, trainmaster of the Southern Pacific, with office at Bakersfield, Cal., has been appointed assistant superintendent of the Portland division, with headquarters at Portland, Ore., vice **William Wilson**, promoted.

J. W. Tucker, formerly trainmaster on the Tennessee & Coosa branch of the Nashville, Chattanooga & St. Louis, was appointed assistant superintendent of the Chattanooga (Tenn.) terminals effective February 1.

J. F. Maguire, assistant to vice-president in charge of operation of the Lehigh Valley, with headquarters at New York, has been appointed general manager. Mr. Maguire formerly served in the same position on this road.

W. L. Fox, formerly supervisor of the Western & Atlantic

division of the Nashville, Chattanooga & St. Louis, was appointed trainmaster on the Tennessee & Coosa branch, effective February 1, succeeding **J. W. Tucker**, promoted.

E. W. Fowler, inspector of transportation of the Chicago Great Western, with headquarters at Chicago, Ill., has been appointed superintendent of transportation with general supervision over transportation matters, effective March 1.

M. J. Flanigan, trainmaster on the Chicago, Milwaukee & St. Paul at Aberdeen, S. D., has been appointed superintendent of the Dubuque division, with headquarters at Dubuque, Ia., succeeding **J. W. Stapleton**, resigned, effective February 15.

R. M. Glover, assistant superintendent of the Southern Pacific lines, at Victoria, Tex., has been transferred to the El Paso division of the Galveston, Harrisburg & San Antonio, with headquarters at El Paso, Tex., succeeding **W. D. Austin**, who died in that city on February 5.

V. S. Burnham, trainmaster of the Southern Pacific, with office at Stockton, Cal., has been appointed trainmaster of the Los Angeles division, with headquarters at Indio, and **C. H. Redington** has been appointed trainmaster of the Stockton division, with headquarters at Stockton, vice Mr. Burnham.

J. W. Daniels, superintendent of the Missouri Pacific, with office at Little Rock, Ark., has been transferred to the White River division, with headquarters at Aurora, Mo., succeeding **J. F. Russ**; **T. A. Shea**, superintendent at Poplar Bluff, Mo., has been transferred to the Arkansas division, with headquarters at Little Rock, succeeding Mr. Daniels; **W. C. Morse**, superintendent at Van Buren, Ark., has been transferred to the Missouri division, with headquarters at Poplar Bluff, succeeding Mr. Shea; **W. F. Kirk**, acting superintendent at Wichita, Kan., has been appointed superintendent of the Central division, with headquarters at Van Buren, succeeding Mr. Morse, and **M. McKernan** has been appointed acting superintendent of the Wichita division, with headquarters at Wichita, succeeding Mr. Kirk.

C. E. Green, whose appointment as superintendent of the Dakota division of the Chicago, Rock Island & Pacific, with headquarters at Estherville, Ia., was announced in these columns

on February 8, entered the service of the Chicago, Milwaukee & St. Paul as a telegraph operator at Garner, Ia., on July 1, 1885. He left the St. Paul in October, 1889, to become operator for the Burlington, Cedar Rapids & Northern at Sibley, Ia. In July, 1891, he was promoted to agent at Cazenovia, Minn., where he remained until February, 1892, on which date he was transferred to Toronto, S. D. He was promoted to despatcher at Estherville, Ia., in September, 1892, and in May, 1898, was transferred to Cedar Rapids,



C. E. Green

Ia. The Burlington, Cedar Rapids & Northern was taken over by the Chicago, Rock Island & Pacific in 1902, and in October of that year he was promoted to night chief despatcher. From March, 1902, to February, 1904, he was chief despatcher at Cedar Rapids; from February, 1904, to October, 1912, he was trainmaster at the same point; from October, 1912, to March, 1913, he was train rule examiner at the same headquarters; and from March, 1913, to July, 1917, he was trainmaster of the Iowa division. On the latter date he was transferred to the Illinois division, where he remained until January 20, 1918, on which date his promotion, as noted above, became effective. Mr. Green has been in the continuous service of the Chicago, Rock Island & Pacific for practically 29 years.

G. W. Wildin, general manager of the New York, New Haven & Hartford, with office at New Haven, Conn., has resigned and his duties have been assumed by **C. L. Bardo**, assistant to president, whose title is now assistant to president and general manager, with headquarters at New Haven. Portraits and sketches of Messrs. Bardo and Wildin were published in the *Railway Age Gazette* of September 7, 1917, pages 442 and 443.

Traffic

J. A. Benell, commercial agent of the Chicago & Alton, at Indianapolis, Ind., has resigned to become associated with the Haines Automobile Company.

F. J. Kemper, traveling freight agent of the Missouri Pacific, with headquarters at Cincinnati, Ohio, has been promoted to general agent, at Atlanta, Ga., succeeding **T. H. McKoy**, deceased.

G. A. Blair, whose resignation as assistant freight traffic manager of the Chicago, Milwaukee & St. Paul, was announced in these columns December 28, 1917, has been appointed traffic manager for Wilson & Co., with office at the Union Stock Yards, Chicago, effective February 25.

G. H. Smitton, assistant traffic manager of the Great Northern, with office at St. Paul, Minn., has been appointed general traffic manager; **H. H. Brown**, general freight agent, with office at St. Paul, has been appointed assistant traffic manager; **P. H. Burnham**, assistant general freight agent, with office at St. Paul, has been appointed general freight agent, and **W. R. Mills**, advertising agent, with office at St. Paul, has been appointed assistant general passenger agent; all with headquarters at St. Paul, effective February 20.

Engineering and Rolling Stock

P. D. Miller, assistant division engineer of the Pennsylvania, at Cambridge, Ohio, has been transferred to Toledo, succeeding **Howard O'Brien**, resigned, effective February 15.

V. B. Wagner, whose appointment as chief engineer of the Cripple Creek & Colorado Springs, with office at Colorado Springs, Colo., was announced in these columns on February 15, was born at Virginia City, Nev., on April 23, 1879. He entered the service of the Denver, Boulder & North Western in October, 1897, as a rodman and chainman on the construction of 10 miles of narrow gage track from Boulder, Colo., to Ward. He was employed by the Colorado & Southern from January, 1899, until 1901. He was instrument man on the construction of the Salmon river extension of the Oregon Short Line from March to June, 1901. From June to October, 1901, he was levelman on preliminary location from Durango, Colo., to Clifton, Ariz., on the Arizona & Colorado. In November, 1901, he was employed as an instrument man on the Colorado & Southern and in March, 1903, was promoted to chief draftsman in the office of the chief engineer. He was employed by the Nevada Northern as a draftsman from January to December, 1907, and was later promoted to resident engineer. From March to July, 1908, he was draftsman for a locating party on the Colorado & Southern; from July to October, 1908, he was draftsman in the chief engineer's office of the Denver & Rio Grande; from October, 1908 to February, 1909, he was engaged in the general practice of engineering at Ft. Collins, Colo.; and from March, 1909, to July, 1910, he



V. B. Wagner

was construction engineer for the street railway system at Greeley, Colo. He again returned to the Colorado & Southern in June, 1910 as resident engineer and was later promoted to office engineer at construction headquarters. On April 1, 1912, he was appointed chief engineer of the Colorado Midland, with headquarters at Colorado Springs, Colo., and in February, 1914, he was assigned additional duties as chairman of the valuation committee of the road. On January 15, 1918, he was again assigned additional duties as chief engineer of the Cripple Creek & Colorado Springs.

T. D. Sedwick, acting engineer of tests of the Chicago, Rock Island & Pacific, with headquarters at Chicago, Ill., was appointed engineer of tests, with the same headquarters, effective January 15.

W. C. Davis has been appointed road foreman of engines of the Shasta division of the Southern Pacific, with headquarters at Dunsmuir, Cal., vice **R. W. Couveller**, assigned to other duties; effective February 21.

Charles Raitt, general foreman of the car department of the Atchison, Topeka & Santa Fe, at Richmond, Cal., has been appointed master mechanic of the Arizona division, with headquarters at Needles, Cal., succeeding **L. A. Mattimore**, deceased, effective February 20.

Railway Officers in Military Service

F. M. Odena, Jr., mechanical and electrical engineer for the Chicago Union Station Company, Chicago, Ill., has been commissioned a major in the ordnance department of the army.

Col. Charles DeLano Hine, who resigned from railroad service last summer and was placed in command of the 165th Infantry, has been transferred to the transportation department of the U. S. Expeditionary Forces in France.

Horace B. Coburn, assistant superintendent of the third division of the Union Pacific System, with headquarters at Walla Walla, Wash., has been commissioned first lieutenant, engineering corps, U. S. Reserve and is now stationed at Camp Lee, Petersburg, Va.

P. M. Benedict, assistant to the president, assistant secretary and assistant treasurer of the Chicago, Burlington & Quincy, with office at Chicago, has been appointed by the War Department as assistant district manager of the equipment division of the Signal Corps, United States Army, with headquarters in the Consumers building, Chicago.

In addition to the list of employees of the Nashville, Chattanooga & St. Louis who have entered military service published in these columns several weeks ago **F. H. Jackson, Jr.**, stenographer in the office of the master mechanic at Atlanta, Ga., has received a commission as second lieutenant in the 43rd Infantry, Camp Pike, Little Rock, Ark.

Obituary

John N. Drake, of New York city, secretary and treasurer of the Short Line Railroad Association, died in Washington, D. C., on February 22, at the age of 73.

JAPAN'S RECORD YEAR IN FOREIGN TRADE.—Commercial Attache Frank R. Rutter reports from Tokyo under date of January 14 that imports into Japan in 1917 reached a total of \$516,343,000, and exports from Japan in that year amounted to \$799,098,000. These figures represent a gain over 1916 of 37 per cent in the case of imports, and 42 per cent in the case of exports and were the largest in the country's history.

BALTIMORE & OHIO MILITARY MAP.—A military map of the United States has been issued by the Baltimore & Ohio and copies may be obtained from passenger and freight representatives of the railroad. The map shows not only national army and national guard camps but all regular army increment camps, reserve officers' training camps, army posts and stations, naval stations, hospitals, marine barracks, naval training stations and aero training stations. An index easily locates each camp on the map.

EDITORIAL

Railway Age

EDITORIAL

Standardization or Efficiency

UPON those at Washington who are attempting to evolve standard equipment rests a tremendous responsibility. Equipment must be produced that is modern in every respect. It must be possible to operate it as efficiently as the most modern equipment that we now have. If an attempt is made to build either cars or locomotives cheaply by eliminating patented devices which are essential for economies both in operation and in maintenance, there can be only one result—disappointment and a great reflection on those who stand sponsor for the designs.

It would be a national calamity should the equipment be standardized at the expense of modernization and efficiency. The problem is an engineering one and nothing else.

Any drastic standardization of equipment is bound to be reflected in increased operating expenses. It will be a boomerang to those who father it.

There must be no mistake made in standardization!

Orders for freight cars are being held in abeyance until Congress has passed the President's railroad bill. The country needs new freight cars. It is plainly evident that some sort of a standard car will be determined upon. Everything must be done, however, to speed the placing of actual orders. The builders were never in better shape to receive orders and any order placed, even at this time, will not be ready for delivery until midsummer at the best. There will be a vital need for new cars next fall and winter. The standardization committees have had sufficient time with the assistance of what has previously been done on the standard car, to formulate definite plans for the consideration of railway men. The men who provide special equipment for the cars must hold themselves in readiness for prompt deliveries. Let everyone cooperate and urge that the matter be handled with dispatch.

Be Prepared to Order Cars Promptly

Suppose, Mr. Railroad Man, that Mr. McAdoo should say: "You can have no new locomotives this year." What would your answer be? After the first cry of "Help!" you would wire Mr. McAdoo for money to improve your shops, to add modern facilities to your engine terminals, to modernize your locomotives and to perfect your shop organization. You would set about doing what should have been done years ago, but for which money was not available. The experiences of the past winter have shown, as nothing could have shown, what the lack of up-to-date facilities has meant. It is not so

much the lack of locomotives as it is the lack of power. The real work to be done is to modernize the equipment, improve the shop and engine terminal facilities, and increase the rating of the power. If the railroad were allowed to do this we should have a far more efficient transportation system. This is where the real "record" is to be made.

How many railroads allow their train dispatchers to study their divisions by riding over the road regularly on local freight and other trains? Or, rather, how many require such inspection and pay the man while he is doing it? This question, asked by a correspondent in our last issue, page 442, is overlooked, but important. It has been asked regularly for 25 years past, but there is evidence of poor dispatching on good roads which indicates that many operating officers still fail to give to the question the correct answer. Dispatchers with specially vivid imaginations, and with the necessary energy and ambition, frequently succeed in doing wonderfully well with a minimum amount of knowledge concerning the grades, the engines, the men and the hundred other things which cannot be realized thoroughly without actually seeing them with the physical eye; but it is important to recognize the cold fact that a good many dispatchers are not endowed with such imagination, energy and ambition. To be assured that the dispatcher will do the best thing in every train-move it is important to make sure that he knows his territory with his eyes shut. And if there ever was a time when poor dispatching was costly and good dispatching was vitally necessary, such a time is now.

Well-Equipped Train Dispatchers

Among the problems which the regional directors and their staffs are now studying at the request of Director-General McAdoo is whether freight solicitation as it existed under private management should continue under government control, and, if not, the changes in methods and organization which should be made. In this connection all railroads have been asked to prepare lists of their traffic soliciting offices, both on and off their lines, with the cost of maintaining them. Although under present conditions of abnormal tonnage and government operation competition for traffic is a dead letter, it is the opinion of many shippers and railroad officers that traffic representatives perform other services than solicitation which are indispensable. They have done invaluable work during the present period of car shortage by encouraging the heavy loading of equipment by shippers and the prompt release of cars by both shippers and consignees. They have assisted claims to the satisfaction of both the carriers and their patrons and have assisted in tracking freight for shippers and in routing cars in a way to avoid congestion. It is pointed out that operating officers are so heavily burdened with the details of their own work that they cannot be expected to give proper attention to the individual needs of shippers and consignees. By virtue of their long experience as intermediaries between the carriers and the shipping public traffic representatives are best fitted to adjust such cases

Need for Traffic Representatives

Truth About The Power Situation

of misunderstanding and friction as arise between the railroads and their patrons. It is possible that this work can be carried on by a smaller force of men than was necessary under competitive conditions and that outside agencies representing roads in common territories may be consolidated advantageously. The extent to which these changes can be made is the problem which the railways are now studying. It is clear, however, that nothing would do more to create misunderstanding or concentrate criticism against the railroad administration than the abolition of traffic representatives. Under competitive conditions one road profited by the mistakes of another and a premium was placed on service to the public. Under government control criticism will not be confined to one line, but will be directed against the whole transportation system. Consequently, the need for men to keep in close touch with the shipping public is even greater under the present system of railroad operation than in the past.

Recent Developments in the Handling of L. C. L. Freight

MORE ATTENTION has been given to the handling of less-than-car-load freight during the last three or four years than during any decade previous to that time. This has already resulted in a number of interesting developments and will lead to even more important ones in the near future. It has brought to railway men a greater realization of the inadequacy of present methods and facilities for the handling of the large tonnages of package freight now offered to them. This in turn has provided the incentive for the investigation of mechanical means for the handling of this class of business; for the development of multiple-story freight houses to decrease ground rentals; for the construction of union transfer stations for the interchange of l. c. l. freight between roads, etc.

The most elaborate plan for the handling of traffic of this character which has yet been proposed is that developed by the American International Terminals Company for the handling of package freight between Jersey City and New York, which was described in the *Railway Age* of March 1. While adapted directly to conditions existing at that terminal the more important principles involved in the layout are capable of application at other large stations and are therefore of general interest.

The most important development in the handling of package freight within recent years has been the motor truck. While its reception has been relatively slow and there are still many freight houses in which it can still be applied to good advantage, it has shown marked economies in those places where it has been installed and where operating methods have been adapted to its use. It is not surprising, therefore, that this New York terminal contemplates the use of motor trucks throughout.

The suggestion that receiving stations be established at various points on Manhattan Island and in Brooklyn for the collection and distribution of freight for all lines has much to commend it, particularly in reducing the average distance of trucking by shippers and in relieving congestion at existing stations which is now particularly acute along the west water front of New York.

The greatest innovation in this plan is the recommendation for the use of motor trucks with removable bodies for the transfer of the freight between the terminals at Jersey City and the collection and distribution stations in New York. This development is in its infancy at the present time, having been used at only a few points, including Cincinnati and Baltimore. It is showing marked advantages at those points, and it is, therefore, not surprising that this

method of transference has been adopted in the New York plan.

These various steps have much to commend themselves to students of package freight transfer, not only in New York, but in the other large terminals throughout the country. The presentation of plans such as these indicate that important improvements are to be expected in the handling of l. c. l. freight in the near future.

Comprehensive Water Treatment Program

AT THE PRESENT TIME when railway men are giving increased attention to water treatment as a means of reducing the number of engine failures and improving locomotive performance, it is necessary that they realize the importance of treating properly all the water supplied to the locomotives under consideration, whether this includes one station, an engine district or an entire division. It has happened too frequently that, after a superficial examination of conditions, those stations on the different divisions have been selected for improvement where the water was most objectionable or the consumption greatest, to the exclusion of less objectionable but nevertheless unsatisfactory supplies at adjacent stations. While the improvement in the character of the water at these isolated stations may be all that can be expected and constitutes an important betterment, full relief cannot be secured in this manner.

A survey of water treatment on railroads made several years ago by the water service committee of the American Railway Engineering Association disclosed the fact that a much larger measure of success was experienced in cases where the water treatment covered an entire division and had taken due account of all waters used on at least one entire engine district. The reason for this is simple. Softened water cannot be used advantageously in boilers containing appreciable quantities of scale or suspended matter. This is demonstrated by the difficulties commonly attending the initial operation of new water softening systems, when progressive disintegration of the old scale in the boilers through the action of the treated water causes foaming and a reopening of scale-closed leaks at first, although these troubles are readily overcome under a properly considered water treating system as soon as the boilers become free of scale.

This fact points to the need of keeping the boilers clean, a condition which cannot be fulfilled as long as appreciable quantities of encrusting solids are being introduced into the boilers at certain water stations, no matter how perfectly the treatment may be carried out at other points on the same engine district. This does not necessarily mean that a complete system of treatment must be provided at each water station, for in some cases the water may be naturally non-encrusting, while at other points a modified form of treatment may be sufficient. Again some waters carry large amounts of material in suspension and but little in solution, so that a filter or settling basin will suffice to produce a satisfactory water. Each water must be studied as an individual case and the necessary corrective measures applied as indicated by the investigation, keeping in mind that the ultimate object is to keep all bad water out of the boilers.

The simplest problem in feed water treatment is encountered with engines in switching and transfer service which take water from a single source. Some of the best records for life of boiler flues have been obtained in the case of engines of this class, using only the treated water coming from one terminal water station. In the case of passenger locomotives also, the problem is relatively simple, for the provision of good water at terminals and at one or perhaps two intermediate stations will often be adequate for this

class of engines. The most difficult problem and the one whose solution is most important is that created by freight engines taking water at each roadside station and frequently running over two or more engine districts radiating from one terminal.

It is evident that only limited benefits can be secured from even the most successful treating plant at one station if the others from which an engine also takes water are supplying untreated water of objectionable quality. Therefore rather than selecting the worst points on several divisions for attention, the best results can be secured by concentrating attention on one district or division at a time and the greatest returns for the expenditure can only be secured in this way.

Controller Williams on the Breakdown of Railroad Credit

WE PUBLISH on another page a letter written by John Skelton Williams, controller of the currency, to the Interstate Commerce Commission on November 1. That was over four months ago, but the letter is almost as interesting reading now as it would have been if it had been made public then. Mr. Williams had already given utterance in the press to some of his views on the railway situation. The letter which we are now permitted to publish was intended only for the eye of the commission and was a much more complete discussion of the state of railroad credit, its causes, and the effects it was producing than was contained in Mr. Williams' public statements.

There has been and will continue to be much discussion as to why government control of the railways was adopted. There really were two reasons, one financial, the other operating.

The financial condition to which the railways had been brought has never been more strikingly shown than in Controller Williams' letter. He presents statistics demonstrating that there had been a shrinkage in the market value of the stock of 12 leading railways since 1906 of \$1,697,000,000, or 51 per cent. The general shrinkage of values, of which the cases of these 12 roads were merely illustrations, had impaired the investments not only of hundreds of thousands of individuals, but also of many of the most important financial and fiduciary institutions of the country. Mr. Williams called attention forcefully to the reduction in the average rate per ton per mile which had taken place since 1908, at a time when wages and the prices of materials were greatly increasing. As he made clear, the collapse of railway credit was due to a repressive policy of railroad regulation, which had prevented rates from being advanced enough to meet increased expenses.

A little over a month after Mr. Williams wrote his letter to the Interstate Commerce Commission, that body sent a special report to Congress. Mr. Williams had strongly recommended an advance of rates. The commission said that no increase of rates it could give would remedy the financial situation of the railways, and recommended government guarantees to them. Only the certainty that the policy of guaranteeing the net return of the carriers was going to be adopted has prevented serious further declines of the value of their securities. It is well to have the reasons for the financial condition to which the railways had been reduced before government control was adopted set forth authoritatively at this time by a high government official so well situated to understand and so competent to present the facts as is Mr. Williams. Perhaps it is a good omen that the man who wrote this letter has since the adoption of government control been made one of the advisors of Director General of Railroads McAdoo and placed in charge of the division of purchases and supplies.

As already stated, there was an operating as well as a

financial reason for the adoption of government control. President Wilson decided that the railways could be more efficiently operated under government than under private control because, as he said, there are some things which the government can do which private management cannot do. As the existing transportation facilities were being operated, it had become impossible for the railways, and especially the Eastern lines, to handle all of the available business. They have continued under government control to be unable to do so, and it is a safe prediction that these facilities, and especially those of the Eastern lines, are being increased, this condition will last indefinitely. It is stated in some quarters that "private management had broken down." On the contrary, private management was moving more traffic in proportion to the number of locomotives and amount of facilities available than it ever did before. Mr. Williams makes clear in his letter that the breakdown of the credit of the railways was due to the refusal of the regulating authorities to let them make needed advances in their rates. Their failure to provide enough facilities, in its turn, was due to the breakdown of their credit. The reasons, both financial and physical, which made necessary government control go back, then, to the kind of regulation to which they had been subjected. Of course, the traffic which they have been called upon to handle during the war is not only vastly larger than that of a few years ago, but has been made abnormally complex by the conditions of war. But fundamentally, the past and present inability of the railways to handle all the available business is due to insufficient facilities, and the insufficiency of facilities is directly traceable to the fact that for almost 12 years before the adoption of government control they were subjected to a policy of regulation which was adapted to and did finally break down their credit.

The Interstate Commerce Commission has not yet decided the case involving advances in rates which called forth the letter of the controller of the currency regarding the condition of railroad credit. It will be interesting to see when the decision is rendered whether the developments of the last few months have had any influence on the commission's views regarding the way in which rates should be regulated.

Standard Locomotive Repairs

THERE ARE MANY OBJECTIONS to the adoption of universal rigid equipment standards which have received considerable attention since the investigation of the standardization of cars and locomotives has been in progress at Washington. Little has been said, however, about the relation of the locomotive standardization plan to the maintenance department. This is a matter which should be given careful thought, especially when considering the adoption of standard types of locomotives under present conditions. There are many railroads, including most of those now of the greatest importance to the nation, which have been slowly developing their own standards of locomotive construction for many years. The purpose has been to develop interchangeable parts in order that the stock of spare parts and material may be kept at a minimum and that these parts may be made on a manufacturing basis. As the details and, to some extent, the classes of locomotives, have become standardized, special shop equipment has been provided to make possible the economical centralized production of the finished parts needed in the maintenance of the power. Patterns for a large number of castings have been made applicable to several classes of engines, turret lathes, and in some cases, automatic machines have been provided for the quantity manufacture of motion work pins; jigs, templates and flanging forms have been designed for the performance of standard opera-

tions; the sizes and tapers of bolts have been standardized in order that standard drills and reamers may be supplied to all repair points on a system and repair practices retained under effective control. To impose an entirely new design of locomotive upon the maintenance departments, differing in all respects from the local standards evolved on each road, would at any time result in considerable disorganization and loss of efficiency in the operation of shops. There are already many extraordinary difficulties to be overcome in order to keep up the output of locomotive repair shops. Under these conditions, when a national crisis demands the utmost from these organizations, the wisdom of throwing such an additional burden of disorganization upon the maintenance departments is very doubtful.

The Shepherdsville Collision

CHIEF INSPECTOR BELNAP reports the Shepherdsville collision of December 20 as due to the negligence of (1) the leading train, No. 41; (2) the following train (No. 7), and (3) the operating officers of the company. The language in which he sets forth this conclusion is quoted on another page. The failure of the flagman of No. 41 must include his failure to use fuseses, though the report has nothing special to say on this point. If trains are to be spaced by time alone the use of fusees (or torpedoes) is always an essential element, for the distances between stations, and the length of time which the flagman may take, in any given case, to get back with his red flag or lantern, are so variable that they can never be fully provided for in any general rule; and a general rule is our only protection, for no flagman can be expected to know enough of the circumstances of any particular case to be able to exercise his own judgment. To get along by the exercise of individual judgment is an experiment that was tried for half a century and had to be admitted a failure. In place of that expedient, the only practicable recourse, aside from the space interval, is the use of fusees. Fusees, however, besides being costly, introduce new difficulties; so that, in the light of extended and varied experience, it is not very strange that they afforded no protection in this case.

As to flagging *per se* (excluding the question of fusees), it may be said that if the flagging rule ever fails, this was one of the occasions where failure would be liable to occur. The train had station work to do, making it easy to be careless in counting minutes; the following train, No. 7, had a clear view for more than a mile and had the warning of two good red lights on the rear car of No. 41; and it was running under a rule requiring the speed of the train to be kept under control so that it could be stopped within the very short distance of six hundred feet. However, though the conductor and the flagman of No. 41 violated plain rules, it is impossible (unless one had been acquainted with the men, their personalities and their records), to discuss their failure any farther, for they have paid the extreme penalty for their negligence, and their mental processes on that fateful evening are a sealed book. These men took a risk which, no doubt, seemed to them small, but which proved to be great. The country-wide accident records of the Interstate Commerce Commission would show, no doubt, numerous other cases, quite similar, within the same month.

Engineman Wolfenberger's negligence is characterized as a "material contribution." To many railroad officers this will look like an inversion of the true relation; his dereliction will be classed as the chief immediate cause of the collision. His testimony as to speeds, and as to when he first saw the train-order signal; when he whistled, when he applied brakes and to what extent, and the testimony

of other persons on these points, are subject to a good deal of doubt as to their accuracy; but it is difficult to believe that if both the engineman and the fireman had been keeping a good lookout they would not have seen the two red tail lights of the train ahead.

To take no special pains to reduce speed, or to see the change in the color of the train-order signal was, evidently, habitual; and the omission of the engineman and the fireman to confirm each other's reading of fixed signals was not only habitual, but was approved by their superiors. Enginemen of the highest grade employ this monitorship habitually; and they appreciate its value, whether it is required by the superintendent or not.

The company's responsibility is put third; but the public will be likely to put it first. The officers of the state or federal government would necessarily look first to the company, as they have no way of dealing directly with enginemen, conductors or flagmen except by criminal prosecutions. Probably if there were more criminal prosecutions of employees who cause people to be killed by violating the rules of safe operation, the number of bad accidents would be reduced; but our public officials and juries seem incurably reluctant to apply the law of manslaughter in such cases.

The astonishing thing about this collision is that a prominent road, which is reasonably prosperous, and which has introduced automatic block signals on hundreds of miles of its lines, should be operating a section of its most important main line with no space interval at all! The management of the Louisville & Nashville has many characteristics of enterprise and has spent millions of money for safety; yet here neglected a lesson which has been displayed on the railroad screen, in giant letters, under the brightest light, for the last thirty years. The daily papers, as a matter of course, at once turned their heaviest guns on the wooden coach, ignoring the impossible problems which face the railroad manager who would introduce steel cars throughout his lines at a single stroke—or even in five years; but the railroad manager cannot ignore the fundamental principle that, in the matter of collisions, it is his duty to prevent them, not merely to mitigate their effects.

The company's statement said that the line was operated under the standard rules of the American Railway Association; but that declaration has little meaning, for everyone acquainted with the Standard Code knows that innumerable safeguards necessary in train operation are covered by the rules only in the most vague and general way. The code is no more a guarantee of safety than is cold water in the boiler a guarantee that the engineman will ever start his train. The company might have added, with truth, that so far as concerns clear and forceful language, lucid arrangement of subjects, and careful attention to a thousand details, its own code of rules is one of the best in the country; but the rules for train operation are nothing but a skeleton at best. This was a case where the time interval system was of no value except as it was supplemented by flags, torpedoes and fusees.

That the road should report the block system as in effect when in fact it was not, and repeat the declaration year after year, is inexplicable. The existence of train-order signals at the stations of the Louisville & Nashville, with operators in attendance, made it possible to operate the block system at any time; but a rule that is suspended completely and permanently can hardly be called a live rule.

But if no block system had ever been invented, the explanation offered by the road would still be grossly inadequate. Whether or not there had been proper inspection to test the intelligence and fidelity of flagmen and conductors in protecting the rear of trains is a point on which Mr. Belnap's report has nothing to say; but whether this was done and proved ineffective, or was neglected because these men had never got into serious trouble, is perhaps only an

academic question now. In any event a discussion of this point could only go over old ground.

The question whether there had been inspection to see that enginemen properly heeded the rule requiring them to slacken speed for the purpose of seeing the operation of every train-order signal is already answered, in the negative, by the admission of the engineman, before the Kentucky commission, that motionless signals were accepted by enginemen, habitually. Indeed, the fact that fast trains could not obey the rule in times of fog without losing time, seriously, gives ground for the conclusion that the neglect of this rule must have been well known.

The railroad company will, no doubt, take the government's advice to put the block system in operation on this section of its road. The public will be interested to see whether that system is better enforced than was the old system. It undoubtedly will be, for when the management of the Louisville & Nashville does apply itself to doing a job particularly well it always succeeds in doing it well.

Railroad Rates as a Means of Taxation

THE NEW YORK TRIBUNE editorially commends to the consideration of Congress a plan for increasing freight rates to an extent (the Tribune suggests 100 per cent increase) which would yield the government a large surplus over and above its guarantee to the companies. The Tribune says: "No form of taxation yet devised could reach all of the people of the country more surely than a tax on freight." The Tribune's proposed increase of rates is to be solely as a war measure and solely for the duration of the war. The Tribune apparently forgets that there is now a tax both on freight and on passengers as a war measure. The proposal to increase freight rates as a tax is, we believe, founded on unsound principles and it is open to the greatest dangers both economically and politically.

The *Railway Age* has already advocated the establishment of rates which will furnish net operating income ample to meet the government's guarantees. Every commercial product as well as every product of mines, agriculture and forests has two primary measures of value: one, its inherent qualities; the other, its relative geographical position. The factory, the mine, the farm or the lumbering camp produce—manufacture—the inherent quality of the subject. Transportation produces—manufactures—the other element of value—relative geographical position. In modern life only a fraction of the products of factory, mine, farm or forest are consumed where produced. To all the rest must be added transportation. Transportation is therefore in the nature of a part of the process of production; it is that part of the process which produces geographical position. Geographical position is as necessary an element in consumability as are the inherent qualities of the article itself.

It is a fundamental economic mistake to put a tax on production. Such a tax is essentially different from a tax on profits from production. One tends to restrict production, the other to the adoption of economies in production. Just the minute you begin to use railroad rates as a part of the taxing power of the federal government you will get the railroads into politics in the same way that the tariff question has been in politics. The equitable freight rate is a fine blend of the value of the service with the cost of the service. It is true that if you adopt as a guiding principle the rule that the government must at least receive net operating income sufficient to meet its railway guarantees, you lay stress on the cost of service; but this is as it should be.

Now is the opportunity of more than a generation to readjust the rate fabric of this country. Competition in the first place and a shortsightedness on the part of the Interstate

Commerce Commission in the second place have left a rate structure that is quite illogical. With the government as the recipient of any surplus over its guarantee there is an opportunity to go at this rate structure in an open-minded, broad way that ought to work great good to the industries of the country as well as to the consumers. To miss this large opportunity, however, as means of taxation would be a serious blunder.

Reforms in Passenger Service

GOVERNMENT CONTROL is beginning to effect some important reforms in railway passenger service which the *Railway Age* has been advocating for years, but which it was impracticable to secure while the unrestricted competition required by law prevailed in the railroad business.

This paper has called attention many times to the wasteful duplication of passenger train service between cities in all parts of the United States. One of the examples on which we have often commented has been the service between Chicago and St. Louis. Four railways operating between these cities have run 15 trains a day from Chicago to St. Louis and the same number from St. Louis to Chicago. The trains on the different roads have departed and arrived at destination at practically the same time. In consequence, although there were 15 trains, there were only five times in the day when a passenger could leave Chicago for St. Louis. We have repeatedly remarked that if, in such cases as this the number of trains was reduced and they were so spaced as to leave at different times, a large economy would be gained, and at the same time the service rendered to the public would be improved.

A reform in the Chicago-St. Louis service is now to be made. The number of trains is to be reduced from 15 to 9, and they are to leave at eight different times in the day. An article giving the new schedule is published elsewhere in this issue. Under the new schedule, a large economy and the improvement in the service which long have been practicable, will both be attained. There are many other cities in the country the passenger service between which is susceptible of similar reform, and it is understood that like action regarding the service between these other places is to be taken by the railroad administration. It is to be regretted that changes along this line had to be deferred until government control was adopted, but the necessities of the railways should not on this account be too severely criticized. The law has required them to compete, and duplication of passenger service has been a result of law-enforced competition.

Another reform which this paper has advocated for years has been the consolidation of the ticket offices of the railways in the various cities. The multiplicity of ticket offices, like the duplication of passenger service, has afforded an opportunity to effect reforms which would save the railways money, and at the same time provide the convenience of the public. Under the system under which each railway has had its own ticket office, if a traveler wished to go from Chicago to St. Paul, for example, and could not get sleeping car space on one road he had to go to the ticket office of some other road, which might be a considerable distance away. With a consolidated ticket office, if he could not get sleeping car space on one railway he could without leaving the office, go across to a train on some other railway. The St. Louis office, some years ago, consolidated their ticket offices so as to include essentially all railways, and at the same time improved the convenience of the public. Since government control has been adopted it has been decided to consolidate the ticket offices in Washington, and it is understood that this is a forerunner of similar action in

other cities. The reason for the multiplication of ticket offices in the past has been the same as the reason for the duplication of passenger train service.

Another reform in passenger service which government control probably will soon accomplish will be the abolition of the indiscriminate and wholesale reservation of space on sleeping cars. Our railways in the past have given passengers the privilege of making as many reservations as they have pleased, at as many times as they have pleased. This privilege has been grossly abused, and its abuse has cost the railways and the Pullman Company millions of dollars a year. Whenever people, especially in the large cities, have thought that they might want to make a trip they have reserved sleeping car space. The railways have had to put enough cars in their trains to accommodate all making reservations. A large number of those who have made the reservations and who have later decided not to make the trips they contemplated, have either canceled the reservations a short time before the hours of departure of the trains or have not canceled them at all. In consequence, all over the country the railways have run cars which have not been properly loaded. The remedy for the abuse of the reservation privilege is to require passengers when they make reservations to pay cash for their railway and sleeping car tickets. Of course, if they do not make the trips they contemplate their money will have to be refunded but when people are required to pay cash for reservations the number of them made will be greatly curtailed and the number of cars run half-loaded will be correspondingly reduced.

There are various other reforms in the handling of passenger business which long have been needed and which can be made in such a way as to save money for the railways and at the same time not materially inconvenience the public. It is to be hoped that under government control many of them will be so completely accomplished that the old abuses will not be revived after government control is terminated.

Pennsylvania Railroad Company

THE INCREASE IN THE TONNAGE of freight handled was not apparently the primary cause of the unprecedented strain which was put on the Pennsylvania Railroad in 1917. It is hard to overstate the extent of this strain. Transportation expenses—the out-of-pocket cost of actually moving freight and passengers—increased by \$24,540,000 and totaled \$104,935,000 in 1917. This is an increase of 51 per cent. There was congestion and delays to ordinary freight and passenger trains, such as had never before been experienced, and yet the total tonnage of freight carried in 1917 amounted to 169,647,000 tons, an increase of only 3,402,000 or 2.05 per cent. It is true that the average haul of each ton of freight was somewhat longer so that the total ton mileage amounted to 27,791,000,000, an increase of 3.06 per cent over the ton mileage of the previous year. It is also true that there was a tremendous increase in passenger business. The number of passengers carried one mile totaled 2,524,000,000, an increase over the previous year of 16.39 per cent; but as a matter of fact, by curtailing regular passenger service, the Pennsylvania was enabled almost to offset the mileage made by special troop trains. Passenger train mileage totaled 31,759,000, an increase of only 2.61 per cent over the previous year.

To adequately understand these figures and to get some conception of the burden put on the management and employees and the heroic efforts which were put forth to carry this burden, it is necessary to describe briefly the situation at the beginning of the calendar year, 1917.

The Pennsylvania Railroad directly operates 4,541 miles. The main line runs from New York via Philadelphia through Harrisburg to Pittsburgh. Branching out from this main line, are a network of lines connecting the principal traffic centers as far south as Baltimore, Md., and north to Wilkes-Barre, Pa., Rochester and Buffalo, New York, and Erie, Pa.; thus the Pennsylvania Railroad serves the great manufacturing, industrial and commercial center of the United States.

Notwithstanding the fact that huge sums have been spent each year for many years on additions and betterments and these sums have been expended with keen foresight as to the trend of the developments of traffic, the physical plant at the end of 1916 was being operated within a very small percentage of its full capacity. This could be said of no other railroad of the size of the Pennsylvania. It is hardly necessary to cite even the most impressive of the great undertakings which the Pennsylvania has completed in recent years, in the attempt to keep its railroad up to the requirements placed on it. The New York extension, costing over \$100,000,000, and the double track low-grade line from Harrisburg to Philadelphia, costing as it did \$40,000,000 and being an addition to a four-track line already existing between these two cities, are two examples. On an average \$30,000,000 a year was expended for fifteen years for additional terminal and yard facilities. The credit of the company was used to the full extent that it was considered safe to use it. If the profits which the company had been making had provided a better credit far greater facilities would have been provided. The fact was recognized that although a very large amount was being expended for such purposes it was not as much as should be spent. The road had reached the point of saturation by the end of 1916.

There is another feature which must be borne in mind. The organization, by which is meant the officers and employees of the Pennsylvania, is unique. The aim of the development of this organization has been to take in young men, to train them carefully and fully, to treat them so well as to insure their remaining with the company and to operate the property along scientific lines which require skill and long practice to understand and effectively to carry out. The piece of machinery is so huge, its complicated parts fit one within another so intricately, that the loss of a single part is liable to cause endless confusion.

W. W. Atterbury, vice-president in charge of operation, was in September appointed director general of transportation for the United States in France and later was made brigadier-general. More than 11,000 officers and employees of the Pennsylvania entered the service of the United States. Through death, the Pennsylvania lost Simon C. Long, general manager, George W. Creighton, general superintendent of the Eastern Pennsylvania Grand division, George W. Boyd, passenger traffic manager, and Robert H. Large, coal traffic manager. It is not that younger men had not been trained to replace and do the work of Mr. Atterbury and of the executive officers who died, but was rather the combination of all the circumstances, the loss of Mr. Atterbury's services, loss of the trained services of 11,000 others who went into the war service, unprecedented passenger service demands, and what has not heretofore been mentioned, but what is of the very greatest importance, the mass of preference orders from the government, many of them at times contradictory, and a hopelessly confusing change in the ordinary channels of traffic. At one time 85 per cent of the total freight traffic was subject to preference orders. Moreover, 177,000 new men were hired in 1917. This is at least four times the number of men that had been taken on new in any previous year. Is it any wonder that there was congestion and greatly increased expense on a road 4,500 miles long that was trying to do a freight business alone exceeding over 60

per cent of the combined annual ton mileage before the war of all the railroads of Great Britain and France.

Notwithstanding all the extraordinary difficulties, the average tonload in 1917 was 872 tons; an increase of 62 tons over the previous year. The average loading per loaded car was 32.17 tons, an increase of 2.94 tons. This is an achievement which every Pennsylvania man may well be proud of.

The total operating revenues in 1917 amounted to \$255,960,000, an increase of \$24,815,000 over the previous year. Total operating expenses amounted to \$200,588,000, an increase of \$34,424,000. After paying largely increased taxes and increased interest charges, there was \$59,282,000 available for dividends. This was less by \$12,995,000 than the amount available at the end of 1916. Regular dividends of 6 per cent called for \$29,951,000 and sinking funds called for a little over \$2,000,000 more. The remaining \$7,000,000 the Pennsylvania appropriated toward the quarterly dividend which was paid February 28, 1918.

During 1917 \$25,579,000 was spent for additions and betterments and \$8,494,000 for additional equipment. Of the twenty-five and a half million dollars spent for additions to terminal facilities, additional track, etc., less than half, probably, was spent on improvements which were actually available during any part of the year 1917. For instance, \$11,555,000 was spent for the purchase of property for terminal facilities and for right of way.

The taking over of the operation and assets and liabilities of the Pennsylvania Company, which operates the southwest system of the Pennsylvania Lines West and controls their stock ownership, and the other Pennsylvania Lines West, has been previously commented on in these columns. The figures, of course in these comments do not include any of the Pennsylvania Lines West. The Pennsylvania has acquired almost all of the minority stock of the Long Island and now owns 99.16 per cent of all of the stock of that company.

At the end of the year the Pennsylvania had on hand \$17,744,000 cash, an increase of \$3,686,000; but no time drafts and deposits which latter, at the end of 1916, amounted to \$48,374,000. Loans and bills payable amounted to \$14,317,000, a decrease of \$21,688,000. During the year the company sold \$60,000,000 general mortgage 4½ per cent bonds, charging to profit and loss \$3,266,000 discount. It was from the proceeds of these bonds that the company paid off the loans and bills payable as noted above—the principal payment being \$20,000,000 of 4½ per cent notes—and also paid for the new equipment and additions to road, terminal facilities, etc., previously mentioned. There are available \$21,000,000 additional general mortgage bonds which have previously been authorized by the stockholders, and the stockholders are now asking to authorize an additional \$75,000,000 of these bonds so as to make a total of \$96,000,000 of bonds which the directors can sell on such terms as are possible.

The table below shows the principal figures for 1917 and 1916:

	1917	1916
Operating revenue	4,541	4,536
Freight revenue	\$76,927,094	\$164,226,792
Passenger revenue	57,958,945	44,907,476
Total operating revenue	155,093,405	200,278,533
Maintenance of way and structures	9,610,653	38,819,322
Maintenance of equipment	52,613,430	45,805,126
Other expenses	860,787	2,534,360
Depreciation expenses	104,934,709	80,394,313
General expenses	6,409,937	5,509,430
Total operating expenses	200,588,086	166,164,582
Taxes	10,199,823	9,027,399
Operating income	44,264,408	55,056,012
Gross income	65,983,659	74,220,874
Net income	19,818,584	53,276,504
Sinking Funds	187,111	1,788,059
Dividends	29,510,000	29,951,000
Provisions for additions and betterments	25,579,000	9,214,925
Provisions for betterments branch lines	8,494,000	3,737,866
Provisions for 1918 bonds	7,143,459	
Surplus		7,256,902

Letters to the Editor

The Labor Situation and Its Effect Upon Clerical Forces

DORVILLE KY

TO THE EDITOR:

While the writer, like practically all other railroad office men, holds the opinion that he is not being paid as much for his services as they are worth, he desires to have it understood that this communication is not written with a selfish motive, and that it is not to be taken in the light of a class protest. The writer is a railroad clerk and has been for ten or more years, but he has been for some time in charge of an office in which a number of clerks are employed. He has had some experience in employing and handling clerical forces, and therefore feels qualified to sound a warning regarding the present situation, and the probable future situation under existing conditions, with particular reference to the quality of labor available for clerical positions. He will endeavor to place himself in the position of an employer of clerks, which, in fact, he is, as he not only employs them but is responsible for the work which they do, or do not do.

In the first place, there seems to be a disposition on the part of officers who handle labor matters in general, such as rates of pay, hours of service, and working conditions, to consider clerical labor hardly worth the same serious consideration that is given train and enginemen, shop forces, and the employees in the maintenance of way department. The idea seems to be that clerks do not produce anything, that their work does not, except in an indirect way, affect operation; that it is easy and no especial intelligence is required to handle it, and therefore, that the heads of the offices should be able to continue to keep an effective force at the same old rates or at very slightly increased rates.

As a matter of fact, under the present conditions, the clerical labor situation deserves very serious attention if railroad offices are to meet the demands made upon them. In the first place, some classes of clerks, such as yard clerks, bill clerks and station forces, do affect operation as vitally as telegraph operators. In the second place, the requirements of the Interstate Commerce Commission, and the increased demand for accuracy in records of all kinds, call for a very much higher degree of intelligence in accounting and in the various other classes of office work than when railroad office salaries were high in comparison with the salaries paid for similar classes of service in other industries. Under the old conditions excellent material was available from which office men could be drawn. But the quality of the material available for this class of work has been steadily deteriorating for several years, until at present, the head of the average railroad office is hard put to maintain an organization with which he can turn out work which will not keep him in hot water continually.

The standard of education is very much lower in the material now available; initiative, judgment and loyalty are so rare as to cause surprise, and it is next to impossible to build up an efficient organization and to maintain it.

Girls and women have been and are being used to fill the gaps in many offices, and it may be said of them that in some cases they fill them well. Female clerks are as good, if not better, than male clerks in some positions, but they are not always suitable for use as bill clerks in the yard offices, and for use in some of the agencies and division offices. The working conditions in these offices are not favorable for the

retention of women of the class likely to be efficient and likely to have the necessary education.

The present situation, then, is that the standard of the work required of office forces continues to be raised, and the quality of the labor available to handle the work continues to deteriorate. What is the cause of this condition? The answer—two words—salary, opportunity. The remedy, in the opinion of the writer, lies in the same two words. Another general increase? More expense? No, not a general increase, a little more expense probably, but not much, nothing like so much as it looks at first glance.

The trouble lies in the method of organization. Clerical workers cannot be handled like shopmen, operators, or trainmen; they should not receive class rates. The men we need for office work do not fit in with that kind of an organization. Office work is not, strictly speaking, a trade or a profession. With the class of men we want it is simply a means to an end. This class of men take up office work for the experience it gives which will fit them for the more or less important official positions on the railroad or in other business. They want promotion to executive positions, they want to get somewhere—the class we need and want, understand, not the class we are getting.

Clerks, or the class we need for the office work now required, are not trades-union men, they are not of the type that takes kindly to trades-union principles; they are, and if we are to get the class of service we want, they must be of the executive type. They would never be content to serve an apprenticeship at the less important desks and then be satisfied to settle down as mere clerks for the balance of their lives. A different order of intelligence is required for clerical positions; they must offer advancement and encouragement. The men must see themselves a little further along each year, or at least see prospects of promotion. If they are satisfied without this they are not of the best type for office men.

Under the present method of organization, which is more or less common to the railroads of the country, there are too many positions that pay practically the same salaries—\$60, \$65 or \$75. The writer knows of one division office in which there are five \$75 jobs in the timekeeping and personal record department. The men on these jobs are good men in their way, but not one of them has been in that office longer than one year and the timekeeping force is constantly changing. When some one steals the chief timekeeper the office head has to steal another from some other road where the rate is lower.

How much better would be an organization, the total salaries of which would represent practically the same outlay, with the clerical compensations graduated so that the new man received \$65, the next \$70, then \$75, \$80 and \$85. The work could be arranged so that the importance and the responsibility of men would increase with the rates of pay and promotions would follow as vacancies occurred. The \$85-man, having been through the whole mill, would be the logical man for his chief's job when the chief stepped up, and the quality of service given by the whole organization would be very much higher.

The graduated wage scale is the ideal for office work, and there should be a definite and comparatively inflexible path of promotion. Thus ambition would be kept alive, the mind kept active and broadened by reaching ahead for the details of the next job, and the new man would be broken in—where he could do the least damage—on the job of the least importance. True, there would be some little disorder when everybody moved ahead, but this would not be serious. As all would be more than fairly familiar with their new duties, the organization would work down to the usual or perhaps greater efficiency in a few days, and every one would feel that he was getting somewhere.

The opportunity for promotion need not end in the office

and should not end there. Men of the stamp that a good system of advancement would attract and develop would make good officials in some positions, if they were permitted to get some outside experience as they went along. Send them out regularly to look up something concerning the work on which they are engaged at the desk. Have them go with the division officials occasionally on their various trips of inspection. Let them see both sides of the work and become familiar with the actual conditions about which they write and which they record.

Each office man should make periodical trips over the division and over other divisions, under the supervision of field men who will explain matters from the field man's point of view. Under this arrangement the interest in the work would increase greatly. The men would know what they are writing about. There would be fewer foolish letters, and by the time a man reached the chief clerk's desk, he could, with a few weeks' coaching, make a valuable man in many of the minor official positions, having gained by experience a fairly good grasp of both theory and practice. Office men are quite generally promoted to official positions in the freight and passenger traffic departments, and these departments get good men. The same could be done in the operating department if the rudiments of the outside work were taught during a term of several years, as suggested above.

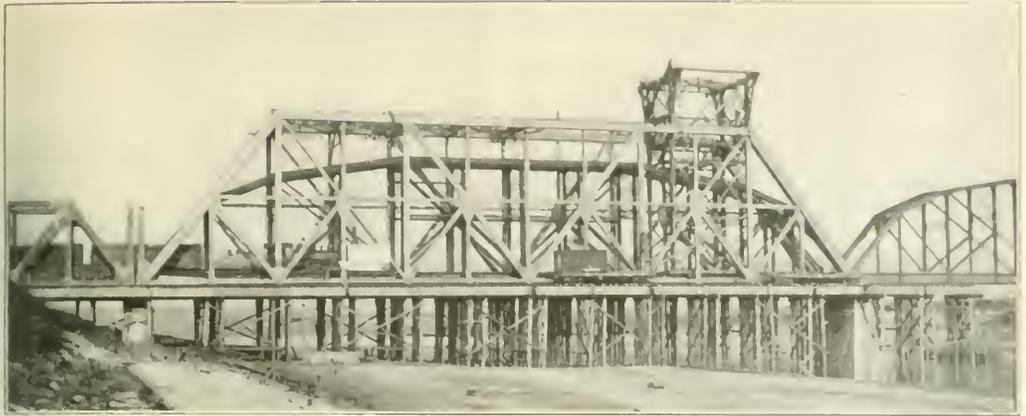
The same system of graduated salaries, suggested above, could be worked out even in the great billing offices in the cities, for though the work cannot be so easily divided as to importance and responsibility, it can be graded to some extent. With the possibility of a gradual promotion and increase in compensation before them, a much more intelligent class of men could be secured for these positions.

Unionism would be a highly undesirable thing in the offices, both from the standpoint of the railroad and from that of the men, but office men are being driven towards it. The average clerk does not want it, and if he can see fair prospects without it he won't have it. But there is imminent danger that it will come to a real union, as strong as the telegraphers, or the trainmen, under the present conditions, and with the union a much poorer quality of work will be turned out. Or if, as is possible, we avoid the union because the men with spirit enough to form one seek employment elsewhere, we shall in time be forced to do work that should be handled by men of keen intelligence, with spiritless drudges, rejects and failures, and the word "clerk" will deserve the more or less good-humored contempt which is already beginning to be attached to it.

CHIEF CLERK.

MEXICAN WAR TANKS.—A large Mexican oil company during each year assembles all of its tank cars for repairing. In search of three cars which had been side-tracked in the territory formerly dominated by Villa, a party representing the company espied what appeared to be "British armored tanks." On investigation, it was found that the Mexicans had drilled three holes in each side of the cars and had installed six machine guns in each. It was so furnished that eight men could comfortably be seated and entrance was made through an opening at the front of the car.

EUROPE'S FREE PORTS.—In the free ports of continental Europe merchants can ship goods through a free port either by arranging with a shipping company, whose vessels call at the free port, to have the goods shipped to their destination or through bill of lading; or shipped to the free port on option bill of lading which allows the merchant to defer his choice or settlement of the destination of goods until they have arrived at the free port. Merchants may also forward goods from domestic or foreign points to the free port for storage, and afterwards order them reshipped to any domestic or foreign point.



Completing the West 200-ft. Span

Elevated Terminal Connection at Kansas City

Project Involves a Long Two-Track Steel Viaduct and a Heavy Double-Deck Bridge of Unique Design

THE KANSAS CITY TERMINAL RAILWAY is expanding about \$4,500,000 in constructing an approach to the Union station for the use of certain railways entering the city from the west which involves a double track elevated railway several miles in length across the bottoms of the Kansas river in Kansas City, Mo., and Kansas City, Kan., It also includes a double-deck railway bridge over the Kansas river, a project alone of no ordinary proportions which embodies a number of novel features of design and construc-

tion. The project is being carried out in a hasty manner about by the congested condition of the approaches to the old station, as well as by the inadequacy of the station facilities. Because of this fact the selection of a site for the new station at a distance of more than a mile from the old one left a number of the railroads without adequate means of access. Consequently the conclusion of the agreement between the several roads was largely contingent upon the formulation of satisfactory plans for adequate approaches to the station for all of the roads concerned. These plans embodied the West Bluff connection for the Chicago, Burlington & Quincy, the Wabash and the Chicago, Rock Island & Pacific, Chicago line, extending south from the Hannibal bridge past the old Union depot. It also provided for the reduction of grades and the four-tracking of the main line of the Kansas City Belt Railway to afford ample approach from the east for the Chicago & Alton, the Missouri Pacific, the Atchison, Topeka & Santa Fe, the Rock Island's St. Louis line, the St. Louis-San Francisco and the Kansas City Southern. A third provision was for an elevated railway to afford approach over the industrial district occupying the bottoms on both sides of the Kansas river between the bluffs of Kansas City, Mo., and Kansas City, Kan., for the trams of the Union Pacific, the Chicago Great Western, the Nebraska and northern Kansas lines of the Missouri Pacific, and the western lines of the Chicago, Rock Island & Pacific which enter Kansas City over the Union Pacific tracks.



Location of the New Elevated Line Across the Kansas River Bottoms

tion. This is the latest important step in the Kansas City Union station project. The work has been in progress since October, 1916, and its completion in 1918 will effect a marked improvement in the facilities for both freight and passenger traffic in the district immediately west of the station.

The Union station project at Kansas City was brought

The first two improvements were carried out simultaneously with the construction of the station but the building of this elevated railway or "High Line" was delayed. Consequently when the new station was opened the four railroads were compelled to seek temporary entrance to the station until such time as the approaches agreed upon would be ready. The Union Pacific and the Rock Island have been entering the new station via the tracks of the Kansas City Terminal from the Kansas side of the Kansas river, crossing that stream near the Santa Fe's western connection. The Missouri Pacific and the Chicago Great Western, which uses the tracks of the former from Leavenworth, Kan., now enter the station from Kansas City, Kan., by a route that crosses the Kansas river near its mouth, skirts the bank of the Missouri

river for about a mile and joins the tracks of the Kansas City Terminal near the site of the old Union station.

Both of these routes are subject to serious interference from freight, transfer and switching movements. The route of the first two roads is most seriously congested at the Kansas river bridge on account of a heavy movement of refrigerator cars to and from the packing houses on the Kansas side. Further interference in this route is caused by 15 railroad crossings and 4 crossings of important streets at grade in Kansas City, Kan. The second route interferes with switching in the industrial district along the Missouri river and with the operation of freight yards of the Santa Fe, the Burlington, the Alton and the Frisco in the vicinity of the old station.

New Connection Eliminates Interference

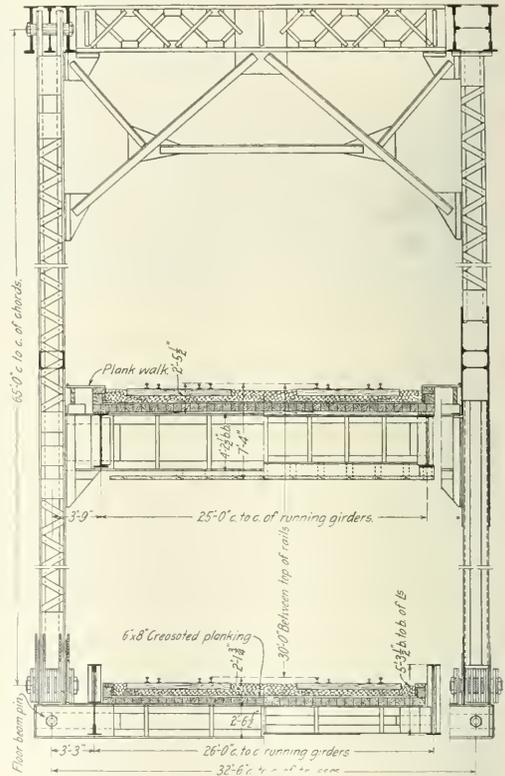
The new "High Line" leaves the grade of the west station approach tracks about one-half mile west of the station, crosses the Kansas river on the site of the existing bridge and curves to the northwest to a point north of Kansas avenue where the structure divides, one branch for the Union Pacific and Rock Island turning to the west and the other continuing to the north to a connection with the Missouri Pacific tracks near Central avenue. The total length of this elevated railway is about 4 miles. Each of the branches is about 1½ miles long. It consists of 3,900 ft. of surface tracks, 8,800 ft. of embankment approaches, 8,500 ft. of steel viaducts and the bridge across the Kansas river, which in addition to providing a double track crossing for the elevated railway provides two tracks on a lower level for freight and switching movements.

The construction of this connection was delayed for a number of years in the negotiations for a franchise for the overhead street crossings in Kansas City, Kan., the primary difficulty being a difference of opinion as to the character of passenger station facilities to be provided by the railroads for that city. This feature was finally agreed upon and the plan which was approved by the people of Kansas City, Kan., in July, 1915, includes provision for two passenger stations to cost \$100,000 each, in addition to the elevated railway. One of these stations will be located on the Union Pacific branch at Seventh street and the other on the Missouri Pacific branch at Central avenue.

The Kansas River Bridge

The bridge over the Kansas river is the most important single feature of the project and is distinctive in a number of features. It is a double-deck structure. The heavy loading which this implies on two spans of 300 ft. each required the use of a number of special details of design. As in the

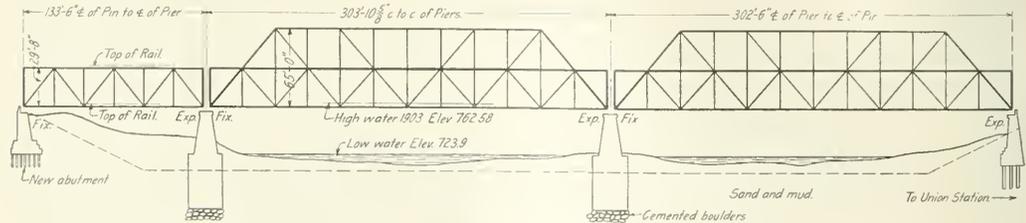
bridge each 24 hr. it was imperative to devise erection methods which would insure absolute continuity of traffic over the bridge and at the same time avoid the use of the track on the bridge for any of the erection operations. As a result of



Cross Section of 300-ft. Double-Deck Span

these exacting requirements the method adopted is unusual.

The old bridge was built for single track in 1907 to replace a structure destroyed by a flood. A single track was entirely adequate at that time since the bridge was used only



Profile of the Kansas River Bridge

old bridge, a preponderance of refrigerator car movements calls for the use of a water tight floor and the design of this was complicated seriously by the necessity for shallow construction on account of the unfortunate relation of high water in the river to the elevation of the tracks on the lower level. Because there are about 180 train movements over this

for transfer and switching traffic. It consists of two pin connected Petit through truss spans 300 ft. long with an 80-ft. through girder span and 50 ft. of pile trestle on the west end. A timber ballast floor on a suspended floor system carries the track. Of the substructure for the old bridge, the two piers and the south abutment are used to support the

new superstructure. These had been built to provide ultimately for double track. The two piers were carried to a cemented boulder formation by the pneumatic process and the abutment is supported on a pile foundation. The decision to make use of the old masonry was based on a careful study which took into account the heavier loading to be obtained from the double-deck structure. It was necessary



New 132-ft. Span in Foreground with Old 80-ft. Girder Span Still in Place

to provide a new west abutment which is carried on a pile foundation.

In the new structure the old 300-ft. spans are replaced by spans of the same length consisting of pin connected Baltimore trusses of sufficient height to provide a through structure for the traffic on both levels. The girder span is replaced by a 132-ft. riveted Warren truss span of such a height that it is a through structure for the lower level tracks and a deck span for the upper level.

Because of the heavy loading the truss members in the two 300-ft. spans assumed proportions ordinarily to be found in spans of much greater length. Each of the spans weighs nearly 2,300 tons. The bottom chord and one set of the main diagonals are eye-bars of nickel steel with a required ultimate strength of 95,000 to 110,000 lb. per sq. in. and an elastic limit of 55,000 lb. All other web members are of a box- or I-sections made of the ordinary structural grade of steel. The top chords and the end posts are of an H-section similar to that used in the main members of the Metropolis bridge. They have two heavy girder sections for the sides connected by a diaphragm in the plane of the chords, and double plate lacing and channel battens on the top and bottom faces. The material in top chords and end posts is a high carbon steel similar to that used in the ribs of the Hell Gate arch and has an ultimate strength of 66,000 to 76,000 lb. per sq. in. and an elastic limit of 38,000 lb. per sq. in.

Ballast floors are provided for both decks. The thickness of the lower floor from top of rail to under clearance was limited to 4 ft. 10 7/8 in., while that of the upper floor, which was not so limited, has a thickness of 7 ft. 4 in. However, the same general scheme of floor framing was used in each case. The main floor beams, spanning from truss to truss at the panel points, carry girders spanning longitudinally just inside the trusses on each side. These in turn carry intermediate floor beams 5 ft. center to center on which are supported the timbers of the ballast flooring. In the upper floor the depth is such that this system entails no departure from ordinary structural practice. The main floor beams are at-

tached to the posts of the trusses with the usual bracket connections, lateral stiffness of the spans being obtained by these connections and heavy portal and sway bracing above the upper roadway.

In the lower deck the main floor beams could be made only 2 ft. 6 1/2 in. deep, back to back of angles, making it necessary to construct them as box girders. For this reason the longitudinal girders, which are 5 ft. 3 1/2 in. deep could not be framed into them to make the connection, so it was necessary to notch the ends of the longitudinal girders to rest on the top flanges of the main floor beam. A departure from usual practice in the connection of the lower floor beams to the trusses was devised to avoid bending in the posts as a consequence of the material deflection in floor beams of so shallow a depth. The bottoms of the posts were



New 300-ft. Span Surrounding Old Span, Showing Also Gantry Traveler and a Derrick Car on Temporary Track

extended below the main truss pins and were supported with a steel casting containing a pin hole at right angles to the floor beam, thus affording a pin connection between the post and floor beam and thereby making the truss members independent of flexure in the floor system.

Erection Under Difficulty

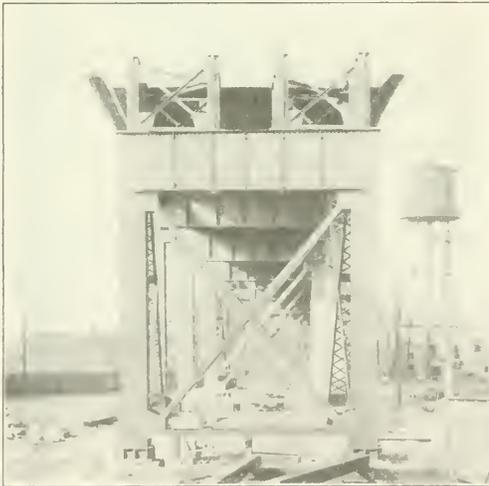
The greater width and height of the new spans naturally suggested their erection around the old bridge, which was to be remained in service. The old superstructure had been erected on the south side of the substructure with a view to future renewal of the structure by a double track bridge. The erection plan adopted for the new structure in consequence entailed the shifting of the old superstructure from its original central location in which its axis would coincide with the axis of the new bridge. This measure, however, would not

solve the problem of the erection of the new floor system for the lower deck, since the grade for the old track and that for the tracks on the lower level of the new bridge are identical. The piecemeal removal of the old floor system and its replacement by the new floor would be a slow and cumbersome process that would result in serious interference with the traffic. Another obstacle was the impracticability of driving piles for falsework in the space between the trusses of the old bridge since this would involve a disturbance of the ballast floor and interference with the heavy train movements.

The solution of these difficulties was attained by raising the old spans 27 in. so that the floor system for the new spans could be installed completely underneath the old floor before disturbing the old structure in any way. This plan has the further advantage that the old spans can be supported from the new and thus obviate the need of any falsework directly under the old span.

The erection method and falsework scheme are shown in several of the photographs. The space between the trusses of the new span was sufficient to permit the placing of the legs of the gantry traveler between the new and old trusses. The gantry is supported on rails carried on the top flanges of the two lines of longitudinal girders of the lower floor system.

The falsework consists of two bents of five piles each driven under each panel point of each truss of the new bridge. These bents are long enough to afford ample support for the new trusses, the girders carrying the gantry and also a temporary track outside the trusses on each side car-



Typical Sectional View of the Viaduct

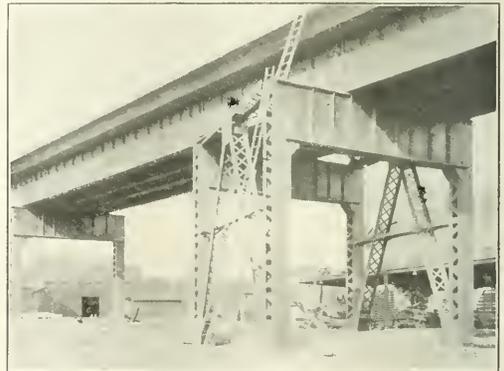
ried on girders intended for use in the upper floor system. These temporary tracks are used to deliver all structural materials to the work on flat cars and to support the derrick cars in erecting the lower floor system.

The method of erection with the gantry may be seen from the photograph. The two main cross beams at the top of the gantry have a material overhang beyond the trusses on each side and are fitted with rails on which a pair of heavy longitudinal beams spanning between the cross members may be rolled transversely. The longitudinal beams are equipped with heavy tackle for lifting and are shifted transversely as found necessary for the raising of members from cars on the tracks alongside and for placing them in position in the trusses.

One of the photographs shows an end view of the partly completed viaduct and indicates the character of the construction. The bents consist of two vertical columns generally 20 ft. center to center, connected by a cross girder, a bottom tie and cross bracing. These carry four lines of longitudinal girders covered by a reinforced concrete slab for ballasted tracks. The columns are of a built up H-section and the cross girders of a box section, the two webs being approximately in the planes of the two sides of the columns to facilitate web splices. The flange angles of the girders also extend beyond the webs for riveted connections to the column.

The Viaduct

Longitudinal stiffness of the structure is provided at intervals by bracing two bents to form a tower. Where this could not be done on account of interference with surface tracks, streets, etc., masonry piers were introduced consisting



Special Tower Bracing Was Used Over a Team Yard

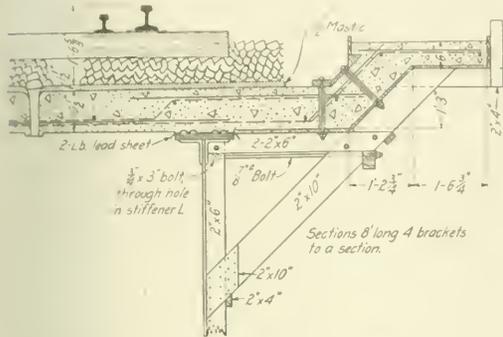
either of solid shafts or two pedestals connected by an arch. Another variation from the standard construction was used where the viaduct crosses a freight house and team yard at Baird street. To provide clear passage for tracks and roadways, the transverse bracing was omitted and the longitudinal bracing for the towers was arranged to form an "A" rather than an "X" to give a minimum interference.

The viaduct columns are carried on creosoted pile foundations with pedestals varying from 6 ft. square to 12 ft. square depending on the load and the allowable pile bearing as determined by pile driving records. The concrete deck is 10½ in. thick, and cantilevers out on each side for a walk with outside edges 9 ft. 3 in. from the center line of track. The slab was built in place to give monolithic construction but has a longitudinal joint on the center line between the tracks and a transverse joint at intervals of about 100 ft. It is covered with waterproofing consisting of four-ply felt and one ply of cotton drill laid down with asphalt and covered with a one-inch asphalt mastic. The slab is pitched from the walk and from a ridge at the center line between tracks to drain holes at intervals of 5 ft. on the center lines of track. One interesting feature in connection with this floor slab is the protection given to the top flanges of the girder where covered by the slab. This surface is treated with a coat of refined coal tar and then covered with a sheet of lead weighing 2 lb. per sq. ft. which is carefully pressed down over the rivet heads. The concreting of the slabs was materially cheapened by the use of an ingenious form system suspended from the steel work as shown in a drawing.

On the Missouri Pacific branch of the viaduct three truss spans, 147 ft., 117 ft. and 137 ft. in length respectively

span a yard of the Union Pacific. These are riveted Pratt truss spans of the usual construction except that a floor of special construction is used on the northernmost span on account of the reduced headroom resulting from the descending grade of the tracks.

The embankments used in the three approaches to the viaduct contain 290,000 cu. yd. of material and were given two different forms according to the local conditions. Where space was available fills were built, having a 1 1/4 to 1 slope on each side with toe walls where the fill would encroach on streets or private property. These retaining walls are of a gravity broken back type which has been used extensively on Kansas City Terminal work. Where but a limited amount of space could be used for the approach embankment, particularly where located between



Part Section of Viaduct Floor Slab Showing Form for Overhang

adjoining tracks, the embankment is supported between reinforced concrete walls 2 ft. thick, spaced 30 ft. apart and tied together at intervals of 14 to 16 ft. by concrete ties. These concrete ties were used to support the construction track required to place the filling material. The fill is all clay and will be planted with alfalfa on all exposed slopes.

Special mention is due the conduct of the engineering work for this structure. In the face of a rapidly advancing steel market it became imperative to award contracts for the structural steel for the entire viaduct, including the Kansas river bridge, as soon as the stage of work on the design, would reasonably allow, and was followed with the preparation of detail plans for the bridge companies at the rate of about 3,000 tons a month. This program entailed the perfection of an efficient organization and conduct of the work along systematic lines. Special measures were taken to insure accuracy of the field work. A standardized type was procured from Washington and careful checks were made between the tapes used in the field and those used in the actual fabrication of the members.

This work was under the direction of J. V. Hanna, chief engineer, and G. E. Tebbetts, bridge engineer of the Kansas City Terminal. The general contractor for the entire project is the Arkansas Bridge Company of Kansas City, Mo. The steel work was fabricated by the American Bridge Company at the Gary plant, and is being erected by the Kelly Atkinson Construction Company, Chicago.

THE AUSTRIAN LOCOMOTIVE INDUSTRY IN 1917 delivered 398 locomotives and 326 tenders for Austrian State and private railways, but exported nothing. The car works delivered about 14,000 trucks and coaches to the state and private railways and to private industry.—*Commerce Reports*

Rules for Handling Freight for the War Department

NEW INSTRUCTIONS AND REGULATIONS governing the shipment of freight for account of the War Department, which take the place of the old orders of reference orders which were issued by the various government departments and which resulted in so much confusion, first being issued by the Car Service Section of the Railroad Administration and by H. M. Adams, director of inland transportation of the war department.

The instructions by W. C. Kendall, manager of the Car Service section, were issued in Circular No. C. S. 1 and order that beginning March 1 the shipment of freight for account of the War Department be handled only in accordance with the regulations of the division of inland transportation.

The director of inland transportation has issued Order No. 1, general rules and regulations for the shipment of contractors and bureaus in shipping freight for the use of the war department, and Order No. 2, regulations for the shipment of freight for particular destinations and provisions for a system of transportation orders.

The circular of the Car Service Section provides that it will be noted that under the provisions of Order No. 1, all negotiations conducted by the war department with respect to embargoes, special movement, failure to furnish cars, tracing and delivery of cars, etc., will be conducted by the Division of Inland Transportation with carriers through the Car Service Section.

Carriers affected by the restrictions in Order No. 2, section 1, or reissues thereof, should cover these restrictions by embargo, or by special instructions to agents and others interested, on their respective lines.

It will not be necessary to transmit such embargoes to zone chairmen or to connecting lines.

Carriers laying embargoes against points not designated in Order No. 2, or against points included in subsequent orders from the Director of Inland Transportation, will exempt freight for account of the war department, in accordance with Circular No. C. S. 1, dated February 11, 1918, or reissues thereof.

Where such general exemption is not made, carriers must honor all Transportation orders issued by the Director of Inland Transportation, except when the freight covered by such orders is of a perishable nature, and the route of destination is impassable by reason of physical obstructions.

Agents must in all cases endorse original and all copies of bills of lading, and waybills (including card bills if issued) with a reference to the transportation order in the following form:

TRANSPORTATION ORDER
No. U. S. W. D.

Agents honoring transportation orders will receive the surrender of such orders when presented, filing thereon with station copies of bills of lading.

In case of emergency, transportation orders may be issued by telegraph or the signature of the Director of Inland Transportation. These telegraphic transportation orders will be addressed to the shipper or railroad agent at point of origin and will give the number of the order with all necessary details. They will be confirmed as usual. Such telegraphic orders should be honored and the shipments held by the agent until the supporting orders are received.

Failure of the shipper to make use of transportation orders after they have been presented to carriers agent or failure to comply with the instructions governing their use, should be covered by full report to the Car Service Section.

In the event that connecting carriers refuse to accept ship-

ments moving under transportation orders, immediate report should be made to the car service section, giving full information, including order number, point of origin, destination, and the nature of the shipment.

These instructions supersede all previous instructions with respect to the handling of freight for use of the war department.

Report on Shepherdsville Collision

THE INTERSTATE COMMERCE COMMISSION has issued a report, dated January 28, and signed by H. W. Belnap, chief of the Bureau of Safety, giving the cause and nature of the rear collision of passenger trains on the Louisville & Nashville at Shepherdsville, Ky., on December 20, when 45 passengers and two employees were killed and 52 passengers were injured. This collision was reported in our issues of December 28, page 1,185; January 4, page 88, January 11, page 137, and January 18, page 181.

This report gives the facts substantially as they have been reported, but with a number of additional details. It is estimated that train No. 7, at the moment of collision, was running at 25 miles an hour. The force of the collision drove the standing train (No. 41) forward a distance of 800 ft. The conductor and the flagman of this train, who were killed, were standing on the front platform of the rear car. The line approaching Shepherdsville from the north is level for a distance of 2,100 ft. and is straight for 5,400 ft. In this distance there is nothing to obstruct the view of the engineman of an approaching train. The hour was about 5:30 p. m., it was dark, but the weather was clear. Shepherdsville station is on the west side of the tracks and the passing siding, on which the local train was to be set back, extends 400 ft. south of the station and about 2,500 ft. north. This track is between the two main tracks. The train-order signal is a semaphore, operating in two positions in the lower right-hand quadrant. The station agent and others testified that the red lights on the rear of train 41 were burning brightly. Testimony as to the speed of the express train, as to whether smoke, or fog or anything obscured the lights, whether or not train No. 7 whistled and as to how long No. 41 had been at the station, is somewhat confusing and the report makes no attempt to clear up all of the discrepancies.

Engineman Wolfenberger, of No. 7, said that it did not occur to him that not getting the signal at Shepherdsville was due to train 41 being close ahead, although he knew that he left Louisville 18 minutes behind it; he had been losing time himself. The fireman was on his seat but did not say anything to Wolfenberger about the signal.

The report makes no mention of the statement, reported to have been made by Wolfenberger at the investigation which was held by the Kentucky State Railroad Commission, to the effect that operators often change the train order signal, from stop to proceed, before the engineman calls for it, and that consequently enginemen were accustomed to accept a stationary signal (contrary to the rule requiring them to see the signal change from stop to proceed).

The fireman of train 7 said that all of the train order signals encountered between Louisville and Shepherdsville were given promptly. He had no conversation with the engineman about the position of the signal at Shepherdsville as they were approaching it; the rules do not require the engineman and fireman to call signals to one another.

The conclusion of the inspector is that the direct cause of the collision was the failure of the conductor and flagman of train 41 properly to protect their train. "The action of these two experienced employees in failing to protect their train is inexcusable." (According to the officers of

the road, an important element in the negligence of these men was their failure to use fuses or torpedoes when losing time; but the present report does not say, in detail, in what the failure consisted.) Engineman Wolfenberger's neglect is called a "material contributing cause"; and to the officers of the road is attributed "a large measure of responsibility"; this for "failure to provide proper means of spacing trains in this territory." Continuing, the report says:

"Between South Louisville and Lebanon Junction, which territory embraces the scene of this accident, there are 44 scheduled trains in both directions daily. Traffic of such density can not be safely handled under the rules and practices of the time-interval system. For the prevention of similar accidents the operating officers should take immediate steps to provide an adequate block system.

"Rules 221a and 221d which assume to provide means for the proper spacing of trains in this territory, are grossly inadequate, if not positively unworkable. Rule 221a requires that when an approaching train has reached a point 600 feet from the signal, 'or nearer if the signal can not be seen that far,' the engineman will call for the signal, and if it is not changed to the proceed position at once the train must be brought to a stop before the signal is reached, as required by rule 221d [which requires conductors and enginemen when approaching train-order offices to have their trains under control and not assume that the signal will be changed.]

"Rules 221a and 221d establish a maximum braking distance of 600 ft., which is entirely inadequate for the safe movement of high-speed passenger trains. The schedule rate of speed of train No. 7 between Brooks and Shepherdsville is 50 miles per hour, and had the signal been in its normal position the engineman of train No. 7 could not have stopped short of the signal without having reduced speed very materially at a point considerably farther away than 600 ft. In short, compliance with this rule means that, irrespective of their schedules, trains must approach all open train-order offices prepared to stop within a distance of 600 ft. . . .

"The Louisville & Nashville Railroad in its annual reports to the Interstate Commerce Commission has repeatedly stated that this section of the road from Louisville to Bardstown Junction was operated under manual-block rules. It is clearly disclosed by this investigation, however, that such protection is not afforded, and furthermore it is evident that such protection was not intended to be given. Several witnesses stated that it was the practice to space trains 10 minutes apart. This is provided for in rule 91 of the general rules for movement of trains, and there is no rule among those providing for train movement under the manual block which permits this method of operating trains. It is therefore apparent that the manual block system is not in force on this portion of road, notwithstanding the Louisville & Nashville Railroad Company's reports to that effect.

"During the past five years about 700 miles of the Louisville & Nashville have been protected by automatic block signals, most of which mileage is on single-track road. According to its reports for 1916, 132 miles of road are worked under the manual block system. With 4,700 miles of road operated, this gives about 20 per cent of its passenger mileage protected by some form of space interval, and of its principal main lines about 45 per cent is so protected. While this shows commendable progress, the fact remains that there are still long sections of its main lines carrying heavy traffic without adequate protection. . . ."

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Causes of the Decline in Railroad Credit

A Letter to the Interstate Commerce Commission by the
Controller of the Currency

THE FOLLOWING LETTER, outlining the history of the conditions which caused the decline in railroad credit and a serious shrinkage in the market prices of railroad securities during 1917, was addressed to the Interstate Commerce Commission on November 1, by John Skelton Williams, controller of the currency and a former railroad executive, who is now also director of the divisions of finance and of purchases of the United States railroad administration. The letter was written just before the opening of the hearings before the commission on the application of the eastern railroads for advances in freight rates and gives the reasons which, in the opinion of the writer, demonstrated the insufficiency of the existing level of rates. It also gives an interesting view of the financial condition of the railroads just before the decision was reached that they should be taken over by the government. Mr. Williams said:

The official reports made to this office by the national banks of the United States show that these banks are the holders of about \$500,000,000 of railroad bonds, largely of high character, selected with care and discrimination during a period of years. In addition to these large holdings the state banks, savings banks and trust companies hold approximately \$1,500,000,000 additional of railroad securities.

Demoralization of Credit

These investments the banks purchased in the belief that they would maintain the prices at which they were purchased, or grow more valuable from year to year, with the growth and development of the country's business and of the corporations issuing them. A crisis, however, has arisen. The net earnings of many of our most important railroad systems, as well as of the less important lines, despite the greater volume of business, show a shrinkage which not only impairs dividends, but is threatening the ability of many railroads to meet their interest charges, and their solvency. There has been a serious collapse in the market values of railway securities and such a demoralization of credit that the sale of new securities to provide fresh capital or to meet maturing bonds has been shut off, and even temporary financing is now only being obtained at rates which are costly if not ruinous.

The impairment of confidence and consequent shrinkage in securities owned by the national banks had become so pronounced that on October 15, 1917, as controller of the currency I gave to the press a statement which said, in part:

"In view of all conditions, the controller of the currency has instructed national bank examiners that they need not at this time require national banks holding high grade bonds of unquestioned intrinsic value and merit to charge such investments down to present abnormal figures; but an intelligent and conservative discretion will be exercised as to the prices at which national banks can safely and reasonably be permitted to carry such high class securities, and as to what proportion of the depreciation should be charged off in any six months' period."

In giving out that statement I did so in the confident belief that the credit and welfare of the railroads of this country would be safeguarded and protected and that they would be permitted to charge such rates for the transportation of freight and passengers as would, with honest and efficient

management, enable them to meet their expenses and yield a fair return upon the billions of dollars of capital which has been invested in them, and I am, of course, still confident that this will be done.

This office has received so many earnest requests asking the controller of the currency, in behalf of the national banks of the country, to make to your honorable commission representations as to the serious consequences which may ensue if relief is not promptly afforded the railroads in the shape of increased rates, to enable the roads to meet the unprecedented increases in the cost of materials and labor and yet maintain their credit, that I ask the liberty of submitting to you this memorandum and brief summing-up of the situation as I see it at this time, in the light of an experience of about 20 years as a railway executive (as well as banker) before retiring entirely from these activities and divesting myself of all financial interest in railroads and in banks, as I did, to accept public office more than four years ago.

As an illustration of the communications which have come to me as controller of the currency from banks which are under the supervision of this office, I beg leave to quote the following extract received under date of October 29, 1917, from the president of the First National Bank of _____, who says in part:

"Why does not the controller appear before the Interstate Commerce Commission and make an appeal for the banks of which he is supposed to be the guardian and protector? With millions of our funds invested in railroad securities, it would seem this would be his duty. . . . With the farmers granted over double prices, the coal, steel and copper double and more, the railroads are certainly entitled to a paltry 15 per cent."

With this apology I trust that I may be pardoned for respectfully submitting to your honorable commission this communication, based, as above stated, upon my own knowledge and observation of past and present conditions.

From the close of the Civil War up to the beginning of the present century the principal media for investment of the surplus earnings of the American people, in the way of public securities of any kind, were the bonds and shares of our railroad corporations. The railroad mileage of the country grew from 52,922 miles in 1870 to 192,940 miles in 1900, an increase of nearly four-fold; this new construction was paid for partly from the savings of our own people and partly from capital sent in from Europe.

Confidence in railway securities as investments was rudely shaken between 1892 and 1897, during which years 213 railroads having an aggregate mileage of 56,407 miles failed and passed into the hands of receivers. The total railway mileage of the country in 1892 was 171,567 miles—in 1897, 183,284 miles, so that the companies which became bankrupt in those five years represented nearly one-third of the entire railway mileage of the country. This is exclusive of many thousands of miles which had already become insolvent before 1892 and were in receivers' hands at the beginning of that five year period.

The records show that the persistent and steady decline in railroad freight rates which had been going on through several decades culminated in 1898-9, but this shrinkage did not cease until the solvency of over one-half of the entire railroad mileage of the country, which had been built up to that time, had been destroyed.

The average rate which in 1888 was 10.01 mills per ton

per mile, declined in 1890 to 9.41 mills. By 1895 it had fallen to 9.39 mills, and the low point was reached in the fiscal year 1898-9, when the average rate per ton per mile was only 7.24 mills. But although the shippers got this reduction of 25 per cent in the freight rate and also a reduction in the same period of 18 per cent in the average passenger mile rate, along with these reductions came the bankruptcy of companies operating tens of thousands of miles of railroad lines. In those years, it is fair to point out, the Interstate Commerce Commission did not possess the control over railroad rates which has since then been conferred upon it by Congress. With the powers now exercised by the commission such disastrous rate wars as were sometimes waged in the past by rival roads to ruin one another and which brought much demoralization, we are happy to realize, are no longer possible.

The Trend of Railway Rates

It is a long lane that has no turning. Finally the turn came, and a slight upward trend in ton-mile rates began in 1899. Contemporaneously with this upward movement came the revival in the general business of the country.

In 1901 the average rate per ton mile was 7.50 mills, and these rates did not again go below 7.48 mills until 1912, when the downward dip again manifested itself and an average rate of 7.41 mills was established. In 1913 the

out in those years the successful reorganizations of many of the important trunk lines which had passed through receiverships in the five years prior to 1898. These reorganized properties included such well known systems as the Atchison, Topeka & Santa Fe, the Baltimore & Ohio, the Union Pacific, the Norfolk & Western, and many others.

Between 1898 and 1907, 42,807 miles of new railroads were added to the country's mileage—but this was 13,596 miles less than the mileage which had become bankrupt in the five years prior to 1898.

The financial panic of 1907 was followed by several years of more or less uncertainty and there were ups and downs in business without any great variations in railroad rates, until the outbreak of the European War in 1914. The swollen business of the country incident to the European war in 1916 brought large earnings to the railroads, which reached their maximum, both as to gross and net, in that year.

The Decline in Security Prices

The year 1917 has been a period of unprecedented advances in the prices of products and commodities of all kinds accompanied by heavy declines in the market values of bonds and stocks generally, but especially of railway securities. Some moderate advances in rates have been granted to railroads in some sections in the past 12 months,

TABLE SHOWING THE SHRINKAGE IN THE SHARES OF THE COMMON CAPITAL FROM THE HIGH PRICES IN 1906 OR STOCK OF THE PARENT COMPANIES OF TWELVE LEADING RAILROAD SYSTEMS LATER TO THE PRESENT LOW LEVEL.

	Outstanding capital stock (common)	Highest price since 1906	Value on basis of present capitalization and highest prices reached	Recent lowest sales	Value on basis of present low prices	Percentage* of shrinkage to capital stock	Shrinkage shown by multiplying given decline by present capitalization
Chic. Mil. & St. Paul	\$117,000,000	199 5/8	\$233,561,000	43	\$50,310,000	156 5/8	\$183,251,000
Baltimore & Ohio	152,000,000	122 1/2	185,820,000	50	76,070,000	72 1/2	109,820,000
Delaware & Hudson	42,000,000	227 1/2	95,550,000	95	39,900,000	132 1/2	55,650,000
Erie	112,000,000	50 7/8	56,980,000	15 1/2	16,940,000	35 1/2	40,040,000
Illinois Central	109,000,000	172	187,480,000	97 1/2	106,003,000	74 1/2	\$1,477,000
N. Y. Cent. & Hudson River	249,000,000	147	366,030,000	68	169,320,000	79	196,710,000
N. Y. N. H. & Hartford	157,600,000	204 3/8	321,953,000	21 1/2	33,755,000	183 1/2	287,898,000
Norfolk & Western	118,000,000	147 1/2	173,608,000	101	119,180,000	46 1/2	54,428,000
Pennsylvania	499,000,000	151 1/2	754,738,000	95 1/2	476,545,000	55 1/2	278,193,000
Southern	120,000,000	42 7/8	51,450,000	23	27,600,000	19 1/2	23,850,000
Southern Pacific	272,000,000	138 3/4	376,040,000	82	223,040,000	56 1/2	153,000,000
Union Pacific	222,000,000	219	466,180,000	114 1/2	253,635,000	104 1/2	232,545,000
Total	\$2,169,000,000		\$3,289,090,000		\$1,592,228,000	78.23	\$1,696,862,000

Note: Percentage of shrinkage to value on basis of present capitalization and highest prices reached 51.59 per cent.

*What is meant by this is evidently the difference between highest price indicated from the figure in the second column to get the figure in the sixth column and lowest price. In other words the figure in the fourth column is subtracted from the figure in the second column to get the figure in the sixth column.—[EDITOR.]

rate declined still further to 7.29, with a general business depression. In 1914 there was in the first half of the year a slight improvement in general business and the average rate moved slightly up to 7.33 mills. In 1915 the average rate was 7.32 mills. This rate of 7.32 mills was very close to the minimum rate established in 1898-9 of 7.24 mills, when over one-third of our railroad mileage had been turned over to receivers. At that time (1898-9), however, the cost of materials and labor was very much less than in recent years. Now, on top of unsatisfactory and inadequate freight rates, come enormous increases in the cost of both materials and wages, and the situation has again become perilous.

The following figures show the comparative stability of railroad rates after the minimum of 7.24 mills had been reached in 1899, and a 7.50 mill rate established in the fiscal year 1900-1:

1901..... 7.50 mills	1905..... 7.66 mills
1902..... 7.57 mills	1906..... 7.48 mills
1903..... 7.63 mills	1907..... 7.59 mills
1904..... 7.80 mills	1908..... 7.54 mills

With the rapid development of the country and prosperous and tremendously expanding business of those years, there was a pronounced revival of interest in railway securities, which rose to a very high level, and there were carried

it is true, but the advances thus far allowed do not begin to offset the enormous increases which have taken place in the prices of materials and in wages.

The apprehension and fear that the railroads of the country may not be allowed to charge rates which will adequately offset the heavy increases in wages and in all materials which they use in operation, is in a large measure responsible for the shrinkage which has taken place in the railway security market in the past year.

To the inability of the railroads during the past 10 years to charge rates commensurate with the increases which have taken place during this period in wages and other operating costs is attributable a portion, but not the whole, of the enormous shrinkages in railroad values which have taken place in this longer period.

The table shows vividly the unprecedented declines in the market value of their shares which have been sustained by 12 of the leading railroad systems of the country from the highest prices reached in 1905 and later to the low prices prevailing at this time. These 12 systems include railroads in every portion of the country, north, east, south and west, and their gross earnings amounted for the year 1916 approximately 1,400 million dollars, or about 40 per cent of the total earnings of all the railroads of the coun-

try. Their mileage represents over 80,000 miles, or more than 50 per cent of the total railroad mileage of the United States.

The table only gives the declines that are shown in the market value of the shares of common stock of the parent companies of the 12 systems, and does not express the great losses that have been experienced in the preferred shares and in the bonds of the parent companies, or in the stocks or the bonds of the many subsidiary or auxiliary companies which are embraced in the mileage of those systems. The shrinkage in these has also been enormous.

From this table it is shown that the capital stock of these parent companies was.....	2,169,950,000
The market value of these stocks at the respective high points for the period named aggregated.....	3,280,000,000
The market value at the recent low levels of prices is only.....	1,771,125,000
The result that there has been a total shrinkage in values of..... per cent, the total shrinkage in these 12 stocks being.....	1,696,825,000

This collapse in prices has wiped out, in this brief period, values, in the aggregate, nearly as great as the entire capital and surplus of all the national banks of the United States. Such a destruction or elimination of values, existing or supposed to exist, is well calculated to produce a profound and far reaching effect. This vast loss or shrinkage also represented a sum greater than the total net operating income of all the railroads of the United States for any two years combined prior to 1916.

Besides the direct losses inflicted upon individual investors and holders of railway bonds and shares, there must be taken into account the indirect losses suffered by the men and women who are stockholders in corporations of many kinds which hold railway securities among their investments, such as the insurance companies (both mutual and joint stock), savings banks, trust companies, national and state banks.

The total outstanding capitalization of the railroad corporations of this country at this time, which is now imperilled (including stocks, bonds and other obligations) is close to \$18,000,000,000.

It is noteworthy that while railroad shares are now in many instances at the lowest prices at which they have ever sold, the shares of many industrial corporations are still selling at prices above the highest quotations which prevailed for them at any time prior to the outbreak of the European war.

The Necessity for Relief

Unless the roads are now enabled to secure substantial relief through an increase in rates, we will probably have a repetition of the experiences of 1892-7, when hundreds of railroad companies, operating about a third of the entire mileage of the country, including trunk lines and independent roads, were handed over, insolvent, to the management of receivers. The ton-mile rate is now close to the minimum rate of that period, although the roads are now compelled to pay from 50 per cent to 150 per cent more for wages and salaries, and for every material and article used by them in their operations. The enormously increased carrying capacity of the roads per car and per train, and efficient and scientific methods of management do not begin, as it is easy to demonstrate, to be sufficient to offset the big increases in wages, in taxes, and in the prices of materials which the railroads are now obliged to meet.

Within the past few days the announcement has been made of a large increase (45 cents per ton) in the price of coal in a large section of the country, to enable operators to meet an increase in wages to the miners. Many roads which a year ago were paying from 55 cents to \$1.10 per ton for their coal, are now obliged to pay from \$2 to \$2.45 or more. An advance of a dollar a ton on the 200 million tons used by the railroads means an increased annual ex-

pense of 200 million dollars. The railroads could not increase in rates to enable them to meet the great increase in wages and materials, far more than do the operators who had already gotten an increase in the rates. They are allowed to charge for coal of over 50 per cent.

For the fiscal year 1916 the freight rate per ton per mile was unofficially reported to have been 7.14 cents. That is, in fact, lower than ever before recorded, the previous minimum having been reached in 1898 at 7.24 cents, and at the end of the calendar year 1916 we had 44,000 miles of railroad, embracing 70 railroad corporations covering every section of the country, administered by receivers. The mileage of these insolvent roads ranged from 1,400 miles up to the Rock Island System with 7,653 miles. Among the lines in the hands of receivers were nine systems of over 1,000 miles each, namely, the Boston & Maine, 2,963 miles; the Chicago & Eastern Illinois, 1,136 miles; the Chicago, Rock Island & Pacific, 7,653 miles; the International & Great Northern, 1,160 miles; the Missouri, Kansas & Texas, 3,576 miles; the Missouri Pacific, 3,931 miles; the St. Louis, Iron Mountain & Southern, 3,555 miles; the Tex. Mariette, 2,249 miles, and the Texas Pacific, 1,944 miles.

Your honorable commission in the past has shown itself to be the best friend of the railroads, as well as the protector of the public, and one cannot look back to the old days of cut-throat competition among the railroads, or remember the gross discriminations in rates in times past when the railroads used their rate-making and rate-cutting powers to make fortunes for favored shippers and to ruin others, without appreciating the enormous power for good which your commission has so beneficently exercised; nor should we fail to remember the time when certain leading trunk lines not only gave special low rates to certain monopolies or trusts, but also granted to those monopolies a bonus for every ton of freight hauled by them for the convenience of the 'trust.'

Fair-minded and well-informed men have admired the firmness with which this honorable commission has resisted the pressure so often brought to bear upon it in divers ways by selfish interests, and the force and clearness with which it has presented the sound reasons for the conclusions which it has reached. Right thinking men have also deplored the unjust and malicious criticisms that your honorable body has been required to endure in the just and fearless performance of its duties.

When the railroads shall have laid before you frankly the facts and figures to show to what extent the rates now in force are insufficient to maintain the work of the roads and to enable them to perform efficiently their public functions, under the present unusual and extraordinary conditions, we are entirely confident that the decision which you may reach will be one which your superior knowledge and painstaking study of the whole situation will amply justify; but I trust that I may be pardoned for expressing the earnest hope that this decision, whatever it may be, will come promptly.

The construction of new railroad lines has practically ceased, and existing roads have been forced to cut down largely on their improvement and betterment plans. Unless a way can be found now to reduce the prices of material and the cost of labor to a normal basis, and that for the present is hopeless, it seems clear, on the facts as they now appear, that revision and modification of the laws of rates to meet these new conditions has become imperative.

If this is not done I fear we may look forward to defaults in dividends and in interest and to another era of railroad receiverships, with all the evil destruction of credit and demoralization which that implies. If the relief required is granted, confidence in our railroad securities will be revived and a basis established for new financing and

for proceeding with new development and construction work which is now so greatly needed. The beneficent influence and effect of such action would be felt throughout our entire country.

Mr. Williams also discussed the subject in his recent annual report in part as follows:

Depression in Railway Securities Owned by Banks

For more than half a century most of the surplus earnings of the people of the United States available for the purchase of public securities have been invested in the bonds and shares of our transportation corporations, principally steam railroads and electric street railroads. The rates these corporations are allowed to charge for transportation of passengers and freight are closely limited—for steam railroads by both the Interstate Commerce Commission and the state corporation commissions of the respective states; for the street railroads by municipal and other local authorities. The average freight and passenger rates permitted to our railroads in the past year were about 30 per cent under the average rates of 30 years ago; while the wages paid, in many instances, have increased 100 per cent, and the cost of materials used for operation also has increased as to numerous articles 100 per cent, and in some cases much more than 100 per cent.

In the fiscal year ending June 30, 1916, the railroad corporations of the country, despite low rates, made the greatest earnings in their history, both gross and net, owing to the great increase in the volume of traffic. It became evident, however, that with the tremendous advances in wages and in the cost of materials between July, 1916, and December, 1917, the railroads would be unable hereafter to approximate the net earnings realized in the last year or two, without a material increase of the rates for transportation they are allowed to charge, and that many of them lacking such increase, or some other relief, would be unable to meet their fixed charges and maintain solvency. The uncertainty on the part of investors as to whether the Interstate Commerce Commission would grant the relief the figures seemed to show to be needed was asserted—and apparently with reason—to have caused heavy declines in the quoted prices of nearly all railroad securities. The shares of some of our most important transportation lines and "arteries of commerce" have recently fallen to the lowest level in the past quarter of a century.

There are faithful students of the situation who think it is as important rightfully to protect for honest investors the value of the securities of legitimate enterprises and to save them from ruin as to restrain the prices charged the people for what they eat and wear and use to keep their homes habitable. The investors and holders of securities representing the corporate business enterprises of the country may be few in numbers, comparatively, but the effect of disaster or ruin to them spreads widely and threatens the stability of our entire economic and financial system, impairs ability to absorb future loans needed by the government, and checks hope of development.

FUEL PRICES IN HOLLAND.—The Netherlands Government has fixed maximum prices for coal and coke, taking effect January 1, which are an advance on previous prices. They are stated in florins per hectoliter, but in American terms are equivalent to about \$22 a ton for anthracite, and \$17 for bituminous coal; coke, about \$10 a ton; coal briquets, about \$25 a ton. The distribution is carefully regulated by cards in specified quantities, varying with the size and nature of the residence or the place of business. The quantity allowed, especially to residences, is much smaller than the amount they consumed in peace times.—*Commerce Reports.*

Gigantic Construction Program of American Engineers in France*

THE STUPENDOUS CHARACTER of the construction program undertaken by the American railway engineers in France is outlined in a letter received by G. D. Hood, superintendent of telegraph of the Chicago, Rock Island & Pacific, from Mel Printz, master engineer, Third Engineers' First Battalion, National Army. The letter reads in part as follows:

"With the arrival of more and more material, and more men skilled in railway and terminal construction, the 'port to front' American railway is developing on a large scale, so that thousands of troops will be handled and an endless supply of ammunition and food kept going every day. American engineering genius is having its chance to show on French soil what it has done at home and, after the war, France will have a splendid American line to help reconstruction.

"Aside from the high officers of army headquarters, the transportation experts gathered by General Pershing from the army engineers and from civil life, few Americans have the slightest idea of the size of the project. Few, in fact, realize that the problem placed before the transportation service of the A. E. F. is so important that until it is solved and the solution put into concrete form—in rails and ties, in cars and locomotives, in wharves and warehouses—until that time the army itself, as an important factor on the battlefield, must remain imperceptible.

"There is a long stretch from the available harbors of the French coast to the American troops near the front. Somehow this territory must be traversed by speeding trains, carrying men and munitions, food and clothing, building materials, and all the other goods, animate or inanimate, which must be delivered from the transport harbors to the front. This must be done without disturbing for an instant, the traffic on the many French lines in military use.

"The main route from the harbor of —? to the American front has been in existence for years. It sufficed for handling the peace-time traffic of that part of France. When a small freighter arrived, it was unloaded, chiefly by hand. Its cargo was put ashore and ultimately removed in small lots by the tiny French freight cars. From there on, distribution inland was conducted much after the fashion of the 'local freight work' in America.

"This is a matter of technical construction not merely of yard tracks, but of wharves and warehouses, giant cranes, dredges, everything which would be needed, say, for the creation of a new harbor within the Jersey meadows leading to rail connection at Newark.

"At one of the chosen harbors, ten new wharves are to be built. On them are to be installed mechanical unloading devices—as an example, the army has ordered sixty of the largest loading cranes. The old terminal system suited to the light traffic of French peace times is to be swept out almost bodily. It was possible to run small cars in on direct stub tracks, receive them on turntables, slide to another stub track and send them out. The big American cars cannot be handled that way; so instead, the engineers will put in the loop system providing for a continuous flood of empty cars passing into the wharves system and out loaded.

"As cars will not be always immediately available, and as it is vital that the ships be unloaded and returned without delay to America, there are to be giant storage sheds for holding the freight until new rolling stock arrives. Every bit of this work is pioneer work, in a strange land, with

*The *Railway Age* expects to publish regularly letters from railwaymen overseas. If you receive a good letter from a railwayman who is now in France send it in for publication and let the *Railway Age* pass it around for all to enjoy.

labor almost non-existent. Even the great route must be enlarged with sidings. The prevalent French system of despatching at half hour intervals must be replaced with a quick service allowing in emergency, trains at five times that frequency. Here is employed the remarkable brain of the American train despatcher, brought to France by the U. S. government, for that purpose.

"And at the end of the express route are the light field railways within the area where it is not advisable to build permanent tracks. Here are the narrow-gage tracks and rolling stock and motive power built today, destroyed tomorrow, rebuilt the next day and working, as nearly as possible, all the time. And from this net-work must be built a still finer net-work of highways where motor trucks will take over the goods and distribute them to advanced points in the fighting area itself. This is no job of building park boulevards."

The 413th Telegraph Battalion

ONE OF THE MOST INTERESTING of the special military units which have been raised in this country for service abroad is the 413th Telegraph Battalion, Signal Corps, National Army. This battalion, which is composed entirely of volunteers and numbers 230 men, is an organization of railroad telegraphers. The work of drilling, training and thoroughly equipping the men has just been completed, and the battalion is now housed in its barracks in France ready for actual service in the field.

has been for seven years division operator of the Pennsylvania Railroad at New York and has been altogether 20 years in the company's service.

The duties of the battalion, which will probably take its members frequently into and near the front-line trenches, will be to construct and maintain telegraph lines of communication for the American Expeditionary forces abroad.

Major Baird's experience in the railroad service has particularly fitted him to direct and supervise work of this kind. When the New York passenger station of the Pennsylvania Railroad and the tubes under the Hudson and East rivers were opened, he was placed in charge of the construction and installation of all the telegraph and telephone lines and other similar electrical work required. He also built the overland lines and equipped ten interlocking block stations, and then organized the operating forces, consisting of train despatchers, train directors, telegraph operators, signalmen, etc., and remained in charge of them until he assumed his military command. Major Baird is a veteran of the Spanish War, in which he distinguished himself for bravery under fire.

The adjutant of the battalion is Lieutenant D. S. Bixler, who was a Junior at Princeton University when war was declared, and volunteered for service, entering the military training corps at Princeton. He was then transferred to the Officers' Reserve Training Corps at Fort Myer, Virginia, and after completing that course was transferred to the Army Transportation Section and assigned to the 41st Telegraph Battalion, Signal Corps. He is an employee of the Pennsylvania Railroad, and was learning the railroad business by working through various departments during



The Officers of the 413th Telegraph Battalion

From left to right: Capt. R. J. Hunter, superintendent; Lieut. D. S. Bixler, adjutant; Lieut. A. A. Lawton, medical officer; Capt. Charles G. Baird, commanding officer; Lieut. J. D. Jones, Lieut. J. G. Dennis, Lieut. E. K. McCloskey, Lieut. A. A. Lawrence, and Lieut. J. G. Dennis.

All but one of the officers, and a majority of the enlisted men, of the 413th Telegraph Battalion are employees of the Pennsylvania Railroad, furloughed from their usual duties to devote their specialized skill and experience to the military service of the nation as long as may be required. They consist of division operators, train despatchers, block signal operators, telegraph operators, electricians, linemen and other railroad men of allied occupations.

The battalion has been recruited in the last three months by its commanding officer, Major Charles G. Baird, who

vacations. He is the son of H. C. Bixler, superintendent of stations and transfers of the Pennsylvania Railroad.

The medical officer of the battalion is Dr. A. A. Lawton, who has been commissioned first lieutenant. He was a prominent physician in New York City.

The supply officer is Lieutenant R. G. Hunter, who was Major Baird's chief assistant in the construction and installation of the telegraph and telephone systems of the Pennsylvania Railroad's New York improvement.

Company "D" of the Battalion is in command of Captain

J. D. Jones, an electrical engineer who was division operator of the Pennsylvania Railroad at Williamsport, Pa., when he volunteered. Prior to that he had been assistant division operator at Pittsburgh.

Company "E" is commanded by Captain J. B. Crossley, who was train dispatcher on the New York, Philadelphia & Norfolk at Cape Charles, Va.

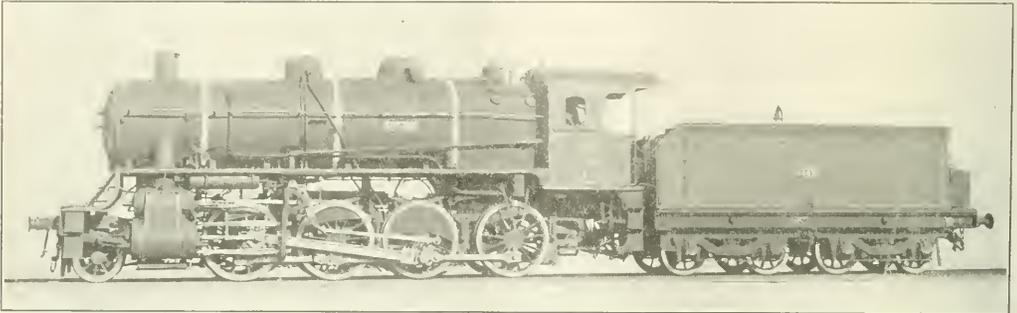
Lieutenant J. G. Dennis was a train dispatcher of the Pennsylvania Railroad at Pittsburgh. Lieutenant J. H. Pinter was a telegraph operator of the railroad at New York. Lieutenant E. S. McCormick was a train dispatcher on the Allegheny division. Lieutenant E. K. McCloskey was a telegraph operator in the railroad service at New York.

As a final step of preparation all of the members of the 413th Telegraph Battalion were furnished with comfort kits and other supplies by the Women's Division for War Re-

11,000 of its employees in the military and naval service of the United States. All of these have been furloughed from the railroad service, and upon their release from military duty will be returned to their old or equally good positions with the railroad.

Consolidation Type Locomotives for French Railways

TWO ORDERS OF CONSOLIDATION TYPE LOCOMOTIVES, aggregating 140 locomotives, have recently been completed by the American Locomotive Company for France. The Chemin de Fer du Midi received 40 and the French State Railways 100 locomotives, the design being the



The French State Railways Locomotive

lief of the Pennsylvania Railroad, an organization composed of wives and daughters of Pennsylvania Railroad employees who have made it their duty to look after the comfort of railroad men who have entered military service.

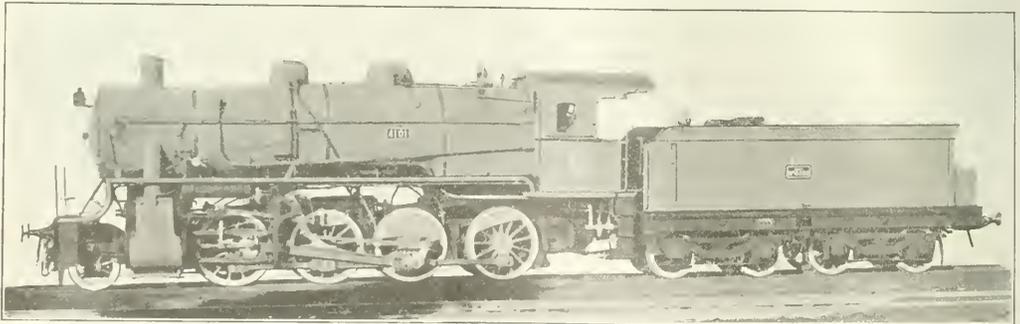
The medical officer of the battalion, Dr. Lawton, has been supplied with a complete hospital equipment, which was a gift to the battalion by the Pennsylvania Railroad.

A liberal supply of tobacco for all the boys in the battalion was delivered to the barracks shortly before de-

parture. This was a gift from the Pennsylvania Railroad Employees Tobacco Fund, an organization of employees of the railroad who are endeavoring to keep their former associates, who are now in the army and navy, supplied with "smokes."

same in both cases with the exception of the diameter of the driving wheels and some other minor differences. The engines are of basic American design modified in fittings and fixtures to suit French practice. They were designed by the builder, and each drawing was approved by a representative of the railway. The dimensions are in the metric system, the International system of screw threads, and the French-Westinghouse system of pipe threads.

The locomotives all have cylinders 23 in. by 26 in., and



Consolidation Type Locomotive for the Chemin de Fer du Midi

carry 170.6 lb. boiler pressure. Owing to the slight difference in the diameter of the drivers there is a difference of 1,000 lb. in the tractive effort of the two orders, the locomotives for the French State Railway developing a tractive effort of 35,200 lb., while those for the Midi develop 36,200 lb. While the boiler capacity is low in

The Pennsylvania Railroad System now has more than

carry 170.6 lb. boiler pressure. Owing to the slight difference in the diameter of the drivers there is a difference of 1,000 lb. in the tractive effort of the two orders, the locomotives for the French State Railway developing a tractive effort of 35,200 lb., while those for the Midi develop 36,200 lb. While the boiler capacity is low in

relation to the cylinder capacity, it compares very favorably with recently built locomotives of the same type for use on American railroads.

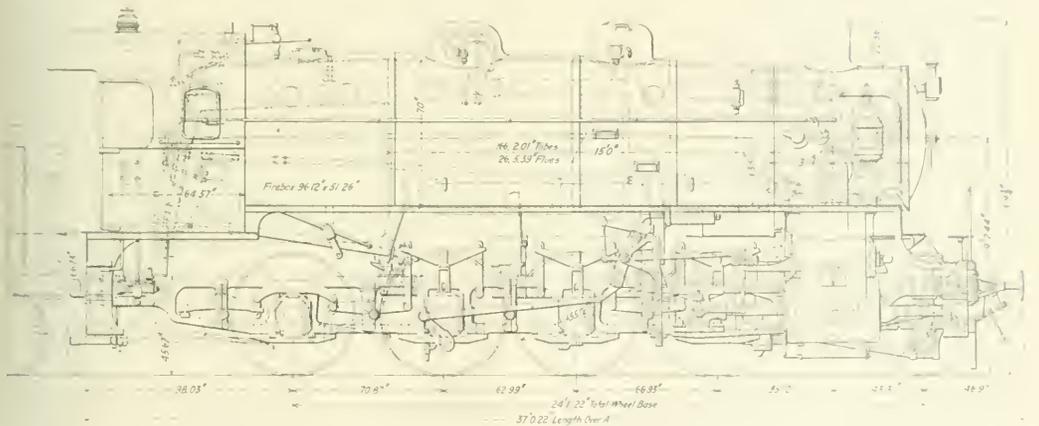
The dimensions of both boilers are identical. The design in general follows American practice, a good grate area being obtained by the use of a short, wide firebox. The firebox is fitted with a brick arch and the boiler includes a 20-element superheater. Handholes are used instead of washout plugs to give greater accessibility for washing out. A dump grate in the front of the firebox is operated from the cab by a screw, the firedoor opens inside as required by a French law, and the outside end of the blowoff cock has a special thread for connection to the fire hydrants of the city of Paris. In order to quickly free the stack of smoke, the blower is fitted with a quick-opening valve operated from both sides of the cab. Lagging on the boiler is omitted; the jacket is supported on a crinoline frame leaving an air space which acts as a non-conductor.

Among the points of general interest in the design, it will be noted that the locomotives are all controlled from the left side, contrary to American practice. The steam is distributed by 10 1/4-in. piston valves, which are controlled

Weight of boiler and tender	11,200 lb.	25,500 lb.
Weight on drivers	4,774 lb.	8,550 lb.
Weight on leading truck	1,000 lb.	
Weight of engine and tender in service	6,400 lb.	264,500 lb.
Wheel base, driving	16 ft. 9 in.	
Wheel base, total	24 ft. 11 1/4 in.	
Wheel base, engine and tender	3 ft. 3 1/2 in.	

Weight on drivers ÷ tractive effort	4.0	3.9
Total weight ÷ tractive effort	4.6	4.4
Tractive effort % diam drivers × equivalent heating surface*	748.6	748.5
Equivalent heating surface* ÷ grate surface		76.2
Firebox heating surface ÷ equivalent heating surface* per cent		5.3
Weight on drivers ÷ equivalent heating surface*	52.1	52.0
Total weight ÷ equivalent heating surface*	21.6	22.8
Volume both cylinders ÷ vol. cylinders	1.5 cu. ft.	
Equivalent heating surface* ÷ vol. cylinders	213	
Grate area ÷ vol. cylinders	17	

Kind of boiler	Simple
Driver and stack	24 ft. 11 1/4 in.
Kind of boiler	Simple
Diameter	11 1/4 in.
Greatest travel	6 in.
Outside lap	1 in.
Inside clearance	Line and line
Lead in full gear	1/2 in.



Elevation of Consolidation Type Locomotive for the Chemin de Fer du Midi

by the Walschaert valve gear. The cylinders are fitted with 16-pass valves operated by air cylinders, and with muffled cylinder cocks.

While the running gear in general is designed along the lines commonly followed in this country, the cross-balancing of the driving wheels is contrary to American practice for two-cylinder locomotives. The effect of this practice on the angularity of the counterbalances is clearly indicated in the illustrations.

A pneumatic sander is combined with a screw conveyor extending through the sandbox and operated from the cab.

All the engines have a variable exhaust operated from the cab by a screw which passes through one of the handrails, and the front ends are fitted with spark arresters. Other special types of equipment include French Westinghouse air brakes, French standard buffers and couplers, Roy buffers between engine and tender and a water brake.

The general dimensions and data for the two locomotives are given in the table:

	France	Spain	Midi
Cap	4 ft 8 1/2 in.	4 ft 8 1/2 in.	4 ft 8 1/2 in.
Series	Freight	Freight	Freight
Fuel	Bit. coal	Bit. coal	Bit. coal
Tender	31,500 lb.	31,500 lb.	36,600 lb.

Driving, diameter over tires	31 1/2 in.
Driving, thickness of tires	1 1/2 in.
Driving journals, diam. diameter	4 1/2 in.
Driving journals, diam. diameter and length	8 1/2 in. x 10 in.
Prime truck wheels, diameter	20 in.
Engine truck, journals	3 1/2 in. x 6 in.
Style	W
Working pressure	160 lb.
Outside diameter of cast iron	11 1/4 in.
Firebox, length and width	96 1/2 in. x 26 in.
Firebox, grate surface	1,000 sq. ft.
Firebox, water	100 cu. ft.
Tubes, number and diameter	20 x 2 in.
Flues, number and diameter	20 x 2 in.
Tubes and flues, total surface	1,000 sq. ft.
Heating surface, grate and tubes	1,000 sq. ft.
Heating surface, tubes	1,000 sq. ft.
Heating surface, tubes	1,000 sq. ft.
Superheater heating surface	1,000 sq. ft.
Grate area	1,000 sq. ft.
Weight	25,500 lb.
Weight on drivers	8,550 lb.
Weight on leading truck	1,000 lb.
Weight in service	264,500 lb.
Wheel base, driving	16 ft. 9 in.
Wheel base, total	24 ft. 11 1/4 in.
Wheel base, engine and tender	3 ft. 3 1/2 in.
Total capacity	1,000 gal.

* Figures are based on the following assumptions: 1. Heating surface of tubes and flues is based on the outside diameter of the tubes and flues. 2. Heating surface of grate is based on the grate area. 3. Heating surface of superheater is based on the heating surface of the tubes. 4. Heating surface of cylinders is based on the volume of the cylinders. 5. Heating surface of firebox is based on the heating surface of the tubes. 6. Heating surface of boiler is based on the heating surface of the tubes and flues. 7. Heating surface of locomotive is based on the heating surface of the tubes and flues. 8. Heating surface of engine is based on the heating surface of the tubes and flues. 9. Heating surface of tender is based on the heating surface of the tubes and flues. 10. Heating surface of train is based on the heating surface of the tubes and flues.

An Equation to Express Fair Return

By Wm. G. Raymond

Dean, College of Applied Science, University of Iowa,
Iowa City, Ia.

IN A LITTLE BOOK CALLED "What Is Fair" which has just been published, the author, who is also contributing this article, proposes an equation to express fair return to a public utility under continuous regulation from the beginning. In proposing the equation the author contents himself with saying that the application of the equation pays interest, which he calls the wage of money, on all capital whether represented by bonds or stock, and a profit rate for service that grows less as the business grows larger although the gross money profit grows with the growth of business; that the application of the expression is such that extension of business on a given capital is encouraged; that it indicates the profitableness of doing business with borrowed capital, and that public control must be exercised to see that operating costs are not inflated.

The equation is, Fair Return = $rI + 10rC\%$,

in which I is the invested capital, r the rate at which the corporation can borrow money, and C the annual operating expense, excluding fixed charges but including depreciation and all other items.

The author says that the coefficient and exponent of the second term of the second member may be subjects for discussion, but that he thinks the principle accorded with general commercial practice is sound.

No further discussion of the application of this equation is given and it is thought an illustration of its application under various conditions will be of interest. For this purpose Tables 1 and 2 herewith are presented. Table 1 shows the application of the formula for five different amounts of invested capital varying from \$10,000 to \$100,000,000 and for two ratios of invested capital to annual operating cost. The first, with the capital $\frac{1}{4}$ of the annual operating cost, represents in some degree the private competitive commercial enterprise in which capital is turned several times a year.

TABLE 1.—SHOWING THE APPLICATION OF THE FORMULA (FAIR RETURN = $rI + 10rC\%$) FOR TWO RATIOS OF CAPITAL TO ANNUAL OPERATING COSTS. WHEN r IS 5 PER CENT. (QUANTITIES CERTAIN TO FOUR SIGNIFICANT FIGURES ONLY.)

Capital	\$10,000	\$100,000	\$1,000,000	\$10,000,000	\$100,000,000
Return:					
Wage of money 0.05					
× Capital	500	5,000	50,000	500,000	5,000,000
When Capital Is One-Fourth of Annual Operating Cost					
Wage of service =					
profit	5,318	39,881	299,070	2,242,710	16,817,800
Total return	5,818	44,881	349,070	2,742,710	21,817,800
Per cent of capital.	58.18	44.88	34.91	27.43	21.82
When Capital Is Four Times Annual Operating Cost					
Wage of service =					
profit	470	3,525	26,434	198,231	1,486,525
Total return	970	8,525	76,434	698,231	6,486,525
Per cent of capital.	9.70	8.53	7.64	6.98	6.49

The second represents in some degree the case of the public utility, which generally has an invested capital much in excess of the annual operating costs. Indeed, in the case of electric lighting properties and rail properties it is probable that the capital is more often five times the annual operating cost than four times that cost which is assumed in the table. An interest rate of 5 per cent has been assumed for the table and it will be noted that in the application of the equation there is nothing to encourage the corporation to obtain its money at a low rate since the higher the rate it must pay, the higher its profit rate will be, and it may be that the two r 's of the two terms should be different; the first representing

what the company must pay, the second representing an acceptable going rate of interest. For the table the r 's are taken as the same and as 5 per cent.

The table gives the total return that would be allowed under this formula, and the rate of return on the invested capital, which in the case of the private competitive commercial enterprise varies from about 58 per cent where the capital is small (\$10,000) to about 22 per cent where the

TABLE 2.—SHOWING THE RATE PER CENT OF RETURN TO THE OWNER FOR THREE RATIOS OF BORROWED CAPITAL AND OWNER'S INVESTMENT; OTHER ASSUMPTIONS AS IN TABLE 1.

Total capital invested	Capital = $\frac{1}{4}$ annual operating cost			Capital = 4 times annual operating cost		
	Nothing borrowed	$\frac{1}{2}$ borrowed	$\frac{9}{10}$ borrowed	Nothing borrowed	$\frac{1}{2}$ borrowed	$\frac{9}{10}$ borrowed
\$10,000	58.18	111.56	536.8	9.70	14.40	52.00
100,000	44.88	84.76	403.8	8.55	12.05	40.25
1,000,000	34.91	64.81	304.1	7.64	10.28	31.43
10,000,000	27.43	49.85	229.3	6.98	8.96	24.82
100,000,000	21.82	38.64	173.2	6.49	7.97	19.87

capital is large (\$100,000,000). For the public utility the rate on the investment varies from 9.7 per cent where the capital is small (\$10,000) to 6½ per cent where the capital is large (\$100,000,000). Many thoroughly successful commercial enterprises are earning in accordance with the figures given and most public utilities would be entirely content to earn in accordance with the figures given for them if such earnings could be assured. And the earnings shown are certainly sufficiently less than those of the successful private commercial enterprises to satisfy the most conservative of those who feel that public utilities, being whole or partial monopolies, should be content with a less rate of return than is accorded private competitive business.

But a study of Table 2 is perhaps even more interesting in showing the effect of doing business with borrowed capital. Purely private business is more often done on the capital of the owner than is the public utility business which is more often done with borrowed capital, and this fact tends to equalize the earnings of the two classes of business, such equalization being considered proper by the author of the book. It will be noted that for the private business where nothing is borrowed, the rate of return on the invested capital is only slightly more than the rate of return on the owner's invested capital in the public utility business in that case where the owner borrows 9/10 of his capital.

It should be noted also that rate of return is not always as important as the gross sum earned. Many public utilities have been financed wholly on borrowed capital, the stock representing nothing but speculative value, and where this is the case the rate of return is infinite on the capital invested by the owner. If the stock could be said to have some value, that attaching to the foresight and enterprise in establishing the property, then the rate would be finite, and if this value might be said to be 1/9 of the money capital invested, so that the whole capital might be said to be 10/9 of the actual money invested, the owner's return would be as in the last column of Table 2, which compares favorably with the return shown in the second column.

It is thought that a careful study of Tables 1 and 2 will be interesting and instructive to many persons who are studying the question of fair return.

IMPORTS TO THE UNITED STATES for the seven months of the fiscal year ended with January were valued at \$1,634,000,000, as against \$1,348,000,000 for the corresponding period of the previous year, according to figures just issued by the Department of Commerce. Exports for the seven months' period totaled \$3,448,000,000, as compared with \$3,616,000,000 for a similar period the year previous.

Railway Officers Wanted for Service Abroad

S. M. Felton, Director General of Military Railways, Organizing Additional Operating and Engineering Regiments

S. M. FELTON, director general of military railways, is organizing a number of additional railway regiments and battalions for active service in France and desires to hear from capable railway officers or ex-officers who desire to go abroad as commissioned officers. In addition to the regiments already abroad, two railway operating regiments of a total strength of 1,587 each, are now being organized, together with five railway operating battalions of a strength of 774 each, one railway maintenance of way battalion of a strength of 774 and two maintenance of equipment battalions with a strength of 774 each; and other units are to follow.

Mr. Felton desires to hear from officers and ex-officers who are or have been general managers, general superintendents, assistant superintendents, superintendents of transportation, division superintendents, superintendents of motive power, master mechanics, trainmasters, chief dispatchers, general yardmasters, yardmasters, road foremen of engines, general shop foremen, engine house foremen, engineers of maintenance of way, roadmasters and track supervisors who desire to take active service in these railway units, providing they are not over 50 years of age in the case of general superintendents, superintendents of motive power and general managers, and not over 45 years of age in the case of officers of lower rank. In communicating with Mr. Felton at his office at 734 Fifteenth street, N. W., Washington, D. C., they should give their railroad experience in detail and their references. Men now in active service should have the consent of their superior officer before applying.

Providing the qualifications are satisfactory, commissions will be given for the various ranks as follows:

General managers, as lieutenant colonels;

Assistant general managers, general superintendents, and superintendents of motive power, as majors;

Division superintendents, master mechanics, engineers of maintenance of way, as captains;

Trainmasters, chief dispatchers, road foremen of engines, general yardmasters, roadmasters, as first lieutenants;

Yardmasters, track supervisors, and engine house firemen as second lieutenants.

Enlisted Men

The office of the Chief of Engineers of the War Department has recently issued a booklet entitled "The United States Needs Skilled Engineers in France," describing the needs of the army for engineer troops, the duties of the various departments of the engineer service and the conditions of enlistment, for the purpose of giving information to men desiring to enlist as privates or non-commissioned officers and to the employers of such men. Some extracts from this booklet, including the sections particularly applicable to railway engineers, are as follows:

In this war, the duties of engineer troops are so varied that any man with technical training can be so placed that he may employ his training with advantage to his country and with pleasure and profit to himself.

Engineer troops are charged with reconnoitering and surveying for military purposes and the preparation of maps of the theater of operations; planning and superintending of defensive and offensive works of troops in the field; examination of routes of communications for supplies and for military movements; construction and repair of military roads, railroads, and bridges; military demolitions; the conduct of gas and flame warfare; the operation of "Tanks";

the location, design and construction of wharves, piers, landings, storehouses, hospitals and other structures of general interest; the construction, maintenance and repair of roads, ferries, bridges and incidental structures; and the construction, maintenance and operation of railroads under military control, including the construction and operation of armored trains.

The American army operating in Europe must be transported, fed, supplied with ammunition and all other materials and supplies required to conduct successful warfare. To render this possible the engineers must provide for the construction of wharves, warehouses, storehouses, ships, hospitals, depots and all of the other structures necessary to protect the army and its ammunition and supplies from the weather. It must build and operate railroads connecting the wharves with the storehouses and depots, and the latter with a point as close to the scene of fighting as may be practicable, with branch lines to every point where it may be necessary to supply the American forces.

Roads must be constructed and repaired, bridges built, repaired and strengthened, fortifications and other defensive works laid out and constructed. For these and other purposes, trees now standing in French forests must be felled and converted into railroad ties and timber.

All of this work falls to the part of the engineers, whose efforts are just as important toward the final success of our arms as are those of the men in the forefront of battle. The man building a road over which motor trucks rush bombs to the front is doing work just as important as the man who finally throws the bomb into the enemy trench. The railroad builder or trainman who facilitates the movement of supplies of food and ammunition to the front is performing just as essential a duty as the man on the firing line. So, too, is the carpenter who is engaged in construction of storehouses for supplies and ammunition which are stored until needed for use of the fighting force.

The engineer department is not organizing a civilian construction and operating corps for service in France, and further addition to the overseas civilian clerical force has been stopped. It is proposed to have the engineer construction, clerical and operating work required by the American Expeditionary Forces performed by special engineer units organized as part of the United States Army. This rule will be observed save under very exceptional circumstances.

There are no civil positions in connection with the engineer units in the military service. All civil positions in the engineer department at large, except that of menial laborer, are made under civil service rules as required by law. The incumbents of these positions are not in the military service and are not sent abroad. Information relating to qualifying for these positions should be obtained by corresponding with the Civil Service Commission, Washington, D. C.

Approximately one-half of the organizations are directly combatant, the others are special units made up of skilled men who, in peace time, are engaged on work similar to that which they are expected to perform with our armies abroad. All of these organizations, whether originally organized as combatant or special troops, will be assigned such duties as competent authority may direct and will be available for all kinds of service. All organizations will be organized as military units with the various grades of officers and non-commissioned officers, and all men are uniformed and equipped as soldiers. The officers are taken

from the Corps of Engineers, the Engineer Officers Reserve Corps, from graduates of engineer training camps, and from enlisted men who have earned promotion to commissioned grades. The enlisted men are enlisted for the period of the emergency in the National Army authorized by the act of Congress approved May 18, 1917.

An enlisted man desiring to transfer to another unit must make an application therefor through military channels to the commander having authority to effect the transfer and stating the reasons for the request, also his qualifications for service in the particular regiment to which he asks transfer. Action on such requests will be governed by circumstances, and by the views expressed in the indorsements of commanding officers. The expense of a transfer made at the request of a soldier must be borne by the soldier.

Any registrant under the selective service law, who has not actually been called to service, may be immediately inducted into the service at the request of the registrant. Applications for induction should be made to the Chief of Engineers, giving a complete statement of the applicant's qualifications.

Any man who is physically qualified between the ages of 18 and 21, or 31 and 40, may voluntarily enlist for an engineer organization, provided he proves to the recruiting officer that he is experienced or skilled in any engineering trade, or is a "handy man" who is specially suited for engineering work.

Volunteers should apply to a recruiting officer, or to an engineer officer.

There are about 600 recruiting stations in the United States. An officer at any one of these stations will enlist you for an engineer organization, if you are deemed suitable.

Enlistment is in the grade of private. Subsequent promotion to the rank of non-commissioned officer is secured by merit. It is intended to fill many of the vacancies which will occur from time to time among the commissioned officers by selection from the ranks. One of the best ways to secure a commission is through enlistment.

The regulations governing physical requirements for enlistment in engineer organizations are the same as for the army at large, but minor defects in volunteers for some of the special units may be waived by proper authority.

After entering the service, men are clothed, fed, sheltered and transported at the expense of the United States.

Army pay, as shown below, is practically clear money:

MONTHLY PAY OF ENLISTED MEN

Rank	Pay in U. S.	Pay abroad
Master engineer, senior grade.....	\$81.00	\$96.00
Master engineer, junior grade.....	71.00	84.00
Regimental sergeant major.....	51.00	60.00
Battalion supply sergeant.....	51.00	60.00
Regimental supply sergeant.....	51.00	60.00
Battalion supply sergeant.....	51.00	60.00
First sergeant.....	51.00	60.00
Sergeant, first class.....	51.00	60.00
Sergeant bugler.....	48.00	56.00
Master sergeant.....	44.00	51.20
Supply sergeant.....	44.00	51.20
Stable sergeant.....	44.00	51.20
Color sergeant.....	44.00	51.20
Sergeant.....	36.00	40.80
Horseshoer.....	38.00	44.00
Saddler.....	36.00	40.30
Wagoner.....	36.00	40.30
Cook.....	38.00	44.00
Private, first class.....	33.00	33.00
Private.....	33.00	36.00
Private.....	30.00	33.00

The act approved October 6, 1917, makes government allowances for the dependents of soldiers, in addition to the soldiers' pay.

Engineer troops are organized into sections, detachments, separate companies, separate battalions and regiments.

The organization of Sections and Detachments depends upon the character of the work for the section or the detachment.

An engineer company consists of the following enlisted men:

	No.
First sergeant.....	1
Sergeant, first class.....	4
Supply sergeant.....	1
Master sergeant.....	1
Stable sergeant.....	1
Sergeant.....	10
Corporal.....	20
Horseshoer.....	1
Saddler.....	1
Wagoner.....	5
Cook.....	5
Bugler.....	3
Private, first class.....	66
Private.....	132
Total enlisted.....	250

A Separate Battalion consists of the following enlisted men:

	No.
Master engineer, senior grade.....	2
Master engineer, junior grade.....	4
Battalion sergeant major.....	1
Regimental sergeant major.....	1
Sergeant.....	2
Corporal.....	2
Wagoner.....	2
Cook.....	2
Private, first class.....	3
Private.....	6
and three or four companies.....	6

A Regiment consists of the following enlisted men:

	No.
Master engineer, senior grade.....	4
Master engineer, junior grade.....	4
Regimental sergeant major.....	1
Regimental supply sergeant.....	2
Sergeant bugler.....	1
Color sergeant.....	2
Sergeant.....	2
Wagoner.....	3
Cook.....	2
Private, first class.....	6
Private.....	12
and six companies, of two or more battalions.....	12

Railway Construction Battalions

These battalions will construct or repair the railroads which will carry food and ammunition to the front; their duties will include grading, track construction and maintenance, bridge work, etc. When an advance is made, the tracks must at once follow the troops, so that the supply of munitions will not fail.

Volunteers are especially desired who are experienced

- | | |
|-----------------------|--------------------|
| Timbermen; | Blacksmiths; |
| Bridge carpenters; | Transitmen; |
| Masons; | Surveyors; |
| Pipe fitters; | Draftsmen; |
| Steam fitters; | Storekeepers; |
| Hoisting enginemen; | Machine repairmen; |
| Firemen; | Clerks; |
| Dinky runners; | Electricians; |
| Teamsters; | Oilers; |
| Track layers; | Painters; |
| Construction foremen; | Rock drillmen; |
| Pile drivers; | powdermen; |
| Concrete foremen; | Signal installers; |
| Telegraph linemen; | Blackmen; |
| Riggers; | Cooks. |
| Machinists; | |

Car Repair Shop Battalions

These organizations will be located in car repair shops and yards in France where repairs will be given to freight and passenger car equipment. Volunteers are desired who have had experience in railway and manufacturing car shops.

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| General foremen; | Machinists; |
| Shop foremen; | Mechanics' helpers; |
| Gang leaders; | Painters; |
| Office men; | Pipe fitters; |
| Storekeepers; | Planing mill men; |
| Acetylene welders; | Roofers; |
| Airbrake repairmen; | Sheet iron workers; |
| Air tool repairmen; | Tinsmiths; |
| Automobile repairmen; | Truck repairmen; |
| Blacksmiths; | Upholsterers; |
| Buckers up; | Buglers; |
| Car builders, wood and steel; | Barbers; |
| Derrick enginemen; | Cooks; |
| Electricians; | Tailors; |
| Flange—steel shapes; | French interpreters. |
| Gas enginemen; | |

Enginehouse Battalions

These organizations will be located at railroad terminals in France from entry ports to the fighting lines. They will maintain American and French type locomotives in service. Volunteers are desired who have had experience in railway enginehouses.

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| Clerks; | Electricians; |
| Draughtsmen; | Engine watchmen; |
| Engine despatchers; | Electrical welders; |
| Enginehouse foremen; | Flue repairmen; |
| Gang leaders; | Hostlers; |
| Storekeepers; | Locomotive inspectors; |
| Airbrake repairmen; | Laborers; |
| Airbrake inspectors; | Messengers; |
| Asphalt men; | Machinists; |
| Acetylene welders; | Oil room attendants; |
| Boilermakers; | Plumbers and Pipe fitters; |
| Boilerwashers; | Stationary engineers; |
| Blacksmiths; | Switchmen; |
| Car repairmen; | Staybolt inspectors; |
| Carpenters; | Tinsmiths; |
| Coal and sand storage men; | Turner repairmen. |

Locomotive Repair Shop Battalions

These organizations will be located in locomotive repair shops in France where general repairs will be given to American and French type locomotives, including fire box and boiler renewals. Volunteers are desired who have had experience in railway shops as

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| Master mechanics; | Rebuilding shop machinists; |
| Shop foremen; | Gas engine men; |
| Gang leaders; | Machine shop machinists; |
| Office men; | Mechanics' helpers; |
| Storekeepers; | Painters; |
| Acetylene welders; | Pipe fitters; |
| Air tool repairmen; | Stationary engineers; |
| Automobile repairmen; | Sheet iron workers; |
| Blacksmiths; | Tender repairmen; |
| Boilermakers; | Truck repairmen; |
| Carpenters; | Tinsmiths; |
| C. b. builders; | Waglers; |
| Chimney makers; | Washers; |
| Coppersmiths; | Cooks; |
| Crane operators; | Tailors; |
| Electricians; | French interpreters. |

Railway Maintenance of Way Battalions

These organizations will maintain the railroads in France. The men of the regiments will renew ties, repair worn rails and switches, in fact, everything which goes towards the maintenance of a railroad already built. Volunteers are desired who are, or have had experience as

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| Track laborers; | Carpenters—Foremen; |
| Section foremen; | Signal supervisors; |
| Extra gang foremen; | Signal maintainers; |
| Carpenters—Bridge and building; | Signal batterymen. |
| Track supervisors; | |

Railway Miscellaneous Trades and Storekeepers Battalions

In order to supply the needs of the army at the front it is necessary to maintain and operate a high class, standard gage railroad.

The amount of traffic handled during a stated period of time is so vast that it requires a very efficient force of experienced railroad men to make the enterprise a success.

Railroad storehouses must be manned to handle this vast business and special men are needed for the work, as well as for other details of railway operation among them men of the following classes:

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| General storekeepers; | Shipping clerks; |
| Assayers; | Machinists; |
| Mill men; | Carpenters; |
| Painters; | Plumbers; |
| Storekeepers; | Electricians; |
| Statisticians; | Freight handlers; |
| Stevedores; | Station agents. |
| Clerks; | |

Railway Operating and Transportation Battalions

These organizations will operate railroads in France from the landing places to the fighting line. The men of

the regiments will operate the trains and act as dispatchers, station agents and operators, etc. Volunteers are desired who are, or have had experience as

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| Yard clerks; | Freight car engineering; |
| Blacksmiths; | Freight car painting; |
| Signalmen; | Freight car repairmen; |
| Conductors; | Freight car stores; |
| Yard foremen; | Freight car storesmen; |
| Asst. yardmasters; | Locomotive repairmen; |
| Yardmasters; | Locomotive storesmen; |
| Locomotive firemen; | Locomotive storesmen. |

Progress Toward Standardization

RAPID PROGRESS has been made by the committees of car and locomotive builders and of railroad mechanical officers in the preliminary work of preparing specifications and designs for various types of standard freight cars and locomotives to be reported to Director General McAdoo for his decision. When the standard types are finally adopted it is understood that they are to be used not only for the cars and locomotives to be purchased by the Railroad Administration out of the revolving fund consisting of an appropriation by Congress of \$500,000,000 and any surplus earnings of the railroads above the amount required for their guarantee, but also for orders to be placed by individual roads which are able to finance additions to their rolling stock.

Greater progress has been made so far in the designs for standard freight cars than in those for the locomotives, both because of the greater degree of standardization which previously existed in the car field and also because some of the work done by the Committee on Standard Box Cars of the American Railway Association could be taken as a foundation. It is probable that the railroad officers and the builders will be able to agree on specifications for the cars to be submitted to Mr. McAdoo early next week.

As has been previously reported in the *Railway Age*, the Railroad Administration first requested suggestions for the proposed standards from the committees representing the car and locomotive builders, of which Samuel Vaulain, vice-president of the Baldwin Locomotive Works, is chairman. These were appointed by the Council of National Defense last summer at the time when the plan for having the government acquire from 100,000 to 150,000 cars for the use of the railroads was under serious consideration. These committees were called into conference by Henry Walters, chairman of the Atlantic Coast Line and the Louisville & Nashville, who is in charge of the standardization investigation for Director General McAdoo, and their recommendations for both cars and locomotives were then referred to a committee of railway mechanical officers, three appointed by each Regional Director, and H. T. Bentley, superintendent of motive power and machinery of the Chicago & North Western and mechanical assistant in the Transportation Division of the Railroad Administration, as chairman.

The designs submitted by the builders' committees have been given over carefully by the railroad officers, which has made numerous suggestions for changes as to types, dimensions, weights, etc., and has asked the builders to make the desired changes in their designs. When the revised designs are approved by the railroad committee they will be submitted to Mr. Walters and Mr. McAdoo for final approval.

In addition to the members of the committee reported in last week's issue, a number of others have been added into the conference including E. H. Clark, general superintendent of motive power of the Baltimore & Ohio; C. A. Schroyer, superintendent of the car department of the Chicago & North Western; H. R. Wapack, general superintendent of motive power of the Chicago, Milwaukee & St. Paul; J. C. Fritts, master car builder of the Delaware, Lackawanna & Western; A. G. Trumbull, master of the

general mechanical superintendent of the Erie; J. McMullen, mechanical superintendent of the car department of the Erie; W. O. Moody, mechanical engineer of the Illinois Central; John A. Pilcher, mechanical engineer, Norfolk & Western; W. J. Keisel, Jr., assistant mechanical engineer, Pennsylvania; F. W. Mahl, director of purchases of the Southern Pacific.

While the entire matter is still in a tentative stage and nothing will be definitely decided until the various recommendations are approved by Director General McAdoo, it is understood that the following types of cars have been under consideration: 40-ton single sheath box car, 40-ton double-sheath box car, 50-ton single-sheath box car, 50-ton all-steel gondola with light drop doors, 50-ton composite steel and wood gondola with light drop doors, 55-ton all-steel hopper bottom coal car, 70-ton all-steel hopper bottom coal car, and 70-ton low side gondola. The suggestions of the railroad committee were concurred in by the Vaulchain committee and the necessary changes in design are being made this week, to be presented for approval at a meeting next week in Washington.

It is also understood that about 10 types of locomotives have been under consideration, for the first orders to be placed, including 6-wheel and 8-wheel switching locomotives, a heavy and a light Mikado, two Pacific types, two Mountain types and possibly a Mallet and a Santa Fe type.

The proposed Mikado, Pacific and Mountain types are as follows:

Type	Cylinders	Weight on drivers	Tractive power
Mikado	26 in. by 30 in.	220,000 lb.	54,600 lb.
Mikado	27 in. by 32 in.	240,000 lb.	60,000 lb.
Pacific	25 in. by 28 in.	165,000 lb.	40,700 lb.
Pacific	27 in. by 28 in.	180,000 lb.	43,800 lb.
Mountain	27 in. by 30 in.	240,000 lb.	57,000 lb.
Mountain	27 in. by 30 in.	220,000 lb.	53,900 lb.

Further conferences between the railroad committee and the locomotive builders are to be held next week at Philadelphia after the car designs have been approved.

Because of the greater variety of conditions encountered on western lines additional types will probably have to be considered before the work is completed as well as variations for the different kinds of coal used.

The question of patented specialties has been one of the most complicated that have had to be considered and the question of how they are to be dealt with has not yet been finally determined.

One of the questions under consideration has been as to how far it is desirable to go in standardizing various devices—whether the specifications shall extend to detail types or whether they shall be sufficiently elastic to admit of all types that can conform to standard dimensions in such a way as to permit of interchangeability. It is understood that the

latter idea is most likely to prevail and that modern devices of proved merit will be approved, but those in the experimental stage will not be included. The locomotives are to be equipped, among other things, with superheaters, brick arches, mechanical grate shakers, mechanical fire-doors, and two water gages. It has not been decided to what railroads the locomotives will be assigned, but it is understood that where it is known that a considerable number, such as 50 to 60, are to be delivered to a road, that road may be allowed to indicate the particular specialties which it has been accustomed to use.

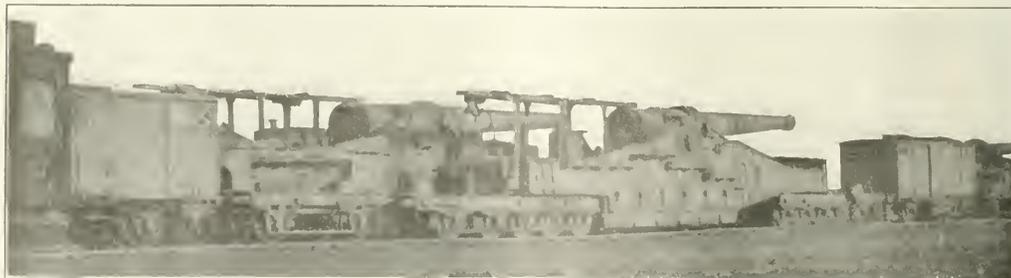
As to the cars, it is understood that friction draft gear conforming to standard specifications must be used and that spring draft gear will be excluded.

It is also understood that cast-steel bolsters and cast-steel side-frames will be used, if conditions in the steel market permit. Frictionless side-bearings probably will be given preference. It is understood that the M. C. B. journal boxes will be used. Brakebeams of three or four point suspension are favored. There is a report that the committee thinks roofs on which the patents have expired should be used.

The committees probably will not make public their recommendations until they have gone to Mr. McAdoo and been passed on by him, for until then nothing can be regarded as finally settled. Meantime, those who have been watching developments closely pretty well agree that the outcome will be a widespread distribution of orders among railway supply manufacturing concerns. In fact, the orders to be placed will be so large that only by a pretty widespread distribution of them will it be possible to get the specialties required made as rapidly as the conditions demand. There are some classes of concerns, such as the makers of spring draft gear, which apparently will be hard hit. The same will be true of concerns having devices that are just in the development stage.

There has been much speculation as to the number of cars and locomotives to be ordered by the government. The bill providing for an appropriation of \$500,000,000 has been passed by both Houses of Congress and is in conference this week for the adjustment of provisions on which the bill was passed in different form by the Senate and the House. An order of 100,000 cars is most frequently mentioned in the gossip, but an order for 150,000 to 200,000 has been spoken of as possible and it is understood that the locomotive order will be for 1,500.

It is understood that the Railroad Administration will arrange for standard prices, which will apply to all orders, whether placed by the railroads or by the administration, and arrangements will be made whereby the builders will have priority orders for the materials needed so that the cars and locomotives may be delivered as rapidly as possible.



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They Move Them as Easily as Wrecking Cranes

The Japanese Operated Railroads of Korea

Over One Thousand Miles of Railway Constructed in Asiatic Peninsula in Less Than Twenty Years

THE RAILWAYS OF KOREA, or of Chosen, as the Japanese would have us call it, have the distinction of being among the standard gage railways of the world which pay the lowest salaries and wages to their employees. The average monthly compensation on the railways of Chosen is only \$11, about 37 cents a day, while the head of the system with its 1,000 miles of line receives only \$292 a month.

The railways of Korea have the two-fold purpose of helping to develop Chosen for the Japanese, which control it,

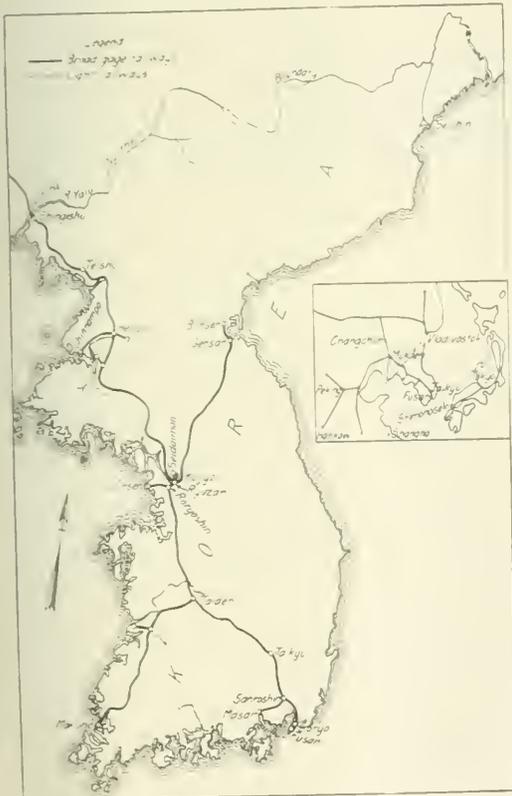
the Asiatic continent in the building of standard 4 ft 8 1/2-in. gage railroad lines is soon to be carried further by the contemplated change of the 5 ft. 6 in. gage railways of Japan proper to standard gage.

The railways of Chosen are divided into four main sections: (1) that from Keijyo to Fusan, 275 miles, connecting Keijyo or Seoul, as the capital of Chosen is sometimes named, to the port of Fusan where connection is made by fast steamer lines to the main line railroads of Nippon to Kobe, Osaka, Yokohama and Tokyo; (2) the line from Ryuzan near Keijyo to Autung, 310 miles, where direct connection is made with the railways in Manchuria; (3) the line from Taiden, a point between Keijyo and Fusan, to Mokuho; (4) the line from Ryuzan to the eastern coast at Gensan and Bunsen. There are also additional branch lines.

As a link in the transportation system between Japan and China the system benefits by an increasing flow of through traffic in addition to the intra-peninsula business which is still in its infancy and a fertile field for development. The Nipponese have shown characteristic aptitude in encouraging both passenger travel and freight movement in Chosen. Excursion rates and reduced fares for Koreans going to market at the larger cities have swelled passenger receipts and encouraged industry. Electric lights, electric fans, heat, drinking water and toilet facilities in passenger coaches, sleeping and dining car service, railway hotels and hospitals, medical attention by physicians on the payroll of the system, and other accommodations for the comfort of patrons of the lines have all tended to make travel more attractive. In a like manner the simplification of custom house transactions, the introduction of the principle of re-consignment, the reduction of rates for longer hauls, the establishment of a system of rebating and the opening of warehouses at the larger stations have encouraged freight movement.

History of Chosen Lines

The history of the railway lines in Chosen dates back to a concession to build and maintain a railroad between Keijyo, the capital, and Jinsen, its seaport, which the Korean government granted in 1896 to James R. Morse, an American. In May, 1897, while construction work was in progress, the Kei-Jin Tetsudo Hikiuke Kumiai (Syndicate) purchased the concession and continued the work. Other private companies undertook the extension of the Korean railway system. In September, 1899, a line between Jinsen and Roryoshin, about 20 miles in length, was opened to traffic, and the remaining section between Roryo-hin and Seodaemon in Keijyo, 5 miles, was finished in July, 1900, thus completing the railway between Jinsen and Keijyo. The construction of a 270-mile line from Keijyo to Fusan, the port at the southeastern extremity of Korea, was undertaken in August, 1901, and completed in January, 1905. A 300-mile extension from Keijyo to Shingishu, on the Manchurian frontier, and a 25 mile branch from Sanroshin to Masan, a port near Fusan, were opened to general traffic in April, 1908. When the nationalization of the railways in Japan was decided upon in 1906, the Imperial Government of Japan purchased the Keijyo-Fusan and the Keijyo-Jinsen lines, establishing the Railway Bureau of the Residency-General of Korea at the same time. In September of the same year the Keijyo-Shingshu and the Sanroshin-Masan



Map of the Chosen Railways

and of serving is the connecting link between the railways and steamship lines of Japan and the railways to the west and north of Chosen, in Manchuria.

Twenty years ago there was not a mile of railway in Korea. Today there are 1,006 miles of line in the peninsula, practically all of which was constructed by Japanese engineers. The fact that these railways, like those controlled by the Japanese in South Manchuria, are all of standard gage merits more than ordinary attention. The Japanese are converted to the idea and advantages of standard gage railways and the work which they have begun on

lines were also acquired and placed under the jurisdiction of the Railway Bureau. These lines were taken over by the Imperial Government Railways in December, 1909, but in October of the following year they were transferred to the jurisdiction of the Government-General of Korea.

The first construction work of the railways in Chosen was carried on rather hurriedly, with a view to connecting the extreme South with the extreme North of the country as quickly as possible and joining a few of the important seaports with the trunk line by means of branches. Within a few years after their completion, however, reconstruction work was undertaken and finished in due time. With the construction of a bridge over the Yalu river and the rebuilding of the Antung-Mukden line in Manchuria, the Chosen railroads assumed world-wide importance as a link in communication between China and Japan, and hence between Europe and Japan.

Other units added to the Korean railway system include lines from Taiden to Mokuho at the southern extremity of Chosen from Keijyo to Gensan on the northeast coast, and from Keijyo to Chinnampo, a western port, totaling 348.3 miles, and the Gensan-Bunsen section of the projected Kankyo line along the northeastern seaboard, 12.5 miles. The program for 1916 was to build two more units of the Kankyo line, one from Bunsen to Yeiko, 21.4 miles, and another from Seishin to Sohyo, 32.2 miles. The total operated mileage of the Korean roads at the end of the fiscal year 1915 was 1006.5 miles, or an increase of 368.6 miles over the mileage at the end of the fiscal year 1906.

Connections with Japan and Manchuria

The railways of Chosen connect with the railways in Japan by fast and regular steamship service between Fusan in the south and Shimomoseki, the southeastern terminus of the main line railway of Nippon. Similarly a through connection is made with the South Manchurian railway in the



View at Fusan Pier

north at Antung by a bridge over the Yalu river between Antung and Shingishu.

This steamship connection with Japan and the consumption of international affiliations have proved a potent factor in increasing freight traffic on the Chosen lines. Following the completion of the bridge over the Yalu river and the reconstruction of the Manchurian line from Antung (on the Yalu river) to Mukden in 1911, through traffic arrangements were made with the Manchurian, Siberian and Russian lines whereby the Chosen trunk line (Antung to Fusan) became a portion of the great passenger and freight route from Japan to Europe. At a conference held at Moscow in June, 1913, the Korean railways were recognized as a part of three great international transportation routes, i. e., via Siberia, via Siberia and Suez, and the round-the-world route

via Siberia and Canada. Through traffic agreements with the various Chinese roads were effected in 1914 and 1915 and have further added to the importance of the Chosen system.

When the Residency-General took over the management of the lines in 1906, they could not be operated to their fullest capacity because of the inadequacy of existing transportation facilities. Since that time through passenger service has been established between Fusan and Shingishu, the termini of the main line at each extremity of the peninsula, express service has been inaugurated on the Keijyo-Jinsen and other branch lines and general increases have been made in the number of trains run. With the construction of the Yalu river bridge and the rehabilitation of the Antung-Mukden (Manchurian) line in 1911, tri-weekly service was inaugurated between Keijyo, Korea, and Changchun, Manchuria, and all trains on the Chosen trunk line were operated as far as Antung, on the boundary with Manchuria. The opening of through service between Korea and Manchuria thereupon resulted in the revision of the steamer schedules between Shimomoseki, Japan, and Fusan, Chosen, to provide for daily instead of every-other-day service. At the same time the night train between Fusan and Keijyo, which had been run every other night, was run nightly and this innovation in conjunction with a daily passenger train between Keijyo and Antung, completed daily through service in Korea. Since June, 1912, the time of the through trains has been shortened and the run of the tri-weekly Chosen-Manchuria express which operated between Changchun and Keijyo was extended to Fusan. The construction of a new pier at Fusan facilitated passenger transfers from steamers to trains, and the revision of time-tables on the imperial Government Railways of Japan made close connections with the steamers at Shimomoseki possible, thereby tying Manchuria to Japan with a dependable regular service. There has also been a through freight service over the same route since January, 1913.

The policy of adding trains and revising time-tables in both Chosen and Manchuria continued until the fall of 1914 when the European war resulted in a decrease in the number of through passengers. This necessitated a reduction in the service of the Chosen-Manchuria express from three times a week to once a week. On the other hand, the Gensan-Bunsen section of the Kankyo line was opened to traffic in August, 1915; and in September of the same year schedules on the Keijyo-Gensan line were revised to provide for closer connections with the other lines running into Keijyo.

Freight Traffic on the Chosen Lines

Freight traffic has developed gradually as industries have increased in number and size, and as trade relations and traffic connections between Korea, Japan and Manchuria have become closer. The first year after the nationalization of the lines showed an increase of four per cent, both in the volume of freight and of receipts, over the previous year. In the following year (1907) arrangements for through traffic were improved, transactions at custom houses were very much simplified, a system of rebates was established to encourage shipping and other changes were made, all of which resulted in heavier traffic. In 1912 rates were reduced, the principle of reconignment was put into practice, and rates for long hauls were further reduced with a resultant increase in shipments, especially after the reduction in rates on import freight which became effective at the end of the year.

A special reduction in rates on cotton cloth and cotton yarn consigned to Manchuria and an increase in rice exports to Japan contributed to the favorable showing in 1913. Although the inauguration of through-freight service between Japan and Manchuria in January, 1913, encouraged

the exportation of rice and other grains, an economic depression set in towards the end of the year and continued until 1915. In the latter part of that year increases in the price of rice and other grain contributed to a revival in traffic. Greater activity in mining enterprises was reflected in a great volume of ore shipments. Timber, salt and coal traffic also increased appreciably and through business between Japan and Manchuria assumed greater importance. Freight statistics of the Korean roads for the fiscal year 1915 showed an aggregate tonnage of 1,656,040, a ton mileage of 170,945,269, and receipts amounting to 3,350,200



Station at Fusan Steamer Dock

yen (\$1,678,100), as compared with a tonnage of 391,175, a ton mileage of 24,777,710 and receipts totaling 1,088,498 yen (\$544,240) in 1907.

Korean Passenger Traffic

The passenger traffic of the Chosen lines has similarly increased both relatively and absolutely since their nationalization in 1906, although adequate statistics are not available for a direct comparison of results achieved before and after they were taken over by the Railway Bureau of the Residency-General of Korea. In the second year of operation by the Bureau riots in different provinces of Chosen affected passenger business adversely. In the following fiscal year, however, the opening up of the Keiijo-Shingishu and Masan lines, and the adoption of a uniform passenger rate for all the lines resulted in increased traffic. Night train service and an increase in the number of trains run further induced travel. Subsequently, a reduction of through service and a re-arrangement of local train service were necessitated by the economic reaction following the Russo-Japanese War. Thereafter no marked increase in passenger traffic occurred until 1910, when business conditions began to improve. In 1911 there was a further improvement in business and in 1912 when a reduction in passenger fares was made the number of short-distance passengers greatly increased. Excursion trains and special trains for large parties of visitors proved very popular, with a resulting increase in passenger receipts. In the following year the initiation of the policy of selling tickets at reduced rates to Koreans going to market at the principal towns swelled the number of travelers. In the same year the opening of through traffic between Japan and Manchuria and China marked a new epoch in the railway history of Korea.

The beginning of the present world war was reflected in a heavy decrease in passenger traffic in 1914. Although this period of depression continued in 1915, the Industrial Exhibition which took place at Keiijo in September in commemoration of the establishment of the Government-General in Chosen produced a revival in passenger travel which continued even after the close of the exposition. The number of passengers carried during the fiscal year 1915 totaled

5,040,471 and the receipts 1,901,230 yen (\$1,980,790), as compared with 2,625,772 passengers and receipts of 2,118,744 yen (\$1,059,372) in 1907.

Well-directed publicity, traffic affiliations with foreign companies, improvements in service, and the economic betterment of Chosen have all contributed in producing these satisfactory results. The railway have co-operated with newspapers in holding train exhibitions and in other undertakings to stimulate passenger travel. A rise in the standard of living in Korea and greater interest in travel, as well as a better understanding of the country's attractions, has resulted in an increase in tourist parties. For the convenience of tourists from foreign countries arrangements were made with Thomas Cook & Son, the International Sleeping Car Company, the Nordisk Reisebureau and the Tourist Bureau for the sale of tickets both to points in and through Korea to Japan or Manchuria.

In 1908 dining-car service was inaugurated on the Korean lines. Dining cars are equipped with writing tables, and boards and men for Japanese chess are loaned to passengers on request. Emergency medicine cases are provided on express trains, and first and second class cars are equipped with drinking water, electric fans in summer and steam heat and stoves in winter. First and second class sleeping cars are run on the Keiijo-Fusan line, extending from the capital to the extremity of the peninsula, and all express trains on the Keiijo-Fusan, Keiijo-Shingishu and the Keiijo-Jinsen lines are electrically lighted. To meet the needs of both passengers and employees, railway hospitals have been built at Ryuzan, Laiden and Soryo on the Keiijo-Fusan line, and, in addition, physicians in the service of the railways are available at all the principal stations.

Rolling Stock, Warehouses, Hotels, Maintenance Work

At the end of the fiscal year 1915 the rolling stock of the Chosen lines consisted of 169 locomotives, 357 passenger cars and 1,604 freight cars. The latest type of locomotive in use is a ten-wheel superheater locomotive weighing 112 tons. Seven other classes of engines are in use, three of which are of the saddle-tank type. All passenger cars have four-wheel trucks and are fitted with steam heat, air-brakes, vestibules, electric lights and fans. The largest type of car has a capacity of 104 persons. The freight cars



Railway Bridge Over Yalu River

are all of the four-wheel truck type except some of 50-ton capacity, which have six wheel trucks. Most of the freight cars are provided with air-brakes and have capacities ranging from 22 to 26 tons. Some four-wheel freight cars of 10-ton capacity are still used at the different shops.

In 1912 the Chosen lines opened hotel accommodations for tourists in the upper floors of the station buildings at Fusan and Shingishu. A five-story iron roof hotel, costing 840,000 yen (\$420,000) was completed in Keiijo in October, 1914. In the following year a small hotel was built at Kongo-san (Diamond Mountain), a resort on the Keiijo-Gensan line. In the fiscal year 1915 the guests at these hostleries numbered

2,505 and the gross receipts amounted to 108,218 yen (\$54,109).

The first railroad warehouses in Chosen were opened at 11 stations in July, 1913. Since that time warehouses have been constructed at nine other stations. Warehousing in Korea, however, is still far below the needs of the country, to the disadvantage of industrial development.

Maintenance work on the Korean lines in 1915 included the handling of 21,692 cu. yd. of earth work, 132,664 cu. yd. of ballast, 205,632 sq. ft. of painting, the renewal of 321,387 ties and the transfer of 8.8 miles of rails. In addition, 2,935 telegraph poles and about 630 miles of wire were renewed and a number of bridges and buildings were repaired.

Telegraph Facilities

In the fiscal year 1915 the 156 telegraph offices on the Chosen lines handled 4,279,790 railway messages and 179,730 public messages. To take care of the increase in business an additional telegraph line was added in 1915 between Ryuzan and Teishu and one of the lines between Taikyū and Soryo was extended to Fusan. Prior to 1906 facilities for telegraphic communication on the Korean system were crude and rudimentary. In 1908 with the inauguration of through passenger service between Fusan, at the extremity of the peninsula, and Shingishu, at the Manchurian frontier, a through telegraphic circuit between Ryuzan and Soryo was installed. When the railway bridge over the Yalu River was completed and through Korean-Manchurian train service was established in 1911, all telegraphic circuits along the lines were changed. Subsequently, additional circuits were opened between Ryuzan and Taiden, between Ryuzan and Shingishu, and from Ryuzan to Mokuho.

Employees' Relief Association

The Relief Association of the Chosen railways was established in April, 1910, as a part of the Relief Association of the Imperial Government Railways of Japan, but in October of the same year when the roads were taken over by the



Railroad Hostel in the Diamond Mountains

Governor-General it became an independent organization. Benefits granted by the association fall under two heads: one for injuries and the other for death and old age. Injury benefits cover expenses arising from injuries to members while on duty and compensation to employees permanently disabled, the latter ranging from the equivalent of wages or salary for from one month to two and one-half years in the case of the Japanese and half that amount for Koreans. Benefits for death and old age are granted in the case of an employee's death before the age of 55 years or upon his

reaching that age. The amount of the benefits varies according to age, length of membership in the association and the amount of salary or wages. Refunds are made to members who retire from the organization before reaching the age of 55. The benefit funds are supported by government subsidy and contributions by the members. In the fiscal year 1915, 8,430 out of 9,234 employees and officers of the lines were members, and of this number 5,114 were Japanese and 3,316 Koreans. Total receipts, including the government subsidy, members' contributions and interest amounted to 114,051 yen (\$57,025), while expenditures totaled 47,644 yen (\$23,822).

Wage Scales on Korean Lines

The wage problem in Chosen is insignificant when considered from the point of view of American standards. In 1915, the average monthly wage of the 8,699 employees of the system was but \$10.81. Japanese constituted 5,359 of



Railway Hotel at Keiiji

the total number employed and received an average compensation of \$13.06 a month, or nearly twice as much as the wage of the 3,340 Korean employees who received but \$7.23. Even the 531 officers of the lines received an average salary of but \$46.40 a month. The munificent salary of the chief executive officer, known as engineer in chief, was 583.32 yen a month, or the equivalent of \$291.66.

Operating Results

Comparisons of Korean operating data for the fiscal year 1915 with statistics of all American lines having annual operating revenues above \$1,000,000, for the year ended December 31, 1916, show marked differences in transportation conditions in the two countries. The average receipts per passenger on the Chosen lines amount to but \$.0106 a mile, or barely more than one-half the American average of \$.02042. This low rate of return is compensated for by the heavier loading of Korean passenger trains. Whereas the average number of passengers per train-mile on American railroads is but 57, Chosen roads carry 118.3 per train-mile, or over twice as many. Freight traffic statistics, on the contrary, show lower receipts and heavier train-loading for railroads in the United States. Average receipts per ton per mile in Korea are \$.0093 as compared with \$.00706 on American lines; the average trainload in Chosen is but 91.6 tons as against 560 tons in the United States. It is interesting to note that average receipts have been falling steadily in Korea, while the average tonnage per train has been increasing. In 1907 the average trainload was but 29.3 tons, or less than one-third the trainload in 1915; the average receipts per ton per mile, on the other hand, were reduced from \$.0219 in 1907 to \$.0093 in 1915.

In the first two years following the nationalization of

the Korean lines in 1906 net losses were incurred in the operation of the system. Following general improvements in facilities, increases in traffic resulting from the steady industrial development of Korea and reductions in operating expenses, the lines became self-supporting. In 1908 the subsidy received from the government amounted to only 181,000 yen (\$90,500) as compared with 433,000 yen (\$216,500), the amount estimated as necessary to cover the annual losses of the lines. In the next year despite an economic depression, an epidemic of cholera and an unusually severe winter, no subsidy was required. Since then the financial condition of the roads has been improving steadily. In 1913, the net returns were almost double those of the previous year as a result of the increase in freight and passenger business following the opening of the Keijyo-Gensan line and a part of the line from Taiden to Mokuho.

The beginning of the war in Europe caused a decline in transportation for a time, but later a revival of business and an increase in rail shipments because of the scarcity of ships resulted in a recovery in the receipts of the Chosen system. In the fiscal year 1915 operating revenues amounted to 8,934,430 yen (\$4,467,215) and operating expenses to

7,155,866 yen, leaving a balance of 1,778,564 yen (\$887,349). The opening ratio for the year was, therefore, 80.01.

Railroad Enterprise Awakening the East

A Yankee naval officer first brought the light of western civilization to Japan. With a lapse of but 65 years, the enterprise, energy and initiative of the Nipponese have won for them the name of "Yankees of the East." Having transformed their own island kingdom into a progressive and powerful commercial and industrial state, they have undertaken also to awaken continental Asia from its lethargy by tapping its immense undeveloped resources and introducing modern economic standards. Knowing that improved transportation is the necessary forerunner of material welfare, the adaptable Japanese have provided themselves worthy imitators of the Caucasian nation in opening up new avenues of trade on both land and sea. As indicated by the review of their railway undertakings in Chosen, they have successfully penetrated the exclusiveness of the "Hermit Nation," thereby acquiring a territory 86,000 square miles in area, in which to exercise their genius for development.

Car Building Plants and Railroad Repair Shops

A Census Report on This Subject Gives Some Interesting Figures on These Plants for 1914

In 1914, there were 103 establishments engaged in the manufacture of freight and passenger cars for steam railroad service. These plants hired on the average 58,988 persons and the total value of products was \$194,775,069. In the same year also there were 1,362 steam railroad car repair shops, which shops hired on the average 361,925 persons and the value of the products of which was \$514,041,225.

These figures are contained in a report of the Bureau of the Census entitled Steam and Electric Cars and Railroad

including the operations of railroad companies, while the last two classes include the reports of railroad companies covering only the operations of their machine and repair shops. The value of products of the latter group is not a selling value, but a value equal to the operating expenses, such as salaries and wages, cost of materials, and miscellaneous expenses. An abstract of the report follows, the numbers of the tables being retained as in the original report.

Table 1 summarizes the statistics of the four industries

General Statistics of Car Building Plants and Railroad Repair Shops

Table 1	TOTAL.			CARS: 1914.		RAILROAD REPAIR SHOPS: 1914.	
	1911.	1909.	Per cent of increase. ¹	Steam.	Electric.	Steam.	Electric.
Number of establishments.....	2,128	1,810	17.6	103	14	1,362	649
Persons engaged.....	453,414	376,071	20.6	58,988	4,286	361,925	28,215
Proprietors and firm members.....	16	10	.....	11	.....	1	4
Salaries and wages.....	29,368	24,890	18.4	4,089	446	22,496	1,827
Wage earners (average number).....	424,030	351,291	20.7	54,288	3,810	339,515	26,584
Primary horsepower.....	615,684	412,113	39.3	129,687	10,013	433,994	44,989
Capital.....	\$390,298,801	\$431,188,849	36.9	\$157,811,199	\$14,751,882	\$384,692,399	\$93,615,741
Salaries and wages.....	390,635,874	299,417,044	32.6	48,348,202	3,199,654	28,559,533	2,559,583
Salaries.....	33,645,325	24,274,568	38.6	6,954,821	72,647	24,043,517	1,914,538
Wages.....	297,010,549	225,142,476	31.9	41,393,579	2,467,027	224,565,698	18,644,845
Paid for contract work.....	355,875	866,151	-58.9	.....	.....	128,844	291,575
Rent and taxes (including internal revenue).....	3,729,777	2,272,373	46.5	999,059	108,218	1,730,343	681,867
Cost of materials.....	399,988,119	297,594,642	34.4	132,261,199	6,349,779	24,828,497	17,669,574
Value of products.....	757,889,412	569,102,781	33.2	194,775,669	10,494,953	514,041,225	38,576,565
Value added by manufacture (value of products less cost of materials).....	357,900,293	271,508,119	31.8	62,575,410	4,115,174	270,212,618	20,966,991

¹ A minus sign (-) denotes decrease; percentages are omitted where base is less than 100.

Repair Shops which has just been made public. This report presents statistics for (1) establishments building cars for use on steam railroads; (2) those building cars for use on electric railroads; (3) the operations of repair shops by steam railroad companies, and (4) the operations of repair shops by electric railroad companies. The first two classes include the reports of car-manufacturing establishments not

for 1914 and gives a comparison of the total with 1910, together with the percentages of increase.

The Car Building Plants

Table 14 shows in detail the statistics of cars built for use on steam railroads by establishments engaged primarily in their manufacture, for 1914, 1909, 1904 and 1899.

There was an increase of 2.1 per cent in the number of steam-railroad cars built in 1914, as compared with 1899, while the value for the same period shows an increase of 101.6 per cent. The average value of passenger-service cars increased from \$7,526 in 1899 to \$12,800 in 1914, and freight-service cars from \$533 in 1899 to \$825 in 1914. This increased cost per car is due largely to the more extensive use of steel in the construction of cars and the building of larger cars.

In addition to the cars manufactured by establishments

Cars Built for Steam Railroads by Establishments Making Cars Primarily

PRODUCT.	1914	1909	1904	1899
Total value ¹	\$194,775,669	\$123,729,627	\$111,175,310	\$90,510,180
Steam-railroad cars:				
Number.....	130,054	74,778	102,616	117,569
Value.....	\$140,157,583	\$75,521,432	\$87,289,248	\$69,529,312
Passenger service ² —				
Number.....	3,434	1,601	2,030	979
Value.....	\$43,955,798	\$13,829,407	\$18,140,293	\$7,368,299
Baggage and express—				
Number.....	438	214	199	72
Value.....	\$3,642,629	\$1,105,779	\$806,185	\$238,554
Mail—				
Number.....	115	95	95	42
Value.....	\$1,497,824	\$600,912	\$576,230	\$197,465
Passenger ³ —				
Number.....	1,645	957	428	331
Value.....	\$19,577,866	\$7,209,425	\$2,955,517	\$1,975,469
Chair, dining and buffet, parlor, sleeping, and all other—				
Number.....	1,206	333	1,308	534
Value.....	\$19,237,459	\$4,913,491	\$13,712,361	\$4,956,811
Freight service—				
Number.....	116,650	73,177	100,616	116,590
Value.....	\$96,201,785	\$61,691,825	\$69,148,955	\$62,161,013
Box—				
Number.....	50,481	29,728	38,184	47,838
Value.....	\$40,932,538	\$23,982,446	\$28,508,632	\$26,562,893
Caboose—				
Number.....	340	537	160	193
Value.....	\$420,568	\$325,605	\$150,977	\$184,865
Flat—				
Number.....	4,781	3,222	5,412	4,525
Value.....	\$3,120,084	\$2,033,501	\$2,890,154	\$1,923,523
Gondolas—				
Number.....	25,077	19,607	9,518	11,821
Value.....	\$22,908,750	\$18,128,186	\$5,518,088	\$6,873,145
Hopper ⁴ —				
Number.....	9,734	11,473	27,998	28,837
Value.....	\$10,708,407	\$9,419,655	\$21,367,218	\$18,414,718
Refrigerator—				
Number.....	5,800	2,618	3,353	2,354
Value.....	\$8,007,062	\$2,747,357	\$3,042,835	\$1,956,097
Stock—				
Number.....	3,929	2,349	4,235	2,760
Value.....	\$2,587,065	\$1,566,008	\$2,463,123	\$1,426,800
Tank—				
Number.....	1,230	.....	.....	.....
Value.....	\$1,255,167	.....	.....	.....
Other varieties—				
Number.....	15,238	3,633	11,756	18,242
Value.....	\$6,272,144	\$3,268,167	\$5,214,932	\$4,818,970
Electric-railroad cars:				
Number.....	194	603	418	935
Value.....	\$711,198	\$2,023,922	\$994,654	\$1,090,854
Passenger—				
Number.....	161	558	331	902
Value.....	\$635,804	\$1,903,317	\$930,791	\$1,062,172
Other—				
Number.....	33	45	87	53
Value.....	\$75,394	\$120,605	\$63,863	\$28,682
All other products, value.	\$39,906,888	\$46,154,273	\$22,891,408	\$19,890,014

¹ In addition, 14,876 cars, valued at \$14,638,932, and parts and repairs, valued at \$90,074, were reported in 1914, and 23,693 cars, valued at \$19,362,855, and parts and repairs, to the value of \$210,487, were reported in 1909, by establishments engaged primarily in other industries.

² Includes gasoline motor cars for use as passenger cars by steam railroads for 1911 and 1906.

³ Reported as coal and coke cars in 1909, 1904, and 1899

⁴ Includes 9,737 logging, mining, industrial, and dump cars, valued at \$1,825,693.

⁵ Includes 25 cubic cars, valued at \$21,292.

assigned to this industry in 1914, there were 17 steam-railroad cars, valued at \$72,034, built by establishments engaged primarily in the manufacture of electric-railroad cars: 10,745 cars, valued at \$11,999,983, by repair shops of steam-railroad companies; and 4,114 cars, valued at \$2,566,915, by establishments engaged primarily in other in-

dustries, making a total of 14,876 cars, valued at \$14,638,932, as compared with 23,693 cars, valued at \$19,362,855 in 1909.

Of the total number of steam-railroad cars reported in 1914, 9.8 per cent were all-wood; 47.8 per cent, steel underframe; 3.3 per cent, steel body with wood interior; and 39.1 per cent, all-steel. A larger percentage of the passenger-service than of the freight-service cars were steel; \$4.8 per cent of the passenger-service cars were all-steel, and 9.7 per cent were steel body with wood interior. Of the freight-service cars, 49.1 per cent were steel underframe, of which 71.5 per cent were box cars, and 37.8 per cent were all-steel, of which 50.1 per cent were gondolas.

Railroad Repair Shops

Scope of the combined industry.—This industry is divided for census purposes into two classes—cars and general shop construction and repairs by steam-railroad companies, and cars and general shop construction and repairs by electric-railroad companies.

Every steam or electric railroad company of any magni-

The Railroad Repair Shops Divided by Value of Products

VALUE OF PRODUCT.	Census year.	Number of establishments.	Average number of wage earners.	Value of products.	Value added by manufacture.
All classes.....	1914 1909	1,362 1,145	339,518 282,174	\$514,041,225 405,600,727	\$270,212,618 206,187,315
Less than \$5,000.....	1914 1909	44 52	115 152	133,531 163,034	81,776 98,548
\$5,000 to \$20,000.....	1914 1909	154 149	1,584 1,515	1,865,296 1,760,888	1,202,354 1,124,545
\$20,000 to \$100,000.....	1914 1909	358 286	14,430 12,059	19,548,203 14,701,863	12,158,925 8,963,187
\$100,000 to \$1,000,000.....	1914 1909	684 564	168,586 152,534	237,177,633 199,863,116	133,985,665 109,493,358
\$1,000,000 and over.....	1914 1909	122 94	154,903 115,914	255,810,562 189,111,816	122,783,893 86,507,677
Per cent distribution:					
Less than \$5,000.....	1914 1909	3.2 4.5	(1) 0.1	(1) (1)	(1) (1)
\$5,000 to \$20,000.....	1914 1909	11.3 13.0	0.5 0.5	0.4 0.4	0.4 0.5
\$20,000 to \$100,000.....	1914 1909	26.3 25.0	4.3 4.3	3.8 3.6	4.5 4.3
\$100,000 to \$1,000,000.....	1914 1909	50.2 49.3	49.7 54.1	46.1 49.3	49.6 53.1
\$1,000,000 and over.....	1914 1909	9.0 8.2	45.6 41.1	49.7 46.6	45.4 42.0

¹ Less than one-tenth of 1 per cent.

tude operates one or more repair shops, chiefly for the purpose of maintaining the efficiency of the rolling stock. Such shops often manufacture complete cars and some of them manufacture complete locomotives. While the bulk of the work of the repair shops is on the rolling stock, they also do shopwork in connection with the construction and repair of bridges, buildings, etc. Most of the work done is on rolling stock operated by the company, but some companies do work of this character for others. The products are not ordinarily given a selling or contract value. The amount reported as the value for 1914 usually represented the cost of materials, salaries, wages, rent, and taxes. At prior censuses a miscellaneous expense item was reported, which to that extent increased the value of products. For steam-railroad repair shops this item amounted to \$3,946,043 in 1904 and \$5,886,066 in 1909, and for electric-railroad repair shops \$285,483 in 1904 and \$702,536 in 1909. The steam-railroad repair shops are far more important than the electric-railroad repair shops. In fact, measured

by the number of persons employed, they constitute one of the important industries covered by the statistics of manufactures.

Size of establishments.—The tendency of the industry to become concentrated in large establishments is indicated by the statistics given in Tables 29 and 30.

Fuel.—Coal is the principal class of fuel used in steam-railroad repair shops. In 1914, 506,696 tons of anthracite,

Railroad Repair Shops Divided by Number of Employees

WAGE EARNERS PER ESTABLISHMENT.	NUMBER OF ESTABLISHMENTS.				AVERAGE NUMBER OF WAGE EARNERS.			
	1914		1909		1914		1909	
	Per cent of total.				Per cent of total.			
	1914	1909	1914	1909	1914	1909	1914	1909
All establishments....	1,362	1,145	100.0	100.0	339,518	282,174	100.0	100.0
1 to 5 wage earners.....	76	87	5.6	7.6	234	281	0.1	0.1
6 to 25 wage earners.....	194	164	14.2	14.3	2,128	2,128	0.7	0.8
26 to 50 wage earners.....	202	148	14.8	12.9	6,840	4,953	2.0	1.8
\$1 to 100 wage earners.....	213	162	15.6	14.1	15,634	11,848	4.6	4.2
101 to 250 wage earners.....	287	238	21.1	20.8	45,788	37,217	13.5	13.2
251 to 500 wage earners.....	197	184	14.5	15.7	67,492	63,821	19.9	22.6
500 to 1,000 wage earners.....	131	122	9.5	10.7	91,941	84,619	26.8	30.0
Over 1,000 wage earners.....	62	44	4.6	3.8	109,986	77,237	32.4	27.4

and 5,486,405 tons of bituminous coal were consumed in this industry. The other fuel used was coke, 79,597 tons; oil, 2,508,703 barrels; and gas, 1,829,902,000 cubic feet.

Special Statistics of Repair Shops

Table 32 gives in detail the statistics of steam-railroad repair shops for 1914, 1909, 1904, and 1899.

The table shows fewer locomotives and cars built in steam-railroad repair shops in 1914 than during some of the earlier census years. The number of locomotives decreased by 85, or 31.2 per cent, from 1899 to 1914, and the number of cars built, by 16,188, or 60.1 per cent, but

Statistics of Railroad Repair Shops, 1899, 1904, 1909 and 1914

CLASS OF WORK.	1914	1909	1904	1899	CLASS OF WORK.	1914	1909	1904	1899
Total value.....	\$41,041,225	\$405,640,727	\$399,775,089	\$218,238,277	Car department, value—Contd.				
Motive power and machinery department, value.....	\$236,723,721	\$184,971,870	\$149,643,933	\$34,417,262	Cars built, value—Continued.				
Locomotives built—					Other—				
Number.....	187	213	148	272	Number.....	308	359	2,000	(1)
Value.....	\$3,594,003	\$3,289,110	\$1,833,939	\$3,276,303	Value.....	\$233,045	\$267,153	\$645,362	(1)
Repairs to locomotives, motors, etc.....	\$169,037,932	\$127,928,773	\$101,326,895	\$7,387,143	Repairs to cars of all kinds....	\$183,753,538	\$147,194,063	\$103,219,022	\$74,667,700
Work for other corporations.....	\$57,018,359	\$40,018,953	\$40,751,502	\$39,419,135	Work for other corporations....	\$14,819,084	\$8,784,239	\$6,946,560	\$7,184,877
All other products or work.....	123	218	314	390	All other products or work....	\$32,403,269	\$30,464,464	\$24,492,787	\$39,104,843
Car department, value.....	\$342,976,771	\$199,768,939	\$149,748,830	\$118,376,532	Bridge and building department (shopwork), value.....	\$3,127,644	\$2,799,898	\$5,096,141	\$1,414,000
Cars built, value.....	\$11,999,983	\$13,329,171	\$12,569,011	\$16,521,332	Repairs and renewals.....	\$2,449,821	\$1,886,737	\$4,351,487	\$1,887,170
Passenger—					Work for other corporations....	\$37,061	\$16,196	\$40,581	\$211,926
Number.....	123	218	314	390	All other products or work....	\$640,762	\$846,060	\$704,073	\$1,286,669
Value.....	\$1,233,302	\$1,291,334	\$2,337,977	\$1,141,733	All other products and work not classified, value.....	\$31,213,085	\$18,060,628	\$5,286,175	(1)
Freight—									
Number.....	10,314	13,972	11,712	26,543					
Value.....	\$10,513,676	\$11,767,664	\$10,086,612	\$15,079,619					

¹ Includes \$121,910 reported for Alaska.

¹ Not reported.

the total value of work done in these shops shows an increase of 135.5 per cent for the 15 years.

In 1914 the motive power and machinery department reported 46.1 per cent of the total value of products; car department, 47.3 per cent; bridge and building department, six-tenths of 1 per cent; and all other, or unclassified products, 6.1 per cent.

DAYLIGHT SAVING IN FRANCE will begin on Saturday, March 9, when all clocks will be set forward an hour at midnight.

Cinderella
Or the Little Coal Slipper

By B. L.

ONCE UPON A TIME, in the reign of good king Wudro, there was a man named Samuel who, on account of his easy-going nature, was generally known as Uncle Sam. He had a little daughter named Cinderella. She had a step-mother and besides two step-sisters called Industrie and Husbandrie, who hated little Cinderella because they did not want to share with her. They treated her like a servant and she had to fetch and carry everything; all the coal and wood, and goods of every kind that came into or out of Uncle Sam's house, Cinderella had to carry. They were constantly scolding her so that life was miserable for the poor child. The sisters dressed in rich gowns and went to balls and parties, while Cinderella had to stay at home in her torn and shabby clothes. Cinderella grew very fast, so that her clothes became too small for her, but every time she went to her step-mother and complained that her skirts had become too short and that her stockings were full of holes, her step-mother would say that five per cent more would make the skirts plenty long enough, and that she did not really need the stockings, reminding Cinderella that she was eating too much and suggesting many ingenious ways how Cinderella could do more work on less food.

It happened one evening that King Wudro gave a grand ball for his officers, who were going to the war, and invited Cinderella's step-sisters, who were now prouder than ever, but no one thought of the little girl at home, who felt so sad and lonely. Just as she was thinking how unhappy she was, her fairy godmother, Trafique, appeared before her.

"What troubles you, dearie?" she asked. "Would you like very much to go to the King's ball tonight?"

"O, very much, indeed!" answered Cinderella.

"Well," said her godmother, "you shall go and be the

most beautiful lady there. Fetch me a large pumpkin out of the garden" said the fairy. Cinderella, lest no time in doing as she was bid, bringing a venerable yellow pumpkin known as a "Gentlemen's Agreement." No sooner had the god-mother touched the pumpkin with her wand, then behold! it was changed into a grand carriage. She then had four mice brought in belonging to the Brotherhoods, which she turned into horses. Four lizards, who had been executives, became footmen, and a wise old rat was changed into a suave coachman.

Cinderella could hardly believe her eyes. Just as she

looked down at her ragged clothes the good fairy waved her wand over her, and there stood Cinderella in a most magnificent ball gown, looking more beautiful than ever. To complete the toilet, the fairy gave her a pair of tiny coal slippers, which fitted her dainty feet perfectly. The only drawback to Cinderella's costume was that for the sake of efficiency she had to wear also a union suit, and there was a terrible law in the kingdom, called the Sherman Act, which punished with death anyone wearing such a garment.

The fairy then warned Cinderella on no account to remain at the ball after 12 o'clock, for if she did all her finery and splendid livery would be changed back again and she would once more be the shabby Cinderella.

Prince Makadu, a most noble and active gentleman, was told that a beautiful princess had arrived and he hastened to greet her. He led her into the ball room, where everyone looked at the charming girl. The prince danced with Cinderella many times, for he had never seen so lovely a lady. Cinderella had such a delightful time that she forgot to watch the clock, and suddenly she heard twelve strokes ring out, her fairy garments began to give her the greatest anxiety and she heard a terrible voice, supposed to be that of the King's Executioner, crying out in a voice of thunder, "Are you wearing a union suit?" Without saying good-bye to the prince, she rushed from the palace, and in her haste lost one of the coal slippers, the only gift of the fairy's that had remained unchanged, for when she reached the door she found that at the sound of the terrible words she had heard, the coachmen and footmen had run away, and instead of the fine horses there were only four small mice, squeaking for over-time upon a minute basis.

The prince was very sad when he missed the beautiful princess. He ran to the gates to see if any trace of her could be found; but the only thing he saw was a little coal slipper which Cinderella had lost in her flight, and he vowed that he would marry the lady whose foot it fitted.

So the next day a herald went through the town, going from house to house to fit the dainty slipper. All the ladies tried it on, but no matter how hard they squeezed their feet, it did not fit. At last the herald arrived at Cinderella's home. Her two step-sisters quickly stepped forward but they could not possibly manage to move the coal. They were greatly disappointed, and just as they were about to give up the attempt they heard Cinderella's gentle voice asking, "Will you let me try?"

As soon as her dainty foot slipped into the fairy shoe, it fitted perfectly! Then to the surprise of all, she pulled the companion slipper out of her pocket and put it on the other foot. Cinderella was the only girl in the kingdom who could accomplish this movement of coal, or keep it on foot. Just at this moment the fairy god-mother appeared and waved her wand over Cinderella. There again stood the magnificent lady of the ball with her beautiful dress studded with anthracite. The herald was delighted to have found the charming princess for whom the prince had been searching. He took Cinderella to the palace and Prince Makadu was so happy that she could move the coal that he made no objection to her costume, but thought only of her efficiency.

He married her at once, so at last Cinderella became a real princess. In the bride's trousseau there was a beautiful garment of the finest silk, which fitted her from wrist to ankle, like a glove. You will have to guess what it was, but I can tell you this, it made Cinderella very efficient.

She and the Prince lived happily together for ever—perhaps it would be better to say—for ever since.

Gaines Wall and Firebox Efficiency

By Jno. D. Rogers

Shop Superintendent, Virginian Railway, Princeton, W. Va.

THE WRITER has had an opportunity during the past six years of observing the advantages of the Gaines type of firebox construction from a practical and operating standpoint, both on passenger and freight locomotives. In considering the design of modern power, the question of firebox proportion is of primary importance, and should be given the most careful consideration, keeping in mind the ratio of grate area to heating surface. In the past the grate area has been limited by the endurance of the firemen. Since the introduction of successful stokers, this is no longer a function of steam making capacity. We now have stokers successfully firing grates of 100 sq. ft. and over, with apparently no limit to even further increase in grate area. The most important factor in firebox design is having proper depth of throat sheet; this is limited by the wheel arrangement. Few modern locomotives can have the mud ring over the driving wheels without a sacrifice being made in the design of the ash pan, and in many cases, even with the use of trailer wheels, ash pans are designed in such a manner that they choke the grate, making them very difficult to clean, at the same time limiting the air opening to the underside of the grate.

The source of all trouble in many bad steaming locomotives is in the ash pan, yet the front end, bad coal, and improper firing get the blame. Most grate failures can be traced to fire on the flares of the ash pan, choking off the draft, and causing the grates to become overheated.

With the Gaines wall the depth of throat sheet does not have to be considered, as, regardless of the depth of the fire, flues cannot be affected, nor can the misuse of the blower combined with dirty coal, or dead fire, have the usual bad results; flues leaking on locomotives with this construction are unheard of, cold air cannot reach them, and the writer has known of locomotives in service two years or more without any work being performed on the flues; in fact, no more than inspection of firebox by the boiler-maker.

With all the advantages of the superheater there is no device that is more inefficient when the superheater flues are stopped up. To get results the flues have to be cleaned. This means every two or three trips. A green fireman may choke a full set of flues before he gets his train out of the yard by improper firing. It costs money to remove arches and blow flues. A great many locomotives could be turned "on the pit" if it were not for the flues being stopped up. I have no record of a locomotive equipped with a Gaines wall and combustion chamber having a flue choked; consequently the superheater operates at maximum efficiency, at the same time saving delay and expense at terminals. Most of the sparks are caught in the combustion chamber, which is easily cleaned at any time.

Even with the best designed fireboxes it is difficult to keep the bottom flues open, which means that a great part of this heating surface is continually out of service; at the same time choking these flues causes them to leak. A great proportion of our flue trouble can be traced to this source.

The Gaines type of firebox should be especially adapted to roads operating in terminals that have rigid smoke restrictions. The fact has been demonstrated that this firebox gives more complete combustion with the result that criticism from smoke inspectors is reduced to a minimum, while at the same terminals other locomotives cause frequent complaints. The Gaines walls, under most severe conditions, last from eight to twelve months, maintenance being simply a matter of patching the wall occasionally with fire clay.

MARACAIBO, VENEZUELA, IMPORTED RAILROAD MATERIALS valued at \$68,919 from the United States in 1915, and \$94,186 in 1916. The share of the United States in the import trade of this district rose from about 43 per cent in 1913 to 72 per cent in 1916.

Railroad Bill Sent to Conference for Final Adjustment

Period of Federal Control After War and Rate-Making Authority Still Points of Difference

WASHINGTON, D. C.

BY OVERWHELMING MAJORITIES both Houses of Congress have declared that the taking over of the railroads by the government is a war measure, that the legislation for their control is emergency legislation enacted to meet conditions growing out of the war, and that the existing system of government control shall continue only during the war and for not longer than a specified period thereafter. The question as to what the period shall be was referred to conferees appointed by the House and by the Senate after the railroad control bill was passed by the House on February 28, substantially in the form in which it was written by representatives of the administration and as passed by the Senate on February 22, but with differences on two important points and in several less important particulars. As passed by the Senate, the bill provided that the period of federal control shall continue for not longer than 18 months after the proclamation of peace terminating the war and the bill as passed by the House provided that it shall continue during the period of the war "and for a reasonable time thereafter, which shall not exceed two years next following the date of the proclamation." Both bills provide, in nearly identical language, that the President may, prior to July 1, 1918, relinquish control of all or any part of any railroad or system of transportation, further control of which he shall deem not needful or desirable; and the President may at any time during the period of federal control agree with the owners thereof to relinquish all or any part of any railroad or system of transportation. He may also relinquish all railroads at any time he shall deem such action needful or desirable and in such case no right to compensation shall accrue to the owners from the date of the relinquishment.

The administration had at first opposed fixing any definite time for the return of the roads to their owners, but apparently acquiesced in the idea of a time limit, when the opposition to such a plan became pronounced, and only 10 senators and 40 representatives voted for an indefinite period. Both bills contain the express declaration that nothing in the act is to be construed as expressing or prejudicing the future policy of the federal government concerning the ownership, control, or regulation of carriers or the method or basis of the capitalization thereof.

Affirmative action by Congress will, therefore, be required to prevent the return of the roads to their owners after the war, whereas under the terms of the bill as it was originally introduced, providing that the period of government control should continue until Congress ordered otherwise, a failure of Congress to agree as to the disposition of the roads would have meant an indefinite period of government control.

The House passed the bill by a vote of 336 to 6. Only two democrats and four republicans voted against it—Representatives Thomas, Kentucky; Gordon, Ohio; Chandler, Oklahoma; Dennison, Illinois; Hangen, Iowa; and Ramseyer, Iowa. It is understood that the leaders had planned to avoid a record vote on the bill but a roll-call was demanded by Representative Dennison. The Senate had passed the bill without a roll-call.

The Senate appointed as conferees Senators Smith, of North Carolina, Pomerene and Townsend, and the House appointed Representatives Sims, Doremus and Esch. Later Senators Robinson and Cummins were added.

The principal sections of the bill governing the method of compensation of the roads, on the basis of the average

net operating income for three years as the standard return as proposed by President Wilson, with provision for special treatment in exceptional cases, were not altered either by the House or by the Senate, but the House bill contained a provision omitted in the Senate, providing that the compensation should be increased by a percentage on the additional investment, estimated at about \$240,000,000, during the last half of 1917. It is understood that the conferees have agreed to eliminate this provision. The House bill did not include the Senate amendment that "there shall be no increase of compensation for any additions, improvements or betterments constructed out of or purchased by the earnings for investment or surplus earned during the period of federal control."

Another important question submitted to the conferees was as to whether the President or the Interstate Commerce Commission should have final authority over rates. The Senate bill provided that the President may initiate rates but that they shall be subject to review by the commission. The House bill also provided for a review by the commission of rates initiated by the President but authorized the commission merely to report its recommendations to the President.

The most important contests in the House were on the issues as to whether the President or the Interstate Commerce Commission should have final authority over rates and as to the period of federal control. In committee of the whole an amendment by Representative Sweet giving the authority to the commission was adopted by a vote of 164 to 157, but when a separate vote was taken before the final passage of the bill it was defeated 210 to 165, leaving the provision as reported by the committee. This authorized the President, when in his judgment it is necessary, to initiate rates by filing them with the commission and provided that they should be "fair, reasonable and just" and that the commission should hold hearings and make a report of its findings and recommendations (which shall prima facie be taken as correct) to the President for his final action. The Sweet amendment provided that the commission should retain its full jurisdiction over rates but, during the period of federal control, should "consider all the facts and circumstances growing out of unified coordinated federal control occasioned thereby."

An amendment proposed by Representative Esch to reduce the period of control after the war to one year was also adopted in committee of the whole, 143 to 11, but was defeated in the House 164 to 205. An amendment by Representative Barkley to leave the period indefinite was voted down 143 to 40. Representative London proposed to make the time 99 years, and received 4 votes, while there were 102 against it.

The playing of politics in connection with the bill was manifested in the votes on various amendments, rather than in the passage of the bill itself, particularly on the period of government control and on the rate-making power, the Republicans generally expressing themselves in favor of the shortest period of the continuance of the federal control system after the war and against giving the President power to control rates. There was a strong Republican line-up behind the Esch amendment to reduce the period after the war to one year, on the theory that this might possibly terminate the present system before the next Presidential election, but there was a surprising change in the

votes as taken in committee of the whole, where they were not recorded individually, and as taken separately just before the final passage of the bill. Some 16 Republicans from the western states where the Farmers' Non-Partisan League has a strong influence, with its advocacy of government ownership, voted for the Esch amendment, under cover of the non-recorded vote, but switched and voted against it when a roll-call was taken.

The House adopted an amendment similar to that of the Senate providing for the inclusion of short line roads in the federal system, providing that "every railroad not owned, controlled, or operated by another carrier company, and which has heretofore competed for traffic with a railroad or railroads of which the President has taken the possession, use and control, or which connects with such railroads and is engaged as a common carrier in general transportation, shall be considered as within federal control, as herein defined and necessary for the prosecution of the war, and shall be entitled to the benefit of all the provisions of this act."

In general the House bill contained more qualifications and restrictions on minor points than did the Senate draft. In the provision for the purchase of railroad securities by the President the House inserted, out of an abundance of caution, the words "out of the revolving fund created by this act," because some of the members objected to an unrestricted power. It was also provided that any securities so purchased shall be held by the Secretary of the Treasury, who shall, under the direction of the President, represent the United States in all matters in connection therewith in the same manner as a private holder thereof, and that the President shall make a detailed report of receipts and expenditures from the fund each year.

An amendment adopted on the motion of Representative Lenroot provides that no person employed in connection with the operation of railroads or systems of transportation under Federal control, except those persons referred to in the preceding paragraph of the bill which authorized the President to employ government agencies such as the Interstate Commerce Commission, shall be deemed to be an officer or employee under the United States within the meaning of the excess profits tax nor a civil employee of the United States within the meaning of the federal compensation act.

A section not in the Senate bill sought to protect short lines by providing that nothing in the act shall be construed to affect the routing instructions over and the traffic arrangements of such railroads as may not be taken over unless such arrangements and instructions prejudice the transportation of war materials or of government supplies.

The House was also more cautious than the Senate in its amendments of the section numbered 10 in the Senate bill and 11 in the House bill. The former provides that "carriers while under federal control shall, in so far as is not inconsistent therewith, or with the provisions of this act, or any other act applicable to such federal control, or with any order of the President, be subject to all laws and liabilities as common carriers," and that "suits may be brought by and against such carriers and judgments rendered as now provided by law." The House omitted the words "in so far as is not inconsistent therewith, or with the provisions of this act, or any other act applicable to such federal control, or with any order of the President." It also added that "no defense shall be made thereto upon the ground that the carrier is an instrumentality or agency of the federal government," and that "any final judgment heretofore rendered or that hereafter may be rendered against any common carrier under federal control shall be paid out of the sum accruing as compensation to the carrier against which such judgment is or was obtained."

Another section declares moneys and other property derived

from the operation of the carriers during federal control to be the property of the United States but provides that unless otherwise directed by the President such moneys shall not be covered into the treasury, but shall remain in the custody of the same officers and be accounted for in the same manner as before federal control.

A provision of the House bill not in the Senate draft provides that the owners of a railroad making an agreement with the President for compensation shall accept all the terms and conditions of the act and any regulations or order made by or through the President under authority of the act or of the act of August 29, 1916, under which the President took over the roads.

The House also added by a vote of 31 to 24 an amendment proposed by Representative Parker of New Jersey providing that overlapping and deferred accounts and claims, which are usually paid as current operating expenses, shall be paid out of operating income and on the surrender of the carriers they shall be returned subject to any such overlapping accounts.

The conferees expected to reach an agreement at a night session on Wednesday. An agreement fixing the period of government control after the war was reached on Wednesday, and, after a conference with the President, Senator Smith announced that he had a compromise plan as to the rate making authority to propose which he thought would be accepted. Under this plan the Interstate Commerce Commission would continue to have jurisdiction over rates that would be required to take into consideration increased expenses.

Demurrage on Heatless Days

THE INTERSTATE COMMERCE COMMISSION, Division No. 2, has issued a set of rulings on various questions which have arisen as to the application of demurrage rules and storage charges on the fuelless days designated by the Fuel Administration order of January 17. The questions were as follows:

First.—May the fuelless days designated by the Fuel Administrator be considered legal holidays as that term is used in the demurrage code?

Second.—Should demurrage charges be collected on a shipment such as asphalt which arrived at destination on January 18 and which because of its consistency could not be unloaded without first being heated and which was not heated because of the consignee's understanding of the Fuel Administrator's order?

Third.—Should demurrage charges be collected on cars containing freight which could not be loaded or unloaded without the use of a derrick operated by power derived from fuel?

Fourth.—Should demurrage charges be collected on shipments to a large industrial concern which could not load or unload them without certain inter-plant switching which could not be performed without power derived from fuel?

Fifth.—Should storage charges be assessed on less-than-carload freight which was not removed because an industry completely ceased operation on the fuelless days as the result of its understanding of the Fuel Administrator's order and of the instructions of the local fuel administrator?

It was held, as to the first question, that the fuelless days designated by the Fuel Administrator may not be considered legal holidays as that term is used in the demurrage code.

As to the second and third questions, it was held that a particular shipper's understanding of the Fuel Administrator's order is not conclusive, as different shippers may

construct the order differently; and that in cases where power or heat derived from fuel is necessary and customary for loading or unloading property, cars arriving and set for loading or unloading on January 18 should be treated exactly as though set for loading or unloading on January 23. In other words, in the circumstances of these cases, no demurrage charge should be assessed.

As to the fourth question, it was held that demurrage charges should be collected on shipments to industrial concerns which failed to load or unload cars because it is alleged that they were prevented by the Fuel Administrator's order from using locomotives for inter-plant switching. The Commission does not consider that there was any prohibition upon the plant locomotives from using power where necessary for loading or unloading any more than there was a prohibition against the use of locomotives for general railroad business.

As to the fifth question, it was held that storage charges should be assessed on less-than-carload freight not moved because the industry ceased operation on the fuelless days as the result of its interpretation of the Fuel Administrator's order, or the instructions of the local fuel administrator.

R. S. Lovett Director of Betterments and Additions

DIRECTOR GENERAL McADOO has announced the creation of an additional division in his organization, that of Betterments and Additions, and has appointed Judge Robert S. Lovett director of the new division. Judge Lovett has resigned as chairman of the executive committee of the Union Pacific, and has severed his connections with all other corporate interests to devote himself exclusively to his new work for the government. He has also resigned as a member of the War Industries Board of the Council of National Defense.

As director of the Division of Betterments and Additions of the Railroad Administration, Judge Lovett will receive and pass upon the reports made by the railroads as to their budgets of necessary expenditures for improvements and in general will have supervision over capital expenditures.

Judge Lovett was born June 22, 1860, at San Jacinto, Texas. He entered railway service in 1884 as local attorney of the Houston East & West Texas. Since then he has been consecutively assistant general attorney and general counsel for the Texas & Pacific; general counsel of the Southern Pacific lines in Texas, while a member of the law firm of Baker, Botts, Baker & Lovett; president of the Houston & Texas Central, and general counsel of the Union Pacific-Southern Pacific system, and from 1904 to 1909 was vice-president and general counsel for the same roads. Since September 13, 1909, he has been chairman of the executive committee of the Union Pacific System. From October 21, 1909, to October 1, 1911, he was also president of the same system. From September 13, 1909, to January, 1913, he was also chairman of the executive committee of the Southern Pacific Company. Judge Lovett



R. S. Lovett

has been in Washington since shortly after the United States entered the war, and has been chairman of the priorities committee of the War Industries Board. He was also, until the government took over the railroads, director of priority in transportation.

Chicago-St. Louis Passenger Service Rearranged

ON RECOMMENDATION OF R. H. AINSWORTH, regional director for the western railroads, Director General McAdoo has provided a plan for the rearrangement of passenger train service between Chicago and St. Louis on a non-competitive basis. There are at present 15 passenger trains between the two cities, many of which leave at the same hour over different railroads. The new plan, which is to become effective on March 17, contemplates a reduction to nine trains more evenly distributed throughout the day, and provides that tickets shall be made interchangeable so that the traveling public will be afforded increased train facilities. The day trains are arranged to run from 9:00 a. m. until 12:00 noon, and the night trains from 9:00 p. m. until 11:50 p. m. on the following schedule:

Southbound		
Railroad	Leave Chicago	Arrive St. Louis
Illinois Central	9:00 a. m.	6:00 a. m.
Chicago & Eastern Illinois	10:00 a. m.	6:00 p. m.
Chicago & Alton	10:55 a. m.	6:00 p. m.
Wabash	12:00 p. m.	7:57 p. m.
Chicago & Alton	9:00 p. m.	7:00 a. m.
Illinois Central	9:45 p. m.	7:55 a. m.
Wabash	10:00 p. m.	7:30 a. m.
Chicago & Alton	11:00 p. m.	7:45 a. m.
Chicago & Eastern Illinois	11:30 p. m.	7:40 a. m.
Northbound		
Railroad	Leave St. Louis	Arrive Chicago
Illinois Central	8:55 a. m.	5:15 p. m.
Chicago & Eastern Illinois	9:00 a. m.	5:30 p. m.
Chicago & Alton	12:05 p. m.	7:45 p. m.
Wabash	1:05 p. m.	7:45 p. m.
Chicago & Alton	9:00 p. m.	7:00 a. m.
Illinois Central	9:45 p. m.	7:15 a. m.
Wabash	10:00 p. m.	7:30 a. m.
Chicago & Alton	11:00 p. m.	7:45 a. m.
Chicago & Eastern Illinois	11:30 p. m.	7:40 a. m.

This provides for three morning, one noon and five night trains from Chicago to St. Louis, and two morning, two noon and five night trains from St. Louis to Chicago. This schedule curtails excessive service formerly offered to the public under competitive conditions, but has been arranged so as to leave service which will be entirely adequate, while effecting a total saving of 15,706 train miles per month, an estimated saving in coal of 9,558 tons per month. The traveling public will have a choice of a greater number of hours of departure and arrivals than heretofore by using the road which has a train at the desired time, and the reduction will have an effect in reducing considerably the interference with freight traffic by passenger trains. The total cost per month of the service to be reduced is estimated at \$76,310.

Consideration has been given by Mr. McAdoo's staff and by the regional directors to similar plans of rearrangement of service between other important cities, announcement of which is expected shortly.

NEW JAPANESE SERVICE TO SOUTH AMERICA—Announcement is made by the Nippon Yusen Kaisha that it has definitely decided to open a new service to South America. With three steamers, each of 6,000 tons gross, the service will be operated every two months, making six round trips a year. Among the principal ports of call are Yokohama, Kobe, Singapore, Durban, Cape Town, Santos, Rio de Janeiro, and Buenos Aires.

General News Department

The Wisconsin & Michigan announces that its operating headquarters have been moved from Peshtigo, Wis., to Menominee, Mich.

The paint shop of the Florida East Coast, at St. Augustine, Fla., together with five passenger cars, was destroyed by fire on February 19.

Daniel Willard, president of the Baltimore & Ohio, has been again chosen chairman of the Advisory Commission of the Council of National Defense.

Gordon Grant, formerly chief engineer of the National Transcontinental Railway, of Canada, has been appointed adviser to the Canadian Minister of Railways, a new office created by the Dominion government.

Twenty two hundred and forty men from the Pacific system of the Southern Pacific are now serving their country in the army or navy. This is 366 more than had joined the colors at the time that the statistical issue of the *Railway Age* was published (January 4).

Free transportation for soldiers is proposed in a bill which Representative Steenerson has introduced in Congress. He would authorize free transportation for both officers and men, of the Army, the Navy and the Marine Corps, when on furlough, to and from their homes.

Albert J. Stone, operating vice-president of the Erie, has been appointed Assistant to A. H. Smith, Regional director, Eastern territory, United States Railroad Administration; headquarters, Grand Central Terminal, New York City; D. C. Porteus, secretary of the Seaboard Air Line, has been appointed assistant to John Skelton Williams, director of the Divisions of Finance and of Purchases of the Railroad Administration.

Exportation of railway material to Spain has been the subject of negotiations between the War Trade Board and the Spanish government, now nearly completed, providing for the exportation of a large amount of materials and supplies from the United States to be used in the rehabilitation of the Spanish railroads; this in return for assistance from Spain in furnishing supplies to the American Army in France and in the use of Spanish ships for some of our ocean traffic.

Obsolete or obsolescent locomotives may be useful somewhere, and Director General McAdoo has addressed a circular letter to the presidents of Class I railroads asking for information regarding all locomotives which are not in service by reason of age, condition, size, weight, etc., but which, if in good condition or properly repaired, could be used to advantage on roads of less traffic density or more favorable operating conditions. Information is asked regarding the character of the engines, their power and dimensions, general condition of boilers, fire boxes and machinery, and approximate cost of repair.

The Morkrum rapid telegraph is being installed on a number of important circuits of the Pennsylvania Railroad. The Pennsylvania already has rapid printing telegraphs in operation on lines between Pittsburgh and Philadelphia, between Altoona and Philadelphia, and between Washington and Philadelphia. All of these printing systems are worked on telephone trunk circuits. Most of the operators are women or boys. In the transmission of car reports and other reports to be copied on printed forms, the printing telegraph instrument records them on regular message forms and from these the receiving operator transcribes the figures to the form on which the code letters are printed.

Railroad Employees' Income Tax Returns are the subject of a circular which has been issued by Director General McAdoo. It appears that, numerous railroad employees who are not paid fixed annual salaries have not kept accurate

records of their earnings for the calendar year 1917, and, therefore, find it difficult to make an accurate return under the law. The director general asks the railroads to give to each employee who does not receive a fixed annual salary and who is included in the railroad's report to the collector of internal revenue, a statement as to the amount of compensation shown in such report as having been received by him, in order to facilitate the making of accurate tax returns.

Requirements for steel rails during the current year, is a subject concerning which Director-General McAdoo has asked for information from the railroads. A circular has been addressed to the presidents of all Class I carriers asking them to send information to the Interstate Commerce Commission showing the number of gross tons of new rail placed in track during the calendar year 1917, the estimated amount required for 1918, separately for maintenance and construction, the minimum amount required to maintain track in safe condition during the year, the tonnage contracted for delivery, including that due on previous contracts or carried over on contracts for the previous year, and the tonnage of rail on hand on January 1.

A train of sixty automobile freight trucks, started from Buffalo, New York, by the War Department on February 12 reached New York city, about 440 miles, on February 28, having encountered serious delays because of bad roads. The trucks were two weeks in reaching Amsterdam, about 260 miles. On one day they accomplished only six miles: the longest day's run was 77 miles. Snow from 3 ft. to 5 ft. deep was encountered in many places and the roads, for considerable distances, were not wide enough for the five-ton trucks. On one occasion, the men in charge, 170 of them, had to sleep in the trucks, having found it impossible to reach a town. One man was injured while chopping ice away from truck wheels and one truck fell down a 60-ft. embankment. These trucks were loaded with automobile parts, consigned to the War Department storehouse at Baltimore, Md.

Contractors on new subway construction work in New York City are facing serious financial perplexities because of the high prices of material and of wages, and scarcity of help; and the Public Service Commission of the state has called upon the city authorities to join the commission in devising measures of relief. The number of men now at work for the contractors is about 7,000, as compared with an average of 12,000 in April, 1917; and those now at work are being constantly offered better pay elsewhere. The Public Service Commission fears a complete stoppage of the work, and consequent delay in the opening of the new routes, which would impose upon the city great losses. Remedial legislation is needed at once. The contractors are said to be willing to complete the unfinished work on the basis of cost of labor and materials, without profit. The Public Service Commission, in its annual report, issued in January, expected that some 40 or 50 miles of tracks in the new subways would probably be opened for traffic early in this year. The completion of these lines has been much delayed by the contractors' difficulties.

Railroad Contributions

The Railroad Administration, under the direction of C. A. Prouty, director of the division of public service and accounting, is conducting an investigation to determine whether and to what extent during the period of government control railroads should continue to make contributions to the support of associations of commerce, boards of trade and similar civic organizations. Railroads have not only become members of such associations, paying dues in the same way that other members do, but they have also in some cases made special contributions; and, in order to determine his policy in the matter, the Director General is collecting information as to the character of the practice and the

amount of money involved. For this purpose a circular letter has been addressed to various organizations asking them to furnish the names of railroads; whether the amount of dues is determined by rules or by-laws of the organization, or whether it is voluntarily determined by the railroad, and whether there is any limitation as to the use to which the contribution shall be put.

Railroad Wage Commission

A special session of the Railroad Wage Commission was held on February 28 at Washington to hear testimony by Miss Pauline Goldmark, representative of the Consumers' League of New York, and other organizations, regarding the employment of women in railroad work. She said that women first were employed in any considerable number by the railroads about a year ago, at the instance of the Railroads' War Board, and that while they were at first employed for clerical and other light work they have since been employed in increasing numbers for heavier work in freight yards, track repairs and shops. Some of this work, she said, involved too great a physical strain, as in cases where they are required to lift heavy weights.

Bolsheviki Destroy Bridges on Trans-Siberian

Advices received at Washington Monday indicated that German controlled Bolsheviki elements in Siberia had begun operations to prevent Japan and the Entente Allies from controlling the eastern end of the Trans-Siberian Railroad. John F. Stevens, chairman of the American Railway Commission, reported to the state department that the Russians had begun destroying bridges on the Trans-Siberian between Lake Baikal and the Manchurian frontier. It is believed that this action is aimed at preventing any advance of Japanese troops to carry out police duties.

All the bridges on the railroad have been permanently mined for some time. Russians believe that the Bolsheviki may blow up many of these structures. The Bolsheviki, they insist, will pursue the same tactics toward the Japanese as they have against the Germans, and will refuse to recognize them as friends.

Minnesota Appeals for Cars

The State Public Safety Commission of Minnesota recently sent a personal appeal to President Wilson for cars needed to move 13,000,000 bushels of potatoes from northern Minnesota. The text of the telegram, which was signed by Governor Burnquist and the chairman of the commission reads, in part, as follows:

"Minnesota, in response to requests from your administration and as a patriotic duty, produced 33,000,000 bushels of potatoes last year; 13,000,000 bushels on hand are spoiling for want of a market, but principally for the want of refrigerator cars to move them. Cannot the supply division of the quartermaster's department furnish an immediate outlet for a large part of the same and the director of railways furnish transportation to move this enormous supply of valuable foodstuffs? Failure to do so at once means destruction of the supply and a small acreage this year. All other sources of relief but your good self have been appealed to without success. Here is an opportunity to cut red tape and produce results."

Thirty-seventh Regiment Electrical

Engineers, Being Recruited

A regiment of electrical engineers is being recruited in Chicago as rapidly as possible for service in France. The selection of the staff of commissioned officers has practically been completed, though the selection of non-commissioned officers has not been made and the men who enlist will have chances for these places. Men who are skilled in the following trades will be enlisted: Cooks, machinists, blacksmiths, metal workers, foundrymen, patternmakers, plumbers, electricians, pipe fitters, draftsmen, storemen, carpenters, welders, boilermakers, bricklayers, masons, chauffeurs, handymen and linemen. The regiment will also need operators of oil, steam and gasoline engines and electrically driven pumps.

The regiment will be known as the 37th Engineers and will be commanded by Col. Theodore A. Dillon, an officer of the Engineering Corps of the Regular Army, who has been relieved

from duty as electrical engineer of the Panama Canal to command this regiment. A special recruiting office has been opened at 120 West Adams St., Chicago, in charge of Major Arthur B. Kratz, Engineer Officers' Reserve Corps, also formerly on the Panama Canal.

West in Need of Cars

At a conference in Washington last week with Director-General McAdoo and the other regional directors, R. H. Ashton, in charge of western lines, made an appeal for additional cars for his territory to take care of emergency movements. Cars are especially needed to move potatoes from the northwest and live stock from Iowa, Illinois and South Dakota. As a result of the meeting it was decided to deliver a thousand cars a day to western roads until further notice.

The special trainload movements of flour, grain and meat, arranged for by the western regional director in co-operation with the United States Food Administration, and outlined in the *Railway Age* of March 1, page 473, have been carried out according to schedule and are proving an excellent method of taking care of export demands. Priority is still being given to the movement of grain in 11 western states and, since February 22, priority has been extended to cover farm implements, incubators, egg cases and egg case fillers.

Railroad Commission Investigates Possible Economies

The Railroad Commission of California recently completed an investigation of possible economies of operation of transportation companies in that state during the war. In a report handed down on February 9, the commission made a number of recommendations, including the following:

1. Labor Shortage: To obtain needed unskilled labor the Federal government should remove the entrance tax and suspend the literacy test to permit the importation of Mexican labor. The importation of Oriental labor is not necessary in view of the availability of Mexican labor. To obtain skilled labor universities and technical schools should establish courses in railroad shopwork, including practical training in railroad shops.
2. Competition: No construction work on competitive lines unless so far progressed that stoppage would entail a considerable loss, instead, use existing facilities jointly.
3. Priority: All orders should be handed to the railroads through one central bureau.
4. Cross-hauls: Steps should be taken to do away with all unnecessary cross-hauls.
5. Franchise Requirements: State, county and city government authorities not to require utilities, during the present emergency to live up to franchise requirements which call for improvements that are not absolutely necessary in the operation of the public utility affected.
6. Supplies: The establishment of a priority by the Federal government as between requirements of railroads of the United States and orders for foreign governments and industries in this and other countries.
7. Reconsignment: Suspension of this privilege on all commodities with the exception of perishable products and the reconsignment of such privileges on perishable products to a minimum.
8. Team Tracks: All existing team tracks to be used jointly by any carrier which is able to reach them.
9. Short Haul Freight: All short haul freight, particularly less than carload shipment, to be handled by inland water transport, trolley companies, interurban electric lines and motor tracks.
10. Advertising: The considerable expense incurred by railroads in advertising could be materially reduced without impairment of efficiency.

American Gear Manufacturers' Association

"Gear Standardization" will be the principal subject of discussion at the second annual convention of the American Gear Manufacturers' Association, to be held at Green Brier Hotel, White Sulphur Springs, W. Va., on April 18, 19 and 20. An address by a representative of the United States Chamber of Commerce, of which the association has just become a member, will also bring matters of timely interest before the association.

The convention will begin with meetings of committees on Thursday morning, April 18. At 1:30 the first session will open with an address by President F. W. Sinram, "The A. G. M. A.—Past, Present and Future." Following the address by the Chamber of Commerce representative, C. R. Pool will talk on "Hardening and Heat Treating of Gears" and F. Watrous will present the report of the Standardization Committee.

Friday morning's session will include reports of officers and committees, election of new members of the Executive Committee and miscellaneous business. An informal banquet will be held in the evening.

On Saturday morning a paper on "Uniform Cost Accounting" will be presented by J. H. Dunn, and on "Hobs and Hobbing Machines" by a representative of the Barber-Coleman Company.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER, 1917.

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating (inc. or loss) last year.	Increase (or decr.) last year.
		Freight.	Passenger.	(inc. misc.)	Maintenance of way and structures.	Traffic.	Trans- portation.							General.
Atchafalaya, Toledo & Smt. Pk.	9,629	\$7,989,848	\$3,029,433	\$12,308,969	\$1,416,922	\$-3,032,551	\$234,634	\$8,134,015	66.08	\$4,172,940	\$982,006	\$1,192,140	\$192,870
Atlantic City	1,700	1,875,584	310,040	2,242,750	1,910,111	1,530,231	224,624	3,341,274	72.83	873,701	153,370	770,230	333,640
Baltimore & Ohio	87,829	1,875,584	310,040	2,242,750	1,910,111	1,530,231	224,624	3,341,274	72.83	873,701	153,370	770,230	333,640
Boston & Maine	2,065,966	10,650,458	4,993,348	15,643,806	4,456,400	5,556,400	2,242,750	20,402,550	70.11	30,589,107	4,455,520	26,112,068	1,333,640
Central of New England	2,305	6,237,818	4,278,763	10,516,581	2,193,389	1,005,621	38,359	2,949,357	84.24	1,261,931	455,298	1,839,241	19,846
Central Vermont	411	246,108	247,969	494,077	70,083	46,213	1,366	189,786	74.54	108,158	21,366	1,088,417	59,714
Chicago, Terre Haute & S. F.	2,478	3,513,882	850,986	4,240,933	556,467	702,276	5,621	1,222,354	85.38	47,840	33,653	14,790	1,088,417
Chicago & North Western	3,314,283	22,469	364,391	37,899	80,439	4,728	1,394,524	102,291	3,185,452	67.19	1,555,492	317,370	1,237,979
Cleveland, Columbus & Cincinnati	3,386	2,665,984	1,185,664	3,849,228	113,796	756,759	75,990	2,054,254	73.65	31,226,177	32,061	37,731	34,763
Calv. Harrisburg & San Ant.	1,310	1,150,568	561,647	1,712,215	398,200	176,853	39,032	586,921	29.81	1,283,781	269,151	161,528	343,348
Houston, East & West Tex.	334	326,546	159,009	537,113	102,926	19,526	12,741	347,153	64.63	189,979	8,647	181,724	524,696
Houston & Texas Cent.	90	125,423	53,143	187,339	7,680	23,190	19,296	225,188	12.74	37,153	87,301	171,668	20,916
Kansas City & Memphis	2,010	2,011,000	507,887	2,518,887	35,382	35,382	8,750	300,538	33.38	87,301	153,007	402,525	122,145
Kanawha & Mich.	176	24,054	10,116	36,969	4,146	75,858	4,706	107,050	72.45	33,595	35,047	43,738	23,991
La. Western	207	199,004	126,812	325,816	14,993	38,175	8,459	216,871	42.22	201,592	35,047	43,738	23,991
La. & Tex. R. R. & S. C.	40	482,879	185,772	706,291	109,933	38,175	8,459	216,871	52.78	333,484	154,932	104,485	23,009
St. L.-San Fran.	284	1,222,283	404,776	1,659,226	25,065	37,712	13,498	216,871	70.47	48,845	7,791	40,964	56,534
St. Louis & North Western	6,884	1,005,087	1,005,087	2,010,174	1,433,643	2,010,174	242,127	3,455,659	66.34	116,941	1,005,087	1,005,087	1,005,087
New York, N. H. & H.	1,996	2,005,637	1,095,087	3,100,724	1,172,435	47,597	47,597	2,780,003	53.79	4,338,549	1,268,051	7,168,990	1,271,954
Nor. Pac.	6,534	5,908,038	2,388,750	179,300	1,566,020	107,171	2,800,862	155,594	4,368,212	65.58	1,181,582	3,067,800	3,067,800
Ohio & Reading	1,127	4,054,302	669,152	4,723,454	46,553	279,298	91,129	4,804,262	84.49	790,891	1,074,000	1,414,930	1,831,528
Pitts. & W. Va.	224	1,874,313	207,637	1,940,318	215,716	1,075,353	46,553	2,790,318	84.49	790,891	1,074,000	1,414,930	1,831,528
Pitts. & W. Va. (cont.)	224	1,874,313	207,637	1,940,318	215,716	1,075,353	46,553	2,790,318	84.49	790,891	1,074,000	1,414,930	1,831,528
Port Reading	81	104,192	10,804	127,419	34,627	2,992	1,197	875,318	4.38	1,560,067	380,231	1,049,891	1,049,891
Rich. Fred. & Potomac	21	105,221	272,824	378,045	7,328	40	134,863	19,158	17.97	104,519	11,601	92,917	306,745
St. L.-San Fran. (cont.)	284	1,222,283	404,776	1,659,226	16,005	58,053	4,130	191,958	56.45	118,823	10,669	129,492	115,114
St. Louis & North Western (cont.)	4752	3,005,229	1,797,827	4,803,056	8,491,728	67,942	1,936,457	140,933	69.72	1,94,462	183,602	330,852	123,630
Toledo, Portland & Seattle	554	343,245	170,373	513,618	502,286	84,917	10,743	1,609,141	56.06	248,610	54,153	1,005,983	411,174
Union Pac.	468	367,774	67,293	435,067	39,026	51,490	10,743	1,609,141	61.18	229,613	41,479	167,219	38,613
Union Pac. (cont.)	435	465,762	82,993	548,755	89,023	128,422	10,165	205,427	96.17	22,342	58,769	3,451	27,012
Wash. Stat.	3,635	5,068,063	1,333,772	7,082,019	1,034,358	120,794	120,794	250,698	62.50	2,655,964	258,769	2,062,281	330,730
Wash. Stat. (cont.)	35	76,841	232,352	435,943	15,723	21,374	4,504	104,621	36.30	277,704	95,904	181,798	118,788

CALENDAR YEAR 1917

Atchafalaya, Toledo & Smt. Pk.	8,642	\$98,801,488	\$30,907,445	\$140,978,936	\$19,500,743	\$-23,544,438	\$2,317,637	\$127,608	\$27,114,599	\$88,501,050	\$10,661,868	\$41,792,443	\$899,914
Baltimore & Ohio	170	1,310,377	186,688	3,215,426	3,555,643	2,570,426	440,627	5,627,131	3,016,888	3,241,274	72,833	873,701	153,370
Boston & Maine	2,065	10,650,458	4,993,348	15,643,806	4,456,400	5,556,400	2,242,750	20,402,550	70.11	30,589,107	4,455,520	26,112,068	1,333,640
Central of New England	2,305	6,237,818	4,278,763	10,516,581	2,193,389	1,005,621	38,359	2,949,357	84.24	1,261,931	455,298	1,839,241	19,846
Central Vermont	411	246,108	247,969	494,077	70,083	46,213	1,366	189,786	74.54	108,158	21,366	1,088,417	59,714
Chicago, Terre Haute & S. F.	2,478	3,513,882	850,986	4,240,933	556,467	702,276	5,621	1,222,354	85.38	47,840	33,653	14,790	1,088,417
Chicago & North Western	3,314,283	22,469	364,391	37,899	80,439	4,728	1,394,524	102,291	3,185,452	67.19	1,555,492	317,370	1,237,979
Cleveland, Columbus & Cincinnati	3,386	2,665,984	1,185,664	3,849,228	113,796	756,759	75,990	2,054,254	73.65	31,226,177	32,061	37,731	34,763
Calv. Harrisburg & San Ant.	1,310	1,150,568	561,647	1,712,215	398,200	176,853	39,032	586,921	29.81	1,283,781	269,151	161,528	343,348
Houston, East & West Tex.	334	326,546	159,009	537,113	102,926	19,526	12,741	347,153	64.63	189,979	8,647	181,724	524,696
Houston & Texas Cent.	90	125,423	53,143	187,339	7,680	23,190	19,296	225,188	12.74	37,153	87,301	171,668	20,916
Kansas City & Memphis	2,010	2,011,000	507,887	2,518,887	35,382	35,382	8,750	300,538	33.38	87,301	153,007	402,525	122,145
Kanawha & Mich.	176	24,054	10,116	36,969	4,146	75,858	4,706	107,050	72.45	33,595	35,047	43,738	23,991
La. Western	207	199,004	126,812	325,816	14,993	38,175	8,459	216,871	52.78	333,484	154,932	104,485	23,009
La. & Tex. R. R. & S. C.	40	482,879	185,772	706,291	109,933	38,175	8,459	216,871	52.78	333,484	154,932	104,485	23,009
St. L.-San Fran.	284	1,222,283	404,776	1,659,226	25,065	37,712	13,498	216,871	70.47	48,845	7,791	40,964	56,534
St. Louis & North Western	6,884	1,005,087	1,005,087	2,010,174	1,433,643	2,010,174	242,127	3,455,659	66.34	116,941	1,005,087	1,005,087	1,005,087
New York, N. H. & H.	1,996	2,005,637	1,095,087	3,100,724	1,172,435	47,597	47,597	2,780,003	53.79	4,338,549	1,268,051	7,168,990	1,271,954
Nor. Pac.	6,534	5,908,038	2,388,750	179,300	1,566,020	107,171	2,800,862	155,594	4,368,212	65.58	1,181,582	3,067,800	3,067,800
Ohio & Reading	1,127	4,054,302	669,152	4,723,454	46,553	279,298	91,129	4,804,262	84.49	790,891	1,074,000	1,414,930	1,831,528
Pitts. & W. Va.	224	1,874,313	207,637	1,940,318	215,716	1,075,353	46,553	2,790,318	84.49	790,891	1,074,000	1,414,930	1,831,528
Pitts. & W. Va. (cont.)	224	1,874,313	207,637	1,940,318	215,716	1,075,353	46,553	2,790,318	84.49	790,891	1,074,000	1,414,930	1,831,528
Port Reading	81	104,192	10,804	127,419	34,627	2,992	1,197	875,318	4.38	1,560,067	380,231	1,049,891	1,049,891
Rich. Fred. & Potomac	21	105,221	272,824	378,045	7,328	40	134,863	19,158	17.97	104,519	11,601	92,917	306,745
St. L.-San Fran. (cont.)	284	1,222,283	404,776	1,659,226	16,005	58,053	4,130	191,958	56.45	118,823	10,669	129,492	115,114
St. Louis & North Western (cont.)	4752	3,005,229	1,797,827	4,803,056	8,491,728	67,942	1,936,457	140,933	69.72	1,94,462	183,602	330,852	123,630
Toledo, Portland & Seattle	554	343,245	170,373	513,618	502,286	84,917	10,743	1,609,141	56.06	248,610	54,153	1,005,983	411,174
Union Pac.	468	367,774	67,293	435,067	39,026	51,490	10,743	1,609,141	61.18	229,613	41,479	167,219	38,613
Union Pac. (cont.)	435	465,762	82,993	548,755	89,023	128,422	10,165	205,427	96.17	22,342	58,769	3,451	27,012
Wash. Stat.	3,635	5,068,063	1,333,772	7,082,019	1,034,358	120,794	120,794	250,698	62.50	2,655,964	258,769	2,062,281	330,730
Wash. Stat. (cont.)	35	76,841	232,352	435,943	15,723	21,374	4,504	104,621</					

REVENUES AND EXPENSES OF RAILWAYS

CALENDAR YEAR 1917 Continued

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Total Operating revenues, Maintenance of way and structures, Equipment, Traffic, Trans- portation, Total, Operating ratio, Net operating, Railway acc'rals., Operating income, Increase over last year.

Chicago operation April 1, 1918.
Bureau operation November 1, 1917.

Railway Regiments' Tobacco Fund

During the past week one new subscription to the Railway Regiments' Tobacco Fund for \$10 a month for 12 months was received from the Rome Iron Mills, Inc., New York; a donation of \$20 was made by the McConway & Torley Company of Pittsburgh, and a second contribution of \$100 was received from the Chicago Railway Equipment Company, Chicago.

American Institute of Consulting Engineers

The Council of the American Institute of Consulting Engineers, on February 19, elected the following officers for the ensuing year: President, Lewis B. Stillwell; vice-president, Alexander C. Humphreys; secretary and treasurer, F. A. Molitor (35 Nassau street, New York). The new members of the Council elected at the annual meeting are J. Vipond Davies, P. W. Henry and C. M. Ingersoll.

The Northern Pacific "Careful Club"

The Bureau of Efficiency of the Northern Pacific has adopted a new plan to secure the co-operation of employees in accident prevention. It has organized a "Careful Club." All employees and their families are eligible for membership, which they may secure by accepting a four-colored emblem bearing the Northern Pacific trade mark and the words "Careful Club, Northern Pacific." The emblem is in the form of a lapel button for men and a bar pin, with the added words "Ladies' Auxiliary," for women.

With the emblem each member is handed a card on which is printed: "Having hereby become a member of the Northern Pacific Careful Club, I wear as a token this N. P. emblem to remind me that as our lives and limbs are priceless it is my duty to myself, to my family, to my employer and to my nation to avoid all risks; and my duty to my fellowmen is to induce him to do likewise. This duty I will faithfully strive to perform."

Conference on Railroad Fuel Coal

A general conference on questions arising in connection with the supply of fuel coal to railroads, called by the United States Fuel Administration, was held at Washington on March 1. Representatives of coal mine operators, eastern railroads, the office of the Director General of Railroads, and the Fuel Administration attended. The conference was purely advisory. It selected W. K. Fields, president of the National Coal Association, as chairman, and began a general discussion of recommendations to the Director General of Railroads and the Fuel Administration designed to secure the following results:

1. To provide a definite and dependable supply of good fuel for the railroads.
2. To avoid excessive use of transportation in obtaining railroad fuel.
3. To retain for other uses some coals of special quality which are now being used as railroad fuel.
4. To so distribute railroad fuel in connection with all other distribution as to obtain as nearly as possible equal running time for all mines. A committee was named consisting of one member from each of the railroads represented in the conference and one member representing each of the coal districts present, which should consider the questions they had been called to discuss and report to the conference.

The railroads appointed the following committeemen; Delaware & Hudson, J. White Sprong; New York Central, S. B. Wight; Erie, W. R. Collins; N. Y., Ontario & Western, Chas. A. Draper; Norfolk & Western, Geo. Duglinson, Jr.; Lehigh Valley, F. L. Blendinger; Bangor & Aroostook and Boston & Maine, Frank C. Wright; Pennsylvania and Long Island, C. M. Sheaffer; Delaware, Lackawanna & Western, C. C. Hubbell; Canadian Northern, H. T. Rawlings; Central of New Jersey, J. F. Hinterleiter; Chesapeake & Ohio, D. T. Jellison; Baltimore & Ohio, W. L. Robinson; N. Y., N. H. & H., George G. Yeomans; Philadelphia & Reading, E. B. Crosley. The committee adjourned to meet again on Friday, March 8.

Traffic News

The Kansas Public Utilities Commission in a decision handed down on February 20, denied the application of the railroads of that state for an increase in freight rates of 20 per cent.

Sixty ships are now engaged in carrying coal to New England, and shipments of bituminous coal for factories in that territory are being largely increased. While New England is behind in its normal supply, there is now a gradual revival in industries which were affected by the shortage.

The Adams Express Company has announced this week an embargo on all carload shipments, and on all pieces of freight weighing more than 300 lb. each, throughout the territory east of Chicago and St. Louis, and north of the Potomac and Ohio rivers. Government shipments, food products, and a few other things are excepted.

Figures showing that nearly 50 per cent more grain has been hauled to western primary markets during the last three weeks than in the same period of last year have been made public by the Railroad Administration. In spite of this, however, the reserve of grain in elevators of western primary markets is now only one-third of that of a year ago.

According to reports made by the Milwaukee (Wis.) committee of the Commission on Car Service, the average weight per car of merchandise loaded in Milwaukee during January, 1918, was 16,428 lb., as compared with 11,597 lb. in 1917, or an increase of 4,831 lb., effecting a saving of 3,756 cars. The total number of cars loaded in January, 1918, however, was less than half the total of January, 1917, the decrease in tonnage being 27,620,863 lb.

While Chicago and the entire East have had a siege of snow and cold weather this winter, the weather along the Union Pacific in Wyoming has been mild, says the company's monthly bulletin for February. On February 4 the thermometer at Cheyenne, Wyo., registered 61, and an Omaha newspaper had an article headed "Go to Wyoming, the Land of Fruit and Flowers, the Popular Winter Resort." The Union Pacific spent a million dollars last year for steel and concrete snow sheds in Wyoming but they have proved unnecessary this winter.

General William W. Wotherspoon, superintendent of public works of the state of New York, discussing ways and means for utilizing the barge canal from Lake Erie to the Hudson river, which is to be ready for use on May 15, recommends the building of barges 150 ft. long, and 20 ft. 4.5 in. wide, with a draught of 8 ft. 6 in. or 9 ft. Such a barge could carry 600 tons. For the present the size of vessel which can be used on the canal for through traffic to New York City will be limited by the lock in the Hudson river, between Troy and Albany, which is only 44 ft. wide, 10 ft. deep and about 310 ft. long. A barge of 2,800 tons could pass through this lock, but General Wotherspoon doubts the commercial practicability of so large a vessel. With a supply of vessels of the smaller size suggested he would have them run in fleets of four. With one of the four equipped with power, the fleet could pass through the locks at one time.

The proposal for a special charge to cover the switching service performed by railroads on private and industrial sidings has been revised by the Railroad Administration and is arousing shippers throughout the country. While there has been no announcement, a tentative plan has been drawn by the traffic department of the Railway Administration, which provides for a charge of \$2 a car for placing the loaded cars on a private siding, or taking a loaded car from the siding; \$1 per car for spotting a car at a particular location on the siding, and \$2 per car for interplant switching. It has been estimated that these charges would increase the revenues by \$176,000,000, but shippers have made estimates much higher. The Railroad Administration is also making efforts to expedite the work of compiling a uniform classification of freight. Members of the three classification com-

mittees, together with a representative of the Interstate Commerce Commission, are at work in Chicago at the request of the Interstate Commerce Commission in an effort to submit a report for early consideration.

Through the Hudson Terminal of the Hudson & Manhattan Railroad, Church and Cortland streets, New York City, there pass annually about 17,000,000 passengers to or from stations on the Pennsylvania Railroad, which is an increase of more than 50 per cent over the number thus using the station in 1911, the year in which the Hudson & Manhattan and the Pennsylvania began their joint service of electric passenger trains between Church street, New York, and Park Place, Newark. These figures are given in a statement by Samuel Rea, president of the Pennsylvania Railroad, explaining the use of the tube terminal as a passenger terminal of the Pennsylvania Railroad. He calls attention to the fact that this terminal was so used for two years before the Pennsylvania station at Thirty-second street was opened. Passengers began using the "Hudson Tubes," in place of the ferry boats, as soon as the tubes were opened, transferring to and from the Pennsylvania trains at the old station of that road in Jersey City. Transfers from electric to steam trains, and steam to electric, are now made at Manhattan Transfer, eight miles west of Jersey City.

Freight Congestion at Atlantic Ports

Regional-director A. H. Smith reports that on March 1, the freight on hand at the six North Atlantic ports awaiting shipment by ocean vessels amounted to 30,719 carloads, as compared with 33,595 cars on February 1. The decrease at New York was 3,249 carloads, but there were increases at Baltimore and Philadelphia. Of the total freight on hand March 1, the amount in cars was 7,018 carloads; on piers or in warehouses, 7,000 carloads, and on the ground, 16,701 carloads. Since January 1, the decrease in the total has been about 25 per cent.

Joint City Ticket Office at Washington

City ticket offices of seven railroads in Washington are to be combined in a single union ticket office, in a central location, by order of the Railroad Administration. Committees of the various territorial passenger associations are considering plans for similar changes in other cities, but it was decided to make the first move of this kind at Washington. The offices to be combined are those of the Baltimore & Ohio, which has two offices, the Pennsylvania, the Southern, the Norfolk & Western, the Chesapeake & Ohio, the Seaboard Air Line and the Atlantic Coast Line. A considerable saving in rentals will be made besides releasing valuable space for other purposes, but the total saving will be only about half the amount of the reduction in rentals because it is expected to make some increases in salaries. The new office is to be opened about May 1.

Aerial Postal Service

The Post Office Department has announced that the proposed aerial postal service between Washington, Philadelphia and New York is to begin not later than April 15. By arrangement with the War Department, the postal route will be conducted for one year as a part of the aeronautic training service of the War Department and the War Department will provide the aeroplanes for the service. One trip each way will be made daily, except Sunday, on a regular schedule. Not to exceed 300 pounds of first class mail, occupying a space of not more than 25 cubic feet, will be carried each trip. It is proposed to issue 24-cent stamps, to be used on letters by airplane, their function being similar to that of a ten-cent special delivery stamp; thus making the cost of a one-ounce letter 27 cents. It is expected that the trip between Washington and New York, including a stop at Philadelphia, will be made inside of three hours. In New York the proposed landing places are several miles from the main post office.

EXPORTS FROM THE PORT OF NEW YORK during the month of January, 1918, according to a compilation of the National City Bank of New York, included steam locomotives valued at \$1,025,139, freight cars at \$888,244, and rails at \$670,040.

Commission and Court News

Interstate Commerce Commission

E. L. Bevington, J. E. Hannegan and E. E. MacLeod have filed fifteenth section applications with the Interstate Commerce Commission for permission to file tariffs increasing the rates for the movement of special baggage cars and special passenger cars and making a change in the rules governing the combination movement of special baggage and passenger cars and special trains between Colorado common points, Ogden and Salt Lake City, Pacific Coast points and Chicago, Missouri river, and Mississippi river points, and Texas and New Mexico points. The proposed basis is 12½ fares or 30 cents a mile with a minimum of \$25 a car for special baggage cars and 25 fares with a minimum charge of \$25 for special passenger cars.

Court News

Limitation of Liability

In an action against an express company for the loss of a trunk, the New York Appellate Division holds that although the shipper's servant who delivered the trunk and took a receipt for it was illiterate, the liability of the defendant was limited by the amount stated in its receipt, where the amount paid for transportation entitled the shipper only to such amount under the filed tariffs, the shipper being charged with notice of filed tariffs, which are terms of the contract.—*Kolb v. Taylor*, 168 N. Y. Supp., 685. Decided January 17, 1918.

Grant of Perpetual Right to Use Streets

The Louisiana Supreme Court holds that by the terms of Act No. 79 of 1896, p. 113, the governing authorities of towns or cities having less than 25,000 inhabitants have no authority to grant to a railroad company a perpetual or irrevocable right to use or occupy any street in the municipality, unless the grant be approved by a majority of the property taxpayers in the municipality voting at an election called for that purpose.—*Louisiana Western v. Crowley* (La.), 77 So., 486. Decided November 26, 1917. Rehearing denied January 3, 1918.

Heating Waiting Rooms

Section 784 of the Kentucky Statutes requires ticket offices to be open 30 minutes before time of departure of passenger trains and until the trains depart. Section 772 requires proper waiting rooms, properly lighted and heated. In a prosecution for violation of section 772, the Kentucky Court of Appeals holds that under these sections railroads are not required to keep their waiting rooms suitably heated or ventilated during the whole day, or at any other time except the time provided by section 784.—*Illinois Central v. Commonwealth* (Ky.), 201 S. W., 17. Decided January 29, 1918.

Crossing Accidents—Contributory Negligence

The California Supreme Court holds that the driver of an automobile damaged in a collision with a train at a crossing was negligent, barring recovery, in not getting out and looking up the track, although no whistle was blown nor bell rung. He was driving on the left-hand side of the roadway, on which side a building obstructed his view of the track, and he was well acquainted with the dangerous conditions and knew that several accidents had occurred there.—*Murray v. Southern Pacific* (Cal.), 169 Pac., 675. Decided December 18, 1917.

The California District Court at Appleton, in the Second District, holds that an automobile driver, familiar with a railroad crossing, where the view was somewhat obstructed, could have stopped a safe distance from the track, stilled the noise of the automobile engine and listened for an approach-

ing train; but he failed to do so and was, as matter of law, guilty of contributory negligence, barring recovery for injury to the automobile.—*Rayhill v. Southern Pacific (Cal.)*, 169 Pac., 718. Decided November 8, 1917.

State Commission's Approval of Switching Rates

The Illinois Supreme Court holds that, under section 36 of the Public Utilities Act, declaring that no public utility shall increase any rate or other charge or so alter any classification, practice, or regulation as to result in any increase in rate, except on a showing before the commission, the increase of switching charges by a rule which defines a side track as a team track is improper, where the previous charges had been imposed for many years. Although it was conceded that the fact that an unreasonably low rate had been charged for a long term of years would not prevent the railroad from making a reasonable charge, still the statute does prevent doing it without the commission's approval.—*Commission v. C. P. & St. L. (Ill.)*, 118 N. E., 427. Decided December 19, 1917. Rehearing denied February 7, 1918.

Stipulation as to Claim for Damages

The Massachusetts Supreme Judicial Court holds that the stipulation of a contract for an interstate shipment of horses requiring claim for damages to be in writing, verified by the shipper and delivered to the carrier's agent within five days of the time of the removal of an injured horse from the car, was reasonable. A station agent cannot bind the railroad by admissions in effect substituting a new agreement as to such a shipment in place of the agreement of the railroad and shipper, and depriving the railroad of the requirements of the written contract between it and the shipper. It is also held that a contract covering a shipment of horses was not defective because unfiled and incomplete in certain places, among them omitting the name of the shipper from the heading, reading: "This agreement made this * * * day of 10-2-1912 and by and between the Boston & Maine Railroad, hereinafter called the carrier, and * * * hereinafter called the shipper," etc.—*Fletcher v. N. Y. Cent. & H. R. (Mass.)*, 118 N. E., 294. Decided January 14, 1918.

Federal Employers' Liability Act—

Limitation of Time for Action

The New York Supreme Court, Special Term, Steuben County, holds that under the federal Employers' Liability Act, § 6, providing that no action shall be maintained under the act unless commenced within two years from the day the cause of action accrued, where plaintiff's intestate was killed in service in 1909, and she brought action under the state statutes, later amending to set up the federal Employers' Liability Act, which action finally resulted in dismissal of her complaint, on the ground that she had failed to show her intestate was engaged in interstate commerce at the time of the accident, she was not entitled to bring a new action in 1917, under the federal Employers' Liability Act, though within a year after the decision of the Court of Appeals affirming the judgment dismissing her complaint in the former action, despite New York Code Civ. Proc., § 405, substantially providing that when an action is commenced in due time, and plaintiff fails otherwise than upon the merits, a new action can be commenced within one year.—*Norton v. Erie*, 167 N. Y., Supp. 177. Decided November 12, 1917.

Rival Claims to Goods

The Minnesota Supreme Court holds that where on arrival at destination property is demanded from a carrier by the consignee and also by an adverse claimant, the carrier is entitled to a reasonable time for investigation, on its request therefor, before an action will lie against it. Where the adverse claimant claimed no rights under the contract of shipment and made no claim to the property until after it had arrived at its destination, the carrier owed to him only the duties of a bailee or warehouseman and might relieve itself from liability by showing that without fault or negligence on its part it was unable to produce or deliver the property. In an action of replevin by the adverse claimant the defendant

carrier interposed both the above defenses, and they were excluded at the trial. Verdict was given for the plaintiff, and from an order denying a new trial the defendant appealed. It was held that the defenses were erroneously excluded, and as the record showed conclusively that the defendant did not waive them, a new trial was ordered.—*Taylor v. Duluth, S. S. & A. (Minn.)*, 166 N. W., 128. Decided January 18, 1918.

Cases Under the Federal Employers' Liability Act

Where a railroad, whose tracks were wholly within the state, maintained a private spur track at the owner's expense, over which it moved freight cars from its station to the owner's premises, the New York Appellate Division holds that a laborer, injured while repairing the spur track, was not engaged in interstate commerce, notwithstanding that the railroad sometimes moved interstate freight over the track.—*Liberti v. Staten Island*, 167 N. T., Supp. 478.

The New York Appellate Division holds that a carpenter employed in repairing coal chutes through which coal passed to interstate locomotives was not engaged in interstate commerce.—*Gallagher v. N. Y. C.*, 167 N. Y., Supp. 480.

The Indiana Appellate Court holds, following *N. Y. C. v. Winfield* (1917), 244 U. S. 147, and *Erie v. Winfield* (1917), 244 U. S. 170, that if a railroad employee is engaged in interstate commerce when accidentally injured without negligence of the employer, he cannot recover under the state Workmen's Compensation Act, though the railroad company is not liable under the federal Employers' Liability Act. A flagman killed by an automobile while he was diagonally crossing the intersection of the defendant railroad's track to get his lantern or flag was held to be engaged in interstate commerce depriving the state industrial board of jurisdiction. *Walker v. C. I. & L. (Ind.)*, 117 N. E., 969.

The New Jersey Court of Errors and Appeals holds that under the federal Employers' Liability Act, relieving the employer from liability for injury to an employee arising out of risks assumed by the employee, a railroad employee injured by reason of an obvious risk fully appreciated by him was injured by an assumed risk and could not recover. *Capan v. D., L. & W. (N. J.)*, 102 Atl., 661.

Refusal of Mileage Book Coupons by Foreign Road

In an action for damages for misrepresentation in the sale of mileage transportation tickets it appeared that on April 3, 1914, the plaintiff telephoned to the agent of the defendant, the Alabama Great Southern, at Bessemer, that he wanted transportation from Bessemer to Shreveport, La. Before the train was due the plaintiff went to the ticket office and the agent delivered to him a book containing mileage coupons, form S. I. M., and a ticket from Bessemer to Shreveport, the agent tearing out of the book coupons to pay for such ticket; and the plaintiff signed the contract printed on the outside of the mileage book. The ticket routed the plaintiff over the defendant's road and over the Vicksburg, Shreveport & Pacific to Shreveport. There was stamped on the face of the contract signed by the plaintiff in large red letters that coupons would not be accepted on trains or for transportation over the V. S. & P. after March 1, 1914. Under tariff duly filed with the Interstate Commerce Commission by the defendant and other roads it was provided that the V. S. & P. would not honor coupon mileage tickets, form S. I. M. Desiring to return to Bessemer the plaintiff presented to the ticket agent of the V. S. & P. the mileage book and demanded a ticket in exchange for mileage coupons. This was refused; the plaintiff took passage on the V. S. & P.'s train and was ejected by the conductor for refusal to pay fare. The plaintiff brought action for damages for the defendant's agent's wrongful representation that the mileage transportation was good over the V. S. & P. on his return trip. The Alabama Court of Appeals held that as the contract was strictly in conformity with the regulations and tariff filed with the Commission, it was binding on the plaintiff, and the defendant was not liable for the agent's statement that the coupons were good for return transportation over the V. S. & P.—*Alabama Great Southern v. Vermillion (Ala.)*, 77 So., 67. Decided November 13, 1917.

Equipment and Supplies

Locomotives

THE CANADIAN GOVERNMENT RAILWAYS have ordered from the Canadian Locomotive Company 6 six-wheel switching locomotives and 4 ten-wheel narrow gauge locomotives, the latter four for the Prince Edward Island Railway. Delivery is specified for June.

Freight Cars

CIO ANFALDO & Co. are inquiring for 300 tank cars.

THE CANADIAN GOVERNMENT RAILWAYS are inquiring for 5,000 40-ton box cars.

FELS & Co., Philadelphia, are inquiring for a number of 8,000- to 10,000-gal. tank cars.

THE PURE OIL COMPANY, Minneapolis, Minn., is inquiring for 30 steel underframe tank cars.

THE UNITED STATES GOVERNMENT has ordered for use on military railroads in France in addition to the 3,500 recently reported, 500 low side gondola cars from the Haskell & Barker Car Company and 375 high side gondolas and 200 box cars from the Standard Steel Car Company.

Miscellaneous

FOREIGN TRADE OPPORTUNITIES.—Commerce Reports, published daily by the Bureau of Foreign and Domestic Commerce of the Department of Commerce, contain in recent issues the following trade opportunities:

26540.†—The professor of railway engineering of a college of engineering and mining in Peru desires to receive illustrated catalogues from American manufacturers and exporters of railway equipment, etc., these catalogues to be used in connection with his classes in railway engineering; also sanitary supplies and equipment.

26558.†—An agency is desired by a man in France for the sale of railway construction materials. Correspondence should be in French. References.

26559.*—A company in India desires to secure an exclusive agency for the sale of light railway material. Payment will be made by 60-days' rupee drafts, documents against acceptance. Correspondence may be in English. References.

Reserved addresses may be obtained from the bureau and its district and co-operative offices. Request for each opportunity should be on a separate sheet and state opportunity number. The Bureau does not furnish credit ratings or assume responsibility as to the standing of foreign inquirers; the usual precautions should be taken in all cases. Symbols: *Reported by American consular officers; †Reported by commercial attaches and commercial agents; ‡Direct inquiries received by the Bureau.

Signaling

THE LOUISVILLE & NASHVILLE is making extensive additions to its Union electric interlocking plants at Louisville, Ky., and Amqui, Tenn.

THE MISSOURI PACIFIC has ordered from the Union Switch & Signal company an interlocking machine, 20 levers, to be installed in the place of an old machine at Halsey, Ill.

THE MISSOURI, KANSAS & TEXAS has ordered from the Union Switch & Signal Company material for a twelve-lever interlocking at Clinton, Mo., at the crossing of the St. Louis-San Francisco.

THE YAZOO & MISSISSIPPI VALLEY has ordered from the Union Switch & Signal Company material for a mechanical interlocking at Baton Rouge, La., 21 working levers.

Supply Trade News

A. J. Beuter, representative of the Baldwin Locomotive Works at San Francisco, Cal., has been transferred to Portland, Ore.

The Bettendorf Company has waived its patent rights on truck sides and underframes for the duration of the government control of the railroads.

F. H. Bird, traveling engineer for the American Steel Foundries, Chicago, has been commissioned a first lieutenant in the Ordnance Department of the U. S. Army.

W. I. Seigle, a member of the board of directors of the H. W. Johns-Manville Company, New York City, was elected vice-president at a recent meeting of the board. William T. Klaus was elected a director to succeed Mr. Seigle.

Ernest Baxter, general storekeeper of the Wabash, with office at St. Louis, Mo., has resigned to become manager of railroad sales for the Kansas City Bolt & Nut Company, with office in Kansas City, Mo., effective March 1. A photograph and biographical sketch of Mr. Baxter appeared on page 1128 of the issue of the *Railway Age Gazette*, for May 25, 1917.

W. D. Horton, circulation manager of the Simmons-Boardman Publishing Company, publishers of the *Railway Age*, has resigned to accept a position as district railway sales



W. D. Horton

manager of the Patton Paint Company with headquarters at Milwaukee, Wis., effective March 1. Mr. Horton was born in Brooklyn, N. Y., December 3, 1880 and was educated in the public schools of that city. On June 1, 1908 (at the time of the consolidation of the *Railway Age* and the *Railroad Gazette*) he joined its staff and from 1908 to 1914 acted as traveling subscription representative, on April 1, 1914 being appointed circulation manager. Mr. Horton has had a wide selling experience, having

spent several years, previous to 1908, selling various commodities such as stationary engines, boilers, wood-working and other machinery. In this work he travelled extensively throughout the United States, Canada, Mexico, Cuba, the West Indies, and in South and Central America. As circulation manager, he obtained a wide personal acquaintance among executive officers and department heads of nearly all the railways in the United States and Canada.

R. S. Cooper, who for several years has been in charge of the New York office of the Independent Printing and Engraving Company, Chicago, has been elected vice-president and general sales manager with headquarters at the Trust Building, Chicago. R. T. Scott, who has been in charge of the Pittsburgh office, succeeds Mr. Cooper at New York and H. F. Finney succeeds Mr. Scott at Pittsburgh.

H. J. Tierney, president of the Tierney Supply & Lumber Company, Chicago, has been appointed representative for the Grip Nut Company, Chicago, with office at 1742 Railway Exchange building, St. Louis, Mo. Mr. Tierney has a railway service with the Missouri, Kansas & Texas, on March 5, 1888, as apprentice cooper, and was appointed mechanical engineer in 1907, and was promoted to superintendent of

the car department in January, 1916, with headquarters at Denison, Tex., which position he resigned on January 1, 1918, to become president of the Tierney Supply & Lumber Company.

Interstate Iron & Steel Company

The annual report of the Interstate Iron & Steel Company, Chicago, for the year ended December 31, 1917, shows net earnings of \$989,028, after the deduction of \$61,659 for dividends on preferred stock, the payment of all operating expenses, taxes and fixed charges and after ample provision for depreciation and preferred stock sinking fund requirements. This net return is equal to 24.7 per cent on the outstanding common stock. However, no dividends were distributed on the common shares this year for reasons outlined by S. J. Llewellyn, the president, as follows:

"In normal times a substantial dividend upon the common stock would be justified. However, in view of the extremely unsettled financial conditions and the unknown factors of the business situation throughout the world your directors believe that it is to the best interests of the stockholders to conserve the cash resources of the company so as to adequately meet any unforeseen demands, rather than to pay a dividend at this time."

The company's balance sheet for the last fiscal year is as follows:

ASSETS			
Plant and Goodwill:			
As at January 1, 1917.....	\$5,492,931.46		
Additions during year.....	871,434.93		
	\$6,364,366.39		
Deduct:			
Depreciation reserve.....	\$323,978.18		
Proportion of abnormal cost of construction during 1917 written off.....	44,450.00	568,428.18	\$5,795,938.21
Current Assets:			
Inventory.....	\$1,813,608.48		
Accounts and bills receivable less reserve.....	1,082,403.67		
U. S. Liberty Loan Bonds—4's.....	\$475,000.00		
U. S. Treasury Certificates—4's.....	300,000.00	975,000.00	
Cash in banks and on hand.....	210,431.86	4,081,444.01	
Deferred Charges:			
Insurance, interest, etc.....		8,617.00	
Total assets.....		\$9,885,999.22	
LIABILITIES			
Capital Liabilities:			
Preferred stock—7% Cumulative.....	\$866,600.00		
Common stock—authorized and issued.....	4,000,000.00		
First mortgage 6% bonds.....	2,189,000.00		
	\$7,055,600.00		
Current Liabilities:			
Accounts payable and payrolls accrued.....	\$402,487.33		
Reserve for accident liability.....	25,342.92		
General taxes and interest accrued.....	48,139.99		
Provision for Federal income and war excess profits tax.....	700,000.00	1,175,970.24	
Reserves:			
Refining open hearth furnaces.....	\$24,505.13		
Special inventory reserve.....	128,156.65		
Preferred stock sinking fund.....	30,000.00		
For contingencies.....	300,000.00	502,661.78	
Surplus:			
Adjusted balance January 1, 1917.....	\$162,739.29		
Surplus net income for year ending December 31, 1917.....	1,050,686.75		
	\$1,213,426.04	1,151,767.20	
Deduct—Dividends paid on preferred stock.....	61,658.84		
Total liabilities.....		\$9,885,999.22	

American Steel Foundries

The American Steel Foundries found the fiscal year ended December 31, 1917, the greatest in the company's history. The gross sales for the year were \$49,369,584, as compared with \$31,361,006 for 1916. The earnings from operations, after deducting all manufacturing, selling, administrative, and head and district offices expenses, and adding miscellaneous income, were \$8,956,321, as compared with \$4,965,224 in 1916. Taking out \$917,646 for depreciation, \$219,235 for interest charges, and \$2,287,600 for Federal taxes, there were net profits before bond redemption and debenture retirement of \$5,531,839.

Dividends of 1¼ per cent each were paid in the first and second quarters of the year, and of 1¾ per cent in the third and fourth quarters, involving a total payment of \$1,031,040. Of the balance of the net earnings \$197,251 went into additions to property; \$1,787,378 to reduction of bonded indebtedness (including debentures); and \$2,604,293 to increase in working capital, which at the end of the year was \$9,895,421. The surplus increased during the year \$2,777,538, and now stands at \$6,429,228.

President R. P. Lamont in his report comments on the present situation as follows: "The year 1918 starts out badly. The operations for January were seriously curtailed by extraordinarily bad weather, railroad embargoes, and forced shutdowns on account of the coal situation, though we had plenty of coal and oil to run without interruption. February was also unsatisfactory, and it is certain that the first quarter of the year will not compare favorably with the same quarter last year. However, we have a large tonnage ahead of the Foundries which will keep us busy for six months at least. The miscellaneous business holds up particularly well, and sooner or later the railroads will have to come into the market; a great deal depends upon when they do, but with the large and constantly increasing shortage of equipment it seems certain that as soon as the necessary machinery is provided at Washington, the roads must buy large numbers of both cars and locomotives. We have a considerable volume of government work on our books; the margin of profit is small, but it will increase the volume of our business and help to carry overhead. We expect on the whole a satisfactory year."

The balance sheet follows:

ASSETS			
Real estate, buildings, plant, machinery, tools, equipment, patents and good will.....	\$20,480,727		
Real estate net used for business purposes.....	298,630		
Miscellaneous securities.....	\$1,192,098		\$20,779,358
Inventories.....	7,352,854		
Accounts and bills receivable (less reserves).....	8,608,865		
Cash.....	825,308		
		17,979,125	
Deferred charges to operations.....		226,391	
		\$38,984,873	
LIABILITIES			
Capital stock.....	\$17,184,000		
Four per cent debentures.....	1,716,800		
Notes payable to banks.....	\$3,125,000		
Accounts payable and payrolls accrued.....	2,694,690		
Provision for war excess profits, income and other taxes.....	2,461,791		
Accrued interest on debentures.....	28,613		
		8,310,094	
Reserves for:			
Furnace rebuilding and metal flask renewals.....	273,866		
Workmen's compensation.....	101,482		
		375,348	
Appropriated surplus:			
Bond sinking fund reserves.....	\$3,249,403		
Debenture retirement reserve.....	1,720,000		
		4,969,403	
Undivided surplus.....		6,429,228	
		\$38,984,873	

Trade Publications

NEW YORK CONNECTING RAILROAD.—The Lehigh Portland Cement Company, Allentown, Pa., has issued two companion pamphlets describing this monumental work on which 600,000 bbl. of Lehigh Portland Cement was used. One of these contains a brief description of the construction of this line with special reference to the masonry work and is illustrated by maps. The second is a folder of colored illustrations showing the Hell Gate bridge section of this line in panoramic views and detailed illustrations of various portions of the masonry work.

JAPAN'S FUEL PROBLEM.—Anthracite coal in Tokio has been raised from 7 to 18 yen (\$3.50 to \$9) per ton. One of the causes attributed by coal dealers to the increased prices was the lack of space in the transportation of coal by the railways and shipowners, while at the coal mines and the provincial coal depots, stock is being accumulated to the annoyance of mine operators. The output of the collieries is increasing, but it is yet out of keeping with the demand of the market. The growing decline in the visible stock is mostly due to the overtaxed railways, resulting in the increase of prices.

Financial and Construction

Railway Financial News

CHICAGO, MILWAUKEE & ST. PAUL.—The directors met on February 28, but again took no action regarding the regular semi-annual dividends on both the common and the preferred stock. The question of declaring these dividends was indefinitely deferred at the regular meeting held January 25 last.

DENVER & RIO GRANDE.—E. L. Brown, president and a co-receiver recently appointed by the court, has resigned as co-receiver, and the court has designated Alexander R. Baldwin to act as sole receiver of the company's free assets. He will have no jurisdiction over operations. This change in the status of the receivership was made to segregate the operations of the property from the receivership. In receivership the courts would be called upon to operate the property, which eliminated the control of its operation by Director-General of Railroads William G. McAdoo. The new arrangement will continue the operations of the property under control of the Director-General and retain only the free assets under the jurisdiction of the court.

FT. SMITH, SUBIACO & EASTERN.—In a suit in equity by the St. Louis Union Trust Company to foreclose a mortgage on the Ft. Smith, Subiaco & Eastern, the United States District Court of the Western District of Arkansas issued an order appointing I. H. Nakdimen and Charles H. Sommer receivers of this road, which operates between Fort Smith, Ark., and Scranton, a distance of 14 miles.

ILLINOIS CENTRAL.—This company has notified its stockholders that it has discontinued the practice of sending them a monthly statement of its earnings. This action is taken on the ground that Federal control has so mingled the operations of all roads that a monthly earning statement would be of little or no value to the security holders.

PENNSYLVANIA RAILROAD.—See comments on annual report elsewhere in this issue.

PITTSBURGH & LAKE ERIE.—Col. J. M. Schoonmaker has been elected chairman of the board of directors, a newly created office.

Railway Construction

DELAWARE, LACKAWANNA & WESTERN.—This company is making plans to carry out improvements, including grading and relocation of tracks in the freight yards at Binghamton, N. Y. The work involves the handling of 300,000 cu. yd. of earth fill. Bids for the work will probably be asked for in the near future.

ERIE.—Plans have been made by this company to build a steel bridge with concrete floor about 70 ft. long and 61 ft. wide, over the tracks at Rochester. The new bridge will connect Clarissa street with the bridge over the Genesee river.

NARRON CENTRAL RAILROAD.—This company's plans call for building a line from Kenly, N. C., on the Atlantic Coast Line, northwest, to Zebulun, on the Norfolk Southern, about 20 miles. Track has already been laid on about seven miles. The line is being built to carry lumber, farm produce, cotton, tobacco and merchandise. N. Narron, president, and O. F. Watson, chief engineer, Kenly.

SOUTHERN RAILWAY.—Plans are being made by this company to build a new station at Cordova, Ala. The building will be of frame construction and will replace the structure destroyed by fire.

WESTERN MARYLAND.—A contract has been given to the Price Construction Company, Baltimore, Md., to put up a shop building at Hagerstown, Md. It is to be a brick structure with slag roof, and will be 34 ft. wide by 80 ft. long. The cost of the work will be \$10,000.

Railway Officers

Executive, Financial, Legal and Accounting

G. B. Wall, vice-president of the Chesapeake & Ohio, has been appointed a vice-president also of the Hocking Valley, with office at Richmond, Va., and will perform such duties as the president may assign to him.

I. G. Ogden, vice-president of the Canadian Pacific, with office at Montreal, Quebec, has been relieved of some of his duties, to enable him to give his entire time to the financial department, and **John Leslie**, controller, has been placed in entire charge of the accounting department in all its branches.

James M. Kurn, who was elected vice-president in charge of operations and construction of the St. Louis-San Francisco, as has already been announced in these columns, was born at Mt.



J. M. Kurn

Clements, Mich., on October 4, 1870, and began railway work in 1885 as a telegraph operator on the Michigan Central. On November 1, 1887, he was appointed to a similar position on the Atchison, Topeka & Santa Fe, and during the succeeding five years served as operator and agent at various stations on that system, being promoted to train despatcher in 1892. He was later appointed superintendent of the Rio Grande division and on December 20, 1905, was transferred to the New Mexico division, where he remained until Octo-

ber 1, 1910, on which date he was appointed general superintendent of the western lines, with headquarters at La Junta, Colo. He resigned this position on January 1, 1914, to become president and general manager of the Detroit, Toledo & Ironton, with office at Detroit, Mich., which position he held for the last four years, until the date of his appointment, as noted above, effective March 1.

Operating

Victor Parvin, trainmaster of the Virginian Railway, with office at Princeton, W. Va., has been appointed superintendent of the New River division, with office at Princeton, vice **L. R. Taylor**, resigned.

J. W. Cousins, has been appointed terminal superintendent of the Illinois Central at New Orleans, La., succeeding **J. L. Beven**, granted leave of absence to enter government service, effective February 1.

R. B. Cooper was appointed trainmaster of the New Orleans division of the Yazoo & Mississippi Valley, with headquarters at Wilson, La., succeeding **M. G. Kennedy**, transferred, effective February 1.

H. A. Connett has been appointed chief train despatcher of the eighth and ninth districts and the Park City branch, of the Union Pacific, with office at Evanston, Wyo., succeeding **V. A. Wirt**, promoted, effective February 23.

J. S. Bergman, assistant superintendent of the Winston-Salem division of the Southern Railway, with office at Winston-Salem, N. C., has been appointed superintendent of the same division, with office at Winston-Salem, vice **J. M. Bennett**.

E. L. Desjardins, assistant superintendent of the Canadian Government Railways, with office at Lévis, Que., has been appointed superintendent of the Moncton-Diamond Junction

district, with office at Edmundston, N. B., vice A. R. Macgowan resigned to go to another company.

Charles H. Hopkins, superintendent of the Southern division of the New York, Ontario & Western, with office at Middletown, N. Y., having resigned, W. D. McQueen, superintendent of the Scranton division, with office at Childs, Pa., has been appointed superintendent of the Scranton and Southern divisions with office at Middletown, and N. S. Badger, trainmaster at Childs, has been appointed assistant superintendent of the Scranton division, with office at Mayfield yard, Pa.

Engineering and Rolling Stock

W. H. Eyer has been appointed engineer and roadmaster of the Bloomsburg & Sullivan, with office at Bloomsburg, Pa., vice William C. Fortune, deceased.

B. J. Peasley, whose appointment as mechanical superintendent of the St. Louis-Southwestern of Texas, with office at Tyler, Tex., was announced in these columns on January 18, was born at Decorah, Ill., on December 21, 1867. He entered railway service at the age of 16 as laborer and machinist's apprentice with the Chicago, Burlington & Quincy, at West Burlington, Ia. On completing his apprenticeship he entered Elliott's Business College, at Burlington, Ia. After completing the business course he again entered railway service as a machinist with the Atchison, Topeka & Santa Fe, at Ft. Madison, Ia. In 1894 he was employed by the Ft. Madison Gas & Gasoline Engine Company; from 1895 to 1899 he was employed by the Chicago, Ft. Madison & Des Moines, as fireman and engineer. From 1899 to 1901 he was employed by the Illinois Central, at East St. Louis, Ill., as a machinist and was later promoted to division and wrecking foreman, at Carbondale, Ill. In 1901 he entered the service of the Denver & Rio Grande, as roundhouse foreman at Helper, Utah, where he remained a short time, returning to the Illinois Central, at East St. Louis, Ill., where he served in the capacity of roundhouse foreman, shop foreman and general foreman until September, 1906. He was appointed general foreman with the Missouri Pacific, at Bixby, Ill., in September, 1906, and was later promoted to master mechanic, at Ferriday, La., where he remained for six months and was then transferred to De Soto, Mo., as master mechanic of the Missouri division. In February, 1914, he was promoted to superintendent of shops at Argenta, Ark., where he remained until promoted as noted above.

W. W. Appleton, general master mechanic of the Canadian Government Railways, with office at Moncton, N. B., has been appointed superintendent of motive power with office at Moncton, vice G. R. Joughins, who was superintendent of rolling stock; W. E. Barnes, master mechanic at Moncton, succeeds Mr. Appleton. The title of G. E. Smart has been changed from master car builder to superintendent of car department.

W. A. Randow has been appointed master mechanic of the first division of the Denver & Rio Grande, with headquarters at Pueblo, Colo., with jurisdiction over the entire division, with the exception of Burnham shops, vice M. J. Powers resigned, and the office of assistant master mechanic has been abolished. H. C. Stevens, master mechanic, with office at Alamosa, has been appointed superintendent of shops at Burnham. J. L. Fagan, master mechanic at Grand Junction, has been appointed master mechanic of the fourth division, with headquarters at Alamosa,

vice Mr. Stevens. F. T. Owens, assistant master mechanic at Pueblo, has been appointed master mechanic, with office at Grand Junction, vice Mr. Fagan.

Traffic

G. W. Cushing has been appointed traffic manager of the Utah Railway, with headquarters at Salt Lake City, Utah.

G. E. Hill has been appointed commercial agent of the Lehigh Valley, with office at Newark, N. J., vice C. H. Gulick.

G. F. Brigham, general agent of the Chicago & North Western at St. Louis, Mo., has resigned to engage in other business.

F. E. Pittman, assistant treasurer of the Reid Newfoundland Company, with office at St. Johns, N. F., has been appointed general passenger agent, vice J. W. N. Johnstone, resigned.

Frank D. Austin, acting manager of the Mount Jewett Route, with office at New York, has been appointed assistant coal freight agent of the Erie, with office at New York, vice Charles H. Horrell, resigned to go into other business.

R. C. Cotner, traveling passenger agent of the Southern Railway, with office at Spartanburg, S. C., has been appointed division passenger agent with office at Spartanburg; R. H. Graham has been appointed division passenger agent, with office at Greenville; E. P. Johnson, traveling freight agent, at Jacksonville, Fla., has been appointed commercial agent, with office at Jacksonville, vice T. D. Mullaly and U. G. Soule, has been appointed commercial agent with office at St. Louis, Mo., vice C. F. Lauer.

Obituary

Robert A. Kutschbock, assistant general attorney of the New York Central, with headquarters at New York, died in a hospital in that city on February 28, at the age of 64. Mr. Kutschbock had served in the law department of the New York Central for about 34 years.

A. W. Wright, a railway construction engineer, died at Los Angeles, Cal., on February 3. He had charge of much of the construction of the Union Pacific in the early 60's and later of the Northern Pacific. He was also connected in an engineering capacity with a number of cable railways.

W. S. Danes, retired engineer maintenance of way of the Peru division of the Wabash, died at Chicago, Ill., on February 22, at the age of 65 years. He entered the service of the Wabash in 1880, as general foreman in charge of bridges and buildings. He was promoted to superintendent of bridges and buildings, and later to engineer maintenance of way of the Peru division, with headquarters at Peru, Ind., which position he held until retired.

ELECTRIC LOCOMOTIVES FOR MANCHURIAN COAL MINE.—The 50-ton electric locomotives for use by the Fushun collieries for freight handling are the first of the kind ever built at the South Manchuria Railway workshops. They are for the standard gage. Each locomotive is designed to haul 580-ton trains at the speed of 12.9 miles per hour on the level tangent track, exclusive of the weight of the locomotive, the trolley voltage being 1,200 volts. They are of the two-bogie type, each bogie carrying 125-horsepower motors. The total weight is 97,200 lb.; ballast weight, 15,200 lb.; weight on drivers, 112,400 lb.; weight per driving axle, 28,100 lb.; and weight of a motor, 5,000 lb.—*Commerce Reports.*

ITALY LEADS IN MOTOR CAR EXPORTS.—Italy occupies the position of the leading motor car exporting nation of Europe, according to official figures issued by the Ministry of Finance. For the first eight months of 1917 her motor exports increased 113.4 per cent, as compared with the corresponding period of 1915, and 96.4 per cent as compared with the first eight months of 1916. The largest proportion of vehicles consisted of motor lorries despatched to the various Allied Powers. They numbered 6,169, and had an average value of 14,375 lire (\$2,731) each. Touring cars totaled 506 for the eight months, their average value being 17,568 lire (\$3,338) each. They were practically all fully equipped cars for Allied staff service.

EDITORIAL

Railway Age

EDITORIAL

The Railway Business Association is to be congratulated on the vision of its leaders who are guiding it into channels

A Great

Opportunity

for greater usefulness, the possibilities of which are simply tremendous. It is not too much to say that it has within its grasp opportunities which if rightly used will make for the future welfare and prosperity of the entire country. A "call to arms" of all the supply interests, which has been sent out by the executive committee of the association, will be found elsewhere in this issue. The meeting, which will be held in Chicago on April 8, promises to be one of the most important events in the history of the railways and railway supply interests in this country.

The building of standard locomotives to meet all conditions on American railways is impracticable. This we have demonstrated clearly in recent issues.

Extensive Standardization Impracticable

The Government's standardization committee has been working a month on this problem. If it is attempting to formulate standard designs for all types of locomotives it is working to no purpose. By far the most practical thing to do is to design one or two locomotives which will be suitable for common use or as floating equipment. As far as possible power, for use on individual roads should be built to each road's standards, which are especially suited to its peculiar conditions. To attempt to go further than this is inexpedient and a waste of time—and time is the most potent factor in this war.

The Interstate Commerce Commission's final summary of railroad revenues and expenses for December has been published this week. In December, of course, the roads were being operated without any Government guarantee of net income and without Government control. Transportation expenses averaged \$646 per mile of road in December, 1917, as compared with \$490 in December, 1916. This was for the entire United States. In the East transportation expenses averaged \$1,207 per mile in 1917 and \$914 in December, 1916. Because of weather conditions, January and February were both worse than December in respect to cost of operating trains; but take December and try to get some conception of what this increased cost meant. Visualize any piece of track a mile long that you are in the habit of traveling over. If this piece of track is in the East, it costs about \$300 more for engineers' and trainmen's wages, fuel and lubricants to move the trains that passed over that mile of track in December, 1917, than it did in December, 1916. The freight trains were on an average considerably shorter in December, 1917, than in December, 1916. The freight they carried yielded considerably less revenue for each train in 1917 than in 1916. As a matter of fact the total revenue from freight for all the trains moving over that mile of track was a few dollars less last year in December than in December of the year before. Multiply this increase of \$300 in trainmen's wages and fuel by the number of miles covered in the hour's trip between

What It Cost in December

Washington and Baltimore. There was an *increase* of \$12,000 in the single month of December, assuming that this piece of road was near the average for the Eastern territory. As a matter of fact, probably the increased cost on this particular forty miles was far greater than the average. Likened the operation of one mile of railroad to the business of a corner grocery store; how long would the groceryman stay in business if he had not been permitted to raise his prices in December, 1917, as compared with the same month in the previous year, and had had to pay out in wages and for his goods \$300 more than he had paid the year before? Everybody now acknowledges that railroad expenses are mounting tremendously, but it is worth while to stop and try to translate the figures for this increase into the homely things that we all deal with every day.

Is it any wonder that the railroads have difficulty in obtaining competent supervision in their shops when a man has to make a sacrifice in his earnings to become a foreman? Is it any wonder that the heads of the mechanical department complain that they can't keep competent foremen on the job when we see such conditions as that where, out of about 700 workmen in one shop, last month, five received more wages than the general foreman, eight more than the assistant general foreman, 11 more than the boiler and machine shop foreman, 16 more than the blacksmith foreman, 69 more than the erecting shop foreman and 147 more than the gang foreman? Can a man be blamed for resigning his position when those under his charge, and for whose work he is responsible, are getting more money than he? Full cognizance must be taken of existing labor and living conditions if the shops are to retain and obtain competent men to supervise the work.

Supervision

Must Be

Adequately Paid

There was a meeting of railway executive officers in New York on Monday, presided over by Frank Trumbull, chairman of the Railway Executives' Advisory Committee. In the statement given out after the meeting, it was pointed out that the agreements between the individual companies and the government, which will have to be arrived at, should be actuated by a spirit of co-operation and we may surmise, therefore, that the meeting on Monday was a "get together" affair rather than any attempt to determine upon a usual general policy of action. As any close student of the present situation knows, there are a great number of questions which will have to be settled between each individual road and the government. For instance, the question of continuance or discontinuance of detailed accounting figures, and the question of the adequacy of maintenance. There are also the questions pertaining to the financing of the needs of the railroads. It is the desire of the majority of railroad executives to help the government, both in regard to the sale of Liberty Bonds and the financing of railroad extensions, etc.—necessitated by war conditions—to the full extent of their ability. It may be that with Director General McAdoo's approval, some roads at least can sell their own

Railway Executives' Advisory Committee

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securities to pay for additional facilities urgently needed by shippers and the government. It may be that in other cases the government itself could better afford to lend the roads money. The Railway Executives' Advisory Committee has never been as invaluable to the railway companies and the government both as it is at present. Even if every single railway president in the country were actuated with the single desire to be as helpful to the government as possible, it would still be necessary, if this desire was to be made effective, to have concerted action. The Railway Executives' Advisory Committee can act as a clearing house for intelligent and patriotic discussion of the complex detailed questions which will arise between the government and each individual road. It can on one hand educate the railroad men and on the other co-operate with the director general.

The Test of Efficiency Under Government Control

SEVERAL LARGE RAILWAY SYSTEMS are handling less freight now than they were a year ago. We have in mind one system in particular which is moving so much less freight and earning so much less money that if government control, with its prospective guarantee of net return, had not been adopted the company would be in danger of bankruptcy. If the efficiency with which this railway is being operated could fairly be measured by the total traffic it is handling now, as compared with the total it was handling a year ago, government control might properly be condemned or the officers of the railway might justly be convicted of "lying down." And yet, measured by the standard which ought to be applied, this railway is being operated with greater efficiency than formerly. Its situation calls attention forcibly to the fact that the standard by which efficiency of operation was properly measured a year ago and the one by which it ought to be measured now, are entirely different.

The standard which properly was applied a year ago, when the country was at peace, was the amount of business of all kinds which a railway moved in proportion to the facilities it had and the expenses it incurred. The purpose for which government control was adopted was to make the railways more efficient instrumentalities, not merely for moving all kinds of traffic, but for helping win the war. Therefore, the standard which ought to be applied now, is how effectively each railway is being used to help accomplish this purpose. The railway in question is a large carrier of coal, and is located in the immediate territory where there is the greatest activity in the manufacture of munitions. The Railroad Administration believes the most effective way in which it can contribute toward winning the war is to move the largest possible volume of coal to Eastern destinations. One of the most important parts of its main line is, therefore, being used almost exclusively to carry coal; and it is moving a great deal more coal now than ever before. But this part of its line, when thus devoted almost exclusively to carrying coal, cannot, of course, handle as much traffic of other kinds originating on other parts of its lines as formerly; and as traffic of other kinds originating on its other lines cannot get through without moving over this busy line, the railway is unable to handle anywhere near as much business as formerly on its other lines. In consequence, it is handling a greatly increased business over a small part of its mileage, and, for this very reason, a greatly reduced business over most of its mileage.

The total amount of business which the railways will handle under government control will continue to be one measure of their efficiency, but it will be, while the war lasts, a secondary rather than a primary test. The primary test will be how successful they are in moving traffic whose move-

ment is essential to the winning of the war. Of course, a broad view of what traffic is essential must be taken. The people of the country must live and they must prosper while the war is going on; and it would be easy to make the mistake of concentrating excessive attention on the movement of food-stuffs, coal, munitions, etc. At the same time, in justice both to the Railroad Administration and to the managers of the individual railways, the fact that under these abnormal conditions the old standards of efficiency cannot fairly be applied should be recognized.

The Problem of Increased Track Capacity

AT THE PRESENT TIME under the unified operation of the railroads, other conditions being equal, an effort is being made to route traffic over the lines that will give the shortest haul. This may throw a large amount of business over lines which heretofore have carried only a medium amount of traffic, and one of the problems requiring solution is the handling of this increased amount of traffic in as expeditious a manner as possible. One method of meeting this situation is by the building of additional yards and main tracks, but with the present conditions existing in the labor and material markets such a program would require a considerable length of time before any noticeable results could be obtained. Such construction would also require the use of work trains during the entire time the work is under way, taking motive power, trainmen and cars from other important service. With the above conditions existing it would seem advisable to consider other possible alternative methods of accomplishing the same results.

Train operation is governed by the manual block system over a number of lines that are now handling increased traffic. This system possesses advantages for certain classes of service, but the maximum traffic capacity is not obtainable as the number of block sections necessary for the movement of the maximum number of trains would involve a very high cost for wages of block operators. Another disadvantage of the manual block system is that the length of the blocks is not fixed; in many cases they are very much shorter during the day than at night when the closing of some of the offices necessarily lengthens the distance from one block station to another, with consequent delays to trains. The safety factor of this system is also low in comparison with that of automatic block signals.

With automatic block signals the maximum capacity of the tracks can be secured, as the block section lengths can be arranged for the movement of the largest number of trains. These blocks are always of a fixed length, thus eliminating delays of trains, following one another, where it is necessary to increase the length of blocks by the closing of offices at night. The force of men required for the operation and maintenance of an automatic block system is comparatively small and the safety factor of the system is high in comparison with that of the manual block. As stated by one superintendent, "on the division of 107 miles (82 single, 25 double track), handling the usual business would require 22 additional operators to handle the traffic by manual block, an expense of approximately \$18,500 per annum." In addition to increasing the track capacity the above statement shows only one of the savings resulting from the installation of an automatic block system in place of the manual block.

This method of increasing track capacity should receive careful consideration from operating officers, as such a system can be installed in a comparatively short length of time, with a considerably smaller force and far less work train service as compared to the building of additional track facili-

ties, and with a very low first cost as compared with that for additional tracks. The saving in man power, money and material in construction, and the low cost for operation and maintenance are also important factors to be considered at the present time.

"Reasonable" Rates Under Government Control

ONE OF THE HARDEST QUESTIONS which political economists, railway officers and railroad commissions have ever tried to answer is the question, "What are reasonable rates?" The railroad control bill, as reported by the conference committee and as apparently it will become a law, implicitly gives the answer which should be made to this question at least during the period of control.

It provides that the President may initiate rates which shall be reasonable and just and shall take effect at such time and upon such notice as he may direct." The Interstate Commerce Commission, upon complaint, may investigate and determine whether the rates fixed actually are reasonable. If, however, the President shall certify that in order to defray the expenses of federal control, operating expenses, ordinary taxes and compensation to the carriers it is necessary to increase earnings, the Commission in determining the reasonableness of the rates, must take into consideration this certification of the President. The bill does not say that the Commission must make the rates high enough to cover all expenses, ordinary taxes and compensation to the carriers; but that it is the desire and expectation of Congress that it will do so is made plain.

Various views have been put forward as to what constitutes a reasonable schedule of rates. Some have contended that each rate charged should be made fairly proportionate to the service rendered for it, and that if this were done rates as a whole would be reasonable. Others have contended that a reasonable schedule of rates would consist of rates which were fairly adjusted in relation to each other and would as a whole yield a fair return on the fair value of the property devoted to public use, and no more. Still others have contended that a reasonable schedule would consist of rates which were fairly adjusted in relation to each other and which as a whole would enable the carriers to earn large enough profits to attract into the railway business enough capital adequately to develop transportation facilities.

Most of the regulating authorities have adopted and acted on the "fair return upon a fair valuation" theory. They have persistently ignored the fact that a "fair return upon a fair value," as the courts use the phrase, means merely a return which will not be absolutely confiscatory, and that such a return may be entirely inadequate to attract sufficient new capital into the railroad business. Furthermore, they have not been consistent in carrying out even this restrictive theory. Even on the principle of a "fair return" there necessarily comes a time, in a period of rapidly advancing wages and prices, when rates must be substantially increased. The last few years have been such a period, but the regulating authorities have not allowed sufficient increases in rates to offset advancing expenses.

Government control creates a new situation. The returns of the companies are to be guaranteed. So long as this is done the government must pay increased expenses, and it must secure the means for paying them either by advancing rates or by advancing taxes. Congress has tacitly recognized the fact that the regulating authorities have failed under private control and might fail under government control, in the absence of specific legislation on the subject, to advance rates enough to offset increases in expenses. There-

fore, it, in effect, specifically requires the Interstate Commerce Commission to do this. Nobody entertains the thought that when the government has to pay the bill the state regulating authorities will be allowed to fix state rates lower relatively than interstate rates. It would appear therefore, that both state and interstate rates will be advanced, under government control, as expenses increase.

It is highly desirable from the standpoints of both the railways and the public that this shall be done. Whether the railways are to be returned after the war to the managements of their owners or are to be bought by the government, it will be expedient that there shall exist at that time a substantial parity of income and outgo. The adoption of government ownership seems to grow more improbable every day. The whole course of Congress in dealing with the railroad control bill has indicated that a large majority of its members are opposed to government ownership. A large majority of the newspapers of the country which have spoken on the subject also are opposed to it.

If private ownership is retained the precedent established by saying in the law, almost in express terms, that "reasonable" rates are rates sufficient to meet advancing expenses and also to pay a return on investment, may be important. The Railway Executives' Advisory Committee, in the hearings before the Newlands Committee, advocated legislation which, in effect, would have defined reasonable rates as rates which would cover all expenses and taxes and a return on investment sufficient to cause adequate expansion of railway facilities. These are the only kind of reasonable rates which will ever promote the prosperity and welfare of the country; and a step toward legislation requiring such rates, even when taken under the present abnormal conditions, is a hopeful sign.

Sanitation on Railroads

IT IS AN UNWELCOME fact that the ideas of sanitation are still extremely primitive in many communities in this country, particularly in small towns and rural districts. Consequently it is not to be expected that either the employees or the local patrons of a railroad passing through such regions are particularly squeamish about the pollution of drinking water, contamination by flies, protection from mosquitoes, or other conditions generally frowned upon in more enlightened communities. Because railway trains, station buildings, eating houses and shops are gathering places for people in large numbers and frequently in close quarters, any unsanitary conditions prevailing become intensified and opportunities for the spreading of disease are increased. Consequently it devolves upon the railroad to maintain high standards of sanitation which means in many cases that the standards must be far above that of the communities through which it passes. Generally speaking this work is best handled under the direction of a trained sanitarian and a good idea of the problems with which this officer is confronted and the measures he must take to correct irregularities are covered in an article appearing on another page of this issue.

Sanitation on a railway involves two classes of activities. The first includes those which it takes as a common carrier to guard the health of its patrons and employees, and the second concerns the measures taken for the improved health and therefore greater efficiency of its employees. Under the first class the province of the sanitarian is limited largely to the condition of the surroundings with which the patron and employee come in contact. This problem must also be dealt with in the treatment of the employees in the shops, office buildings, and elsewhere, but if the measures taken by certain large industrial and commercial organizations are to be taken as a model, a much wider field is open for the sani-

tarian in educating the employee in the proper care of his health, not only while at work but in his home as well.

While the conduct of this policy has in some cases verged on paternalism the exercise of common sense will indicate the proper limitations in most cases, and these measures are paying large returns for the money expended through the increased efficiency of the employees, less loss of time from work, and improved esprit de corps.

Maintenance Work Must Be Pushed

WITH THE LEGISLATION relative to the control of the railways agreed upon and the passage of the act only awaiting ratification of the conference committee's action by the Senate and the House, the director general is now in a position to proceed with comprehensive plans for the betterment of the railway properties. One of the problems demanding the most urgent attention is the formulation of a definite policy regarding the routine maintenance as well as the additions and betterment work to be undertaken this year. It is now the middle of March and the roads are still without authority to proceed with plans for the season's work.

Work of this kind is very largely seasonal in character and much of it can be done to best advantage only during the summer months. During the last few years the roads have gradually come to realize the economy of starting the season's work as early in the spring as weather conditions permit. The shortage of labor and the large amount of work left unfinished last season have already given added impetus to this tendency. Many of the roads had their budgets for 1918 practically completed when the President issued his proclamation, taking them over on December 27, 1917. Since that time the initiative has passed largely into the hands of the director general and the preparation of plans by the roads has been almost at a standstill, awaiting his action.

The railways have recently been requested to furnish the director general with information concerning their minimum requirements for the year both for maintenance and for improvement work. In some instances, they have also consulted with the regional directors regarding their needs but they are still awaiting definite authorization to proceed. As a result of this condition over two months' time has been largely lost—time in which plans are usually completed, materials assembled and organizations perfected. The roads are now practically at the opening of the working season, less prepared to undertake actively the improvements which are so needed, than at any time for a number of years. This condition exists at a time when the roads are emerging from one of the most severe winters in history, during which they have handled a traffic exceeding all previous records. It also follows several years of sub-normal maintenance.

The factor limiting the amount of work which it will be possible to complete this year, as in the years just past, will undoubtedly be the amount of labor available. This makes it highly important that the roads enter the labor market at the earliest possible date before contractors, industries and the Government itself, secure all of the men for outside work of a similar nature. It has been the experience of the roads in past years that those companies which have started work early have had their pick of the men and have secured more efficient forces than those which organize their forces later. This year the shortage may be expected to be even greater than last year because of the abnormal demand in the shipyards, and in the war industries and the further effect of the draft, etc.

Equally serious is the situation regarding materials. In normal years the roads have ordered their rails during the early winter for delivery in the spring. Following the out-

break of the war, orders were placed still further in advance. Since the government has taken over the roads almost no rails have been ordered and they are entering the spring with little prospect of securing any in the near future. The only possible result of such conditions will be a large reduction in the amount of work which can be completed and a marked increase in the cost of that which is done.

The standards to which the roads are to be maintained is also a source of some concern. In his proclamation announcing his decision to take over the railways the President stated that "The railway properties will be maintained in as good repair and as complete equipment as when taken over by the government." In contrast with this statement the director general has asked the roads for information showing the minimum number of gross tons of rails required. While the demands for steel and other materials for war purposes are such as to require that no greater inroads be made upon the output of these materials than is necessary, it should be borne in mind that this will not insure the maintenance of the properties to the standards to which they have been maintained in past years and that any reductions in rails or other materials are not savings in the end but merely deferred maintenance which must be made good. The traffic of the country demands that the roads be maintained in proper condition. This in turn requires that they be permitted to secure not less than their minimum requirements of materials and that they may be permitted to undertake their work at once; for, measured in terms of work accomplished, a day now is equivalent to a week in the winter. There is reason, fortunately, for believing the director general contemplates a more generous maintenance policy than the request for information as to minimum requirements indicates; but it will be very difficult to make up for the loss of time that is occurring in getting started on needed work.

New Books

Railroad Structures and Estimates. By J. W. Orrock, principal assistant engineer, Canadian Pacific, Montreal, Que. 580 pages. 272 illustrations. 8½ in. by 5½ in. Bound in leather. Published by John Wiley & Sons, Inc., New York Price, \$5.

Cost figures have assumed a new importance since the inauguration of the federal valuation work, for it has caused many men to recognize the dearth of information of this character today. For this reason this book is particularly timely and valuable. The objection is frequently raised that no cost data can be used safely without a full knowledge of the conditions surrounding its collection. This is true in large measure, but even without this complete detail it is of much assistance to the estimating and construction engineer if used intelligently.

The first edition of this book was published in 1909. In the second edition the contents have been rearranged to conform with the classification of accounts prescribed by the Interstate Commerce Commission in 1914. A large amount of new material has also been added.

The book is limited to railway work and gives in detail data regarding the cost of the more unusual as well as the common problems encountered in such work. It is, therefore, of particular value to railway men. Liberal use has been made of information published in the technical magazines in the preparation of this volume. The book is divided into 20 chapters, typical headings of which include Track Materials and Estimates; Structural Materials and Estimates; Bridges, Trestles and Culverts; Ties; Rail; Other Track Materials; Track Laying and Surfacing; Stations and Other Buildings and Shops and Engine Houses.

Railway Business Association Broadens Activities

Invites All the Supply Interests to a Conference. Its Leaders See Great Possibilities Ahead

ACTIVITIES APPROPRIATE TO CHANGED CONDITIONS, and primarily aimed to serve the business interests of all those who furnish necessities to railroads, are recommended for the Railway Business Association in a unanimous report by its General Executive Committee. This plan for future work is addressed alike to members and those not enrolled but believed to have a common stake with members. It accompanies an invitation to attend the annual convention at the La Salle hotel, Chicago, on April 8, and participate in the discussion of purposes and methods. These proposals have been the subject of protracted conferences. They respond to expressions from many of the business men affected. Discussion from the convention floor is earnestly urged. The report of the General Executive Committee is distributed in advance in order that those attending may come to the meeting prepared to express their views. The report follows:

Events have given to those who deal in railway necessities a duty to the country and to ourselves which calls for more vigorous and far-reaching organized activity than any which we have undertaken in the past.

Successful prosecution of the war requires that American railroads shall be promptly rehabilitated and their facilities maintained and adequately increased. When war shall have ceased a portentous problem will remain. Full enjoyment of the liberties for which we are fighting requires national prosperity. National prosperity depends upon a robust railway system. The impairment of transportation vitality now disclosed is chronic. Its causes must be eradicated. America must have a railway system adequate for her great destiny.

Public Opinion

Determination of policy now and after the war rests with the government. What that policy shall be will depend upon public opinion. Public opinion will be intelligent in proportion to the thoroughness with which exact knowledge is diffused among the citizens. While the railroad men because they are operating under government direction may not be in position to voice their views freely to the public, the manufacturers of and dealers in equipment, material and supplies are entirely free to make inquiry and publication of the results on any aspect which they view as affecting the national interest or their own.

We have never known business men in this field to manifest so great an anxiety or so thoroughgoing a desire as now for concerted action.

The work falls under two general heads:

First:—*Development of policy and practice by the Director General of Railroads affecting construction and maintenance of material, equipment, supplies and structures during the war.*

We recommend a systematic participation by us in public discussion of the problem so far as our occupation gives us special competency to speak.

Second:—*Reconstitution of the railway system after the war.*

We recommend that our industry from now on seek the cooperation and co-ordination of other organizations in the endeavor to promote national concurrence in the general principles which should govern railway legislation upon the conclusion of peace.

Standardization

Decisions by the director general or administrative application of policies by his deputies during the war may pro-

foundly affect manufacturers of railway goods. The present director general has indicated a hospitable disposition toward devices not yet in use. He has also declared that for upkeep and repair, use will be made of the appliances for which existing vehicles were designed.

The purpose to improve car and locomotive design will not only afford the country for the war the most advanced transportation instruments obtainable, but, together with use of existing established devices, will carry through the war into time of peace the occupation of promoting progress in the art of transportation through invention and manufacture.

Such business units have been built up by inventive genius, adequate management and fair dealing; they are established upon the practical demonstration of actual use. To exclude a given maker of appliances for the period of the war with the aim of standardization might signify his permanent disappearance as an industrial factor. It is impossible to foresee in what shapes standardization may be advocated or what criteria may be proposed in sanctioning interchangeable appliances as permitted to bid upon new construction. We do not know what changes in personnel, organization or policy may occur. With constant vigilance we must warn the public and officials against setting up unwise and harmful precedents.

Ultimately what the country has to fear and what manufacturers should resist is overstandardization, which discourages invention and stifles enterprise and progress.

It is our duty to observe systematically the course of official thought and action and to give those in authority the benefit of our knowledge and opinions and likewise the benefit of public opinion as gathered by us upon the questions involved.

Railways After the War

For development of national concurrence in the general principles which should govern legislation affecting railroads after the war, we recommend that the railway supply craft and other businesses allied thereto shall undertake whatever labor may be necessary. Those whose ideas differ widely from our own are not waiting for the declaration of peace. They are carrying on an insistent propaganda. Individuals and organizations in their conduct of that propaganda have increasingly had the aid of numerous and powerful publications.

The sooner our own proposals for railway legislation are developed and arguments presented in their support the more open the public mind will be for unbiased consideration of our views.

Attacks on the Managers

Recently certain railway labor leaders, public officials and others have made statements which if not refuted would deprive the railway managers of the public confidence.

In the highest quarters testimony is abundant to the splendid loyalty and efficiency of American railway officials. With an unprecedented burden of responsibility and difficulty they have wrought wondrously well. Not merely in fairness to them, but in the interest of temperate discussion and sound public thought upon the general railway problem we should place the facts before the public and maintain in the minds of the citizens that esteem for the railway managers as a whole which after many years of acrimonious controversy had at the moment of this assault upon them become happily general.

Still another reason dictates an immediate beginning. Problems will crowd upon Congress in great number and

perplexity after the war. Those will be first dealt with upon which there is the most obvious public concurrence. The period of uncertainty pending railway legislation will inevitably involve a postponement of anything like comprehensive projects for railway construction. The shorter this delay the sooner the new railway system can come into the market with purchases to take the place of munition and other war-supply manufacture. This will tend to stabilize employment in the period of transition from war to peace. Hence it is of great material importance that discussion of principles for an ultimate solution of the railway problem shall have proceeded as far as possible before the cessation of hostilities.

Your committee has endeavored to define certain general principles which it believes you will be ready to espouse.

Individual Initiative

Foremost we place the preservation of individual initiative in the investment of capital and in management.

By this we mean reliance upon the judgment of the investing public in projecting enterprises of construction or improvement. We mean responsibility of the owners or their representatives for selection of operating executives. We mean maintenance in railroading of a career outside the government in which the poor boy, as in the past, can begin with nothing and rise to the top by aid of no influence except his own ability and efforts. We mean the preservation of government regulation—regulation in which the citizen can appeal, not from one government official to another, but from an official outside the government to the government itself.

Competition as Well as Co-operation

Second stands the organization of railways into a number of independent corporate units.

Profound changes have been made possible by the war. These may effect the corporate structure and the relations of one railroad corporation to another. Whatever may come we should, in our judgment, urge that the organism be so worked out as to preserve a healthful equilibrium between co-operation and competition.

Here again it is appropriate to mention competition between manufacturers of railway appliances.

The crux of our peculiar problem is the question: With whom shall the fate of the inventor or developer of inventions rest? If the number of railroad units were reduced or if railroad units adopted group provision and maintenance this would involve partial centralization, but to concentrate altogether would entail an extreme narrowing down of the number of minds whose discretion consideration and experiment lay and from one of whom appeal could be had to another. It may be apprehended that complete centralization would in time be administered by officers who would come to have no personal and compelling motive for hospitality toward improvement. There is always a tendency to overburden the government agencies with detail. To seek relief from this they might fall into the error of a too rigid standardization.

Adequacy the Aim

A third principle is for the federal government to adopt as the primary aim of regulation adequacy of facilities through attraction of capital.

What we have to create is a public sentiment which will result in a governmental policy to promote and not to restrict construction and upkeep of railways. If we are to have a prosperous country and that is to say a progressive transportation system, we must face squarely the fact that our country can have such a system, efficient and expanding to meet the nation's necessities, only by permitting such earnings as will meet railway disbursements, both those essential to adequate operation and those imposed by government, and provide in addition a surplus as the basis of railway credit.

Broader Associated Effort

As dealers in railway necessities we should, in our associated capacity, broaden and strengthen our facilities for making reports to the public from our point of view upon current events in this field and for promoting in the several communities discussion of current proposals affecting transportation.

We should adhere sedulously to the declaration that as a group we "shall have no part in party politics." Now, as from the beginning, we should court the sunlight. We believe we need leave undone nothing that ought to be done if we seek the co-operation of those agencies only which are committed to the most open methods and the most immaculate conduct.

Trade Acceptances and Exports

Supplementary to the rehabilitation, maintenance and enlargement of the railroads during the war and the development of public purposes for legislation affecting railways after the war there are certain other activities to which we invite attention.

Trade acceptances, common abroad, but not until recently introduced here, have been suggested as a means to railway supply manufacturers of reducing their cost of doing business by getting immediate negotiability at the bank for an invoice attested by the purchaser as correct and bearing a contractual due date. Discussion of this subject as it applies to our industry has been placed on the program for the association convention.

Opportunities for trade with railways and other utilities in foreign countries, rendered more obvious by the temporary trade isolation of the Central European powers, have led many to turn their thoughts in that direction.

The investment interest of American citizens in foreign railways has substantially increased as a result of the war and otherwise. Federal sanction of co-operation between competitors in foreign export trade is assured. The association office is engaged in a study of the possibilities of service to our members in connection with exports. A report upon the subject will be presented at the convention. We recommend that delegates be accredited to the National Foreign Trade Council and that steps be taken to encourage participation in that Council by members of this craft.

Our Opportunity

No industrial group ever had a more splendid opportunity. Our special motive we lay bare without apology—that motive is our own prosperity and the prosperity of those who look to us for the steady and profitable employment of their labor and their savings in these industries. The work of the Railway Business Association in the past has brought it public esteem and confidence, while fortifying it with experience and facilities, connections and, above all, mutual acquaintance and the habit of team work. We can rejoice as we proclaim that what we urge is patriotic in time of war and patriotic in time of peace.

PERU'S RAIL PROJECT TO REACH COAL AT HIGH ALTITUDE.—The importance of the project to build a 75-kilometer (46.6 miles) railway line in Peru, from Huancayo to the coal deposits at Jatunhuasi, on the eastern side of the Andes, is discussed in articles which have been published in the West Coast Leader. The railroad to the coal mine will cost approximately \$1,500,000 which money has been guaranteed by the Italian bank at Lima. This new line will join the main line of the Ferrocarril Central del Peru, probably at kilometer 343, and will be of standard gage. The haul from the coal mines to the seacoast will be 418 kilometers (300 miles). The contract is not let, but there is every probability that the Peruvian Corporation will take it and operate the road after its construction.

Winter Temperatures and Locomotive Capacity

A Study of the Relation Between Decreasing Temperature and Increasing Motive Power Requirements

By W. L. Bean

Assistant to the General Mechanical Superintendent, New York, New Haven & Hartford

THE UNUSUALLY SEVERE TEMPERATURES of the winter of 1917-18 added tremendously to the difficulties of railroad operation and prompted the making of a study, the object of which was to establish a measure of the relative effect of the extraordinary weather as compared with that of other years in terms of decreased effectiveness of steam locomotives of the New York, New Haven & Hartford in handling traffic.

A drop in temperature decreases the capacity of the steam locomotive boiler and also greatly increases train resistance; in fact the first factor is of much less importance than the latter. The question as considered in this article is principally that of increased demands of power to move cars whose journal friction increases as the temperature falls, because of the increase in the viscosity of the lubricant.

Operating records in electric freight service between Harlem River terminals and New Haven, a distance of approximately 70 miles, where undulating grades of 0.6 of 1 per cent rule, with considerable curvature, afforded an opportunity to consider the problem on the basis of increased power consumed by electric locomotives in winter as compared with summer. The average kilo-watt hours per 1,000 gross ton-miles in freight service were plotted for each month for nearly two years as shown in Fig. 1 and the monthly mean temperature at New Haven, Conn., as recorded by the United States Weather Bureau, was also plotted. Maximum power consumption and minimum temperatures, and vice versa, register quite accurately, as would be expected. In the year 1916 the maximum and minimum power rates were both higher than in the year 1917, and explanation was sought by plotting.

(a) *Average revenue tons per revenue car mile.*—This shows a fairly uniform increase during the two-year period and would account in part for the lower power consumption in 1917.

(b) *Average wind velocity in miles per hour, all directions.*—There was most wind in March, 1916, when the power consumption rate was highest, and least in the summer of 1917.

(c) *Precipitation.*—The precipitation, especially the snow-fall in February and March, 1916, was much heavier than in 1917.

Each of these factors account for a heavier power consumption rate in the year 1916 than in 1917, there being no change of importance in electric equipment or operating practices.

Temperature and Power Consumption Ranges

In the endeavor to secure values of use in estimating the decreased effectiveness of steam locomotives as a result of cold weather, the average of the minimum power requirements in the two years was subtracted from the average of the maximum consumptions and the "power range" was found to be 8.45 kw. hours. This amounted to 31.1 per cent of the average minimum or summer power consumption and was assumed to represent the excess power required to create 1,000 gross ton miles in mid-winter versus that necessary in mid-summer. Similarly the "temperature range" between average maximum and average minimum was found to be 47.5 deg. Fahrenheit. Dividing the "power

range" by the "temperature range" it is found that for each degree of temperature change the demand for power increases 0.65 per cent.

The above discussion and result has been possible only

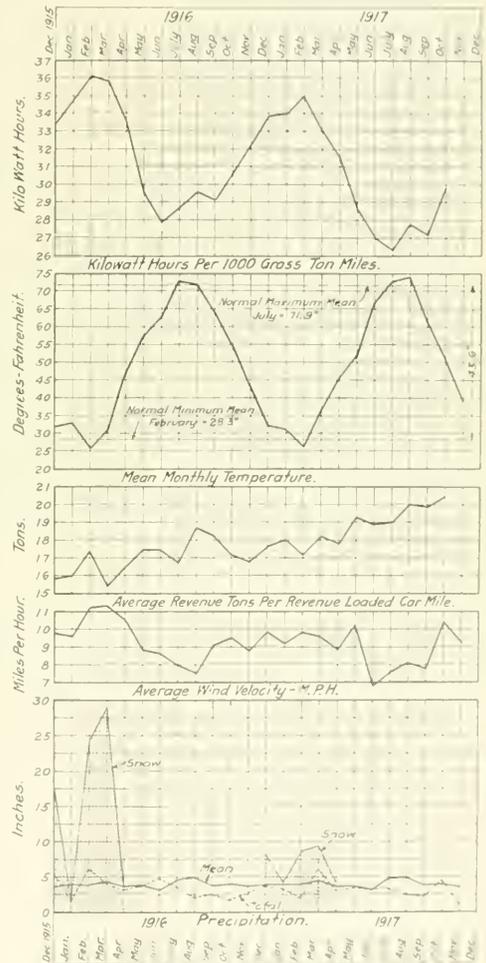


Fig. 1—Relation Between Electric Power Consumed and Weather Conditions

because of power consumption records kept for electric locomotives, but it is felt that the factor 0.65 per cent may be applied to steam locomotive service because there is no great difference in the heat losses and engine friction of steam

and electric locomotives considered in percentage of maximum capacity.

Furthermore, heat losses in steam locomotives causing reduction in capacity in winter versus summer are practically offset for the purposes of this study by the consumption of current in heating cabs of electric locomotives. This use requires approximately three per cent of the total electric power used on a trip.

Concerning heat losses and friction in steam locomotives, Messrs. Schmidt and Marquis in Bulletin No. 59 of the University of Illinois, state:

"Taking all these facts into consideration, it seems likely

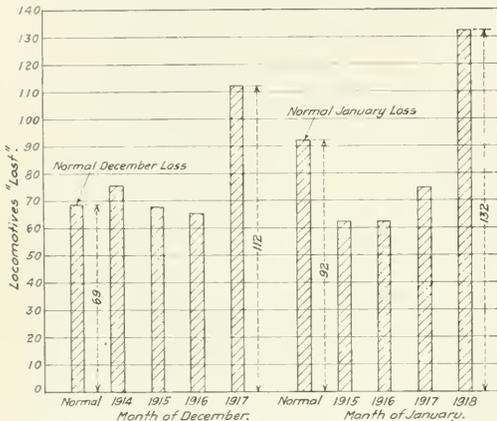


Fig. 2—Estimated Effect of Winter Temperatures on Train Resistance Stated in Terms of Loss of Use of Locomotives

that cold weather does not greatly reduce the tractive effort of locomotives, and that, consequently, it does not necessitate radical reductions in rating in so far as its effect upon the locomotive itself is concerned. Probably a reduction in rat-

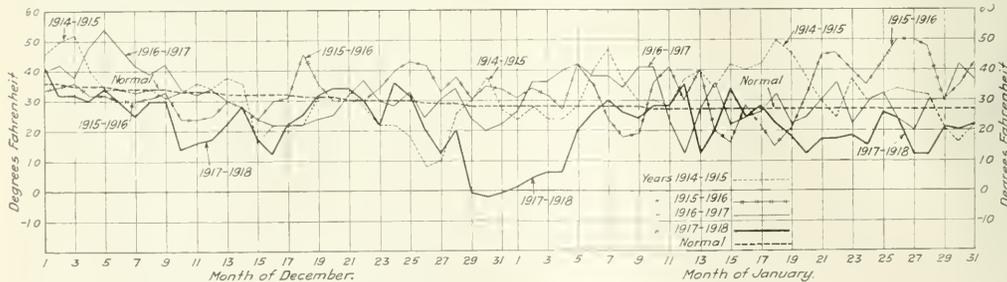


Fig. 3—Temperature Variations at New Haven, Conn., for the Months of December and January for the Past Four Years

ing of four or five per cent, even with air temperatures as low as 0 degrees F., is sufficient to allow for the reduced tractive effort of the locomotive."

Considering all these things, it appears reasonable to apply to steam operation under the track characteristics named the factor 0.65 per cent per degree of temperature.

Steam locomotives are at their greatest disadvantage in starting trains in winter, whereas electric locomotive motors are favored in winter versus summer, because they can be overloaded for longer periods without overheating. Hence, electric engines can exert their maximum tractive effort over

longer periods in the first part of their trips during which time journals are warming up and train resistance is therefore decreasing.

Adjustments in Tonnage Ratings to Suit Temperatures

Reductions in tonnage ratings because of temperature changes are rarely made above 45 degrees F. Starting at that point and applying the factor 0.65 per cent, a table of tonnage reductions can be constructed which would appear to suit conditions obtaining on track of the characteristics of that portion of the New Haven System before referred to.

Temperature Range	Tonnage Reduction
45 to 35 degrees	6 per cent
35 to 25 degrees	13.0 per cent
25 to 15 degrees	19.5 per cent
15 to 5 degrees	26.0 per cent
5 to -5 degrees	32.5 per cent
5 to -15 degrees	39.0 per cent
15 to -25 degrees	45.5 per cent

The above applies to medium and slow freight.

Effect of Temperatures on Available Engine Power

The foregoing data may be used in connection with current weather conditions to measure the effect of temperature at any particular time in increasing the demands on engines in handling traffic and further on in the article a representation is made of this loss in terms of entire engines.

The daily mean temperature at New Haven, Conn., for December, based on 45 years' weather bureau records, is 31.8 degrees. The normal daily mean temperature for January is 27.3 degrees. The actual mean temperatures for those months for four recent years are as follows:

December	January
1914..... 30.4 degrees	1915..... 33.0 degrees
1915..... 32.0 degrees	1916..... 33.0 degrees
1916..... 32.4 degrees	1917..... 30.6 degrees
1917..... 23.4 degrees	1918..... 19.6 degrees

Therefore:

December, 1914, was 1.4 degrees below normal.
 December, 1915, was .2 degrees above normal.
 December, 1916, was .6 degrees above normal.
 December, 1917, was 8.4 degrees below normal.
 January, 1915, was 5.7 degrees above normal.
 January, 1916, was 5.7 degrees above normal.
 January, 1917, was 3.3 degrees above normal.
 January, 1918, was 7.7 degrees below normal.

From the above, on the basis of 0.65 per cent greater power being required to move cars for each degree of temperature drop, excess power requirements in last December

and January as compared with those months in the three immediately preceding years were as follows:

December, 1917
4.55 per cent greater than in December, 1914
5.55 per cent greater than in December, 1915
5.95 per cent greater than in December, 1916
January, 1918
8.71 per cent greater than in January, 1915
8.71 per cent greater than in January, 1916
7.15 per cent greater than in January, 1917

Assuming 800 locomotives normally in service, the result of such handicap as stated above measured in the number

of locomotives necessary to make up the increased demand for power on account of low temperature, was as follows:

December, 1917	
36.4 engines more than in 1914	
44.4 engines more than in 1915	
47.6 engines more than in 1916	
January, 1918	
69.7 engines more than in 1915	
68.7 engines more than in 1916	
77.7 engines more than in 1917	

Fig. 2 indicates the number of engines which would have to be added in a normal December and in a normal January to make up the loss of engines due to winter temperatures as compared with summer. Also the losses in each of the two months in the three preceding years are shown.

It will be noted that December weather in 1914, 1915 and 1916 ran fairly close to normal but in 1917 was excessively low with the result that instead of losing a normal of 68.6 engines, the equivalent loss was 112 engines, or in other words, the December loss this year was 63 per cent greater than the normal December loss.

On the other hand, it will be noted that the losses in January of the years 1915, 1916 and 1917 were below normal because the temperatures in each of those months were above normal.

Curves showing the maximum, minimum and mean temperatures for the past four years are shown in Fig. 3.

On account of the abnormally high temperatures in January in previous years, the loss of engines in those years averaged about 66.5 as compared with a normal loss of 92.0 and an abnormal loss in January, 1918, of 132.1; therefore, the loss this season was about 43 per cent greater than in a normal January and about 98 per cent greater than the average of the three preceding Januaries.

Any consideration of the foregoing estimates should, of course, take fully into account that no effect is considered other than that of low temperatures in causing increased resistance of trains, as regards friction in bearings, and allowance for heat losses in steam locomotives. Those factors only in the slowing up of train movements are to be connected with this study. Greater breakage of locomotive and car parts, as well as rails; delays caused by frozen parts; accumulations of ice; obstruction of vision by steam; and the effect of cold on working forces are, of course, not taken into account.

INCREASED PAY FOR IRISH RAILWAYMEN.—The recent government award of 12½ per cent increase in wages to the workers and 7½ per cent increase to piece-workers engaged on the English railways has been made applicable to all men engaged in the repair, construction and maintenance of locomotives and cars and locomotive sheds and shops in Ireland.

AMERICAN-RUSSIAN TRADE IN 1917.—The total trade between the United States and Russia during the calendar year 1917 amounted to \$438,000,000, according to a statement issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce. This total represents a decrease of \$39,000,000 from the record figures of 1916, but the decrease was in the trade with Asiatic Russia and was doubtless due to the congestion and the import restrictions at Vladivostok. Locomotives worth \$11,281,000 and railway-stock material valued at \$5,865,000 were sent to European and Asiatic Russia together in 1917 as against \$3,727,000 and \$4,407,000, respectively, in the preceding year. There was a marked decline, however, in exports of freight cars, which were valued in 1916 at \$4,112,000 for European Russia and \$7,994,000 for Asiatic Russia, and in 1917 at only \$763,000 for European Russia and \$1,264,000 for Asiatic Russia. This trade in railway equipment has originated since the war started.

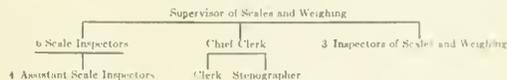
Baltimore & Ohio Weighing Bureau*

By L. D. Davis

Supervisor of Scales and Weighing.

THE ORGANIZATION of the department in the beginning consisted of a chief scale inspector reporting to the chief engineer maintenance of way, with the scale inspectors reporting to the district engineers of maintenance of way. Jurisdiction was extended over the Baltimore & Ohio Southwestern in 1910, and in January, 1911, the chief scale inspector was appointed supervisor of scales and weighing, reporting to the general manager, at which time his supervision was extended to cover all matters pertaining to scales and weighing. Since April, 1912, the bureau has been under the transportation department. In August, 1912, jurisdiction was extended over the Cincinnati, Hamilton & Dayton. Its present organization is as follows:

A scale shop at Martinsburg, employing a foreman and



The Organization of the B. & O. Weighing Bureau

from two to three mechanics, is under the maintenance of way department, but work is handled in accordance with suggestions of the weighing bureau.

The number of different type of scales in use and period for testing is shown below:

Number of scales	Increase since 1910	Period for testing
144 Track scales	18*	Every sixty days
255 Private track scales	20	Every sixty days
537 Motor truck stock and depot scales	195	Every six months
1,500 Portable and other scales	290	Once every year

*Decrease. The reduction in the number of track scales is due to the removal of eleven from coal pits, because of changed operating conditions, and concentration of weighing.

The annual expenditure for new scales, the renewal and maintenance of old scales, and bureau supervision, beginning with 1909 is as follows:

Year	Cincinnati	
	Baltimore & Ohio	Hamilton & Dayton
1909	\$2,840	—
1911	69,471	—
1912	39,827	—
1913	161,967	—
1914	67,886	—
1915	69,746	—
1915	41,306	4,000
1916	83,355	3,000
	\$471,000	\$7,000

The greater part of this expenditure has been for new track scales of improved design and installation. Fifty-two of the improved type scales have been installed, on which 76 per cent of cars are weighed.

The proper design and installation of scales is hardly of more importance than their proper cleaning and maintenance.

It should be considered that in a track scale there are 15 levers of a fixed ratio, coupled together to record a weight, and it is absolutely essential that these levers be rigidly supported, pivots kept sharp and unobstructed by dirt or rust. Measures taken to prevent rust have resulted in a material increase in the life of scales.

The Older Type of Installation

Prior to 1909 only one track scale was set on steel, all others being on timber. In 70 of these the load was supported and distributed to the levers through 12 in. by 18 in. wood stringers. At the present time all but 20 scales are set directly on concrete, and in all of them the load is

*From the Baltimore & Ohio Engineering Magazine for January, 1918.

supported by steel "I" beams. Four of those on timber will be renewed on concrete this year and two abandoned. Every track scale in use at the beginning of 1909 has either been abandoned, renewed or replaced, some of them having been renewed more than once.

The first of the newer type scales was installed at Cumberland, Md., in January, 1910, and there have passed over it approximately 900,000 cars or 35,000,000 tons of freight, resulting in freight revenue of about fifty million dollars, before it was necessary to renew any of the scale parts, and then only the eight main levers were replaced in November, 1915. In that period of nearly six years, the scale was tested 34 times with a scale test car and it was found out of adjustment but seven times, the largest error found being 90 lb. The older type scales under similar service lasted without renewal about six months.

Latest Design in Track Scales

In order to accommodate longer and heavier cars and to allow for a possible increase in these respects, the design in use 1910 to 1917 has been superseded and in the future 60 ft. scales will be installed at motion-weighing points, and 50 ft. scales at spot-weighing points. The latest type is designed to support 50 per cent of the capacity on each section, while the type now in use was designed for a uniformly distributed load of 300,000 lb.

It is logical that this type should be adopted since half the weight of a loaded car is concentrated on each truck which pass successively over each section of the scale, and when cars of equal weight are coupled, the weight of an entire car is concentrated on a comparatively short space. Parts of the 50 ft. and 60 ft. scales of the latest type will be interchangeable except as regards the four extension levers, which are necessarily of different length. Sixty-foot scales have been installed at Newark, at Connellsville and at Cleveland.

The importance of installing the best type of scale obtainable may be realized when it is considered that if the track scale at one large weighing point were weighing one pound light in each thousand, the loss in freight revenue would approximate \$50 a day.

Track scales at nearly all motion-weighing points are equipped with automatic recording attachments. Instructions require that the car shall be entirely on the scales three seconds for weighing and that the speed shall not exceed four miles an hour.

The development and extended use of motor trucks, with about 80 per cent of the load concentrated on the rear axle, has necessitated an improvement of design of scales on which to weigh them. This type has been installed at New York, Chicago, Cincinnati and Olney. The scale is 20 tons capacity with a platform 22 ft. long by 9 ft. wide, and equipped with a full capacity single beam with ball bearing poise. The installation is entirely of concrete and steel, even to the concrete deck.

Depot scales have been improved, both as to design and strength. While formerly designed with truss rods, the rods have been eliminated and levers of sufficient strength in themselves to support the load are now used. The suspension platform type is also used instead of the direct bearing type.

A number of depot scales have been installed at points where only portable scales were in use, and this has resulted in a larger amount of accurate weighing and the consequent increase in revenue.

Test Cars

Test cars are sealed after each test trip, or about five times annually. These test cars are spotted consecutively over each section of a track scale, and if any adjustments are necessary, these are made by moving nose irons on the

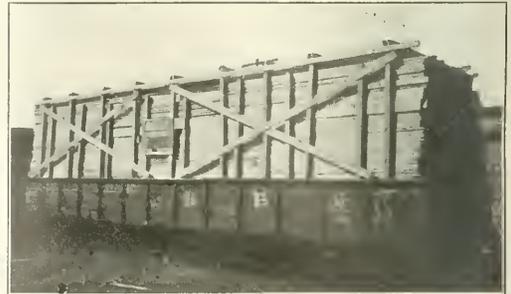
end of levers, thereby changing their ratio to such an extent as to put the scale in adjustment.

Test cars have also been improved in design. There is under construction a heavier car weighing 80,000 lb. Two large castings weighing 33,000 lb. each make up the greater part of the weight. Every unnecessary part has been eliminated from the design, the change of which might result in a change of weight. All parts have been designed, as far as possible, to avoid holding dirt. Journals are equipped with roller bearings to facilitate movement by the scale inspector with push bar, and to avoid the frequent necessity of sponging and packing journal boxes, which frequently results in a change of weight.

Worn and broken scales are sent to the Martinsburg shop. The old pivots are sharpened, if possible, or replaced by new ones, and the fulcrum distances gaged as accurately as possible with special gages after which pivots are hardened, tried with a gage, and ground again if necessary. The levers are then put on sealing horses. If the gaging has been done accurately, which is extremely difficult, a certain weight suspended from the load pivot will balance a predetermined weight on the sealing beam. If it does not, it is then necessary to grind again the pivots until the weights balance. As each lever is sealed in the shop with weights to transmit its proportion of the load accurately, the levers, if properly coupled together and supported will, in unison, accurately transmit the weight of the entire load and the scale give correct weights. In this way loss of revenue from use and wear is reduced to a minimum.

A Record Carload of Lumber

SINCE THE ENTRANCE of the United States in the war car conservation has come to be recognized as a patriotic duty and many shippers have made enviable loading records. The illustration shows a car of yellow pine lumber that was shipped by the Arkansas Lumber Company on February 12 from Cloquet, Ark., to Camp Pike, Ark.,



Car of Lumber Loaded to 110 Per Cent of Marked Capacity

via the Warren & Ouachita Valley and the Missouri Pacific. The car contained 60,000 ft. b. m. of lumber and weighed 150,000 lb., or 110 per cent of the marked capacity of the car, which was 140,000 lb.

IRISH RAILWAY TRAVELING RECORD.—A record for Irish railway traveling was accomplished recently on the Great Northern Railway, says the London Times. Lord Pirrie, in a special train, went from Belfast to Dublin, a distance of 115 miles, in 107 minutes, the return journey being accomplished in 109 minutes.

Selling to Railroads Under Government Control

Orders Placed Will Be Large, and Changes in Standards and Purchasing Methods Less Than Have Been Feared

THREE QUESTIONS regarding the relations between the railways and the railway equipment and supply concerns under government control have been much mooted recently. These are, first, how large are the purchases of the railways likely to be; second, who is going to determine what they shall buy; and, third, who is going to do the actual buying? Pretty definite answers may now be made to these questions, as a result of public announcements and quasi-public assurances which have come from the railroad administration in Washington.

Will Purchases Increase or Decrease?

As to the magnitude of the purchases to be made under government control, there is reason for believing that they will show a large increase over those made in recent years. If the properties are to be put and kept in condition to handle more satisfactorily both the commercial and the war business of the country, the expenditures for both maintenance and additional facilities must be substantially increased.

The expenditures for maintenance of way and maintenance of equipment combined amounted in the fiscal year 1916 to \$992,000,000 in the next twelve months to about \$1,100,000,000. As near as can be estimated, 40 per cent, or about \$400,000,000, of this was spent for equipment, materials and supplies and the rest for labor. The expenditures for maintenance probably ought to be increased at least \$150,000,000 annually, which would involve an increase of expenditures for things used in maintenance of way and equipment of, say, \$60,000,000.

New investment in road and equipment—that is, the outlay charged to capital account—was less than \$280,000,000 in 1916, the latest year for which complete figures are available. Six to eight years ago the annual new investment was about \$750,000,000 annually; and in order to secure anything approaching a normal increase of facilities, the annual new investment at present, with the wages and prices now prevalent, ought to be \$1,000,000,000. Suppose, however, it should be only \$750,000,000, which at present wages and prices would increase facilities only two times as much as they were increased annually in 1910, 1911 and 1912. About 40 per cent of this also would be outlay for equipment, materials and supplies. This would make a total annual outlay for equipment, materials and supplies used in maintaining and increasing facilities of about \$800,000,000. Expenditures for equipment, materials and supplies during the last four years, when additions to facilities have been smaller than for many years and great economy has been practiced in maintenance, probably have averaged less than \$600,000,000 a year. Therefore, if under government control the railways are to be adequately maintained, and any considerable stimulus is to be given to the expansion of their facilities, the expenditures for equipment, materials and supplies will have to be increased by about \$200,000,000 a year.

There is much reason for believing the railroad administration contemplates increases in expenditures on a large scale. An official statement was issued last week announcing the organization of the new purchasing department of the administration. In this it was stated that purchases "will amount to between \$1,000,000,000 and \$2,000,000,000 per annum." This estimate includes the outlay for fuel, which is not included in the estimates of expenditures for equipment, materials and supplies given above. The annual

outlay of the railways for fuel is now about \$400,000,000. An expenditure of \$400,000,000 for fuel and of \$800,000,000 for equipment, material and supplies would make total purchases amount in a year to only \$1,200,000,000, which is but little larger than the *minimum* figure mentioned by the railroad administration.

Needless to say, these estimates of both past and prospective expenditures for equipment and supplies are but rough approximations; but probably they are as near correct as any general estimates that can now be made. From all indications it may be predicted that the volume of the business which the equipment and supply companies will soon be doing will be more satisfactory than it has been for some years.

Who Will Determine What the Railways Shall Buy?

Who is going to determine what the railways shall buy? The announcement regarding the organization of the division of finance and purchases, of which John Skelton Williams is the director, states there is to be a central purchasing committee at Washington and regional purchasing committees associated with each of the regional directors. All purchases of locomotives, cars and steel rails will be made through the office of the director of purchases in Washington. But this does not mean that the exact locomotives, cars and rails which shall be bought will be determined by the permanent staff in Washington. A committee of railway mechanical officers was called for its recommendations regarding the kinds of locomotives and cars that should be ordered and as to how they should be equipped. Doubtless before rail orders are placed a committee of chief engineers of the railways will similarly be called on to consider the weight, specifications and methods of manufacture of the rail to be ordered. In other words, under government control, as under private control, the experienced technical officers of the railways in all parts of the country will determine what kind of locomotives, cars and rail shall be bought. This was not clear when the talk about general standardization was begun a few weeks ago. It seems to be definitely settled now. Furthermore, even when standards once have been used, it does not follow that when additional equipment is subsequently ordered exactly the same standards will be adhered to.

As to other kinds of materials and supplies they are to be bought by the purchasing officers of the individual railways acting under the supervision of the regional purchasing committees. The technical officers have in the past been largely relied on by the purchasing officers of the individual lines to indicate what supplies should be bought for them. They will, of course, continue to do likewise under the new system. In other words, the same trained and experienced men who have had charge of the maintenance and development of the physical properties of the railways in the past will continue to have charge of them. This means that they will be, as they have been heretofore, the men to whom the selling departments of the supply companies will have mainly to address themselves in order to market the things that they make and handle.

But who is going to do the actual buying of things other than rolling stock and rail? In the main it is to be done, as it has been in the past, by the purchasing departments of the various roads. There will, however, be introduced some new elements in the relations between the railways and the supply companies. All contracts for supplies for periods

of six months or longer must be submitted before being made to the regional purchasing committees, and "information as to the prices paid for all supplies will be furnished monthly by all roads to the regional purchasing committees, so that the prices paid by each road for all articles may be carefully checked." The purpose of this requirement is obvious. It is intended to bring about uniformity in the prices paid by the different roads for articles of similar quality handled under similar conditions.

The Co-Ordination of Purchases

The announcement regarding the plan for the division of purchases says that purchases of supplies needed in the current operations will be made for "time being" through the purchasing departments of individual roads. It adds "the regional purchasing committees will address themselves to consideration of the opportunities for standardizing and consolidating purchases of every kind that may admit of such treatment, with a view to increasing efficiency and economy." This indicates that there will be increasing standardization of supplies and increasing centralization of purchases as time goes on.

There is no reason now, however, for believing that in the long run standardization of supplies and consolidation of purchases will be carried as far as there seemed reason to fear when the talk about these policies began. It may be confidently predicted that even though an attempt to go a long way with standardization and centralization were made it would later be abandoned. Both the Ordnance Department and the Red Cross have tried highly centralized organizations, and are abandoning them in favor of decentralized organizations, because they found the centralized organizations were top-heavy, cumbersome and inefficient.

The railways of the United States spread over such an immense area, operate under such diverse conditions, and buy such enormous quantities of equipment and supplies that it would be easy to standardize and centralize purchases for them so much as to cause waste, delays and demoralization which could soon force the Railroad Administration to decentralize.

Both the official and unofficial statements of officers of the Railroad Administration indicate that the policy they are trying to work out is one which will co-ordinate rather than merely centralize purchases. While, therefore, purchasing methods are going to undergo important changes, and it will be necessary for railway equipment and supply companies to modify their selling methods accordingly, there is no reason for believing that a supply dealer who can convince the technical and purchasing officers of a road that they ought to buy his goods, and buy them at prices which will yield a reasonable profit, will have much more difficulty in selling them to that road than he has had in the past.

Supply concerns will have to carry on negotiations in many cases now not only with the officers of individual lines, but also with the regional purchasing committees and with the purchasing department in the director general's office in Washington. But in the past in the case of large railway systems they often have had to convince both the technical officers away from general headquarters and also the technical and purchasing officers at the general headquarters of the railways in Chicago, New York and other large railway centers.

Trying Out New Devices

One important question which has been raised has been as to the influence which government control will have on the selling of new and experimental devices to railroads. The *Railway Age* has raised this question in its editorial columns and pointed out that rigid standardization would

stop progress by preventing the introduction of new and improved devices. This matter was brought directly to the attention of Director General McAdoo in the able letter which was sent to him under date of February 4 by George A. Post, president of the Railway Business Association, and which was published in our issue for March 1. Officials of the railroad administration since then have sought to make clear that it is their intention even under the conditions of war to promote rather than retard the technical development of the railroads, and in accordance with this policy to keep the door open for giving full and fair trial to new and improved devices.

The development of the organization and policy of the Railroad Administration naturally is being followed with anxious interest by everybody who is directly affected by the management and operation of the railways, and this includes not only those who are directly connected with the roads but also all those who manufacture and sell equipment, materials and supplies to them, and all those who are large users of their services. No class of concerns will be more vitally affected by the policy of the railroad administration than the railway equipment and supply concerns because they have invested a vast amount of capital and employ hundreds of thousands of men for the purpose of doing business with the railways. Their plants are located in every part of the United States, and anything that was done which might seriously hurt them or any large part of them would have serious effects on the industry and commerce of many communities, large and small. Therefore, it is not only in their interest, but in the interest of the country generally, that the various organizations which represent the railway supply interests and especially the Railway Business Association, which is the most important and inclusive of these organizations, keep closely in touch with developments and take whatever steps may be necessary to guard their legitimate interests. That misuse or abuse of power by the railroad administration might do them great harm is perfectly obvious. Present indications are, however, that government control, while it may injure some concerns and even some entire classes of concerns, will not cause any revolutionary changes in the railway equipment and supply business, such as government ownership might cause. As already indicated, the purchases of the railways probably will be largely increased under government control, and unless all signs fail in the long run there will not be as great changes in the relations of the supply companies and the railways as there seemed reason to apprehend a few weeks ago.

The committee of railway mechanical officers that has been engaged for some time on the designs for standard cars completed its work on them at a meeting at Washington on Monday and submitted its report to Director General McAdoo, through C. R. Gray, director of the division of transportation, for final approval. If the standards are approved they may be announced by the latter part of this week.

Members of the committee then went to Philadelphia to continue conferences with representatives of the locomotive builders on the proposed standards for locomotives.

CANADIAN RAILWAY REGIMENTS BUSY.—A summary of the work done by all battalions of the Canadian railway troops in France during the month of January has been issued by the Militia Department at Ottawa. The statement shows that during that period 9 miles of broad gage track were laid by the Canadians and 33 miles of narrow gage. The average number of miles of broad-gage track maintained during the month was 49, while 141 miles of the narrow-gage track was maintained. The men were employed in locating, grading, ballasting and laying lines. About 6,100 Canadians were engaged on the narrow-gage lines and 1,100 on the broad-gage lines.

Financing and Purchasing Division Organized in Two Sections

A PLAN FOR THE ORGANIZATION of the Division of Finance and Purchases of the Railroad Administration, which provides for the co-ordination and supervision of railroad purchases of materials and supplies by a central advisory committee at Washington and regional purchasing committees at New York, Atlanta and Chicago, was announced by Director General McAdoo on March 7. While all purchases of cars, locomotives and rails, and of crosses which cannot be obtained along the lines of the respective roads, will be made through the Washington office, and fuel purchases for New England will be made by a special committee, the plan does not contemplate the centralization of all purchases.

All other supplies and materials needed for current operation will be purchased, for the time being, through the purchasing departments of the respective roads under a general supervision of the regional purchasing committees and the central committee.

The plan of organization was submitted by John Skelton Williams, director of the division of finance and purchases, which is to be divided into a finance section and a purchasing section. In the organization of the purchasing section Mr. Williams has been assisted by Samuel Porcher, purchasing agent of the Pennsylvania Railroad.

Finance Section

The director of the division will be assisted in the work of investigating and providing plans to meet the financial requirements of the railroads throughout the country, whether these needs relate to the taking up and renewal of maturing obligations and the issuance of new securities, or the provision for betterments and additions, by an advisory committee of three men, experienced in finance, selected, one from the North, one from the West, and one from the South. These men, whose names will be announced later, will serve the government without compensation, and will have offices in Washington.

The requirements for new capital, outside of revenue from earnings, for new equipment, betterments and additions, have usually called for from \$250,000,000 to \$750,000,000 per annum, according to the activity of business and the condition of the money market.

Purchasing Section

In the matter of purchases for the railroads, which will amount to between \$1,000,000,000 and \$2,000,000,000 per annum, the director of the division will be assisted by an advisory committee of three, which will be composed of the general purchasing agents or vice-presidents in charge of purchases of three leading railroad systems, who will be detailed to Washington for this work, under the supervision of the director of the division.

There will also be constituted three additional committees; these committees to be composed of three or more general purchasing agents, or men experienced in this work, to be known as the regional purchasing committees, with headquarters in New York, Chicago, and Atlanta, in touch with the regional directors of these three districts.

All purchases of locomotives, passenger, freight and other cars, and steel rails will be made directly through the office of the director of purchases.

In New England territory fuel purchases will be made by a special committee appointed by the regional director, under the direction of the Washington office. In other sections, each railroad will be expected to handle its requirements, under the immediate direction of the respective regional purchasing committees, either collectively with other companies, or separately, as may be directed by that com-

mittee. The details of all contracts already made and of all other contracts as made will be scrutinized and checked by the regional purchasing committees, which will act under the general direction of the Central Committee.

Cross ties and lumber which can be obtained along the lines of the respective roads will be negotiated for and purchased through the purchasing department of each road, under the supervision of the regional purchasing committees. Cross ties needed by the various roads which cannot be obtained on their own lines will be purchased through the Washington office.

All other supplies needed for current operations will be purchased, for the time being, through the purchasing departments of the respective roads, but all contracts for periods of six months or longer must be approved by the regional committees before completion.

Information as to the prices paid for all supplies will be furnished monthly by all roads to the regional purchasing committees, so that the prices paid by each road for all articles may be carefully compared and checked, both as to prices and standards, qualities and places of delivery.

The regional purchasing committees will address themselves, as soon as possible, to consideration of the opportunities for standardizing and consolidating purchases of every kind that may admit of such treatment, with a view to increasing efficiency and economy.

The regional purchasing committees will submit to one another and to Washington, as information and for criticism, full statistics as to cost prices of materials used in railroad operations, and these prices will be carefully compared and checked.

The names of the advisory and regional committees are given below.

Personnel of Finance Section

Advisory Committee, located at Washington, will include: Franklin Q. Brown, New York; Festus J. Wade, St. Louis; Frederick W. Scott, Richmond.

Mr. Brown, formerly of Boston, but now the senior member of the banking firm of Redmond & Co., of New York, was for many years vice-president of the Plant System of railroads; also president of the Plant Investment Company, controlling, besides railroads, coast-wise steamships and other transportation companies, including the Southern Express Company. Mr. Brown has had considerable experience both in the construction and operation of railroads; and for the past 10 years has been engaged in the banking business in New York.

Mr. Wade is president of the Mercantile Trust Company of St. Louis, one of the largest banking institutions in the West, organized by him about 20 years ago, and one of the first large trust companies to become a member of the Federal Reserve System. Mr. Wade has also been active in railroad reorganizations in the West; was a leading factor, soon after the outbreak of the war, in the establishment of the "Hundred Million Dollar Cotton Fund," and has been a student of railroad as well as of financial and banking problems.

Mr. Scott, of Richmond, has been prominent in banking and railroad circles in the South for many years past, identified with one of the oldest national banks in Virginia; has for many years been a director in the Atlantic Coast Line; and was organizer of the syndicate which a few years since acquired control of the Chesapeake & Ohio, from which he later retired. He headed the shareholders' protective committee of the International Mercantile Marine Corporation, which was successfully reorganized without foreclosure, and has been a tive in railroad and other enterprises in the South.

The *Central Advisory Purchasing Committee*, with headquarters at Washington, is composed of Henry B. Spencer,

Washington; Samuel Porcher, Philadelphia; George G. Yeomans, New Haven.

Mr. Spencer is vice-president of the Southern Railway in charge of purchases, and was chairman of the Committee on Materials and Supplies of the American Railway Association's Special Committee on National Defense. He has been connected with the Southern Railway since his graduation from Harvard University in 1895; and for a while prior to his election as vice-president was general manager of that system.

Personnel of Purchasing Section

Mr. Porcher was born in South Carolina. He is a graduate of the University of Virginia, and since 1913 has been general purchasing agent of the Pennsylvania Railroad, with which road he has been connected since 1882.

Mr. Yeomans was born in New Jersey; is a graduate of Princeton University; served with the Chicago, Burlington & Quincy Railroad from 1884 to 1905; was subsequently assistant to the President of the Wabash, and since 1915 has been general purchasing agent of the New York, New Haven & Hartford.

The *Regional Purchasing Committees*, to be located respectively in the Eastern, Western and Southern Districts, are as follows:

NEW YORK: E. H. Bankard, general purchasing agent of the Baltimore & Ohio; S. B. Wight, general purchasing agent of the New York Central Lines; E. T. Burnett, of Roanoke, Va., purchasing agent, Norfolk & Western.

CHICAGO: Charles A. How, general purchasing agent of the Missouri Pacific; L. S. Carroll, general purchasing agent of the Chicago & North Western; Ira O. Rhoads, general purchasing agent of the Southern Pacific Company.

ATLANTA: F. H. Fechtig, general purchasing agent of the Atlantic Coast Line; Albert C. Mann, purchasing agent of the Illinois Central; H. T. Shanks, of Louisville, Ky., purchasing agent of the Louisville & Nashville.

Railway Freight Operations For November

THE NUMBER OF REVENUE TON MILES of freight transported by the railways of the United States for November, 1917, increased 2.9 per cent, or from 32,231,086,866 to 33,151,564,499, as compared with November, 1916, according to the monthly report compiled by the Bureau of Railway Economics. The revenue ton miles per freight locomotive increased 2.5 per cent but the average per freight car decreased 1.3 per cent. Freight train miles decreased 0.9 per cent, loaded freight car miles decreased 3.9 per cent, and locomotive miles decreased 1.1 per cent. Non-revenue ton miles increased 8.7 per cent.

The average number of freight cars in service increased 4.2 per cent and of locomotives increased 0.4 per cent. The tonnage per train was 655 as compared with 628 in November, 1916, and the tonnage per car increased from 25.3 to 27.2, or 7.5 per cent. The average miles per locomotive per day decreased 1.5 per cent and per car per day decreased 7.1 per cent.

In the eastern district revenue ton miles handled increased 2.1 per cent, in the western district 2.9 per cent and in the southern district 4.7 per cent.

For the combined eight months, April to November, inclusive, revenue ton miles increased 11.3 per cent, the tons per car increased 9.3 per cent, and tons per train increased 7.3 per cent. The average number of revenue ton miles per freight locomotive increased 10 per cent and per freight car 8.3 per cent. The average mileage per locomotive per day increased 2.8 per cent to 68.7 miles, while the average mileage per car per day decreased 0.4 per cent to 27.5. The percentage of empty car mileage increased 1 per cent to 30.1.

Letters From Overseas*

THE FOLLOWING LETTER has been received by a railroad man from a lieutenant in one of the railway regiments in France:

"Your welcome letter of December 11 received a few days ago and it surely was a distinct pleasure to hear from you, as letters from friends and loved ones back home bring about the only sunshine that enters our lives out here in the war zone.

"Myself and all the men in my district experienced as enjoyable a Christmas as we could hope to so far, far from home, for we all received many nice packages, the most of which reached us a few days before Christmas. Our Chicago Great Western present arrived a short time after Christmas and was surely appreciated by every member of Company C. Myself and two other officers spent the first three days of the New Year in Paris. About every sixty days I run into Paris for three days' recreation, as it does one a lot of good to get out of the war zone and back to real life and civilization occasionally.

"Our regiment is still busily engaged in successfully operating one of France's most important lines of communication, and until the past two or three days we have been handling a record business, as the troop movement has been quite heavy bringing the troops from the trenches for rest and transferring them from one part of the front to another. I was particularly impressed with a troop train we handled the other day, as it was a train of French soldiers coming from the trenches for a few days' rest, and although they were literally covered with mud from head to foot, yet they looked hale, hearty and carefree, for they were singing and seemed quite happy, because they were out of the trenches and mud for a few days' recreation and an opportunity to clean up. The French are wonderful soldiers and wonderful people, and while the dirty Huns are able to kill some of them, yet they will never be able to conquer the indomitable French spirit.

"We now have all of the U. S. A. engineers that are going to be assigned to us, and they are certainly rendering fine service. We are handling at least 40 per cent more tonnage per train per mile than with the French power, and have naturally effected a marked reduction in both train and engine mileage, which results in fuel economy that surely is a vital question over here. These engines are much easier on track than I anticipated, and are not causing any trouble at all in kicking our curves out of line. The winter in our part of France has been most mild, certainly a marked contrast to winters I have been accustomed to in Minnesota the past five years. Our weather during the last two weeks has been like spring and our section men are surfacing track every day now.

"We are all quite optimistic over here, and are of the opinion that a big successful drive by our Allies in the Spring will end it all and bring the dirty, fiendish Huns to their knees."

ON THE NEW YORK, CHICAGO & ST. LOUIS, the green or white flags carried on the front of locomotives are supported on the pilot beam; and the Chicago Great Western and the Bessener & Lake Erie also have an arrangement somewhat different from the usual practice of putting the flags at the side of the headlight. These facts are given in a circular issued by the National Safety Council, W. H. Cameron, general manager, Chicago, which has been issued in connection with an inquiry made by the Council as to injuries to men in putting up the flags. Cases have been reported of serious injuries to firemen by falling from the top of the engine.

*The *Railway Age* expects to publish regularly letters from railwaymen overseas. If you receive a good letter from a railwayman who is now in France, send it in for publication and let the *Railway Age* pass it around for all to enjoy.

Unusual Failure of a Railroad Draw Bridge

Train Pushed the Span Off the Pier at One End, Causing It to Tip Down Into the River

THE failure to stop a freight train approaching a draw span on a middle-western road on Sunday, February 17, after the bridge had started to swing, resulted in the freak accident shown in the pictures. Running part way onto the bridge while it was swinging, the train pushed the span in a longitudinal direction a sufficient distance to clear the bridge-seat on the loaded end, with the result that the span was tipped down into the position shown, carrying with it the engine and two cars that had run onto it. No loss of life or personal injuries resulted.

The bridge was built about 1897 and consists of a 238-ft draw span flanked on the south by a 92-ft. pony span and on the north by four 157-ft. through Pratt truss spans. All of the spans are pin connected and the substructure is ashlar masonry. The draw span has a rim-bearing center and end lift equipment of a type in which the shoes are raised and lowered in a vertical direction by toggles, the bottoms of the shoes being shaped to engage depressions in the bearings on the bridge-seats. The rail locks are of the vertical-lift type with butt-jointed rails.

The accident is accounted for by the failure of the engineer to observe the signals in time to stop his train. Preparations were being made to swing the span for the passage of a boat as a freight train was approaching from the south. The bridge is not protected by interlocking, but the red flag and torpedoes set against the train were apparently ignored as the train failed to stop. The bridge tender said that he had raised the rail locks and the end bearings and had attempted to swing the bridge but found it jammed in some manner so that there was an appreciable delay in starting the swinging movement. This fact undoubtedly saved the train from going into the river for, because of this delay, the span was turned only a few inches when the train reached it, so that a portion of the train readily passed onto the span, although all of the wheels were derailed except the first two wheels on the engine.

There is a lack of definite data on the speed of the train

The locomotive and two cars passed onto the span before coming to a stop, and the resulting longitudinal thrust produced a most remarkable displacement of the superstructure. The draw span was pushed 6 ft north and two feet east



View Showing How the Span Swung in Tipping Down

(upstream) and this span in turn pushed the adjacent 157-ft. span 20 in. to the north. The second fixed span was moved 16 in., the third one 3 in. and the fourth one 2 in. The spans were not anchored to the masonry, but it is be-



Method of Raising the Span

at the instant that it struck the span. The trainmen maintain that the velocity was about 3 miles per hour, but the physical evidences point to a speed much higher than this.

heved that more serious results would have been brought about had the spans been firmly secured to the substructure. Being deprived of its support at the heavy end, the draw

span tipped down like an unbalanced scale. The pictures show the engine almost entirely out of the water with the tender nearly submerged. Behind the latter was a coal car completely submerged, while a second car hung in an inclined position with its rear trucks on the pier, this car being removed before the picture was taken.

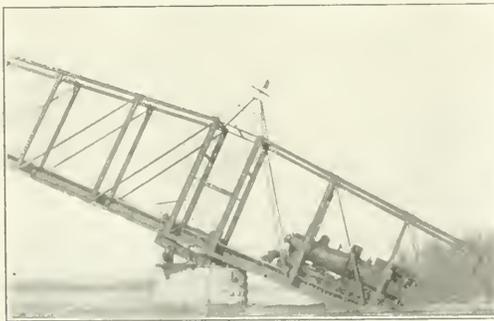
In tipping, the span made an appreciable turn in a horizontal plane so that the south end was swung about 15 ft. to the south. In the longitudinal movement that preceded the tipping the north end of the swing span became jammed tightly against the end of the adjacent fixed span, and in



View of the Span from the Northwest

consequence when the tipping motion started the end of the fixed span was lifted about 2 ft. and also swung somewhat to the east before it was released from the end of the swing span, and dropped back onto the pier. The top of the latter was seriously shattered.

The principal damage to the span was the crushing of the drum on the side which carried the weight of the span while in the inclined position, and a rather serious battering of the floor system in the two panels nearest the south end of the bridge. One hip vertical was also badly buckled.



The Position of the Drum Gives an Idea of the Longitudinal Displacement

As seen in the photographs the bracing in the tower panel is too light to take more than a nominal shear and was entirely inadequate to transmit the enormous dead-load shear obtaining in this panel while in the tipped position. In consequence resistance to collapse of the tower panel was afforded principally by the stiffness of the bottom chords and the floor system. One of the light tower diagonals broke some time after the accident occurred.

The method of restoring the structure is shown in the

large photograph. A large gallows frame was erected over the south end of the span, supporting it on two groups of piles driven in either side of the span by a marine driver. After lashing the locomotive and tender securely in place on the bridge the submerged coal car was drawn out through the south portal of the span. Then by means of heavy hoisting tackles supported from the gallows frame and attached to the hip pins, the span was slowly raised, the power being supplied by hoisting engines on the marine pile driver and a derrick car standing on the 90-ft. pony span. Auxiliary lines from the winch heads on the hoisting equipment were also made use of.

After the span had been raised to within about 4 ft. of the final elevation the south end was supported temporarily on a grillage of I-beams resting on the falsework. With the bridge in this position it was possible to remove the engine and tender after which steps were taken to shift the span to its proper position on the pivot pier. On account of the damage done to various parts of the superstructure it has been found necessary to place the draw span on falsework before restoring traffic.

Railway Revenues and Expenses in 1917

RAILWAY OPERATING INCOME in the calendar year 1917 was \$967,268,525, or \$121,000,000 less than in 1916, according to the summary of railway returns for December and for the 12 months ended December 31, 1917. The income per mile decreased 11.4 per cent. Railway operating revenues for the first time crossed the four billion mark, amounting to \$4,041,014,239, as compared with \$3,625,252,371 in 1916, an increase of \$416,000,000, or 11.2 per cent per mile. Operating expenses amounted to \$2,852,880,196, an increase of \$476,000,000, or 19.8 per cent per mile, while taxes were \$220,162,949, an increase of \$61,000,000. The operating ratio was 70.6, whereas in 1916 it was 66.55. Most of the decline in operating income was in the Eastern district, where the reduction was \$89,000,000, a decrease of 19.4 per cent per mile, and the operating ratio increased from 67.97 to 75.03. In the Southern district there was a reduction in income of nearly \$3,000,000, and in the Western district of \$29,000,000.

For the railroads as a whole all items of revenue showed large increases except that from mail traffic. While freight revenues increased approximately 10 per cent to \$2,829,246,769, and passenger revenues increased from \$707,757,469 to \$825,496,565, or 16 per cent, the mail revenues actually decreased, as a result of the Postoffice Department's new policy of paying for the mail on the space basis, from \$61,227,765 to \$58,681,549. Express revenues increased from \$90,311,885 to \$166,895,282. Every item of expense, except that of transportation for investment, also showed a large increase. Maintenance of way and structures cost \$444,458,855, compared with \$424,530,358 in 1916. Maintenance of equipment increased from \$598,714,857 to \$691,025,391. Traffic expenses increased from \$62,915,931 to \$64,966,241. Transportation expenses increased from \$1,185,833,399 to \$1,529,800,773, or 29 per cent.

For the month of December the figures reflect plainly the severe weather conditions then prevailing. While revenues increased from \$311,000,000 to \$335,000,000, expenses increased from \$209,000,000 to \$251,000,000; taxes increased from \$14,479,000 to \$24,369,000, and operating income was reduced from \$86,869,000 in 1916, to \$59,204,000. In the Eastern district while revenues increased about \$7,000,000, expenses increased \$19,000,000, and the operating ratio was increased from 72.01 to 82.22.

The detailed figures showing per mile averages, as compiled by the Bureau of Railway Economics, are as follows:

REPORTS AND EXPENSES OF STEAM ROADS, DECEMBER, 1912

As to the Interstate Commerce Commission and covering roads of Class 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

Amount,	Per mile of line—			Amount,	Per mile of line—		
	1917	1916	over 1916, Per cent		1917	1916	over 1916, Per cent
Total operating revenue:	\$1,317,465	\$1,336	\$1,336	\$1,317,465	\$1,336	5.8	
Freight	815,728,147	934	1,337	815,728,147	934	1.3	
Passenger	4,478,318	19	4.2	4,478,318	19	4.2	
Mail	10,759,573	45	39	10,759,573	45	39	
Express	16,275,951	83	76	16,275,951	83	76	
All other	19,341,226	85	76	19,341,226	85	76	
Total operating expenses:	51,647,338	1,688	907	51,647,338	1,688	907	
Maintenance of way and structures:	3,577,045	103	1.9	3,577,045	103	1.9	
Maintenance of equipment:	61,863,350	467	20.5	61,863,350	467	20.5	
Traffic:	5,789,911	91	21	5,789,911	91	21	
Transportation:	8,292,903	38	36	8,292,903	38	36	
Compass:	8,292,903	38	36	8,292,903	38	36	
All other	5,183,211	11	6	5,183,211	11	6	
Total operating expenses:	83,685,167	367	4.9	83,685,167	367	4.9	
Operating revenue:	1,317,465	105	6.7	1,317,465	105	6.7	
Operating expenses:	83,685,167	367	4.9	83,685,167	367	4.9	
Operating income:	480,736	68	1.1	480,736	68	1.1	
Operating expenses:	83,685,167	367	4.9	83,685,167	367	4.9	
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Operating expenses:	83,685,167	367	4.9	83,685,167	367	4.9	
Operating income:	480,736	68	1.1	480,736	68	1.1	
Operating expenses:	83,685,167						

The Sanitarian's Work Is Valuable to a Railroad

An Outline of the Work Being Done to Remove Unhealthful Conditions on the Illinois Central

By A. E. Campbell

Health Officer, Illinois Central, Chicago.

GENERAL SANITATION was once considered of value mainly as an adjunct in limiting possible epidemics, but modern public health work has developed its ideas and functions far in advance of this corrective form of work, and its attention is now focused mainly upon broad measures concerned with the prevention of disease and its hazards. If we cover machinery to prevent possible accident, why should we not clean up our laborers and their environment, vaccinate them, for instance, to prevent a possible epidemic and an outbreak of small pox to disturb the harmonious operation of our large plants? Our modern industrial plants have employed experts to study their complicated machinery and obtain maximum of efficiency. Why should the human machine be neglected?

Large industrial organizations are beginning to appreciate the value of promoting the efficiency of the individual employee. The experienced employee is one of the greatest assets of any industrial organization, and the problem is how to keep him employed at his work the greatest number of days in the year and how to keep him physically fit and consequently at his highest state of efficiency.

The Illinois Central and Yazoo & Mississippi Valley have well-developed hospital departments through which the employees receive all medical and surgical care for a small monthly contribution. Careful attention is also given to sanitary measures as regards both working and living conditions of the employees.

Along the lines of the Illinois Central malaria was formerly so common that in certain sections 40 to 50 per cent of the employees would be incapacitated at times by that disease. We early began the use of quinine as a prophylaxis, and we have found that, by administering 12-grain doses of it twice a week to each employee, we can absolutely prevent the development of malaria, even though individuals may become infected.

Drinking Water Is Examined Carefully

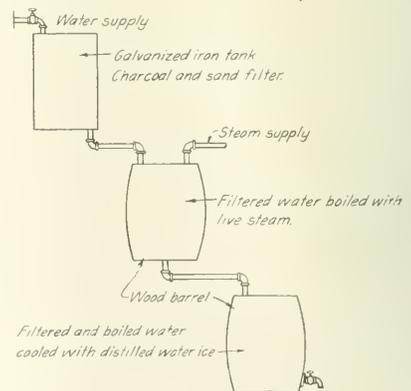
The drinking water at all our shops was investigated. At one point, where a great deal of sickness had developed, it was found that all drinking water was taken out of a surface well with a chicken yard and an outside surface privy quite near, both draining toward the well. The city water was fully three-fourths of a mile distant. We equipped eight large barrels with hinged covers on the top and faucets at the bottom, and hired a negro with a wagon to haul four barrels of city water in the morning and four in the evening and distribute it in the shops. After that we did not have one case of bowel or stomach disturbance. At other places the water, which was taken from rivers or ponds, became quite murky and unfit for drinking after heavy rains. This water was sedimented and then sterilized with lime, by means of an apparatus such as shown in one of the drawings. Now we use lime to sterilize all the drinking water.

The drinking water all through southern Illinois comes from shallow wells, nearly all of them showing gross pollution, and although we had a sign on each of our wells—"The use of this water for drinking purposes is forbidden"—still our employees and the traveling public continued to drink the polluted water, and we felt that we should do

something to lessen this danger. In some cases we have had to resort to water-tight cisterns in which the incoming water has to pass through three feet of sand before entering the cistern. It then passes through a brick wall before being pumped for drinking purposes, so that the rain water is well purified. This style of cistern has been approved by the Public Health Service.

We have abolished the scavenger. When any of the vaults of our outside closets need cleaning, we remove the building, cover all excretions with waste, cobs, wood, or creosoted ties, sprinkle with kerosene and burn, using some tar to keep down the odor, and keeping a hot coal fire over the contents for some time. The pit is then filled in and a new one dug 8 ft. deep, and 6 in. of chloride of lime is put in the bottom. This has worked well with us and has had the unqualified endorsement of municipal and state officers.

We keep our privies dark and as it is very difficult to keep them screened, it has been thought advisable to have them painted black inside as this tends to keep out flies. The doors to all outside toilets should be separated and both the men's and women's toilets screened from view and properly designated. The bottom of the screen should be 16 in. from the ground. The waste from all construction crews is also watched and all gangs are provided with portable toilets. On one division this toilet is now made in one piece,



A Method of Filtering and Sterilizing Water for Trains During Flood Times

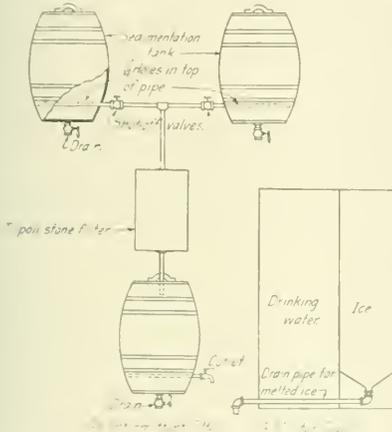
as when sent out knocked down, the different pieces often get lost.

At one of our shops our employees were greatly annoyed by small insects that swarmed through the place, lighting on the victims' faces and hands. We sent samples of them to the Bureau of Entomology at Washington, which informed us that they were white ants, insects very destructible to wood, water tanks, railroad ties, and all wood in the building. They advised that we remove all flooring in the shop, soak the ground with kerosene, and substitute creosoted blocks for flooring. This was done, the annoyance was re-

moved, and an insect pest destroyed that might have proved very expensive to the company.

The reports of the sanitarian are made out in triplicate, one copy going to the general manager, one to the general superintendent, and one to the local superintendent. Thus the needs or desires of the employees are brought direct to the attention of the management. Laborers complained that their living quarters were cold and scarcely fit to live in in cold weather. The sanitarian made a tour of every laborer's shack on that division, in company with the supervisor of buildings, and made a detailed report of every one. Within two months every shack on that division was papered with tar paper, lined and refloored, and painted throughout, adding much to the comfort of the laborers.

The ventilation of waiting rooms and ticket and general offices has received attention. All waiting rooms in stations



Two Forms of Drinking Water Supplies

are ventilated by lowering the upper sash windows on the side opposite the prevailing winds. In this way the air is kept at an agreeable temperature. In general offices, where there are one hundred or more clerks, weights are placed on all papers and windows are thrown open at 10 A. M. and 3 P. M. each day, while the clerks stand up and walk around. In ticket offices, the draft coming through the ticket window causes frequent colds. At one terminal this draft was the cause of six employees leaving the office because of pulmonary tuberculosis, three of whom died. This draft can be overcome by installing other openings such as a transom over the door, or a lattice work over the ticket window, to subdivide the air passage and control the draft.

Large offices are surveyed for the detection of early cases of tuberculosis, and if any employees seem to be in declining health they are examined, treated, and stationed near windows. Clerks who are thin and anemic are treated and built up, probably being given a vacation or a change in their work.

Attention to the Traveling Public

Many railroads have not had any definite system of cleaning their stations and toilets. They were cleaned by the section men when the agent thought the places were dirty, or when some passenger complained. Then they were left until another complaint reached the agent or the management. We adopted a regular routine of scrubbing stations at terminals every second day, at county seats and junction points twice a week, and all other stations once a week. The floors and toilets of all stations at terminals, county seats, and

junction points should be swept twice a day, and the toilets scrubbed twice a day. At all of our stations, the raising of dust when sweeping was a problem that had to be solved. We had a preparation put up at our shops, composed of ocean sand, salt, sawdust and kerosene engine oil. Besides keeping down dust, this preparation possesses cleaning properties that make it valuable. A method used by some of our agents in sweeping is to put an ordinary gunny sack over the handle of a wide pushbroom, so arranged that the handle passes through the center of the gunny sack, turn this over and under the pushbroom, and dampen the sack with kerosene oil. By this means dirt can be removed very readily without the raising of any dust.

The water and ice used on trains are watched with great care. At one large terminal where many trains were watered the city water became polluted owing to floods. We had a sand-and-charcoal filter built promptly, and all water used was passed through this, and then into a large tank, where it was boiled for 20 min. with live steam. Then the water was passed over ice manufactured from distilled water after which it was put in the coolers. All coolers were washed out with boiled water, and the hands of attendants were also washed with water that had been boiled. During all the flood period we did not have a single complaint from passengers.

At one terminal used by two large railroads the only available drinking water came from a spring which had an environment indescribably bad—out-side surface privies, chicken yards, hog pens, and kitchens all draining toward this spring. Examination of this water showed 25,000 bacteria to the cubic centimeter. Four ounces of lime was added and this spring was walled to a height of about four feet. Ten hours after adding the lime a sample of the water was examined and found absolutely sterile. Two weeks later another sample was examined with the same result. All our section crews in this part of the country carry a lime solution and are instructed how to sterilize any water they may use. At all junction points, where the water is bad, water coolers are installed in waiting rooms and the water sterilized for drinking purposes.

We are also watching the drinking water used at all our restaurants, even if our trains are not watered at those stations. At one large terminal, where fully 500 persons ate daily at the restaurant, examination of the drinking water showed three thousand bacteria on gelatin and ten thousand on agar. The manager was at once notified, arrangements were made to have all the drinking water sterilized in a large cooler, and all drinking water served to the public taken from this cooler. The hands of waitresses and the dishes used are washed with water that has been boiled.

The ventilating of trains is also attended to. On suburban trains during rush hours we see that the rear end sash is open. When the train is standing full we have the sash of the front and rear doors open. In this way the air is being changed constantly. The heating of trains in both northern and southern climates is often very perplexing. If 90 lb. pressure is required to maintain steam through a long train, this amount will keep the train entirely too warm in a southern climate unless the temperature is controlled by the train crews. All steel railroads running south should have ceiling paddle fans, as steel becomes very hot. Here are good rules to observe:

1. When the temperature reaches 75 deg. with the train moving turn off the steam on the sunny side or on the side of the train opposite to the prevailing winds.
2. Always keep the transom of the rear door open when there are many passengers in coach. It should always be open when the train moves but should be closed when the temperature falls to 70 deg.

Avoid drafts on cold days. Do not open the transom

on the side of the train when the wind is blowing against it. Keep the front doors on all suburban and through trains closed, unless you wish to cool the coaches quickly.

4. If passengers complain of excessive heat, move them to the outer ends of their seats or to seats near the door.

5. If a temperature of 75 deg. is maintained in a rapidly moving train, there will be no complaint, since the temperature drops as the speed of the train is increased.

The cleaning of trains in transit becomes very necessary when a train travels overnight. A porter should sweep it once or twice while on the journey. The water coolers on trains should have separate apartments for water and ice, and the pipe carrying the melting ice water should cross the lower part of the water cooler so as to cool the drinking water as it escapes.

Attention Is Given to the Food

Restaurants along the line need attention. It was found in many places that one-half of all the refrigerators were unable to maintain a temperature lower than 55 deg., and that sensitive foods, including milk and cream, were kept with vegetables and fish. No attention was paid to the proper cleaning of ice boxes, as it was no person's business to attend to that part of the work. Grease traps were full to overflowing, and when emptied were put back into the sewer.

We brought about a number of changes in these conditions. Now all food is covered at all restaurants, ice boxes are watched and kept clean, and new refrigerators have been installed at many points. The ventilation in our new diners is much improved; the upper half of the door entering the kitchen is open and screened, a canopy has been placed over the stove and an exhaust fan over the canopy. Every diner leaving Chicago is examined regularly and the dining room is closely inspected each month.

The following instructions were issued to all chefs on dining and private cars and all handlers of food at restaurants:

1. Keep all dairy products, such as milk, cream, butter, and cheese, in one compartment. Cheese should be in a box on the upper shelf, if possible, butter on the lower shelf.

2. Keep all bakery goods by themselves; pies should be kept in a locker, cookies wrapped in paraffin paper (neither of these need necessarily be in the ice box).

3. Keep all meats—beef, pork, veal, mutton—in one compartment and as far as possible in the bottom of the cooler on a clean cloth. Chickens can be carried with meat provided that the heads and feet are covered and the fowls are separated from meats by a clean cloth.

4. Fish should be wrapped in a clean towel and packed in ice. No other food should be near it.

5. Lettuce should be trimmed and sprinkled with water and carried in brown paper or paper bags. All other vegetables should be carried in sacks.

6. Conserve all food; permit no waste. All trimmings of meat should be used in entrees or for soup stock as soon as trimmed.

7. Watch for decay in meat and chicken. If meat assumes a dark color, or smells bad, trim it off and use it at once.

8. Watch your ice box; go over it daily and clean it carefully. Arrange all food as here directed, as far as possible, and you will have no trouble.

The carriage of meat and produce on diners during the hot months is a very difficult problem, owing to the close proximity of the fire to the cooler; and as the door is opened so frequently during the preparation of a meal the temperature of the cooler sometimes rises 10 to 15 deg. in one hour. For this reason railroads should control the eating houses along their line, so that all meats can be exchanged and a fresh supply carried on the diner.

Not long ago we were asked as to the effect of fish on

drinking water, as the company is building a large dam in Kentucky and expects to use the water supply thus obtained not only for engines, but also for drinking water at our shops and for watering our trains at that point. It was proposed to introduce fish into the reservoir, but the sanitarian insisted that fish pollute water, and if they abound in small lakes or water which is dammed, their pollution becomes a serious matter, calling for some form of treatment. Besides, fish bring fishermen, and fishermen in boats are also liable to pollute the water in many cases. Not only was it felt that no fish should be put in the lake, but that it should be protected from human visitation, and the grounds around it should be likewise guarded.

Advantages to the Employees

Efficiency engineers today recognize the fact that employees work to better advantage and with greater speed and accuracy if their surroundings are cheerful and well lighted. In considering a lighting installation the subject of brightness should never be overlooked. The investigations of Prof. C. E. Ferree, of Bryn Mawr Psychological Laboratory, indicate that after three hours of work under daylight, the eye loses approximately 5 per cent in efficiency, and that under the indirect system of artificial lighting the loss is about 7½ per cent during the same period. While under the semi-indirect and direct systems the loss reaches over 70 per cent. This latter loss is due to direct glare from the units and also to the specular reflection from polished surfaces, desk tops, etc. Hence we have installed the indirect system at many of our terminals and also in our new office building at 63rd St., Chicago.

The development of sanitation offers advantages for educating the laborer in sanitary measures. If he is surrounded in the workshop or office by ideal sanitary conditions, he is thereby made capable of comparing these conditions with those that obtain in his home. In this way men are unconsciously led to desire a higher environment. The personal relation of the sanitarian to the worker in the office or workshop is a means by which the principles of personal hygiene are so inculcated as to be applied, and not regarded as fads of the medical profession.

Within the past year we have taken up another educational feature which, it is believed, will prove of incalculable benefit to the management—that of giving instruction in first aid to the injured. One of the laborers is taken as an object lesson. He lies on the ground, as if he had been run over by a train. All laborers are shown how to make him comfortable, how to carry him or remove him from wreckage, how to warm him, or to arrest bleeding; step by step they are led through the methods of rendering first aid to the injured man. This training has been given at every shop on the system. It is not only educational but it is welfare work—and work which, if it is to be permanent in its operation and lasting in its results, must be founded on the bed rock of education.

With these aims in view, our employees are addressed in kindly words about their own work, and they are also made acquainted with the burden of care and responsibility borne by the management. They are told frankly that responsibilities in the railway service gravitate to the person who can shoulder them, and power flows to the men who "know how."

EQUIPMENT EXPORTS FROM ENGLAND IN 1917.—The British Board of Trade reports the exports of railway material of the following value during the twelve months ended December 31, 1917, the corresponding figures for 1916 being given in brackets: Locomotives, \$8,075 (\$6,485); rails, \$3,450 (\$2,910); passenger cars, \$895 (\$1,890); freight cars, \$2,205 (\$3,675).

Railroad Control Bill Passed by the Senate

Period Limited to 21 Months After War. Interstate
Commerce Commission Retains Rate Authority

THE BILL PROVIDING for the compensation of the railroads and prescribing the terms and conditions under which government control is to be exercised was expected to be passed early this week but it encountered unexpected delay in the Senate on Monday and its consideration was postponed until Wednesday. The delay was caused by the objection of several senators to the action of the conferees in adding section 15 restricting state taxation of the railroads. The bill was referred back to conference by the Senate on Wednesday; the objectionable features were removed and the bill was returned to the Senate late in the day and passed by a vote of 47 to 8. It is expected that the House will pass the bill before the end of the week.

The conferees appointed to reconcile the differences in the bill as passed by the House and the Senate reached an agreement on March 7, after considerable difficulty in effecting a compromise on the rate-making authority, and submitted their report to Congress March 9.

The conference report includes the provision that the period of government control shall extend not to exceed 21 months after the proclamation of peace terminating the war, and the provision for agreements between the roads and the President for compensation based on the average net operating income for the three years ending June 30, 1917. The section on rate-making, a compromise between those who feared any curtailment of the authority of the Interstate Commerce Commission and those who felt that the President should have a free hand to take action in an emergency, as well as to insure that the roads shall be made self-sustaining during the period of federal control, was written by Senator Robinson of Arkansas. Whereas the Senate bill proposed to authorize the President to initiate rates but to give the commission power to overrule his action after an investigation, and the House bill would have made the commission's report a mere recommendation to the President, the compromise adopted gives the commission final authority but requires it to take into consideration a certificate by the President that increased revenues are necessary to defray expenses and to pay the agreed compensation to the owners of the roads.

The President is placed in the position of an operating carrier that initiates a rate, but without the restriction imposed upon carriers by the requirement that they shall secure the commission's approval before filing an increased rate; and any rate he proposes will take effect without suspension. Upon complaint the commission shall conduct hearings in the usual way, giving due consideration to the fact that the roads are under a unified control and not in competition, and shall then make its findings and report.

The compromise was not reached, however, until the conferees had voted down a provision absolutely requiring the commission to make rates high enough to pay the railroads' guarantees and all expenses and also another that would have required the commission to hand down a decision in 30 days.

The language finally adopted would seem calculated to settle the controversy which has always been interjected into general rate advance cases before the Interstate Commerce Commission as to whether the commission's determination as to what are reasonable rates should take into consideration the needs of the railroads for increased revenues or whether a "reasonable" rate is a reasonable rate regardless of its effect on revenues as a whole. If the President or

the Director General of Railroads, therefore, should find it necessary to increase rates as they are likely to find after the Wage Commission makes its report some time this month, their task will be much more simple than that of the railroads which have been in that position in the past.

The substitute section also provides that the act shall not be construed to amend, repeal, impair, or affect existing laws or powers of the states in relation to the lawful police regulations of the states, except wherein such laws, powers or regulations may affect the transportation of troops, war materials, government supplies or the issue of stocks and bonds. The text of the bill as reported by the conferees is as follows:

Provision for Compensation

"SEC. 1. That the President, having in time of war taken over the possession, use, control and operation (called herein Federal control) of certain railroads and systems of transportation (called herein carriers), is hereby authorized to agree with and to guarantee to any such carrier making operating returns to the Interstate Commerce Commission, that during the period of such Federal control it shall receive as just compensation an annual sum, payable from time to time in reasonable installments, for each year and pro rata for any fractional year of such Federal control, not exceeding a sum equivalent as nearly as may be to its average annual railway operating income for the three years ended June 30, 1917. That any railway operating income accruing during the period of Federal control in excess of such just compensation shall remain the property of the United States. In the computation of such income, debits and credits arising from the accounts called in the monthly reports to the Interstate Commerce Commission equipment rents and joint facility rents shall be included, but debits and credits arising from the operation of such street electric passenger railways, including railways commonly called interurbans, as are at the time of the agreement not under Federal control, shall be excluded. If any lines were acquired by, leased to, or consolidated with such railroad or system between July 1, 1914, and December 31, 1917, both inclusive, and separate operating returns to the Interstate Commerce Commission were not made for such lines after such acquisition, lease, or consolidation, there shall (before the average is computed) be added to the total railway operating income of such railroad or system for the three years ended June 30, 1917, the total railway operating income of the lines so acquired, leased, or consolidated, for the period beginning July 1, 1914, and ending on the date of such acquisition, lease, or consolidation, or on December 31, 1917, whichever is the earlier. The average annual railway operating income shall be ascertained by the Interstate Commerce Commission and certified by it to the President. Its certificate shall, for the purpose of such agreement, be taken as conclusive of the amount of such average annual railway operating income.

War Taxes Deducted

"Every such agreement shall provide that any Federal taxes under the act of October 3, 1917, or acts in addition thereto or an amendment thereof, commonly called war taxes, assessed for the period of Federal control beginning January 1, 1918, or any part of such period, shall be paid by the carrier out of its own funds, or shall be charged against or deducted from the just compensation that other

taxes assessed under Federal or any other governmental authority for the period of Federal control or any part thereof, either on the property used under such Federal control or on the right to operate as a carrier, or on the revenues or any part thereof derived from operation (not including, however, assessments for public improvements or taxes assessed on property under construction, and chargeable under the classification of the Interstate Commerce Commission to investment in road and equipment), shall be paid out of revenues derived from railway operations while under Federal control; that all taxes assessed under Federal or any other governmental authority for the period prior to January 1, 1918, whenever levied or payable, shall be paid by the carrier out of its own funds, or shall be charged against or deducted from the just compensation.

"Every such agreement shall also contain adequate and appropriate provisions for the maintenance, repair, renewals, and depreciation of the property, for the creation of any reserves or reserve funds found necessary in connection therewith, and for such accounting and adjustments of charges and payments, both during and at the end of Federal control as may be requisite in order that the property of each carrier may be returned to it in substantially as good repair and in substantially as complete equipment as it was in at the beginning of Federal control, and also that the United States may, by deductions from the just compensations or by other proper means and charges, be reimbursed for the cost of any additions, repairs, renewals, and betterments to such property not justly chargeable to the United States; in making such accounting and adjustments, due consideration shall be given to the amounts expended or reserved by each carrier for maintenance, repairs, renewals, and depreciation during the three years ended June 30, 1917, to the condition of the property at the beginning and at the end of Federal control and to any other pertinent facts and circumstances.

"The President is further authorized in such agreement to make all other reasonable provisions, not inconsistent with the provisions of this act or of the act entitled 'An act making appropriations for the support of the Army for the fiscal year ending June 30, 1917, and for other purposes,' approved August 29, 1916, that he may deem necessary or proper for such Federal control or for the determination of the mutual rights and obligations of the parties to the agreement arising from or out of such Federal control.

"If the President shall find that the condition of any carrier was during all or a substantial portion of the period of three years ended June 30, 1917, because of non-operation, receivership, or where recent expenditures for additions or improvements or equipment were not fully reflected in the operating railway income of said three years or a substantial portion thereof, or because of any undeveloped or abnormal conditions, so exceptional as to make the basis of earnings hereinabove provided for plainly inequitable as a fair measure of just compensation, then the President may make with the carrier such agreement for such amount as just compensation as under the circumstances of the particular case he shall find just.

Short Lines Included

"That every railroad not owned, controlled, or operated by another carrier company, and which has heretofore competed for traffic with a railroad or railroads of which the President has taken the possession, use, and control, or which connects with such railroads and is engaged as a common carrier in general transportation, shall be held and considered as within 'Federal control,' as herein defined, and necessary for the prosecution of the war, and shall be entitled to the benefit of all the provisions of this act: *Provided, however,* That nothing in this paragraph shall be construed as including any street or interurban electric rail-

way which has as its principal source of operating revenue urban, suburban, or interurban passenger traffic, or sale of power, heat and light, or both.

"The agreement shall also provide that the carrier shall accept all the terms and conditions of this act and any regulation or order made by or through the President under authority of this act or of that portion of the act entitled 'An act making appropriations for the support of the Army for the fiscal year ending June 30, 1917, and for other purposes,' approved August 29, 1916, which authorizes the President in time of war to take possession, assume control, and utilize systems of transportation.

"Sec. 2. That if no such agreement is made, or pending the execution of an agreement, the President may nevertheless pay to any carrier while under Federal control an annual amount, payable in reasonable installments, not exceeding 90 per cent of the estimated annual amount of just compensation, remitting such carrier, in case where no agreement is made, for its legal rights for any balance claimed, to the remedies provided in section 3 hereof. Any amount thereafter found due such carrier above the amount paid shall bear interest at the rate of 6 per cent per annum. The acceptance of any benefits under this section shall constitute an acceptance by the carrier of all the provisions of this act and shall obligate the carrier to pay to the United States, with interest at the rate of 6 per cent per annum from a date or dates fixed in proceedings under section 3, the amount by which the sums received under this section exceed the sum found due in such proceedings.

Adjustment of Claims for Compensation

"Sec. 3. That all claims for just compensation not adjusted (as provided in section 1) shall, on the application of the President or of any carrier, be submitted to boards, each consisting of three referees to be appointed by the Interstate Commerce Commission, members of which and the official force thereof being eligible for service on such boards without additional compensation. Such boards of referees are hereby authorized to summon witnesses, require the production of records, books, correspondence, documents, memoranda, and other papers, view properties, administer oaths, and may hold hearings in Washington and elsewhere, as their duties and the convenience of the parties may require. In case of disobedience to a subpoena the board may invoke the aid of any district court of the United States in requiring the attendance and testimony of witnesses and the production of documentary evidence, and such court within the jurisdiction of which such inquiry is carried on may, in case of contumacy or refusal to obey a subpoena issued to any person, corporation, partnership, or association, issue an order requiring appearance before the board, or the production of documentary evidence if so ordered, or the giving of evidence touching the matter in question; and any failure to obey such order of the court may be punished by such court as a contempt thereof. Such cases may be heard separately or together or by classes, by such boards as the Interstate Commerce Commission in the first instance, or any board of referees to which any such cases shall be referred may determine. Said boards shall give full hearings to such carriers and to the United States; shall consider all the facts and circumstances, and shall report as soon as practicable in each case to the President the just compensation, calculated on an annual basis and otherwise in such form as to be convenient and available for the making of such agreement as is authorized in section 1. The President is authorized to enter into an agreement with such carrier for just compensation upon a basis not in excess of that reported by such board, and may include therein provisions similar to those authorized under section 1. Failing such agreement, either the United States or such carrier may file a petition in the Court of Claims for the

purpose of determining the amount of such just compensation, and in the proceedings in said court the report of said referees shall be prima facie evidence of the amount of just compensation and of the facts therein stated. Proceedings in the Court of Claims under this section shall be given precedence and expedited in every practicable way.

"Sec. 4. That the just compensation that may be determined as herebefore provided by agreement or that may be adjudicated by the Court of Claims, shall be increased by an amount reckoned at a reasonable rate per centum to be fixed by the President upon the cost of any additions and betterments, less retirements, and upon the cost of road extensions to the property of such carrier made by such carrier with the approval of or by order of the President while such property is under Federal control.

"Sec. 5. That no carrier while under Federal control shall, without the prior approval of the President, declare or pay any dividend in excess of its regular rate of dividends during the three years ended June 30, 1917. *Provided, however,* That such carriers as have paid no regular dividends or no dividends during said period may, with the prior approval of the President, pay dividends at such rate as the President may determine.

The Revolving Fund

"Sec. 6. That the sum of \$500,000,000 is hereby appropriated, out of any moneys in the Treasury not otherwise appropriated, which, together with any funds available from any operating income of said carriers, may be used by the President as a revolving fund for the purpose of paying the expenses of the Federal control, and so far as necessary the amount of just compensation, and to provide terminals, motive power, cars, and other necessary equipment, such terminals, motive power, cars, and equipment to be used and accounted for as the President may direct and to be disposed of as Congress may hereafter by law provide.

"The President may also make or order any carrier to make any additions, betterments, or road extensions, and to provide terminals, motive power, cars, and other equipment necessary or desirable for war purposes or in the public interest on or in connection with the property of any carrier. He may from said revolving fund advance to such carrier all or any part of the expense of such additions, betterments, or road extensions, and to provide terminals, motive power, cars, and other necessary equipment so ordered and constructed by such carrier or by the President, such advances to be charged against such carrier and to bear interest at such rate and be payable on such terms as may be determined by the President, to the end that the United States may be fully reimbursed for any sums so advanced.

"Any loss claimed by any carrier by reason of any such additions, betterments, or road extensions so ordered and constructed may be determined by agreement between the President and such carrier; failing such agreement the amount of such loss shall be ascertained as provided in section 3 hereof.

"From said revolving fund the President may expend such an amount as he may deem necessary or desirable for the utilization and operation of canals, or for the purchase, construction, or utilization and operation of boats, barges, tugs, and other transportation facilities on the inland, canal, and coastwise waterways, and may in the operation and use of such facilities create or employ such agencies and enter into such contracts and agreements as he shall deem in the public interest.

President May Purchase Securities

"Sec. 7. That for the purpose of providing funds requisite for maturing obligations or for other legal and

proper expenditures, or for reorganizing railroad in receivership, carriers may during the period of Federal control, issue such bonds, notes, equipment trust certificates, stock, and other forms of securities, secured or unsecured by mortgage, as the President may first approve as consistent with the public interest. The President may, out of the revolving fund created by this act purchase for the United States all or any part of such securities at prices not exceeding par, and may sell such securities whenever in his judgment it is desirable at prices not less than the cost thereof. Any securities so purchased shall be held by the Secretary of the Treasury, who shall, under the direction of the President, represent the United States in all matters in connection therewith in the same manner as a private holder thereof. The President shall each year, as soon as practicable after January 1, cause a detailed report to be submitted to the Congress of all receipts and expenditures made under this section and section 6 during the preceding calendar year.

"Sec. 8. That the President may execute any of the powers herein and heretofore granted him with relation to Federal control through such agencies as he may determine, and may fix the reasonable compensation for the performance of services in connection therewith, and may avail himself of the advice, assistance, and co-operation of the Interstate Commerce Commission and of the members and employees thereof, and may also call upon any department, commission, or board of the government for such services as he may deem expedient. But no such official or employee of the United States shall receive any additional compensation for such services except as now permitted by law.

"Sec. 9. That the provisions of the act entitled "An act making appropriations for the support of the Army for the fiscal year ending June 30, 1917, and for other purposes," approved August 29, 1916, shall remain in force and effect except as expressly modified and restricted by this act; and the President, in addition to the powers conferred by this act, shall have and is hereby given such other and further powers necessary or appropriate to give effect to the powers herein and heretofore conferred. The provisions of this act shall also apply to any carriers to which Federal control may be hereafter extended.

"Sec. 10. That carriers while under Federal control shall be subject to all laws and liabilities as common carriers, whether arising under State or Federal laws or in common law, except in so far as may be inconsistent with the provisions of this act or any other act applicable to such Federal control or with any order of the President. Action at law or suits in equity may be brought by and against such carriers and judgments rendered as now provided by law, and in any action at law or suit in equity against the carrier no defense shall be made thereto upon the ground that the carrier is an instrumentality or agency of the Federal government. Nor shall any such carrier be entitled to have transferred to a Federal court any action heretofore or hereafter instituted by or against it, which action was not so transferable prior to the Federal control of such carrier, and any action which has heretofore been so transferred because of such Federal control or of any act of Congress or official order or proclamation relating thereto, and any action of either party be transferred to the court in which it is originally instituted. But no process, mesne or final, shall be levied against any property under such Federal control.

The Rate-Making Power

"During the period of Federal control, whenever it becomes necessary in the public interest, the President may appropriate from moneys in the Treasury, and may, and hereby is authorized to do so, in connection with the same with the Interstate Commerce

Commission, which said rates, fares, charges, classifications, regulations, and practices shall not be suspended by the commission pending final determination.

"Said rates, fares, charges, classifications, regulations, and practices shall be reasonable and just and shall take effect at such time and upon such notice as he may direct, but the Interstate Commerce Commission shall, upon complaint, enter upon a hearing concerning the justness and reasonableness of so much of any order of the President as establishes or changes any rate, fare, charge, classification, regulation, or practice of any carrier under Federal control, and may consider all the facts and circumstances existing at the time of the making of the same. In determining any question concerning any such rates, fares, charges, classifications, regulations, or practices, or changes therein, the Interstate Commerce Commission shall give due consideration to the fact that the transportation systems are being operated under a unified and co-ordinated national control and not in competition.

"After full hearing the commission may make such findings and orders as are authorized by the act to regulate commerce as amended, and said findings and orders shall be enforced as provided in said act: *Provided, however*, That when the President shall find and certify to the Interstate Commerce Commission that in order to defray the expenses of Federal control and operation fairly chargeable to railway operating expenses, and also to pay railway tax accruals other than war taxes, net rents for joint facilities and equipment, and compensation to the carriers, operating as a unit, it is necessary to increase the railway operating revenues, the Interstate Commerce Commission in determining the justness and reasonableness of any rate, fare, charge, classification, regulation, or practice shall take into consideration said finding and certificate by the President, together with such recommendations as he may make.

Penalties

"Sec. 11. That every person or corporation, whether carrier or shipper, or any receiver, trustee, lessee, agent, or person acting for or employed by a carrier or shipper, or other person, who shall knowingly violate or fail to observe any of the provisions of this act, or shall knowingly interfere with or impede the possession, use, operation, or control of any railroad property, railroad, or transportation system hitherto or hereafter taken over by the President, or shall knowingly violate any of the provisions of any order or regulation made in pursuance of this act, shall be guilty of a misdemeanor, and shall, upon conviction, be punished by a fine of not more than \$5,000, or, if a person, by imprisonment for not more than two years, or both. Each independent transaction constituting a violation of, or a failure to observe, any of the provisions of this act, or any order entered in pursuance hereof, shall constitute a separate offense. For the taking or conversion to his own use or the embezzlement of money or property derived from or used in connection with the possession, use, or operation of said railroads or transportation system, the criminal statutes of the United States, as well as the criminal statutes of the various States where applicable, shall apply to all officers, agents, and employees engaged in said railroad and transportation service, while the same is under Federal control, to the same extent as to persons employed in the regular service of the United States. Prosecutions for violations of this act or of any order entered hereunder shall be in the district courts of the United States, under the direction of the Attorney General, in accordance with the procedure for the collection and imposing of fines and penalties now existing in said courts.

"Sec. 12. That moneys and other property derived from the operation of the carriers during Federal control are hereby declared to be the property of the United States. Unless otherwise directed by the President, such moneys shall not

be covered into the Treasury, but such moneys and property shall remain in the custody of the same officers, and the accounting thereof shall be in the same manner and form as before Federal control. Disbursements therefrom shall, without further appropriation, be made in the same manner as before Federal control and for such purposes as under the Interstate Commerce Commission classification of accounts in force on December 27, 1917, are chargeable to operating expenses or to railway tax accruals and for such other purposes in connection with Federal control as the President may direct, except that taxes under Titles 1 and 2 of the act entitled 'An act to provide revenue to defray war expenses, and for other purposes,' approved October 3, 1917, or any act in addition thereto or in amendment thereof, shall be paid by the carrier out of its own funds. If Federal control begins or ends during the tax year for which any taxes so chargeable to railway tax accruals are assessed, the taxes for such year shall be apportioned to the date of the beginning or ending of such Federal control, and disbursements shall be made only for that portion of such taxes as is due for the part of such tax year which falls within the period of Federal control.

"At such periods as the President may direct, the books shall be closed and the balance of revenues over disbursements shall be covered into the Treasury of the United States to the credit of the revolving fund created by this act. If such revenues are insufficient to meet such disbursements, the deficit shall be paid out of such revolving fund in such manner as the President may direct.

"Sec. 13. That all pending cases in the courts of the United States affecting railroad or other transportation systems brought under the act to regulate commerce, approved February 4, 1887, as amended and supplemented, including the commodities clause, so called, or under the act to protect trade and commerce against unlawful restraints and monopolies, approved July 2, 1890, and amendments thereto, shall proceed to final determination as soon as may be, as if the United States had not assumed control of transportation systems; but in any such case the court having jurisdiction may, upon the application of the United States, stay execution of final judgment or decree until such time as it shall deem proper.

Period of Federal Control

"Sec. 14. That the Federal control of railroads and transportation systems herein and heretofore provided for shall continue for and during the period of the war and for a reasonable time thereafter, which shall not exceed one year and nine months next following the date of the proclamation by the President of the exchange of ratifications of the treaty of peace: *Provided, however*, That the President may, prior to July 1, 1918, relinquish control of all or any part of any railroad or system of transportation, further Federal control of which the President shall deem not needful or desirable; and the President may at any time during the period of Federal control agree with the owners thereof to relinquish all or any part of any railroad or system of transportation. The President may relinquish all railroads and systems of transportation under Federal control at any time he shall deem such action needful or desirable. No right to compensation shall accrue to such owners from and after the date of relinquishment for the property so relinquished.

"Sec. 15. That nothing in this act shall be construed to amend, repeal, impair, or affect the existing laws or powers of the States in relation to taxation or the lawful police regulations of the several States, except wherein such laws, powers, or regulations may affect the transportation of troops, war materials, government supplies, or the issue of stocks and bonds: *Provided, however*, That no State or subdivision thereof, or the District of Columbia, shall levy,

assess, or collect an amount of taxes from railroad property within the State or subdivision thereof, or the District of Columbia, while under Federal control, in excess of the ratio which the taxes derived from railroad property bore to the total taxes of such State or subdivision thereof, or the District of Columbia, for the year previous to Federal control.

"Sec. 16. That this act is expressly declared to be emergency legislation enacted to meet conditions growing out of war; and nothing herein is to be construed as expressing or prejudicing the future policy of the Federal government concerning the ownership, control, or regulation of carriers or the method or basis of the capitalization thereof."

The conferees adopted the bill as passed by the House as the basis for their work and the bill as submitted for final action was in the form of an amendment to the House bill. In several cases in order to reach a new agreement the conferees wrote language into the act which was in neither bill, as in the case of the compromise on a period of 21 months after the war and in the case of the rate-making section. As a result, the Senate on March 8 adopted a resolution directed against the practice of inserting new matter in such reports.

The Senate receded from its disagreement to section one of the House bill with an amendment striking out so much of the House bill as provided an increase of the annual sum payable as compensation to the carriers upon the cost of additions or betterments, less retirements, or road extensions made during the six months ended December 31, 1917, and with further slight amendments of the wording of the House amendment. The section in the Senate bill which proposed to reduce the compensation by providing that there should be no return on surplus invested during the period of Federal control was omitted.

The Senate receded from its disagreement to section two of the House amendment relating to the compensation of carriers which fail to reach an agreement on the basis of a standard return, with an amendment providing that the compensation that might be agreed upon as provided in that section should cover the time consumed in arriving at an agreement.

The Senate receded from its disagreement to section 3 with an amendment at the end of the section providing that proceedings in the court of claims should be given precedence and expedited in every practicable way. In section 8 it was agreed to strike out the Lenroot amendment providing that no person employed in connection with the

operation of the railroads shall be deemed to be an officer or employee of the United States within the meaning of the war tax and workmen's compensation laws.

Section 9 of the House bill, which made provision regarding the operation of short line railroads not taken over, was stricken from the bill because of the adoption by the House of the Senate provision requiring all lines referred to in the section to be taken over.

Section 11, as agreed upon by the conference, leaves the President practically unrestricted by the laws which have applied to common carriers, except to some extent as to rates. The House bill provided that carriers while under Federal control shall be subject to all laws and liabilities as common carriers, except in so far as may be inconsistent with the provisions of this act or any other act applicable to such Federal control. The substitute agreed upon adds the words of the Senate bill "or with any order of the President." This section was also amended by the new language as to the rate-making power, "the effect of which," the conference report states, "is to give paramount and final power to the Interstate Commerce Commission to determine finally as to the reasonableness and justness of any rates, fares, charges, classifications, regulations and practices that may be initiated by the President during the period of Federal control, with authority to make such findings and orders as the commission may think right and proper with regard thereto."

Representative Cary of Wisconsin has introduced a bill, H. R. 10,550, to provide for national ownership of the railroads.

An effort to obtain the passage of the bill in the Senate on Monday was defeated by Senator Frelinghuysen, who made a point of order against the conference report under the new rule adopted by the Senate on the ground that the conferees had exceeded their authority and had written new matter into the bill in the restriction of state taxing powers. Senator Knox also supported the objection to the tax provision, saying that governors of many states had been assured that the bill would not curtail state taxing powers. Senators Curtis, Johnson of California, Williams and Gallinger also opposed the report for similar reasons and it was finally put over until the next day and again deferred until Wednesday. Senators Smith of South Carolina and Robinson of Arkansas defended the conference report and declared the provision was necessary to protect the federal government against the possibility of excessive state taxation. In the bill as finally passed by the Senate Section 15 was eliminated



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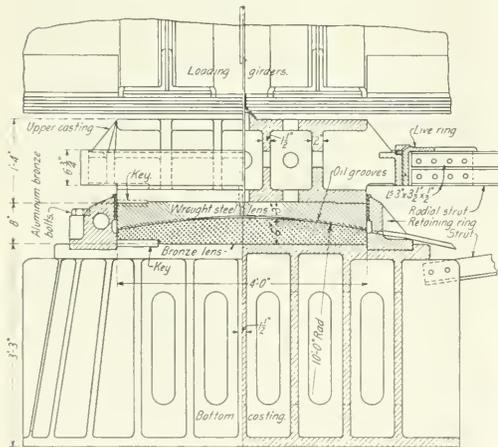
The Tommies Use Them All—Light Railways, Motor Trucks and Canal Barges

New Details for Draw Span Bearings

THE DRAW SPAN of the Chicago, Burlington & Quincy bridge over the Missouri river at Kansas City, is provided with end lifts and a turning center that embody a number of novel features. The bridge is double decked with two railway tracks on the lower level and a highway above. The draw span is 450 ft. long and except for the special features mentioned above may be said to follow current practice. The structure as a whole was described in the *Railway Age Gazette* of June 8, 1917, page 1181.

One of the drawings and the photograph show the details of the end lift. The functions of the end bearing of a swing span are two-fold. It affords the means for raising the end of the bridge as required to change the span from a double cantilever over the pivot pier when open, to a span supported on three piers when closed or vice versa. It must also supply expansion bearings to facilitate changes in the length of the span under varying temperatures or passing loads. This last condition involves a further complication since the device must be equally operative under all positions of the end bearings as determined by the changing length of the span.

The idea of a rocker connected with the end of the span

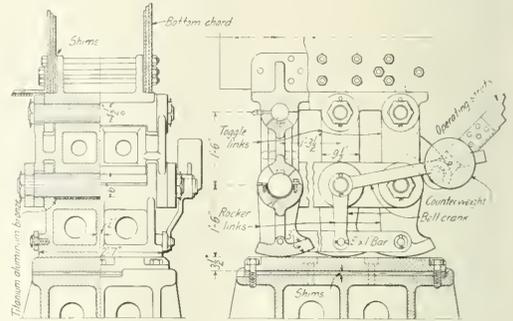


Vertical Section of the Center Assembled

by means of a link so as to form a toggle, has been applied frequently in the design of end lifts, but the design here shown embodies a number of features which overcome disadvantages in some of the earlier plans. It consists of three sets of toggle links and rockers connected up on each side with bars to insure parallel motion. The links are suspended at the upper end, by means of a 4 1/2-in. pin, from a steel casting bolted into the end of the bottom chord. The toggle is operated by a structural steel strut connected at one end to a crank in the operating machinery and at the other end to a pin near the lower end of the inside link. When the strut is pulled to the right (toward the center pier) the toggle links and rockers swing in that direction and the end of the bridge is lowered. When the operating strut is pushed to the left, the links and rockers return to the vertical position and the bridge is raised.

As long as the rockers are in contact with the surface of the bearing on which they rest, their motion corresponds exactly to that of the links, but as soon as the toggles have been swung far enough to clear the span entirely from the bearing, the rockers would have a tendency to hang in a

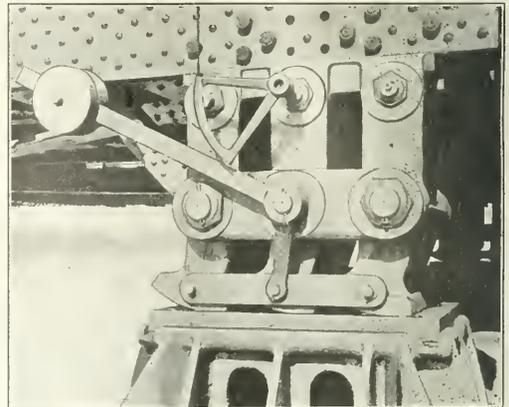
vertical position from the pins that connect them to the toggle links and as a result when the bridge is closed the rockers would come in contact with the bearing while in a vertical position. To overcome this the bell crank and counterweight shown in the drawing were added which cause the rockers to tip up to the left when clear of the bearing and they do not start to right themselves (in raising the bridge) until their roller surfaces come in contact with the bearings as the toggles straighten out. As a result, the angle



Sectional Elevations of the End Lift

between the axis of the toggle links and the surface upon which they roll is always the same at the instant that they come in contact, no matter how much the span may have been shortened or lengthened by temperature changes. The rockers have unusually large radii and are also free to rock under the bridge with changes in the length of the span while the upper links are held in a fixed vertical position by the operating strut.

In the Burlington bridge at Kansas City there are three sets of links as shown in the drawing, but the nature of the design is such that it is capable of indefinite extension and



A View of One End Bearing Complete

as many links may be used as are required for the load to be carried. The dead load under each end of each truss on the Kansas City structure is 160,000 lb., the corresponding live load being 1,600,000 lb. The design of the links and rockers is such that the pins act in direct compression along nearly the entire length. Operating tests of the end lifts, showed that their working efficiency exceeded anticipations.

The center is of the combined center and rim bearing type, one-half of the load of the bridge being on the center which consists essentially of a 48-in. wrought-steel, concave lens turning on a convex aluminum bronze lens of the same diameter, the surface of contact being that of a sphere of 10-ft. radius scraped and ground to fit. The lenses are supported on a cast-steel pedestal and are enclosed by a cast-steel ring, lined with a bronze bushing. This ring is made in halves so that it is taken off readily. With this ring removed it is only necessary to jack the bridge up about $\frac{1}{4}$ in. and remove two keys in order to take the two lenses out when it becomes necessary to re-grind the surfaces or replace them. All bolts removed in this operation are of titanium aluminum bronze, this metal being used since it insures that the bolts will not corrode in place and make removal difficult.

Just above the upper lens is the upper center casting which is equipped with a cylindrical surface to receive the live ring, to which the radial struts are attached. This is a departure from the usual practice since the live ring is ordinarily turned on the lower center casting. To avoid difficulty in the field the segments of the tread were assembled in the shop together with the lower center casting and the 4-in. by 4-in. angles serving as radial struts to connect them. After all the parts had been assembled to give a true circle for the tread, all bolt holes for the radial struts were reamed and all connections marked so that each member could be reassembled in the identical position.

These and other details of the turning machinery of this bridge were designed by B. B. Carter, consulting engineer (Chicago, under the general direction of the late C. H. Carlidge, bridge engineer of the Chicago, Burlington & Quincy.

The Director General on Equipment Standardization

Proposed Standards for New Equipment Only. Will Welcome Opportunity for Making Improvements

ON MARCH 6, George A. Post, president of the Railway Business Association, interviewed Director General McAdoo on the subject of standardization. The following is a letter sent to the members of the association by Mr. Post telling of this interview:

As president of the Railway Business Association, I have had an extended interview with the director general of railroads, in which was discussed the matter brought to his attention in my letter* to him of February 25—the anxiety felt by manufacturers of railway specialties as to possible consequences to them in any scheme for standardization of equipment. I was received cordially, and was accorded a generous period of time for conference. Mr. McAdoo spoke freely and frankly concerning what he has in mind in seeking establishment of standards.

I submitted two queries as a basis:

"First—Are the recently constituted committees on locomotives and cars expected to recommend to the director general standards to be adhered to, not only in the building of the new locomotives and cars, now under consideration for the immediate relief of traffic, but as well to all power and vehicles that may be required during the period that the railways shall remain under the administration of the director general? Also, are such standards, when approved by the director general, to apply and govern in the matter of repairs to equipment during such period?"

"Second—During the period that the railways are under the control of the director general, will it be considered so important to adhere rigidly to any standard that may be now approved, as to cause a cessation of trial, development and acceptance of any new mechanical inventions intended to improve and economize railway operation?"

With these two questions propounded for his consideration, Mr. McAdoo proceeded to express his ideas responsive thereto. I do not attempt to record fully his exact language, but to condense, animated by an eager desire to report faithfully and fairly the viewpoint of the director general:

Mr. McAdoo on Railway Standards

As director general of railroads, it is his duty to see that our railroads are put in condition to perform with the highest degree of efficiency possible the vital part they must play in winning the war. That their performance thus far

has not met the requirements is a fact known to everybody. They must have, as quickly as possible, among other things, large additions to their power and rolling stock. The purchase of such equipment will call for the expenditure of vast sums. The natural thought of an official responsible for such expenditure, and for the least possible delay in delivery of sadly needed locomotives and cars is: "To what extent may they be standardized?" As a matter of general knowledge, Mr. McAdoo was aware that the American Railway Association, made up of the railway executives of the country, had for several years had committees at work for the accomplishment of standardization, so that it was clear the subject was a live one with railway administrators long before the roads were taken over by the government under stress of war. The roads had not agreed when the change of control occurred.

When Mr. McAdoo assumed the directorship, the roads were taken over as going concerns, and their official personnel was not disturbed, except as he has called upon some of the gentlemen of distinction in their service to become members of his official staff. When he sought to be advised as to how far standardization of equipment might be effected, he caused to be appointed committees made up of locomotive and car builders and railway mechanical officials, representative of the regional districts which had been created.

Mr. McAdoo disclaims being a railroad man and is utilizing the forces he finds at hand to suggest what ought to and may be done in the solution of this particular railway problem. He has laid down no rules for their conferences, has no preconceived notions, and has given his advisors free rein. No reports or recommendations from them have yet been received by him (March 6).

Whether he will approve of all their recommendations when received, he does not know, of course, but this he would like the manufacturers of railway material, as represented by the Railway Business Association, to appreciate, namely—that any embarrassments, losses, or necessary expenditures for the purpose of adaptation to the new standards will be entailed not by his personal initiative or prescription, but as the consensus of opinion of those with whom they have heretofore done business and to meet the exigent requirements of war conditions. If the railroad executives had formulated standards before the war manu-

*Railway Age, March 1, page 457

facturers would have been obliged to endure and adapt themselves to the changes ordained by their customers.

Of course, he went on, there can be no such thing as a permanent standard for railway practice. America and progress are synonymous terms. The old gives place to the new in the onward march of progress. There was never a time when the inventive genius of our nation so needed to be working at highest speed as now. No matter what may be established as a standard for new equipment under the present pressure for celerity of manufacture and attainment of economy he would hope and expect that when future requirements shall confront us, the inventor and progressive manufacturer will offer improvements of great value, to be welcomed as aids to economical and efficient railway operation.

During the period that the roads shall remain under governmental control, it will be the determination of the officials in charge that our railroads shall be made better than ever before. Anybody who has plans to suggest for improvement will be hospitably received.

The proposed standards are for the immediate present, and for new equipment to be purchased. They will not apply to existing equipment, which must be kept in repair with parts already intended for such repairs. It would be folly to prescribe that cars requiring repairs must await the arrival of new standard parts, instead of being repaired with specialties already in stock, or easily obtained from the manufacturers.

Accepting the figures presented by the Railway Business Association, for the purpose of his comment, there are now in use and under maintenance 63,862 locomotives and 2,326,987 cars. No one would consider it wise to do anything save keeping them in service as long as they can be made to last by the use in their repair of such devices as were originally used in their construction. In so doing there would be a continuing demand for such stocks of supplies as the manufacturers keep on hand to meet requirements.

Mr. McAdoo can see no reason for the manufacturers of railway material and equipment to be filled with fear for their future. They should, on the contrary, take counsel of their hopes. He expects to see them doing a greater volume of business than in recent years and at a fair profit. There will be no trouble for any manufacturer who is willing to do business at a fair price.

Members of Railroad Administration Staff Resign Railroad Offices

ALL MEMBERS OF THE STAFF of the Railroad Administration at Washington have severed their connections with all railroad companies and other corporate or private interests and are devoting themselves exclusively to the service of the government, according to an announcement by Director General McAdoo.

Walker D. Hines, assistant to the director general, has tendered his resignation as chairman, general counsel, and director of the Atchison, Topeka & Santa Fe. Carl R. Gray, director of the division of transportation, has tendered his resignation as president, chairman and director of the Western Maryland, and as chairman and director of the Wheeling & Lake Erie. Edward Chambers, director of the division of traffic, has tendered his resignation as vice-president of the Atchison, Topeka & Santa Fe. As heretofore stated, R. S. Lovett, director of the Division of Capital Expenditures, has already severed his connection with various railroad companies.

The announcement applies also to the various assistants to the members of Mr. McAdoo's cabinet, who are railroad men; but not to the regional directors. Heretofore the sal-

aries of members of the staff have been paid by the railroad companies but it is understood that they will now be placed on the government payrolls and will be paid presumably from the revolving fund, which, according to the provision of the bill, may be used "for the purpose of paying the expenses of the federal control."

A Novel Arch Viaduct

THE ACCOMPANYING PHOTOGRAPH shows a combination of a structural steel viaduct following the lines of usual viaduct practice combined with a spandrel-braced steel arch, the design representing the solution of the special problem presented by the local situation. The structure is known as the Dead River arch, a few miles from Marquette, Mich., on the Lake Superior & Ishpeming, which handles ore from mines at Ishpeming and vicinity to the ore docks at Marquette.

The structure shown replaces a lighter steel trestle where it crosses a gorge of the small river at an acute angle and on a grade of 1.63 per cent. As it was necessary to replace the existing structure under traffic, it was found expedient to design the new bridge to clear the old one and as there is a considerable fall in the stream directly under the crossing



Combination of an Arch and a Viaduct

so that the stream is very turbulent, particularly during high water, the use of falsework would have been very expensive if not hazardous at the season of the year when the reconstruction was in progress. In consequence an arch was decided upon with a span of 116 ft. and a rise of 70 ft., and with the track at an additional elevation above the crown of the arch of 28 to 30 ft. In a preliminary design the arch was made only 50 ft. high, but this did not work out well on account of the high tractive forces set up in the high trestle bents on top of the arch. The bridge was fabricated and erected by the Wisconsin Bridge & Iron Company, Milwaukee, Wis., under the general direction of R. C. Young, chief engineer of the Lake Superior & Ishpeming, Marquette, Mich.

Refrigerator Cars for the Michigan Central

The Design Represents the Most Modern Practice, Special Attention Being Given the Insulation

A SHORT TIME AGO the Michigan Central received 250 refrigerator cars which represent the latest development in the construction of this class of equipment. These cars were built by the Merchants Despatch Transportation Company at East Rochester, N. Y. They are 41 ft. long and weigh 51,500 lb., having a rated capacity of 70,000 lb.

The cars are particularly well insulated, slab cork being used in the floors and below the sub-belt rail on the sides and ends. The sides are insulated with four layers of $\frac{1}{2}$ -in. insulation and the ceiling has five layers, the layers being applied with no air space between them. The method of insulating these cars was adopted after making extensive tests with the different methods of application. It was applied so as to eliminate as much as possible all dead air spaces. It has been found difficult to maintain a tight car with the courses of insulation separated, as the constant weaving of the car causes a circulation of air in the supposed dead air space. By placing the various courses of insulation close together, the construction of the car is simplified and the insulation can be supported better. The

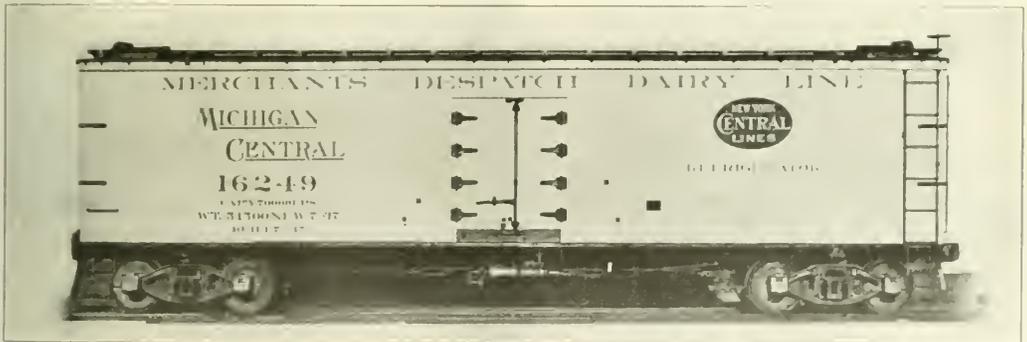
post and over the side sills at the door opening. This extends 16 in. up on the side framing. A layer of burlap plastic is then laid over the sills of the car and extends up 6 in. on the sides. Another layer of burlap plastic is laid over the $1\frac{3}{4}$ -in. flooring, extending up 6 in. on the car framing, and on top of this is placed the top course of flooring.

The carlines are mortised into the side plates and are held in position by $\frac{1}{2}$ -in. tie rods, extending between the side plates and set flush with the face of the carline. The XLA outside metal roof, made by the Standard Railway Equipment Company, is used on these cars. The roof boards and the ceiling are $1\frac{3}{16}$ in. thick.

Insulation

The insulation in the floor is made up of 2-in. corkboard laid on a $\frac{13}{16}$ -in. false floor between the sills. The cork is held in place by 1-in. nailing strips. Zero compound is then placed over the cork, making a perfect seal.

The outside of the car framing is covered with a layer of $\frac{3}{8}$ -in. shiplap pine. Over this is applied a layer of three-



Refrigerator Car for the Michigan Central

ice tanks are of M. D. T. standard construction, which was adopted a few years ago. The ice is held in wire screens in the inside of the tank. An air space of 2 in. is left between this screen and the walls of the tank on all sides, which permits free circulation of air around the ice and through the tanks to the base. An insulated bulkhead is used to prevent cooling of the perishable freight near the bulkhead to a lower temperature than is obtained in other parts of the car. Floor racks are provided to allow free circulation of the air under the lading.

Underframe and Side Framing

These cars are provided with the Bettendorf steel underframe, which is 41 ft. $4\frac{3}{4}$ in. over end sills. This underframe supports two side sills and six intermediate sills $\frac{5}{2}$ in. wide by 4 in. thick. Three-quarter inch diagonal rods criss-cross the diagonal braces, as indicated in the drawings.

The siding and the inside lining are $\frac{13}{16}$ in. thick, and the flooring is $1\frac{3}{4}$ in. thick. Before applying the floor, the side framing is lined with a special waterproofing which extends from the inside face of the corner post to the door

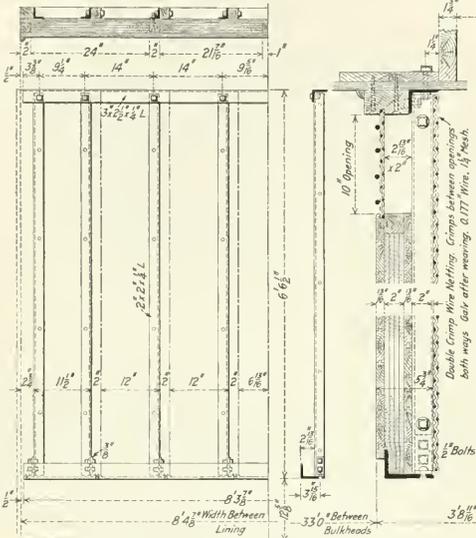
ply 90-lb. waterproof paper extending from side sill to side plate. Sub-belt rails $2\frac{1}{2}$ in. by $1\frac{3}{4}$ in. are then applied over the belt rails. Between the lower sub-belt rail and the side sill 2-in. corkboard is applied, the faces of the board being dipped in hot Hydrex compound before being applied.

The four-ply, $\frac{1}{2}$ -in. insulation is applied en masse between the belt rails and the side plates. The insulation is held in place by $\frac{1}{4}$ -in. round nailing strips. Battens are placed at each intermediate post, corner post, door post and belt rails and an additional batten is applied in each panel formed by the vertical battens, belt rails and side plate filler to more securely support the insulation. Two-ply wool felt is applied immediately on top of the battens, and on top of this is applied a layer of three-ply, 90-lb. waterproof paper extending from the top of the side plate to the bottom of the side sill and from door post to door post around the ends of the car. The siding is applied on top of this.

The roof of the car is insulated with five layers of $\frac{1}{2}$ -in. insulation applied to a $\frac{13}{16}$ -in. false ceiling, separated from the ceiling by 1-in. by 1-in. nailing strips. The insulation is held in place by 1-in. by 1-in. nailing strips, as indicated

mesh. The netting on the side and rear of the tank is fastened to oak furring strips and at the front it is secured to the bulkhead post furring strips. The tank covers are insulated with four layers of $\frac{1}{2}$ -in. insulation. The openings in the roof are 20 in. by 27 in.

The opening at the bottom of the bulkhead is covered with a gate of $1\frac{1}{2}$ -in. diamond mesh made up of 0.177 wire, which is mounted on a frame of $\frac{7}{8}$ -in. by 7/16-in. channels. These gates are fastened to the angle bulkhead



Construction of the Solid Bulkhead

support by hinges. At the top a similar netting is used with four $\frac{1}{2}$ -in. rods applied as indicated in the drawings.

Among the specialties used on this car may be mentioned Miner roller side bearings, Western angle cock holder and card holder, Bettendorf trucks and Virginia dust guards.

The following are the general dimensions of this car:

Length over end sills.....	41 ft. 4 3/4 in.
Length inside of lining.....	40 ft. 5 3/8 in.
Distance between ice tanks.....	33 ft.
Width over outside sheathing.....	9 ft. 5 7/8 in.
Width inside of lining.....	8 ft. 4 7/8 in.
Width over side fascia.....	9 ft. 9 1/8 in.
Width of door opening.....	5 ft.
Height from rail to eaves.....	12 ft. 2 1/4 in.
Height from rail to over all.....	13 ft. 8 5/8 in.
Height from top of floor to ceiling.....	7 ft. 7 1/4 in.
Cubic feet capacity.....	2,026

AMERICAN EQUIPMENT AT CHILEAN IRON MINE.—

Under the name of the Bethlehem Chile Iron Mines Company, the Bethlehem Steel Company operates the iron mines at Tofo, near Coquimbo, Chile. In order to get the ore out on a large scale it has installed a complete modern plant, the most important features of which are the loading dock and the electric railway for taking supplies up to the mine and bringing down the ore. From the trains the ore is dumped upon a storage space on the ground or into the bins of the dock, if the latter are empty. The locomotives that are to haul the trains will run on both 2,400 and 1,200 volts and will employ regenerative braking on the trip down hill, the distance being 24 kilometers (16 miles), with a uniform grade of 4 per cent all the way. Three will be required, and all will be of the type used in the recent Chicago, Milwaukee & St. Paul electrification.—*Commerce Reports.*

An Engineer Doing His Bit*

By Edward F. McKenzie

Passenger Engineman, Pittsburgh Division, Pennsylvania Railroad

WHEN OUR BELOVED COUNTRY entered the war for humanity, I resolved to do everything in my power to help win the war; and, as a beginning, I took council with my wife and son as to how we could do the most good. The first consideration was the elimination of all unnecessary expense and waste. We had planned a vacation to Atlantic City; this was given up at once. Upon looking over our wardrobes, it was decided that last winter's suits would be good enough for this winter. Next, we considered economizing on food, and have worked out the following program for the table:

Meat, two days a week; fish, two days a week, and the other days, beans, soups, macaroni, etc. We use wheat (whole wheat), corn and rye bread in turn. We frequently have mush and milk for evening dinner, and fry what remains for breakfast the following day. The stock of all meat is used in soups; the fryings of all salt meat and pork are used to fry other foods. As breakfast foods, we use oats, corn cakes and buckwheat cakes, alternately. Our rule is never to have more than one heavy meal a day—breakfast and lunch being light. Fruit and vegetables are used at all meals. This program gives a well-balanced diet, keeping us in good health.

I cultivated a war garden in my spare hours which supplied our wants all summer, in addition to a good supply for winter. The money saved by such methods was considerable, and enabled me to join the Red Cross and contribute liberally to it and to the Y. M. C. A. fund, as well as all church and hospital funds that have been presented to me. I purchased a Liberty Bond in the first and also the second issues from my earnings, authorizing the Railroad company to take 10 per cent each month from my earnings; and I am adding to my savings to purchase more when some other men may not be able to buy them. I have also advised other employees to do the same.

I read up on American citizenship and have missed no opportunity to talk to foreign-born men, and show them the advantage of being citizens and supporting the government where they make their living, and have allayed their fears as to any bodily harm that might come to them, or the confiscation of their money, and have advised them to go about their work as usual and not talk too much.

Being a passenger engineman, I next gave thought as to how I could best serve the government while at my work, as I realized that military affairs depend to a large extent on the railroads of the country, on transportation of men, munitions and supplies, as well as keeping the mills and plants which manufacture these supplies working to full capacity. Knowing these facts, I first wrote to our road foreman of engines and to our general superintendent, tendering my services in any capacity in which I could be of most service to the company and to the nation, holding myself ready at all times, although on a regular run.

I go to work one-half hour earlier than required by the company in order that I may give the engine a most thorough inspection and have it in perfect condition when starting, as a break-down on the road means delay—one of the things not desired.

And at the close of each day I ask God to bless our armies and to endow our President and his cabinet with wisdom, that they may be the instruments in God's hands to bring the war to a successful end for humanity and democracy.

*Reprinted from a pamphlet issued by the Pennsylvania Railroad. Mr. McKenzie was the author of the first prize paper on locomotive running, which was printed in the *Railroad Age Gazette*, November 14, 1913; also of an article in the issue of September 22, 1916.

"A Free Route to Persia and Afghanistan"

How England Built Her Sind-Pishin Railway to Protect the Indian Frontier from Invasion

"WE HAVE ACQUIRED a direct free route via Russia to Persia and Afghanistan," said the despatch from the Wolff Bureau, the German semi-official news agency, which was featured in first page headlines in the American press on Saturday last.

Although it would be hard to believe that Germany might have any hopes at this time of conducting such a long range campaign as would be required in Persia or Afghanistan, the announcement is of more than ordinary importance because it is an implied threat at the British possessions in India.

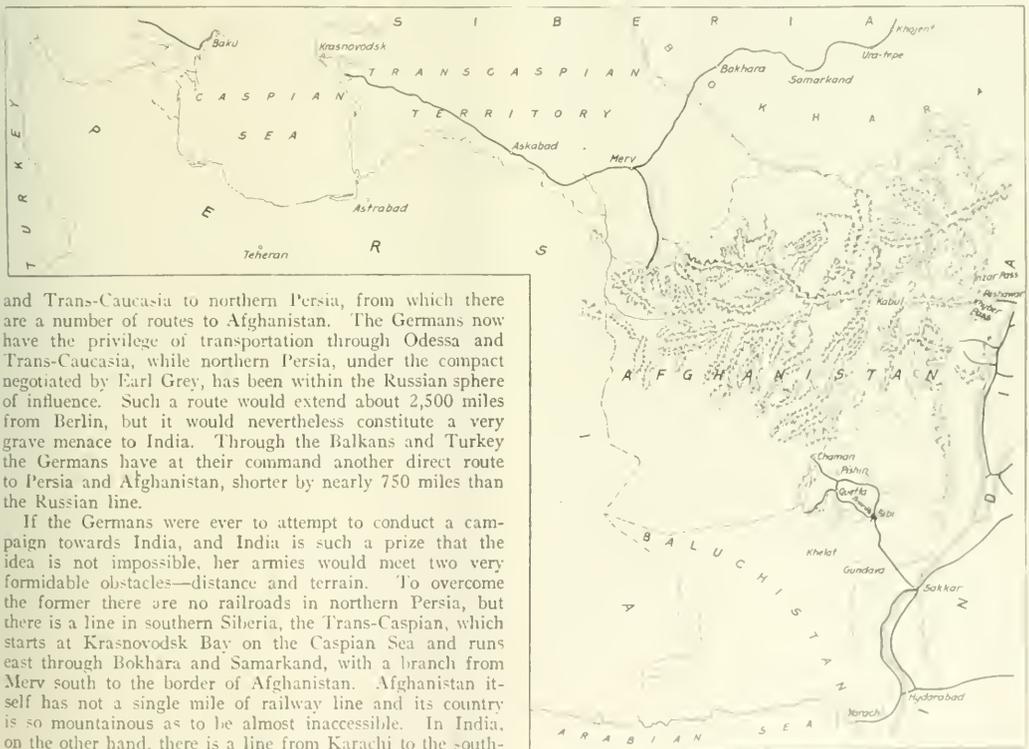
The probable route of the line is through Lemberg or Kiev, which the Germans have announced they are holding, southward and eastward, through Odessa, Postov, Caucasia

conditions or the construction of which has surmounted so many obstacles, physical or political.

The story which follows is abstracted from E. A. Pratt's "Rise of Rail Power in War and Conquest," P. S. King & Son, London, and appears in that book as an appendix entitled "Indian Frontier Railways."

India's Most Vulnerable Point

On the north-west frontier of India the plains of the Punjab are separated from the great central valley of Afghanistan, from the deserts of Baluchistan, and from the Russian Empire on the north thereof, by ranges of mountains, otherwise "a gridiron of stupendous ridges and furrows" intersected by passes which have always been re-



Afghanistan and the Railways Leading to It.

and Trans-Caucasia to northern Persia, from which there are a number of routes to Afghanistan. The Germans now have the privilege of transportation through Odessa and Trans-Caucasia, while northern Persia, under the compact negotiated by Earl Grey, has been within the Russian sphere of influence. Such a route would extend about 2,500 miles from Berlin, but it would nevertheless constitute a very grave menace to India. Through the Balkans and Turkey the Germans have at their command another direct route to Persia and Afghanistan, shorter by nearly 750 miles than the Russian line.

If the Germans were ever to attempt to conduct a campaign towards India, and India is such a prize that the idea is not impossible, her armies would meet two very formidable obstacles—distance and terrain. To overcome the former there are no railroads in northern Persia, but there is a line in southern Siberia, the Trans-Caspian, which starts at Krasnovodsk Bay on the Caspian Sea and runs east through Bokhara and Samarkand, with a branch from Merv south to the border of Afghanistan. Afghanistan itself has not a single mile of railway line and its country is so mountainous as to be almost inaccessible. In India, on the other hand, there is a line from Karachi to the southern border of Afghanistan and another to Peshawar on the eastern border. Afghanistan has served for many decades as a border state between Russia in Siberia and England in India. Will it soon have a new importance as a border state between Germany and England?

It is in the light of that question that it is of particular interest at this time to look back a few years to the struggles that have taken place over Afghanistan and to efforts that have had to be taken to protect the border of that country against invasion of India. The story is of particular interest from a railway standpoint, for there are few railways in the world that have been built under such adverse

garded as the most vulnerable points of the Indian Empire. Through these passes from the earliest days of recorded history there has come a long succession of invasions instigated by that incalculable wealth of India which may well have inspired the envy of dwellers in less favored lands.¹

These considerations would alone suffice to establish the

¹Altogether there have been 26 invasions of India, dating back to about 3000 years B.C., and of this number no fewer than 21 have ended in complete failure.

need for an effective control of the more important of the said passes by the power which exercises supremacy in India; but the obligation thus devolving upon the British people as the present holders of that supremacy has been increased in recent times by two further factors—(1) troubles with frontier tribes; and (2) the development of that central Asian question which, though now no longer acute, was, not so many years ago, a source of great anxiety in England and India. Frontier troubles gave rise to a number of expeditions to Afghanistan from time to time, while the gravity of the general situation was increased by the once steady advance of Russia towards India—whether for purposes of actual conquest thereof, or alternatively, for the attainment of the aim cherished by Russia during three centuries for an outlet to a southern sea, such outlet being sought via the Persian Gulf on her disappointment in regard to the Dardanelles; though British interests were concerned in either case.

This combination of circumstances, with the possibility, at one time, that Afghanistan might become the theatre of war in a conflict between two great European powers, invested with special interest and importance the provision on the north-west frontier of India of railway lines which, whether constructed to the more important passes or going actually through them, would form a ready means of concentrating Anglo-Indian troops at such places on the frontier, or beyond, as occasion might require.

From this point of view the Bolan and Khyber passes—the former leading to Quetta and Kandahar and the latter to Kabul—have more especially had importance attached to them as “the two gates of India.”

The Political Troubles of 1878

The refusal of the Ameer of Afghanistan—who had already accorded an ostentatious welcome to a Russian Embassy at Kabul—to receive a British mission led, in 1878, to an order being given for the advance of three columns of British forces upon Afghan territory, the routes selected for this purpose being (1) the Khyber Pass, (2) the Kuram Pass, and (3) the Bolan Pass. At this time, however, the system of frontier railways which had been advocated so long scarcely existed except on paper. The nearest point of railway communication with Afghanistan was them at Sukkur, on the Indus. An extension across the Sind desert to the entrance to the Bolan Pass had been surveyed, and a very short section had been laid; but in their advance on Kandahar Sir Donald Stewart and his force had to march all the way from the Indus, experiencing great trials in crossing the intervening desert, where many of the men lost their lives. The work of constructing this desert railway—which presented no engineering difficulty—was now taken actively in hand, and the line was available for the troops on their return.

Success attended the expedition of 1878 so far as it led to the flight of Shere Ali, the occupation of Kandahar by Sir Donald Stewart, the control by the British of the three main highways between India and Afghanistan, and the signing of the treaty of Gandamak; but the murder of Sir Louis Cavagnari and his staff at Kabul, in September, 1879, rendered necessary the sending of a further expedition, General Sir Frederick (afterwards Lord) Roberts being directed to proceed with a British force by the Kuram route to Kabul.

Thereupon the whole question of transport facilities was revived afresh and, although the expedition itself was a conspicuous success, delays and commissariat difficulties arose which might have been avoided had better railway facilities been available. The terminus, at that time, of the Punjab State Railway was at Jhelum, 70 miles from Rawal Pindi, 180 from Peshawar and 260 from Thal, the frontier post of the Kuram Pass; and in spite of the vigorous efforts made, between 1878 and 1880, to extend the line, Jhelum remained the actual railway base throughout, no material assistance being gained from the 20 miles of exten-

sion which, owing to the great engineering difficulties presented by innumerable ravines, could alone be carried out during that period.

Rawal Pindi—one of the most important strategic points in India—was not reached by the railway until October, 1880, by which time the Afghan War of 1878-80 had been brought to a close; and the further extension of the Indian railway system to Peshawar—another position of the utmost strategic importance, situate 10 miles from the entrance to the Khyber Pass, and 190 from Kabul—was effected by May, 1883.

Railway Towards Kandahar

From a military point of view, however, still greater importance was attached, at that time, to the securing of rail communication through the Bolan Pass to Quetta and Pishin in the direction of Kandahar, this being the route by which, it was thought, the Russians would be certain to attempt their invasion of India—if they should undertake one at all.

Surveys for an extension of the Sukkur-Sibi desert line to Pishin were made while that line was under construction, and early in 1880 the government gave directions that the extension was to be proceeded with; though they decided that the route to be taken from Sibi should be through the Hurnai Pass in preference to the Bolan route, the former being regarded as preferable for the broad gage line (5 ft. 6 in.) with which the “Kandahar State Railway,” as it was to be called, would be provided.

Arrangements were at once made for collecting the necessary materials and for carrying through the work with the least possible delay; but further progress was checked in July, 1880, by the disaster at Maiwand. In the following October the Gladstone Government, which had succeeded the Beaconsfield Administration and had, apparently, resolved upon a complete reversal of the Indian policy of their predecessors, followed up an earlier announcement of its intention to withdraw from Kandahar by giving orders for the cessation of the work on the Sind-Pishin Railway, Maiwand having been avenged, and some refractory tribes subdued, Afghanistan was completely evacuated by the British at the end of April, 1881, and the construction of frontier railways in India was dropped, for the time being.

In the middle of 1883 came a reconsideration of the position. Russia was then showing increased activity in the direction of Merv, and the British Government concluded, apparently, that it had been too hasty in ordering the abandonment of the Kandahar State Railway scheme nearly three years before. So it gave orders that the work should be resumed; though, in order to render this *volte face* on its part less conspicuous, it directed that the undertaking should now be known only as the “Hurnai Road Improvement Scheme”; that it should be proceeded with quietly, in order that it might not attract too much attention, and that the suggestion of a “road improvement scheme.” instead of a railway, should be kept up by the engineers, not being allowed to have even a temporary line of rails for conveying stores, materials for bridges, etc., from the base to the passes. This last-mentioned stipulation meant that the stores and materials had to be either transported on the backs of camels or dragged on wheels up stream; and it was estimated that, in addition to the great loss of time, a sum of not less than 1,000,000 pounds was wasted in this way before the order prohibiting the use of temporary rails was rescinded.

Russian Advance Toward Merv

A start was made with the work in October, 1883, and the fact that the Russians were then actually approaching Merv, and that a sudden advance by them in force was regarded as probable, led to the laying of great emphasis on the need for construction being pushed on with the utmost vigor. When, in February, 1884, the Russians did occupy

Merv, the pressure brought to bear on the engineer-in-chief became still more acute. Then, in May, the British Government formally announced that, owing to the encroachments of Russia, the line would be built. The fiction of a "Hurnai Road Improvement Scheme" was now abandoned. Henceforth the line under construction was to be known as "The Sind-Pishin State Railway."

From the very outset, however, the difficulties which crowded upon Colonel (afterwards Sir James) Brown, R. E., an officer well experienced in railway and engineering work, who was entrusted with the carrying out of the scheme, were unfavorable to the prospects of speed in construction. The surveys, which had already been made, were found not only worthless but misleading. The first members of his staff were unacquainted with railway work and had to be succeeded by men brought from England. The plant and materials previously collected, but disposed of at scrap-iron prices when the line was abandoned in 1880, had now to be replaced at an almost fabulous cost, owing to the urgency of the need for them.

The Forbidding Physical Obstacles

All these were, nevertheless, minor troubles as compared with the physical conditions to be overcome.

Starting from an elevation at Sibi of 300 ft., the line was to rise 6,200 ft. in the 120 miles between Sibi and the summit level at Kach.

Then, for the greater part of the 224 miles to which the line was to extend, the country was a wilderness of rocks and stones—a land of barrenness and desolation, where there was no timber, no fuel, scarcely a blade of grass, and, in places, for stretches of several miles, no water. It was a land, too, almost devoid of inhabitants, while those who did dwell there were described as "a savage and blood-thirsty race of robbers," continually engaged in plunder and intertribal warfare, and not growing sufficient food even for their own consumption. Almost everything that was wanted—including supplies for from 15,000 to 30,000 workers and materials for the line—had to be imported from a distance.

Still less inviting was this inhospitable region by reason of its range of climatic conditions. The lowlands have the reputation of being one of the hottest corners of the earth's surface. A temperature of 124 deg. has been registered in the Nari Valley. The highlands, in turn, offer the alternative of Arctic cold, the temperature there falling in winter to 18 deg. below zero. Between the lowlands and the highlands there is a temperate zone; but here the constant pestilence was dreaded no less than the extremes of heat and cold elsewhere.

As the result of these conditions, the work of construction could be carried on in certain districts for part of the year only, and the workers had to be transferred from one section of the line to another according to the season. Such a movement of front involved the transport of everything—stores, tools, offices and some thousands of men. "The management of this vast exodus," says Captain Scott-Moncrieff, R. E., in his paper on "The Frontier Railways of India," "was a work of considerable anxiety and difficulty. A sudden influx of people, such as this, into a desolate and barren land naturally caused a famine. Everything was eaten up, and for some days the question of supplies was the burning question of the hour. . . . Nine hundred camel loads of food were consumed daily on the works." The customary load for a camel was 400 lb., but some of the camels carried loads of 800 lb. up the pass.

"One of the Most Weird Tracks"

The engineering difficulties fell into four principal groups: (1) the Nari Gorge, (2) the Gundakin Defile, (3) the Chuppur Rift, and (4) the Mud Gorge.

The Nari Gorge, about 14 miles in length, beginning

just beyond Sibi, has been described as "one of the most weird tracts through which a railway has ever been carried. The hills, absolutely bare, rise above the valley for many thousands of feet in fantastic pinnacles and cliffs. It is a scene of the wildest desolation." The Nari River, running through the gorge, is formed by a combination of three streams having but little water on ordinary occasions, but becoming, in time of flood, a raging torrent which fills up the whole gorge for miles, attains a depth of 10 feet, and has a velocity of five feet per second. Over this river the railway had to be carried in five different places. Not alone bridges, but heavy embankments, cuttings and tunnels were needed. At one point there was an especially dangerous tunnel in which so many accidents occurred, owing to roof or sides falling in, that at last no workmen would enter it except at a wage five-fold that of the high rate already being paid. The whole work was liable to be stopped for months together, owing to the washing away of half-completed embankments, or bridges; though until this portion of the line had been completed no materials could be sent to the sections beyond.

In the Gundakin Defile, eight miles long, two tunnels had to be made through some most treacherous material, and four bridges had to be provided.

The Chuppur Rift is a chasm three miles long in the spurs of a rocky mountain forming an apparently insuperable barrier. The running of the railway on a ledge along the side of the mountain being impracticable, owing to the nature of the rock, the engineers cut a line of continuous tunnels partly on one side of the rift and partly on the other, connecting the two series, by an iron girder bridge; but, instead of constructing the tunnels in the usual way, from each end—a procedure which would have taken much time—they adopted the expedient of driving openings (adits) into the side of the cliff at various points, and then cutting the tunnel right and left of each of these openings until the various sections met. The only way in which the openings could be made was by lowering men down by ropes several hundred feet from the top of the cliff until they reached the point where the work for an opening was to be started. They then drove crowbars into the perpendicular sides of the cliff in order to gain the necessary support for a platform from which the blasting operations could be carried on. Six of these openings were made on one side of the cliff and six on the other. As a separate gang of men could operate at each it was possible to complete the whole work in the course of a few months. Altogether there is a collective length of 6,400 ft. of tunnels in the rift, in addition to a viaduct 75 ft. high, with seven spans of 40 ft. each, and a bridge having an elevation over the river of 250 ft., and consisting of a central span of 150 ft. and eight spans of 40 ft.

On the summit level, 25 miles in length, came the five-mile long Mud Gorge—a narrow valley, between precipitous mountains, filled with a soil little better than dried mud, and of such a character that several bad slips of road-bed, carrying away the whole of the line, occurred

Fever, Scurvy, Cholera, Desertions

In August and September, 1884, the troops and native laborers employed on the work on the lower part of the line were visited by an outbreak of fever and scurvy of a virulence almost unprecedented in Indian experience. Large numbers of the men died. In one gang of 200 the average numbers of deaths was ten a day. Of those who survived the majority were so prostrated as to be scarcely capable of doing anything. Sixty per cent of the sappers were in hospital.

Fresh troops, to the extent of three battalions of Pioneers, were brought on to work; but they had scarcely arrived before—in November—there was a severe outbreak of chol-

era. The Afghans thereupon "bolted to a man"; and they were followed by many skilled artisans who had been collected from various parts of India. Additional labor had to be obtained from the Eastern Punjab, but much time was lost.

Whilst the engineers were struggling to overcome these manifold difficulties, the political situation was steadily becoming still more acute. The climax seemed to be reached by the Penj-deh incident of March 30, 1885, when a Russian force under General Komaroff seized this important strategical position, situate near the junction of the Khushk and Murghab rivers. On April 27, 1885, Mr. Gladstone proposed in the House of Commons a vote of 11,000,000 pounds (\$55,000,000) for the purposes of what then seemed to be an inevitable war with Russia. The money was voted the same night.

So the urgency for completing the line which would now, probably, have been available for use had it not been stopped in 1880, was greater than ever. Orders were sent to India that the work must be continued along all parts of the line regardless of seasons. Within a week or two, however, of the war vote at Westminster, cholera broke out afresh among the construction party in India. By the end of May it was spreading among them "like a raging fire"; while to the cholera itself there was added a heat so intense that even the most willing of workers found it almost unendurable.

Under this combination of cholera, and excessive heat, work on the lower sections of the line was stopped altogether for a time—government orders and Russians notwithstanding. All possible measures were taken to mitigate the severity of the epidemic; but the death-rate increased with frightful rapidity. Some of the best workers, European and Asiatic—men who could least be spared, on account of the responsible positions they held—were carried off. During the month of June no fewer than 2,000 died out of 10,000. Of the remainder large numbers sought safety in flight. Many of the minor government officials, such as telegraph and post office clerks, went off in a body.

Whilst sickness and disease had thus been afflicting the camps, fresh troubles had arisen in another direction. Early in 1885 the district was visited by a succession of floods exceeding in severity anything known there for sixty years. In the course of three months the rainfall amounted to 19.27 inches,—a total six times in excess of the average. Several bridges and many miles of temporary roads were washed away; numerous accidents were caused; camping grounds were destroyed; communications were interrupted; food supplies became scarcely obtainable, and great delay resulted in the prosecution of a work for which urgency was being so persistently demanded. The floods did not finally subside until the end of May.

Nature having done so much to impede the progress of the undertaking, it only remained for politicians and officials to do what they could to follow her example.

Mention has already been made of the initial prohibition of temporary lines of rails for the conveyance of stores and materials, and the loss of time and waste of money involved in the use of camels instead; but to this one fact may be added another, namely, that after the engineer-in-chief had made his arrangement to obtain sleepers from the juniper forests on the north of the line—this being the only timber available in the whole district—the government vetoed the arrangement on the ground that it might, possibly, lead to quarrels among the Afghan tribes. The timber had to be procured from India, instead. Hence more delay.

Such, however, was the energy which had been shown, in spite of all these difficulties and drawbacks, that the work was completed within the two years and half fixed by the engineer-in-chief at the start as the period in which—"with money freely granted"—it could be done. On March 27, 1887, an engine ran over the line all the way from Sibi to

Quetta, and the Hurnai Railway was formally declared open for traffic.

In the meantime the apparent certainty of war with Russia, following, especially, on her seizure of Penj-deh, had led, in April, 1885, to an order being given for the construction of a light railway from Sibi through the Bolan Pass to Quetta, as an alternative, more direct and more quickly constructed route, of which use could be made for a movement of troops to the frontier on the anticipated partial mobilization of the Indian Army.

A Notable Engineering Achievement

The laying of this light railway constituted another notable engineering achievement.

Running through the heart of what has been described as "some of the boldest mountain scenery in India," the Bolan Pass has a length of about 60 miles and a breadth ranging from one mile to a space, in places, of only about 20 yards between the rugged mountain walls which here convert the pass into a mere defile. The pass is, in fact, practically the bed of the Bolan River, and is dry for the greater part of the year, but liable to floods. The temporary narrow gage line was to be laid along the river bed without interfering with the military road constructed in 1882-84 as far as Quetta.

For the first 40 miles there was a fairly good gradient; but beyond that came a very heavy rise to the top of the pass; and here, at least, anything more than a metre gage line would have been impracticable. The possibility of constructing a line of railway through the pass at all had long been the despair of engineers, and this was the reason why the Hurnai route had been decided on in preference to the Bolan for the broad gage line to Quetta. Unfortunately, too, the climatic were even greater than the engineering difficulties. The heat in the lower parts of the pass was "beyond all description," and cholera or other diseases carried off thousands of the workers.

With these two lines at their disposal, the government was, in the spring of 1887, quite prepared for a concentration of British and Indian forces in Afghanistan, had the political conditions rendered such a course necessary; but the situation had by then greatly improved, thanks to the negotiations which had been proceeding with Russia for the demarcation of frontiers. In April, 1877, the British and Russian commissioners met at Petrograd, and, as the result of still further negotiations, the questions at issue were settled without the appeal to arms which had at one time appeared inevitable.

In 1892 some 50 miles of the Bolan light railway were abandoned in favor of another route which, avoiding the first part of the pass, allowed of a broad-gage line being laid from Sibi through Quetta to Bostan Junction, where it connects with what is now known as the Hurnai-Pishin Loop. A branch 90 miles in length, from Quetta to Mushki, on the Seistan trade route, was opened in 1905.

A Strategic Line

Today the Sind-Pishin railway, with its two sections, via the Bolan and the Hurnai respectively, has its terminus at Chaman, on the actual frontier of Afghanistan, and within 70 miles of Kandahar. A broad gage line throughout, it forms part of the railway system of India, linking up at Ruk junction with the line running thence along the north bank of the Indus to Karachi, and, by means of a bridge across the Indus, with a line on the south of the river which, in one direction provides an alternative route to Karachi, and in the other connects with Calcutta and other leading cities. The Sind-Pishin line affords, in fact, a most valuable means for concentrating on the Afghan frontier, within a short distance of Kandahar, and in the shortest possible time a considerable body of troops collected from all parts of India, together with reinforcements from Europe, landed at Karachi.

As a strategical line, therefore, the railway is of exceptional importance to India and to British interests in general, though there can be no suggestion that it would be used otherwise than for purely defensive purposes.

Then, in what, since 1901, has constituted the North-West Frontier Province of India, there has been a considerable extension of frontier railways in recent years,—all serving important strategical purposes. From Peshawar—1,520 miles from Calcutta—there is a broad gage extension, twelve miles in length, to Fort Jamrud, at the mouth of the Khyber Pass; from Naushahra, a cantonment 27 miles due east of Peshawar, there is a narrow gage line to Dargai, at the foot of the Malakand Pass; while among other lines is one to Thal, a military outpost on the extreme limit of British territory which serves also as a depot for the trade with northern Afghanistan passing through the Kurram valley; and one to Banu, a garrison town, 79 miles south of Kohat, built on a site chosen for political reasons by Sir Herbert Edwards in 1848.

A number of other railways on the north west frontiers of India have been proposed. Whatever may or may not be ultimately done in regard to these further schemes, it is obvious that those already constructed have made an enormous difference in our strategical position in regard to Afghanistan and the lands beyond as compared with the military transport conditions of 1878.

A Plant to Transfer Coal and Ore Mechanically

THE PITTSBURGH & LAKE ERIE recently placed in operation at its Haselton yard, a mechanical coal handling plant for transferring the lading of bad order cars to other cars. Haselton yard is located at Youngstown, Ohio, and is the point where the road exchanges a large amount of traffic with the New York Central and the Erie and also handles the enormous traffic of

stone, sand, gravel, iron ore and similar material (2) materials loaded in box cars; and (3) heavy material loaded in open cars requiring the use of a crane for transfer.

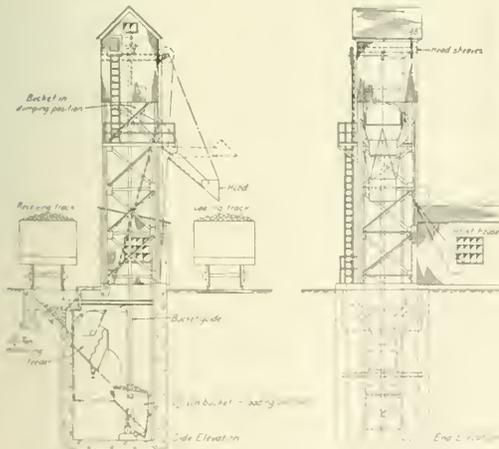
These three kinds of freight require different facilities for handling. The mechanical transfer plant referred to was designed to handle the materials in the first classification, and it includes platforms to facilitate transferring lading from one box car to another and a large electrically-operated gantry crane spanning two tracks for handling the heavy materials.

Previous to the construction of these facilities the transfers described in the first and second divisions were handled entirely by hand, making it necessary to keep a large force of laborers at this kind of work, while the heavy materials were handled by locomotive cranes, wrecking cranes, or in any other way that might be available. It is found by the use of the improved facilities that the delay to cars on account of defective equipment has been very much reduced and that the cost of transfer has also been lessened.

The nature of this mechanical transfer plant is indicated



View of the Transfer Station from the Loading Side



Side and End Elevations of the Haselton Plant

in the photograph and drawing. The plant was built by the Roberts & Schaefer Company, Chicago, and consists essentially of one of the typical coaling stations built by this firm with the storage facilities omitted. The material to be transferred is received from the defective cars in a 9-ft. track hopper from which it is transferred to a 2-ton elevating bucket by means of a Schroeder measuring coal feeder.

The elevating bucket operates in a structural steel tower from the top of which the coal is dumped into a spout which affords a convenient means of discharge into the substitute car standing on a track parallel to and 26 ft. from the hopper track. The elevating machinery has a capacity of 75 tons per hour and, as in the case of the equipment for the standard coaling station of the same type, the operation is entirely automatic. An electrically-operated hoist is located in the small steel-frame shed adjoining the tower, which also contains the necessary regulating apparatus, starting switch, etc. We are indebted for the above information to A. R. Raymer, assistant chief engineer, of the Pittsburgh & Lake Erie, Pittsburgh, Pa., who represented the railway in working out the details of the improvement.

the Youngstown district. As is usual at such places a great many loaded cars are found to be defective, making it necessary to transfer the lading. The kinds of material in these cars, of course, vary widely, but they can be classed under three general heads: (1) materials handled in hopper and drop bottom cars, such as coal, coke, crushed lime-

General News Department

Judge Robert S. Lovett, according to the official circular announcing his appointment as a member of the staff of Director General McAdoo, will have the title of Director of the Division of Capital Expenditures, instead of the "Division of Betterment and Additions," as it was originally announced.

A charge for placing and spotting cars on industrial tracks is not contemplated. This announcement has been made by the Railroad Administration after the receipt of nearly 2,000 telegrams and letters of protest. A memorandum of a plan for such charges was prepared in the traffic division, as a suggestion only; and the report that it was being considered was widely circulated among shippers and state railway commissioners.

Senator Kellogg, of Minnesota, has introduced a bill in Congress to include members of the Russian Railway Service Corps, consisting of about 350 railroad officers and men sent from this country to Russia last year to assist in organizing the Russian railway system, within the terms of the war insurance provided for the United States army. The Russian Railway Service Corps is not a part of the regular army but was specially organized and was financed by the Russian government.

Fuel for the New York Central is the subject of a special order issued by the Fuel Administration on March 6, addressed to coal operators under contract to supply fuel coal to that road, giving priority to such contracts and providing for making regular daily and weekly shipments. Mines under contract to furnish coal to the New York Central will be required to fill these contracts before taking on other business; and the railroad company is charged with the duty of providing cars promptly.

Forest fires burned over 962,000 acres of National Forest lands in 1917 and caused a loss of \$1,358,600 to the government in timber, forage and young growth, according to figures compiled by the Forest Service of the Department of Agriculture. In addition to the actual loss in timber and forage, these fires entailed extra expenditures by the government of \$1,121,451 for watchmen, supplies, etc. Of the 7,814 fires fought on the National Forests, 2,132 were set by lightning, and 952 were incendiary. Careless campers were responsible for 1,288, and railroads for 1,003.

On the Boston & Albany, the officers and employees have formed a permanent organization to gather and record information concerning employees who are now in the military or naval service, and to take charge of the sending of gifts to the men. "Our Fellows At the Front" is the title of a pamphlet which has been issued by a committee telling what has been done up to this time, and giving names of the soldiers and sailors (so far as compiled) together with much other information. The chairman of the committee is W. E. Adams, press representative of the road, Boston.

The mining of clean coal is to be enforced by the Fuel Administration, according to an announcement which has just been made. An inspection system will be organized. During the past winter much of the output of bituminous coal has contained a large percentage of slate and other impurities, the effect of which has been not only to reduce the selling value of the coal, but to put an additional unnecessary burden upon transportation facilities. Under the new plan adopted, coal condemned by the Fuel Administration, either lacking preparation or because it contains a high percentage of impurities, will be sold at 50 cents a ton less than the fixed government price for the mine. The inspection system will be operated through the district representatives of the Fuel Administration, who are authorized to appoint a sufficient number of inspectors to carry out the terms of the order, which went into effect last Monday. Inspectors are authorized to condemn at the mines any coal which, in their judgment, is not properly prepared.

Western Railway Club Meeting

The next meeting of the Western Railway Club will be held at the Hotel Sherman, Chicago, on Monday, March 18. Professor G. A. Young of Purdue University will present a paper on railway mechanical problems, and H. R. Warnock, general superintendent of motive power of the Chicago, Milwaukee & St. Paul, will give an informal address.

Mail-Pay Decision Confirmed

The United States Court of Claims on March 11 reaffirmed its previous decision in the railway mail pay "divisor" case, dismissing the petitions of a number of railroads for claims against the government for large amounts of back pay from the post office department. The former decision was sustained by the Supreme Court but by an evenly divided ruling, so that the case was reopened in the lower court.

Thirty-First Engineers an Operating Regiment

Col. Frederick Mears, formerly a member of the Alaskan Engineering Commission, announces that the Thirty-first Engineers, which is being organized under his direction, is to be a railroad operating organization. With few exceptions every man of the new organization will be a man experienced in railway operation. Applications will be received only from men who have good records as locomotive engineers, firemen, brakemen, railway clerks, yard foremen, trainmasters, switchmen, conductors and others whose training fits them for the duties of operating trains. Col. Mears' regiment will mobilize at Fort Leavenworth, Kan., and recruiting officers are being established at various points throughout the United States.

Disloyalty Charge a Gross Calumny

"I have read with dismay that the charge has been made that the railroad heads of this country do not wish government control of the railroads in this time of war to be successful, and are trying to prevent its success. I have faith that such a traitorous charge has not found lodgment in the public mind. The charge is as damnable as it is deceitful and is a gross calumny upon the railroad men of this country. I adjure you, even as I lay the duty upon myself, to stand firm against touch or taint of disloyalty. Any country that is not loyal to its government in times of stress is not a nation. Let us help in every way we can. The war must be won. It is the privilege of each one of us to do his share to achieve that great and imperative result."—William Sproule, president of the Southern Pacific, before the San Francisco Transportation Club.

Rock Island Generous to Its Soldiers Abroad

During the month of February officers and employees of the Rock Island Lines contributed a total of \$569 to the "Smoke Pot" maintained for the benefit of Company B of the Thirteenth Engineers (Rys.), the Rock Island contingent now in France. The Missouri division was the heaviest contributor during the month, sending \$175. The Illinois division was next with \$75, and other heavy contributors were the Minnesota division with \$63; the dining car department with \$63; the Cedar Rapids (Iowa) shops with \$55, and the St. Louis division with \$49.

In February a shipment of tobacco costing \$286 was made to Company B, and in March athletic equipment costing \$242 was shipped, consisting of complete outdoor baseball outfits, sufficient to equip two full teams, 12 tennis rackets, 2 dozen tennis balls, and tennis nets, indoor baseballs and bats, 8 sets of boxing gloves, quoits, footballs and 4-lb. medicine balls. In addition \$150 was cabled to the company as a contribution to its mess fund.

Fuel Order Modified

United States Fuel Administrator Garfield has issued an order revoking Section 1, of the regulation promulgated January 17, in all states east of the Mississippi, except Pennsylvania, Maryland, West Virginia, Ohio and eastern Kentucky. The order, which went into effect March 5, suspends certain provisions relating to priority in furnishing coal to railroads, domestic consumers, Army and Navy cantonments, public utilities, hospitals and other preferred consumers.

The five states in which the regulation continues in full force embrace the anthracite and bituminous producing fields which supply the eastern section of the country, and coal operators therein will continue to give preference to shipments for consumers in the order named in the regulation. It is also provided that in those states the provisions of Section 1 shall be extended to include contracts for coal made or accepted after January 17, as well as contracts and orders on hand, on that date.

Improved transportation conditions and other factors have contributed to a material improvement in the coal situation in the territory where the coal priority list has been suspended. In the states where the regulation continues in force the car shortage has not been entirely overcome.

Determination of Priorities

In connection with the appointment of B. M. Baruch as chairman of the War Industries Board, President Wilson has written a letter outlining the functions of the board and of the chairman, which are somewhat enlarged as compared with those of the former organization. One of the functions of the board is:

"The determination, wherever necessary, of priorities of production and of delivery and of the proportions of any given article to be made immediately accessible to the several purchasing agencies when the supply of that article is insufficient, either temporarily or permanently."

Continuing, the letter says: "In the determination of priorities of production, when it is not possible to have the full supply of any article that is needed produced at once, the chairman should be assisted, and so far as practicable guided, by the present priorities organization or its equivalent.

"In the determination of priorities of delivery, when they must be determined, he should be assisted when necessary, in addition to the present advisory priorities organization, by the advice and co-operation of a committee constituted for the purpose and consisting of official representatives of the food administration, the fuel administration, the railway administration, the shipping board and the war trade board, in order that when a priority of delivery has been determined there may be common, consistent and concerted action to carry it into effect * * *"

West Observes Embargo to Permit Reduction of Accumulation in the East

In order to enable eastern lines to clear up accumulations, R. H. Aishton, regional director of western railroads, requested the lines under his jurisdiction to discontinue from March 10, the loading of carload freight for places east of the Illinois-Indiana state line. The only exceptions to this embargo are traffic authorized by general operating committee, freight traffic committee or director-general permits; live stock and perishables, coal, coke and charcoal; acids, alcohol, ammonia, light oil and petroleum; empty tank cars; domestic food for human consumption and domestic feed for animals and poultry, not including hay or straw.

The regional director of western roads is still giving special attention to the movement of grain to primary markets and particularly to the transportation of soft corn, which demands prompt landing to prevent deterioration beyond the point of recovery. That the efforts of the Railroad Administration in this direction have borne fruit is evidenced by recent statistics of receipts at primary markets. In February the total grain received at primary markets was 71,754,000 bu. as compared with 48,397,000 bu. in the same month of 1917. In the first nine days of March the receipts at primary markets totaled 28,158,000 bu., as compared with 20,406,000 bu. in the

same period the year before. The movement of corn and oats to markets is appreciably heavier than it was a year ago, while the movement of wheat is somewhat smaller.

The plan of moving grain, flour and meat for export in solid trainloads from primary markets to seaboard is working out to the satisfaction of both the Railroad Administration and the Food Administration. On March 11, eight trainloads of corn were en route to Gulf ports and one of flour to an eastern seaport, while two trainloads of oats, one of barley and three of corn were scheduled to make their departures on that day from primary markets to eastern and southern ports.

American Railway Engineering Association Program

The following program has been issued for the nineteenth annual convention of the American Railway Engineering Association, which will be held in Chicago on Tuesday to Thursday, inclusive, of next week. Morning sessions will continue from 9:30 to 12:30, and afternoon sessions from 2 until 5. The president's address and the secretary's report will be presented on Tuesday morning, following which the committee reports are scheduled in the order shown below, but the program is subject to such change as may appear desirable during the convention. It is expected that most of Wednesday will be devoted to the consideration of the labor problem, which will necessitate some transference of the reports assigned for presentation on that day.

March 19—Signals and Interlocking.
Conservation of Natural Resources.
Buildings.
Track.
Water Service.
Records and Accounts.

March 20—Electricity.
Yards and Terminals.
Economics of Railway Labor. Illustrated use of labor-saving devices.
Ballast. Illustrated use of mechanical tampers.
Economics of Railway Operation.
Uniform General Contract Forms.
Roadway.

March 21—Iron and Steel Structures.
Wooden Bridges and Trestles.
Masonry.
Ties.
Stresses in Railroad Track.
Rail.
Signs, Fences and Crossings.
Rules and Organization.
Wood Preservation.

The annual dinner will be held on Wednesday evening and will be in the nature of a "war dinner." Among the speakers already secured are Sir Edmund Walker, president of the Canadian Bank of Commerce, Montreal, and Rev. Stephen K. Mahon, of Toledo, Ohio.

The Railway Signal Association will hold its stated meeting at the Auditorium Hotel on Monday, March 18, while the National Railway Appliances Association will present its exhibit at the Coliseum throughout Monday, Tuesday, Wednesday and Thursday.

Meeting of Railway Supply Interests

The Railway Business Association will hold a meeting at the La Salle Hotel in Chicago on April 8. Because of the special problems before the supply interests at this time the meeting will be of more than ordinary importance and a large attendance is expected.

Western Society of Engineers

The Western Society of Engineers at its meeting in Chicago on Tuesday evening, March 19, will present a program on the material situation as it affects engineers. There will be a paper on conditions in structural steel plants by Frank J. Lewellen, division contract manager of the American Bridge Company, Chicago; one on conditions in the lumber industry by Hermann von Sahrenk, consulting timber engineer, St. Louis; and one on conditions in the cement industry by B. F. Affleck, president of the Portland Cement Association, Chicago. A special invitation has been tendered to members of the American Railway Engineering Association, the convention at Chicago that week, to attend this meeting.

Traffic News

President Wilson and Director General McAdoo have been urged by a large delegation of senators and representatives to use a part of the \$500,000,000 fund appropriated in the railroad control bill, to establish barge lines on rivers and canals.

The following circular has been sent by the Car Service section to all railroads: "We must at this time impress upon all the necessity of giving special attention to the handling of seeds and agricultural implements for the next 60 days that they may be ready for spring planting."

Major-General Harry Clay Hale, of the United States Army, addressed the Transportation Club of Louisville, March 12, on the subject "What Transportation Has to Do with the War." Major-General Hale addressed the club last year on the details of transporting armies and supplies, since which time he has been in France to survey the situation there.

The Railroad Commission of Louisiana will hold a session at Baton Rouge, on March 20, to consider the adoption of Western Classification No. 55 and supplement No. 1 thereof, for use on business moving between points west of the Mississippi river, and between points east and points west of the river.

The tourist season at the Yellowstone National Park this year will be slightly curtailed. The opening date will be June 25 and the closing date, the same as heretofore, September 15. The trip through the park is now made by motor car, either private automobiles or those of the Park Transportation Company, which has supplanted the horses and stage coaches of former years.

The production of coal in the Province of Alberta in 1916 was, 4,563,020 tons, more than twice the quantity mined in 1909, and enough to put Alberta next to Nova Scotia in the production of coal, Nova Scotia being the leader among Canadian provinces and British Columbia (formerly second) third. The Canadian Northern reports that the mines on that company's lines doubled their output in two years; and for the year ending June 30, 1917, the total production of the mines on the C. N. was about 2,000,000 tons.

Director General McAdoo has announced that C. H. Markham, Regional Director at Atlanta, had arranged to concentrate at South Atlantic ports approximately 100,000 additional bales of cotton, making a total of 225,000 bales now en route or at port. Special steamer service is being arranged to take care of this accumulation. Steamers have been sent to Galveston, New Orleans, Brunswick, Savannah, and Wilmington to take cotton directly to New England. It is planned to place additional ships in service at an early date. The delayed cotton in cars at St. Louis and Chicago is being moved to New England at the rate of 50 cars a day. So far about 500 cars have been moved and this rate will be maintained until the delayed cotton is disposed of.

An emigrant train of 27 cars, double-decked, which passed through New Orleans on March 8, was filled with settlers from Dryden, Tex., going to live in Isabel, La. These new residents of Louisiana are sheep and goats, which have been bought by J. W. Bassett for the purpose of utilizing large tracts of land from which timber has been cut off, and which, since the lumbermen left them, have been wholly unused. Many thousand acres of land of this character are available in Louisiana. Additional shipments of cattle, hogs and more sheep are to be made by Mr. Bassett in the immediate future. The animals are from a district free of the Texas fever tick, and their new home will be in territory likewise free of that pest, which, it is believed, soon will be eradicated from the whole of the south.

Passport restrictions, limited through-train facilities, relatives in the army, fluctuating business conditions, income tax returns, and the unfavorable government attitude toward pleasure travel, make a formidable list of influences which have proved adverse to tourist traffic. The tourist communities of the far west and south have not enjoyed the super-capacity patronage of a year ago, but they report a volume of business which compares

favorably with the average year. The development of our new foreign trade to South America and the far east continues to fill the steamers to those parts of the world with increasing numbers of business travelers. Accommodations must be reserved well in advance and the utmost care must be exercised in complying with passport regulations. Lake, river and coastwise steamship lines, which provide the favorite summer recreation for large numbers of our people, are planning to offer the usual routes and services this season.—*American Express Co.'s Travel Bulletin.*

Oklahoma Two-Cent Fare Law Enjoined

The two-cent passenger rate provision of the Oklahoma State Constitution was permanently enjoined on March 12, in an opinion handed down by Judge Youmans of the United States District Court at Oklahoma City. An order issued by the Oklahoma State Corporation Commission, in which the commission took jurisdiction over freight and passenger rates within the State, also was enjoined permanently. The case has been pending since 1909. The Atchison, Topeka & Santa Fe and several other railroads were plaintiffs in the suit. The opinion upholds the contention of the railroads that the constitutional provision for a two-cent fare is confiscatory.

Improved Freight-Car Efficiency

The Pennsylvania Railroad reports that its campaign to make freight cars do more work saved 73,562 cars on the lines east of Pittsburgh and Erie in a single month, December. The average load in December was 37.23 tons as compared with 31.70 tons in the corresponding month of the previous year, or an increase of 5½ tons per car. Since the early part of 1916, when the department of the Superintendent of Stations and Transfers was established the improvement has been about 30 per cent. In 1915 the average load per car was less than 29 tons; now it is 37 tons. Basing the calculation on the 164,000 freight cars on the Pennsylvania lines east of Pittsburgh, this increase has been equivalent to the addition of 49,000 cars.

On the Pacific system of the Southern Pacific during January, about 11,500 cars were saved by better loading. The freight movement of the month, 1,500,000 tons, was handled in 59,257 cars; and if each car had been loaded with the same average tonnage as in January, 1917, the same quantity would have taken 70,809 cars. Nearly one-fifth of the saving was due to improvement in loading less-than-carload merchandise. The figures do not include oil in tank cars which are always loaded to capacity.

Coal and Food Situation at Atlantic Ports

Director General McAdoo gave out on March 12 the following telegram from A. H. Smith, Regional Director at New York, showing that the railroads had fully met the conditions for transportation of food supplies and coal that is needed: "The bunker coal situation at New York harbor today is in better shape than it usually has been at this season in previous years. The reserve for bunkering transports has been built up to a point that orders have been given to hold off on shipments for two weeks.

"The following cars of export food on hand at ports named today: Boston—Canned goods 25, flour 326, provisions 137, total 588. New York—Canned goods 557, flour 620, provisions 1,150, total 2,327. Philadelphia—Canned goods 41, flour 223, provisions 188, total 452. Baltimore—Canned goods 409, flour 377, provisions 471, total 1,257. Newport News—Flour 154. Norfolk—Canned goods 86, flour 201, total 287. Grand total 4,965.

"In the total at New York are 479 cars of frozen meat. Have limited loading from Chicago to 50 cars a day.

"Total export freight on hand at all North Atlantic ports 8,016 cars on wheels, 6,760 cars unloaded on piers, and 15,713 cars unloaded on ground; total 30,489."

The Director General also gave out the following statement:

"It is not the intention of the Railroad Administration to interfere with normal commercial shipments. It has been necessary to give preferential service to supplies of food, fuel and munitions. It is expected that within a short time the railroads will be in a position to handle commercial business in the usual

way. We have not at any time issued orders interfering with commercial business except when it was necessary to do so on account of special service being required for the commodities above mentioned. Embargoes have been placed on the various railroads due to conditions caused by the extreme weather and the accumulation at certain Atlantic ports."

Economy in Interurban Motor-Truck Service

The New Jersey State Council of Defense has sent to the mayors of New Jersey cities a request that they establish "Return Load Bureaus," so that motor trucks carrying loads from one city to another may be added in finding return loads.

Under the plan proposed the driver of a motor truck, after delivering his load, may telephone to the "Return Load Bureau" and obtain information as to where he may find a return load.

It is proposed to establish bureaus in Asbury Park, Atlantic City, Bayonne, Belleville, Bloomfield, Bridgeton, Camden, East Orange, Elizabeth, Englewood, Garfield, Gloucester, Hackensack, Harrison, Hoboken, Irvington, Jersey City, Kearny, Long Branch, Millville, Montclair, Morristown, Newark, New Brunswick, Orange, Passaic, Paterson, Perth Amboy, Phillipsburg, Plainfield, Trenton, Union Hill, West Hoboken, West New York and West Orange.

Elliott H. Goodwin, secretary of the Chamber of Commerce of the United States, Washington, has issued a circular urging local commercial organizations everywhere to establish "Return Load" bureaus. He says:

"Owners of trucks do not wish half the earning power of their vehicles to be lost. Merchants with goods piled up and awaiting shipment do not like to see empty trucks pass their doors. Such a clearing-house will not ordinarily entail any special expense. It will promote co-operation in the community. The bureau should ascertain the established lines of trucks that run regularly on fixed routes and the part of their capacity that is not being utilized. It should then obtain information from all owners of trucks used for private hauling, getting statements about the capacity of each truck, how far its capacity is used, between what points the capacity is unused, and if the unused capacity can be made available for other persons at a reasonable price. The bureau should be listed in the telephone directory. In England return-load bureaus have proved of great assistance."

Energetic Work at Hartford

[From the Motor Truck.]

Municipal initiative has been productive of a considerable reduction of the congestion in the freight yards of the New Haven railroad at Hartford, Conn. When the factories of Hartford were closed by order of Fuel Administrator Garfield to conserve coal and minimize railroad traffic, Mayor F. A. Hagarty believed that the thousands of workers temporarily unemployed might be induced to unload the thousands of freight cars that had been accumulating; and he called a meeting of merchants and manufacturers and a plan was determined. This was to utilize power trucks and to engage all men willing to handle freight. All freight cars were to be unloaded in a specified order; means were adopted to notify consignees to be ready to receive the freight. The railroad company was anxious to co-operate and the street railway changed the operating plan of several trolley lines that the trucks might not be obstructed in the work.

Despite the short notice, 60 trucks and more than 500 men, including 14 city firemen, worked the first day and unloaded and warehoused 5,900 tons of freight from 160 cars. The second day nearly 1,000 men and more than 100 trucks emptied considerably more than 250 cars, making a total reduction of something more than 400 cars. There were some protests from consignees who were using cars for storage, but without exception the objectors yielded when informed that their attitude would be given deserved publicity. When work was begun upward of 800 cars, laden with 30,000 tons of freight, were in the railroad yards.

There was not as spontaneous a response from the workers of the city as might have been expected, for seemingly many preferred to remain idle; though the severity of the weather may have been a deterrent to some. There is reason to believe that had the employers been able to make a direct appeal and have definite understanding relative to pay, the men would have been available in much larger numbers.

Commission and Court News

State Commissions

In a decision handed down on March 8, the State Public Utilities Commission of Illinois denied the application of William E. Golden, asking that soldiers and sailors in Illinois be permitted to ride on passenger trains for one cent a mile.

Court News

Interstate Transportation of Intoxicating

Liquors Through Prohibition States

The Alabama Supreme Court holds that the state prohibition statutes, as extended by the Webb-Kenyon Act, are inapplicable to the transportation of intoxicating liquors through Alabama in transit from Georgia to Florida. If so construed the prohibition statutes would be unconstitutional.—*Morague v. State (Ala.)*, 77 So. 322. Decided June 7, 1917. Rehearing denied December 20, 1917.

Fires from Sparks—Burden of Proof

The Texas Court of Civil Appeals holds that to rebut the prima facie case made out by showing that fire which damaged the plaintiff's property emanated from a railroad company's locomotive, it is placing too great a burden on the company to make it establish by a preponderance of evidence that the employees in charge of the locomotive exercised ordinary care to prevent the escape of sparks therefrom, and error in the trial court's charge imposing such burden of proof on the railroad is not harmless.—*St. Louis S. W. of Texas v. Johnson (Tex.)*, 199 S. W., 1175. Decided November 22, 1917.

Extension of Spur Tracks

Affirming an order of the State Corporation Commission, the Virginia Supreme Court of Appeals holds that the fact that a side track will be used for interstate commerce, as well as intrastate, does not deprive the commission of jurisdiction to compel the construction or extension thereof. It holds that where, after the lessee of a railroad took over the road part of a side track, some 150 feet of which, built on a wooden trestle, was burned, and the entire track was necessary, the lessee must rebuild, and it is immaterial that a certain concern will be benefited, as all are a part of the public, and are entitled to equal facilities. A railroad, it is held, cannot refuse to extend a spur track because the person desiring the spur will ship products from another State, his competitors shipping from intrastate points, resulting in a decrease in revenue on account of more inequitable interstate rates.—*Washington & Old Dominion v. P. S. Ryester Guano Co. (Va.)*, 94 S. E., 763. Decided January 24, 1918.

Mail Claim of New Haven Road Denied by Court

A claim of the New York, New Haven & Hartford for additional compensation for carrying parcel-post packages after they were added to the mails by the parcel post act of 1912 has been denied by the Court of Claims. Such claims made by this and other New England roads aggregate over \$10,000,000. The road alleged that the mails were carried at a loss, the compensation for four years being based upon a quadrennial weighing of the mails before the advent of parcel post, and that the rate was compulsory and in violation of the Constitution.

The court held that mail contracts are subject to increase of business without additional compensation during the four-year contract period. Not being a land-grant road, the New Haven could not have been forced to carry the mails prior to the act of July 28, 1916. In continuing to carry the increased mails and accepting the contract price, including certain added compensation provided by the act of March 4, 1913, it

made the transportation a matter of voluntary contract, under which an actual loss is not a taking of property. It is pointed out that the plaintiff was not compelled to receive the mails as a common carrier.

Improper Use of Appliance

A railroad put a U-bolt on its grain cars for the purpose of assisting elevators by giving them something to hook onto in setting cars, it being intended that only one car should be pulled at a time. The Kansas City Court of Appeals holds that the railroad was not liable for injuries to a servant of an elevator caused by a bolt giving way when three cars were being pulled at once, where there was no evidence that it would not hold if one car was being hauled, or that it was a custom to move more than one car at a time.—*Caenfielt v. Bush* (Mo.), 199 S. W., 1041. Decided December 31, 1917. Rehearing denied January 28, 1918.

Defective Door Fixtures—Variance

Between Pleadings and Proof

In an action by a railroad employee against the road, which impleaded the Pullman Company, for injuries due to a defective guard rail used to hold open the door of a vestibule in a Pullman car, the defects alleged were that the rail was bent, old and worn, and that the catch was old and defective. The Texas Court of Appeals held that the plaintiff was limited in his proof to such defects, and could not prove that the guard rail was defective in that it had not been properly latched. It also held that the Pullman Company and the railroad hauling the Pullman car, if liable at all for the injury, were jointly liable. Judgment for the defendant was affirmed.—*Blackman v. San Antonio & Aransas Pass* (Tex.), 200 S. W., 412. Decided January 2, 1918. Rehearing denied January 30, 1918.

Right of Condemnation—Abandonment

A Missouri statute requires a railroad to finish its road and put it in operation in ten years from the time of filing its articles of incorporation. Another statute provides that all railroads may contract with each other or other corporations in any manner not inconsistent with the object of their creation. A predecessor of the C. B. & Q., instead of building its own track through the city of Hannibal, used, by contract, the track of a bridge company for about a mile, and had the right on determination of the contract to condemn land for a track on the west side of the bridge company's 50-foot strip. The Missouri Supreme Court holds, in condemnation proceedings by the C. B. & Q., that the company did "finish its road and put it in operation," so that its corporate powers did not cease. The agreement with the bridge company did not constitute an abandonment of its right to condemn property adjoining the track to afford further necessary facilities under a statute giving it the right to lay out its road, not exceeding 100 feet in width.—*C. B. & Q. v. McCoey* (Mo.), 200 S. W., 59. Decided December 3, 1917. Rehearing denied December 22, 1917.

Safe Approach to Train—Ownership of Station

In an action by a passenger against the Cincinnati, New Orleans & Texas Pacific for personal injuries while attempting to board a train at a station in Cincinnati, the petition alleged that between the platform and the third track, on which the train stopped, were two other tracks on which the defendant and two other companies, including the Baltimore & Ohio Southwestern, operated passenger and freight trains. While the plaintiff was crossing one of these tracks, the B. & O. S. W. negligently caused one of its trains to move thereon and strike and injure plaintiff. His injuries were alleged to be the proximate result of the defendant's negligence in failing to provide him with a safe approach to its train, and the concurrent negligence of the B. & O. S. W. (which was not sued) in moving its train over the track at that time and place. The Kentucky Court of Appeals holds that a demurrer to this petition was properly sustained. The plaintiff's injuries were not due to the fact that the physical condition of the approach was itself dangerous or defective. On the contrary, the approach was rendered dangerous solely by the negligence of the B. & O. S. W. In the absence of an allegation

to the contrary, the court assumed that the B. & O. S. W. was the sole owner of the station and tracks, and the movement of its trains, as well as the rules and regulations governing their movement, were under its exclusive control.—*Scott v. Cincinnati, N. O. & T. P.* (Ky.), 200 S. W., 6. Decided January 25, 1918.

Carriage of Perishable Fruit

In an action against a carrier for the decay of a car of peaches shipped from Texas to Indianapolis, there was an inference of full refrigeration from payment of full charge therefor, and there was no showing that the time in transit, about 96 hours, was not reasonable dispatch. The Texas Court of Civil Appeals holds that a mere showing of delivery to the initial carrier in good condition and delivery by the terminal carrier in bad condition, with testimony that the peaches should have been carried 60 to 72 hours under proper refrigeration, did not warrant a directed verdict for the plaintiff. The inferences as to the railroad's negligence or fault being conflicting and not conclusive the case was for the jury. Judgment for the plaintiff was therefore reversed.—*Texas & Pacific v. Woldert Grocery Co.* (Tex.), 199 S. W., 1139. Decided December 27, 1917. Rehearing denied January 10, 1918.

Consignee's Duty to Remove Fruit

In an action by the consignor against a carrier for the conversion of a shipment of fruit, which the carrier sold because of the consignee's failure to unload it, the Texas Court of Civil Appeals holds that evidence of the market value of the fruit on August 22 did not support a judgment for the plaintiff, where the sale was made on August 25, the goods being of a perishable nature and subject to rapid deterioration. Under the rule established by the Texas courts the consignees had no right to retain possession of the car and peddle the fruit from it at retail, as they were doing, in violation of the instructions of the railroad. It was their duty to unload the car within a reasonable time; failing to do this they were liable for demurrage and for reasonable expenses incurred by the railroad in caring for the produce, after retaking possession, up to the time of the sale. Judgment for the plaintiff was reversed and the cause remanded.—*Ft. Worth & Denver City v. Nabors Fruit Co.* (Tex.), 200 S. W., 420. Decided January 9, 1918. Rehearing denied February 6, 1918.

Production of Bill of Lading

The New York Appellate Division holds that, under a straight bill of lading in the form provided by the rules of the Interstate Commerce Commission, the carrier's obligation is complete when it delivers the goods to the named consignee, and it need not require the surrender of the bill. Notice of the words "draft against B/L" on the face of the bill would not increase the obligation; nor does section 227 of New York Personal Property Law, added in 1911, operating as notice that the consignor intended to require payment of the draft before the buyer would be entitled to receive and retain the bill, apply to an interstate shipment, so as to require the consignee's production of the bill before delivery. A consignor of an interstate shipment, intending that the goods should not be delivered to the consignee without production of the bill of lading, may protect himself by taking an order bill, or, if preferring a straight bill, may protect himself by notification to the carrier, under section 219 of the said Personal Property Law, that a third party is the transferee of the bill.—*Dusal Chemical Co. v. Southern Pacific*, 168 N. Y. Supp., 617. Decided January 17, 1918.

Injury to Passenger's Hand in Door Jamb

In an action for personal injuries to a passenger it appeared that the plaintiff boarded the train at Atlantic, and at South Boston, where the train stopped, when about to alight, her left hand was caught in the jamb of the forward door of the car. At this station the track is straight, the grade, as estimated by an engineer called by the plaintiff, was about 2½ or 3 per cent down grade. The car was crowded and people were standing in the aisle near the forward door. She followed the passengers leaving the car and stopped on the car

platform for a moment to allow some people to precede her. As she was going onto the car platform she saw the brakeman approaching through the aisle of the car ahead and heard him shout, "Look out for your hand!" but the warning came too late, for the door swung to, crushing her fingers. There was evidence that as each passenger went out they held the door. There was nothing to show that there was a catch to hold the door in place when open, and there was no evidence of any defect in the door or its appliances. Nothing appeared to show by whom or at what time the door was opened. The Massachusetts Supreme Judicial Court considered this the difficulty with the plaintiff's case. It distinguished, as inapplicable here, the cases of *Kellogg v. B. & M.*, 210 Mass., 324, 90 N. E., 525, and *Silva v. B. & M.*, 204 Mass., 63, 90 N. E., 547, where the car door was opened by employees of the railroad. It held that a grade of 2½ or 3 per cent did not show negligence, nor did that fact require the presence of a brakeman at the door of each car where passengers were alighting, and his absence from the platform was not negligence. Exceptions to the verdict for the railroad were overruled.—*MacGill-Allen v. N. Y., N. H. & H.* (Mass.), 118, N. E., 248. Decided January 7, 1918.

United States Supreme Court

Maintenance of Roadbed for Men's Feet

A civil engineer who had been in the employ of the Southern Railway eleven years was directed to make a survey in one of its yards. While doing so he walked on the main track between the rails where he had seen others walk. As he stepped on a cross-tie, a small V-shaped piece of it, one and a half inches by six, being rotten, splintered off under his weight. His foot slipped down between the ties where the ballast was five or six inches below the top of the tie; and stumbling, he fell and dislocated his knee. The defect in the tie could have been discovered by sounding with an iron rod, and the standard of maintenance of roadbed prescribed by the road was to ballast to the top of the ties. But neither the condition of the tie, nor the failure to ballast to the top of the tie, was a defect of a character to impair safety in operation. The engineer knew that there were always some ties on the line which were partly decayed, and also that the ballast was occasionally below the top of the ties. On these facts he sought in a state court of North Carolina to recover damages from the railroad under the Federal Employers' Liability Act. The trial court refused the railroad's motion for a non-suit; and the jury rendered a verdict for the plaintiff. Judgment thereon was reversed by the Supreme Court of the State on the ground that there was no evidence of negligence; and the case came before the Supreme Court of the United States on writ of error. That court holds it to be clear that the railroad did not fail in any duty which it owed to the plaintiff, and affirmed the judgment of the State Supreme Court.—*Nelson v. Southern*. Decided March 4, 1918.

Fined \$22,400 for Not Stopping Trains at County Seat

Suit was brought by the State of Texas to compel the Gulf, Colorado & Santa Fé to stop two interstate trains, No. 17 southbound and No. 18 northbound, at Meridian, the county seat of Bosque county, with a population of 1,500. Two other trains each way stopped there daily, but the State Railroad Commission found that these were insufficient for the needs of business, and granted the order sought. The Texas statute giving the commission power to make such order contains a proviso that "four trains each way, carrying passengers for hire, if so many are run daily, Sundays excepted, he required to stop as aforesaid at all county seat stations"—so that the commission seemed to have obeyed a statutory mandate. Art. 6676 (2) Vernon's Sayles' Statutes. Another article, 6672, imposes a penalty of not more than \$5,000 for every failure to obey such order. The trial court confirmed the finding of the commission that the existing service was insufficient, and the order, and imposed a fine of \$22,400, being \$100 for each failure to stop. The Texas Court of Civil Appeals confirmed the finding and affirmed the judgment. The Supreme Court of the State refused to allow a writ of error, declaring itself unable to say that the conclusion of the lower court was unwarranted as matter of law.

The Supreme Court of the United States has affirmed the

judgment of the State Court, the chief justice, Mr. Justice McKenna, and Mr. Justice McReynolds dissenting. The court, by Mr. Justice Holmes, said, in part: "It is the reasoning that prevailed with the Court of Civil Appeals were applied to Meridian simply in view of the number of its inhabitants, there would be a serious question whether it could be sustained. For the consideration most emphasized was that no sleeping cars were attached to the local trains and that in order to make use of such accommodation on the trains in question passengers had to get in or out at stations from seven to fifteen miles away. It was thought that when the railroad furnished such accommodations to a part of the public it was bound to furnish the same to all others—a very questionable proposition as applied. The other fact relied upon was that passengers not infrequently came on trains Nos. 17 and 18 destined for Meridian and had to get out at Morgan or Chilton, the next stations to the north and south. We repeat that whether these facts would justify an intermeddling with interstate trains in favor of a place of this size, merely as such, would be a serious question. But the State Court sustained the order as one required by statute in favor of county seats, up to the number of four trains each way, Sundays excepted. The law is not directed adversely at interstate trains, but expresses the specific judgment of the legislature as to the needs of county seats, all of which, of course, it knew. If its judgment is correct, which we have no grounds for denying, the order may be justified, so far as its interference with interstate commerce is concerned, unless some other fact shows that the burden is too great."—*Gulf, Colorado & Santa Fé v. Texas*. Decided March 4, 1918.

Engines Changed to Burn Oil

In an action for the death of an engineman, caused by a locomotive boiler explosion, the negligence charged was that the boiler on the engine was insufficient in that (1) the button-heads of the crown-bolts were excessively and unnecessarily large and consequently unduly exposed to the direct heat produced by the fuel oil used on the locomotive; (2) the boiler was not provided with sufficient safety plugs; and (3) scale was negligently allowed by the company, its officers and employees to accumulate on the crown-sheet in the boiler. The company denied negligence and set up the defenses of contributory negligence and assumed risk. Judgment for the plaintiff was affirmed by the Supreme Court of the State of Washington, and the case was taken to the Supreme Court of the United States. The ground of reversal principally urged was that the testimony did not warrant a recovery by the plaintiff. There was evidence that the engine had been a coal-burning engine, but that at the time of the explosion the fuel used was oil; that the button-heads on the bolts of the crown-sheet at the top of the fire-box were large ones when the engines were fired with coal, and were not changed with the change to oil; that the button-heads, because of their size, became overheated when oil was used for fuel, resulting in deterioration and weakening, and from the consequent giving way of the button-heads the crown-sheet came down and the explosion resulted. There was also testimony tending to show that there was an accumulation of scale and that there were no fusible plugs. On the part of the company there was testimony tending to meet and refute that of the plaintiff, and a considerable amount of testimony was introduced tending to show that the water in the boiler was too low, thereby causing the explosion from the fault of the deceased engineer in allowing it to become so. There was testimony for the plaintiff to the effect that the water was not too low at the time of the explosion. The jury having returned a verdict for the plaintiff, and the State Circuit Court and Supreme Court having found that there was evidence sufficient to sustain the verdict, the Supreme Court of the United States said that it was not its province to weigh conflicting evidence, and that the record showed testimony supporting the verdict; and that was as far as that court enters on that question. The court did not sustain the railroad's contention that so long as the large type of button-head had not been disapproved by the government inspector such fact was conclusive of the sufficiency of the type in use. It found nothing in the boiler inspection act to warrant the conclusion that there is no liability for an unsafe locomotive, in view of the provisions of section 2 of the act, because some particular feature of construction, which has been found unsafe, has not been disapproved by the federal boiler inspector.—*Great Northern v. Donaldson*. Decided March 4, 1918.

Equipment and Supplies

Railway supplymen will be specially interested in the announcement of the extended activities of the Railway Business Association on page 537, and in the articles on selling supplies to the railways under government control on pages 543 and 559.

Locomotives

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, is in the market for a second-hand 3 ft. gage ten-wheel locomotive with 14 x 18 or 20 in. cylinders or heavier.

CANADIAN GOVERNMENT RAILWAYS. The Railway Department, of which Hon. J. D. Reid is Minister, is mapping out a big program to meet the railway equipment requirements of the Dominion. The department figures that there are needed at least 150 engines and 7,500 box cars. Inquiries are being made as to prices, specifications and number of engines and cars each Canadian company can manufacture this season. A recommendation to the Cabinet Council will likely be made in a few days. The Grand Trunk is now using 45 government locomotives.

Passenger Cars

THE ATLANTIC LOADING COMPANY, 65 Broadway, New York, is in the market for 6 second-hand passenger coaches for immediate delivery.

Iron and Steel

THE CANADIAN GOVERNMENT has placed an order for 100,000 tons of steel rails with the Dominion Iron & Steel Company. The government will afterwards sell the rails to different Canadian railways.

Signaling

THE ST. LOUIS-SAN FRANCISCO has ordered from the General Railway Signal Company a mechanical interlocking, 35 working levers, to be installed by the railroad forces at Durant, Okla.

THE ATCHISON, TOPEKA & SANTA FE has ordered from the Union Switch & Signal Company materials for two interlocking plants at Hutchinson, Kan.; one at the Missouri Pacific crossing, 32 levers, and one at the Rock Island crossing, 36 levers.

THE BOSTON ELEVATED has ordered from the Union Switch & Signal Company the material for block and interlocking signals on its extension from Boston northward to Everett, Mass., about three miles. There will be 14 automatic block signals—style "N" light signals—and a mechanical interlocking plant at Everett. The new line leaves the existing line at Sullivan Square, Boston, where a complete new electro-pneumatic interlocking machine, 79 levers, will be installed. Alternating current is to be used for the control of all switches and automatic stops, as well as signals, relays and indicators.

THE WASHINGTON, BALTIMORE & ANNAPOLIS ELECTRIC RAILROAD, to provide for the heavy traffic to Camp Meade, is to install automatic block signals on its line, double track, between Baltimore and Naval Academy Junction, 14 miles, so as to space trains six minutes apart under clear signals, or three minutes under caution signals; and the signals are to be so installed that later, by putting in additional signals, the space between trains can be reduced one half. The signals will be the Union Switch & Signal Company's light signals, giving indications by colors; "three-position." The lights will have six-inch lenses, with a range, in sunlight, of 1,500 ft.

Supply Trade News

Edward U. Smith, chief draftsman with the Austin Company at Philadelphia, Pa., has been promoted to district engineer of the Philadelphia branch, with jurisdiction over the states of New Jersey, Delaware, Maryland and Eastern Pennsylvania.

Robert E. Frame, for the past six years assistant to the president of the Haskell & Barker Car Company, Michigan City, Ind., resigned, effective March 1, and has been elected vice-president of the Hutchins Car Roofing Company, with office in Detroit, Mich.

R. J. Himmelright has been elected vice-president of the American Arch Company. In his new position Mr. Himmelright will have charge of the service and road development work in



R. J. Himmelright

the United States and Canada. Mr. Himmelright was born at Wadsworth, Ohio, and received his grammar and high school education at that place. Upon leaving high school he attended Wooster University for two years as a special student. Completing this work he entered Purdue University, graduating with the degree of mechanical engineer. While at Purdue University he specialized in railroad work. Immediately upon graduation he entered the service of the Lake Shore & Michigan Southern as a special apprentice. His

work with the Lake Shore, while wholly in the mechanical department, covered a wide and varied field and gave him unusual opportunity to study locomotive operation. Leaving the Lake Shore he entered the service of the Locomotive Stoker Company as mechanical expert. In 1913 he accepted a position with the American Arch Company as traveling engineer and was made successively assistant to the manager of the service department and manager of the service department, which position he held at the time of his recent election.

Walter H. Allen, for several years in the track department of the Pennsylvania Steel Company, Steelton, Pa., and for the last two years with the Maxwell Motor Company, Detroit, has become associated with the Taylor-Wharton Iron and Steel Company, with headquarters at 30 Church street, New York.

W. F. Wagner, after 52 years' service, has severed his connection with William Jessop & Sons and is now sales manager of the Seaport Steel Company, which specializes in carbon tool steel and forgings, high-speed steel, alloy and carbon sheet steel and all varieties of high-grade steel.

G. W. Bichlmier has recently become associated with the machinery department of the Walter A. Zelnicker Supply Company, St. Louis, Mo. Mr. Bichlmier was formerly associated with the supply departments of the Missouri Pacific and Kansas City Southern and was secretary-treasurer of the W. L. Sullivan Machinery Company.

Paul T. Irvin, who has been associated with the Wells Brothers Company, and the Greenfield Tap & Die Corporation for 12 years, has resigned his position as sales manager of the gage division to accept the position of general sales manager of Lincoln Twist Drill Company, of Taunton, Mass. Edward Blake, Jr. (formerly of Wells Brothers Company), is vice-president and general manager of this company, and Frank O. Wells, president and Frederick H. Payne, vice-president of the Greenfield Tap & Die Corporation are directors.

At the annual meeting of the stockholders and directors of the Driver-Harris Company, Harrison, N. J., **Leon O. Hart** was elected treasurer and a director of the company. Mr. Hart was born in Hoboken, N. J., in 1885, and was educated at the Stevens Institute of Technology, where he graduated in 1907 with the degree of mechanical engineer. After graduation, he worked as a cadet engineer with the Public Service Gas Company of New Jersey for about one year. On October 2, 1908, Mr. Hart became associated with the Driver-Harris Company as electrical engineer, in which capacity he served until March, 1917, when he was elected assistant treasurer.

R. S. Cooper, whose election as vice-president and general sales manager of the Independent Pneumatic Tool Company, was announced in these columns March 8, entered the pneumatic tool field in 1903, after specializing in pneumatic engineering at Cornell University. After one year in the shops, becoming familiar with the processes of manufacture, and one year in the sales department at Pittsburgh, he was appointed eastern sales manager, with headquarters at New York city, and retained that position until his election to the vice-presidency, which necessitated his transfer to the general offices at Chicago, and led to his recent appointment as general sales manager, in charge of the distribution of Thor pneumatic and electric tools, and Thor motorcycles.

J. L. Price, assistant to the chairman of the board of directors of the Chicago Pneumatic Tool Company, Chicago, was recently elected vice-president in charge of finances. He was also re-elected assistant to the chairman of the board of directors and in that capacity will continue to act as the representative of the chairman. He was born at Springfield, Ill., and entered the employ of a bank in that city after graduating from high school. He later became associated with Francis Beidler & Co., Chicago, and for some years was general manager of a mill in the lumber district controlled by them. He served in various executive and financial capacities with Armour & Co., and for about five years was president of the Stock Yards National Bank of Ft. Worth, Tex. Later he was associated with the Atlantic National Bank, of the city of New York.

American Car & Foundry Changes

A. E. Ostrander, mechanical engineer at the New York office of the American Car & Foundry Company, has been made general mechanical engineer of that company and will have general supervision over all mechanical matters, reporting to **J. M. Buick**, vice-president and general manager. Mr. Ostrander's promotion has made necessary a number of other changes in the engineering department, the more important of which are as follows: **H. C. Lunger** has been made assistant to the general mechanical engineer, with headquarters at New York; **Fred G. Wolff** has been made mechanical engineer with headquarters at St. Louis, Mo.; **Norman Litchfield** has been made mechanical engineer, with headquarters at New York; **John G. McBride** has been made engineer of car construction, with headquarters at New York, and will report direct to the general mechanical engineer; **H. P. Field** has been made assistant engineer, with headquarters at Berwick, Pa., and will report to the engineer of car construction; **W. L. Yocum** has been appointed assistant engineer, with headquarters at Chicago; **H. D. Distelhurst** has been made assistant engineer, with headquarters at Washington.



A. E. Ostrander

W. H. Seiden and **J. D. Thompson** have been made assistant engineers, with headquarters at New York. **W. J. Rao**

has been made assistant engineer, with headquarters at St. Louis, Mo. Mr. Ostrander was born and educated in New Haven, Conn., and during his school vacations worked in various departments of the New York, New Haven & Hartford. He entered the drawing room of the New Haven in 1897 and was later employed by **Cornelius Vanderbilt** in designing cars, car trucks and other railway appliances. For a time he worked as a car designer and checker for the Standard Steel Car Company at Pittsburgh and in September, 1902, entered the service of the American Car and Foundry Company at New York and was successively employed as designer, estimator, and chief estimator. In February, 1904, he was made assistant mechanical engineer and October 1, 1915, was promoted to position of mechanical engineer of the New York office. He has been closely identified with the development of steel cars and especially steel passenger cars. Since the outbreak of the war, he has given considerable time to special work for the government and has served on the committee of engineers from car building companies that has been engaged in designing the standard freight equipment for the United States government.

Truscon Steel Company

The Trussed Concrete Steel Company, Youngstown, Ohio, announces a change in its name to the Truscon Steel Company.

Aside from this simplification of the name, there has been no change in the company, its organization, or management in any way.

The Trussed Concrete Steel Company, in its early days, devoted itself exclusively to reinforced concrete, introducing many new reinforcing products, such as the Kahn Bar, Florystyles, etc.

For many years, however, the activities of this organization have expanded far beyond the concrete field so as to include a large variety of steel products. Prominent among these might be mentioned the steel windows so widely used in building work, metal lath, pressed steel joists, all-steel buildings, inserts and other specialties.

For years the company has been generally known by the name "Truscon"—a simplified abbreviation of the longer name. For this reason "Truscon Steel Company" has been selected as the new name of the company.

Railway Steel Spring Company

The year ending December 31, 1917, was the best in the Railway Steel Spring Company's history. For the year the company's gross earnings were \$23,905,714 as compared with \$14,086,499 in 1916. The net earnings of \$4,307,860, even after the deduction of a reserve of \$3,500,000 for Federal taxes compared with \$2,710,806 in 1916. After dividends of \$945,000 were paid on the preferred stock there was available for dividends on the \$13,500,000 common stock a balance of \$3,362,860, equal to \$24.91 a share as compared with \$13.07 a share in 1916. Dividends of 5 per cent amounting to \$675,000 were paid on the common, and the surplus at the end of the year was \$8,657,801 as compared with \$5,969,941 in 1916.

The Railway Steel Spring Company is in an exceptionally strong financial position. It has kept out of war business in the past, has been conservative as to its dividends and the result is now seen in the fact that on December 31, 1917, the company's working capital amounted to \$9,313,681, as compared with \$6,735,759 in 1916 or slightly over \$4,000,000 in 1914. The declaration of 85 dividends is evidence that the policy will be continued.

F. F. Fitzpatrick, president of the company, in his remarks to stockholders, says in part: "Your board of directors has made a charge of \$1,000,000 for depreciation of machinery, plants and gas wells, and applied the same to operating expense. In addition, a reserve of \$1,000,000 has been made from the surplus earnings of the year for improvements, betterments and retirement of bonds. A reserve of \$3,500,000 has been made to cover Federal income and excess profit taxes. The provision for payment of these taxes is in part represented by securities purchased for that purpose and carried under stock, bonds and investments. "The sinking fund provisions of the Latrobe plant and Inter-Ocean plant 5 per cent bonds were provided during the year, and the trustees of the sinking fund redeemed and had cancelled \$133,000 in par value of the Latrobe and \$132,000 in par value of Inter-Ocean bonds.

"The Latrobe plant 5 per cent bonds provided for payment

of the principal on January 1, 1921, and in view of this approaching maturity and the favorable condition of your company's finances, the provision for calling of these bonds, at 105 and interest, was availed of by the company and pursuant thereto arrangements have been completed with the trustees of the mortgage for retiring them. There were outstanding on December 31, 1916, \$2,994,000 in par value of Latrobe bonds. All of these bonds have now been retired, partly by cancellation of the bonds that were purchased by the company during the year 1917 and the remainder through payment to the trustee on December 31, 1917, of the sum required for their redemption on January 1, 1918.

"Your company encountered considerable difficulty throughout the year in conducting its regular line of business, due to the restrictive market in obtaining raw materials, and to the very tense situation prevailing with the railroad transportation facilities. It has therefore been deemed advisable to carry much larger amounts of materials in the inventories than heretofore. The policy of the company to increase the capacity of the different plants has been continued. All the plants have been maintained as far as possible in the best operating condition and for this purpose much larger expenditures than usual have necessarily been made and may continue to be made during the coming year.

"The year just closed shows results to be the largest in the history of the company, and the volume of business done, especially during the last few months of the year, has been conducted under the most trying difficulties, yet it is hoped that with better market and transportation facilities the situation will improve in the near future so as to make possible a very favorable showing for the year 1918."

The balance sheet follows in brief:

ASSETS		
Plants, properties, etc.	.....	\$29,311,122
Inventories: materials, supplies and products, finished and in process	.....	5,113,038
Stocks, bonds and investments	.....	3,553,254
Accounts receivable	.....	4,077,856
Other items	.....	132,045
Cash	.....	857,906
		\$43,045,221
LIABILITIES		
Capital stock, preferred shares	.....	\$13,500,000
Capital stock, common shares	.....	13,500,000
Inter-Ocean plant 5 per cent gold bonds	.....	2,967,000
Accounts payable	.....	652,791
Reserved for preferred stock dividend, interest on bonds, taxes, etc.	.....	267,630
Reserved for federal and excess profits taxes	.....	3,500,000
Surplus	.....	8,657,801
		\$43,045,221

P. & M. Patent Claims Sustained

The United States Circuit Court of Appeals for the Seventh Circuit handed down a decision on March 9 denying the petition for rehearing filed some time ago by the Ajax Rail Anchor Company, Chicago, in the suit brought against it by the P. & M. Company, Chicago, for an infringement of the Kramer patent No. 1,014,155 by the Ajax rail anchor. The suit of the P. & M. Company versus the Ajax Rail Anchor Company has been in the courts since early in 1914. In the lower court the case went against the plaintiff but no opinion was handed down. In the Court of Appeals the decision handed down in the October, 1916, term was unanimous in favor of the P. & M. Company and Judge Mack rendered an opinion which, taken in conjunction with the opinion of the court in the suit of the Track Specialties Company versus Barnett, which was handed down at the same time, is considered to have defined the art as entirely independent from that of rail joints, tie plates or other rail fastenings. In this decision the court stated that "The fundamental features of the Kramer patent are employed in the Ajax structure in order to secure the same objects. The latter not only responds literally to the Kramer claims, but it operates on the same general principles and is essentially similar in form so far as form is material to obtain the results sought by Kramer. Transposition of parts without change of operation or function is of no importance. That the Ajax, by decreasing very considerably the amount of metal required without in any way altering the method of operation or the objects to be attained, represents a valuable improvement over Kramer, does not save it from the charge of infringement inasmuch as, despite the changes in form thereby secured, the structure is built and embodies Kramer's conception and contribution to the art."

The Bucyrus Company

According to the annual report of the Bucyrus Company, South Milwaukee, Wis., the net earnings for the year 1917 amounted to \$854,281, of which approximately 75 per cent resulted from the company's usual pre-war products, and the remainder from munitions contracts and other special contracts arising from war demands. During the year a one per cent dividend was paid quarterly on the preferred stock, or a total paid during the year in dividends of \$160,000. The earned surplus at the end of the year was approximately 30 per cent on the preferred stock issued and the cumulative unpaid dividends thereon aggregated 22 per cent after deducting the dividend payable on January 2, 1918.

A note issue of \$1,000,000 dated December 15, 1915, matured on June 15, 1917, at which time \$400,000 was paid from the cash resources of the company and the balance paid from the proceeds of a sale of a new issue of \$600,000 in one-year six per cent gold notes maturing on June 15, 1918.

Owing to the unusual cash requirements for the payment of excess profits and additional income taxes, the amount of money involved in the inventory, the approaching date of maturity of the gold note issue and the uncertainties of the coming year, the directors considered it best not to increase the dividend disbursements above the rate of four per cent per annum.

The shipments of the usual products of the company exceeded in value those of the previous year by over 60 per cent, which is accounted for in large part by the higher prices prevailing during the later period. The company's products are to a greater or less degree essential to the successful prosecution of the war, and throughout the year many machines were ordered by the United States and allied governments. The larger portion of the output of the company went into coal mining equipment, consisting of coal stripping and coal loading machines, and a smaller quantity into iron and copper mining equipment. In addition, the company has received many contracts for material used directly in the prosecution of the war.

The company entered the year 1917 with a larger volume of orders on its books than in any previous year. New orders have more than kept pace with shipments, and 1918 opens, therefore, with more orders than the beginning of last year, exclusive in each instance of special contracts for unusual products.

Foreign business in 1917 was maintained at about the same proportion to the total business of the company as in the previous year, in which the volume of foreign orders was the greatest, up to that time, in the history of the company. Shipments of excavating machinery were made to Russia, France, Colombia, Chile, Cuba, Manchuria, England, Africa, Sweden, Costa Rica, Siam, Bolivia, Australia, New Zealand, Spain and the Federated Malay States.

At the annual meeting of the company held on March 5, 1918, the retiring board of directors was reelected, and, in addition, Major F. R. Bacon, president of the Cutler Hammer Manufacturing Company, Milwaukee, Wis., and Fred Vogel, Jr., president of the Pfister & Vogel Leather Company, Milwaukee, were elected directors to fill two vacancies. The company's statement of assets and liabilities follows:

ASSETS		
Cash	.....	\$146,012.98
Payments on Liberty Bonds	.....	152,798.47
Accounts and Bills Receivable	.....	1,449,641.19
Inventories	.....	2,792,653.44
Land, buildings, machinery, patterns, securities, patents, etc.	.....	6,781,116.63
Total	.....	\$11,322,222.71
LIABILITIES		
Bills payable a/c Liberty Bonds	.....	\$140,790.00
Other bills and accounts payable	.....	466,732.97
Advance payments received	.....	463,045.17
Preferred dividend payable January 2, 1918	.....	40,000.00
Reserves	.....	289,999.77
Gold notes	.....	600,000.00
Capital stock	.....	8,000,000.00
Preferred (Auth. \$5,000,000.00) Issued	.....	\$4,000,000.00
Common (Auth. \$5,000,000.00) Issued	.....	4,000,000.00
Surplus, as at January 1, 1917	.....	\$627,574.16
Net earnings for year ended December 31, 1917, after deducting costs of manufacturing, repairs, and maintenance, administration and selling; royalties, depreciation, interest, insurance and taxes (including excess profits tax)	.....	854,280.64
		\$1,481,854.80
Less dividends	.....	60,000.00
Surplus, as at December 31, 1917	.....	1,321,854.80
Total	.....	\$11,322,222.71

Financial and Construction

Railway Financial News

CANADIAN PACIFIC. The annual report for the year 1917 shows gross earnings of the railway and of lake and coastal steamers amounting to \$152,389,334. Net earnings from these sources aggregated \$40,546,018; surplus, \$36,316,875. Net revenues available for dividends were \$33,848,192. After payment of all dividends, surplus from earnings was \$12,420,919. The pamphlet report itself will be published within the course of a week or two.

NEW YORK, NEW HAVEN & HARTFORD.—John Skelton Williams, director of the division of finance and purchases of the Railroad Administration, has issued the following: "Director General McAdoo authorizes me to say that newspaper reports to the effect that the Railroad Administration has stated that the New Haven's obligations of about \$45,000,000, maturing shortly, have been or would be provided for by the government, are incorrect. While it is hoped that the road may find some way to protect its obligations, no decision has as yet been reached by the government as to the extent, if any, to which it may extend aid to the system. The subject is now under consideration, and as soon as a decision is reached official announcement will be made."

OZARK VALLEY.—Judge Dyer in the United States District Court of St. Louis has placed a valuation of \$150,000 on this road and ordered that if it has not been sold at that figure before April 22 it is to be sold at auction to the highest bidder.

PENNSYLVANIA RAILROAD.—The stockholders of this company at their seventy-first annual meeting on March 12, approved an increase of \$75,000,000 in the indebtedness of the company, in accordance with the management's proposal providing for capital requirements, including maturing obligations. Concerning this sum, which is to be raised by this issuance of bonds and other obligations of the company, Samuel Rea, who was re-elected president, said: "In a large and growing corporation like the Pennsylvania Railroad there is a constant demand for funds with which to serve the government with the utmost efficiency. These funds will be required for new equipment and enlargement of freight handling facilities."

The shareholders ratified the acquisition by the Pennsylvania of the properties and franchises of the Cornwall & Lebanon and the Susquehanna, Bloomburg & Berwick railroads. After these matters were settled the chairman was authorized to appoint a committee of seven stockholders to nominate candidates for four directors to be elected on March 26.

A resolution offered by John Gribbel was adopted authorizing the directors and officers to execute for the company an agreement with the President of the United States to secure compensation for use of the railroad properties during their control by the government.

Railway Construction

ARCADE & ATTICA.—This company will build an engine-house at Arcade, N. Y., to be of cement block construction, 60 ft wide and 75 ft long.

FLORIDA EAST COAST.—This company is building a paint shop at St. Augustine, Fla., to cost about \$15,000. The structure is to have wood frame with slate roof and will be one story high, 88 ft wide and 100 ft long. The work is being carried out by company forces.

MAGDALEN RIVER.—The Quebec legislature has granted an extension of time in which to build this projected line along the Magdalen river valley to Little Falls, and has authorized the construction of a line from that point south and west, to connect with the Atlantic, Quebec & Western and the Canadian & Gulf Terminal, at Gaspe, or at some other point on either of these roads, also to build wharves, docks and deep water terminals at Gaspe. F. Murphy, secretary, New Carlisle, Que.

Railway Officers

Executive, Financial, Legal and Accounting

L. B. Butts, auditor of miscellaneous receipts of the Illinois Central, with office at Chicago, has been appointed auditor of station accounts, succeeding **C. C. Whitney**, who succeeds Mr. Butts.

G. H. Parker, assistant to vice-president of the Delaware & Hudson, with office at New York, has been appointed assistant controller of the Philadelphia & Reading with headquarters at Philadelphia, Pa.

The New Mexico Central was bought from the receivers on February 14, and a new company organized with the following officers: **S. C. Munos**, president; **A. F. Mack**, vice-president; **F. L. Watson**, treasurer; **F. A. Wagner**, general counsel, all with offices at New York. **R. C. TenEyck**, vice-president and general manager; **C. A. Richardson**, traffic manager and assistant treasurer, and **D. C. Collier**, general agent, all with offices at Santa Fe, New Mexico.

Operating

J. B. Wilson has been appointed trainmaster of the San Joaquin division of the Southern Pacific, with headquarters at Bakersfield, Cal., vice **D. S. Weir**, promoted.

R. M. Seale was appointed superintendent of car service of the Texas & Pacific effective March 5, with headquarters at Dallas, Texas, succeeding **R. E. Clarke**, who has entered government service.

L. M. Betts, having been granted leave of absence to enter the service of the regional director, **F. A. Spink**, on February 15, assumed charge of the office of the car accountant in addition to his duties as traffic manager of the Belt Railway Company of Chicago.

C. D. Bovard, acting assistant superintendent of the Canadian Government Railways, with office at Campbellton, N. B., has been appointed acting assistant superintendent, with office at Moncton; and **J. H. Wilson**, has been appointed acting assistant superintendent, with office at Campbellton, succeeding Mr. Bovard.

J. D. Clarke, chief clerk in the operating department of the Baltimore & Ohio, has been promoted to assistant superintendent of transportation, with headquarters at Baltimore, Md. **W. G. Curren**, superintendent of transportation, has been granted a furlough to serve in the office of **A. H. Smith**, regional director of eastern railroads, New York City.

M. C. Blanchard, district engineer of the Atchison, Topeka & Santa Fe, at Topeka, Kan., has been appointed division superintendent, with headquarters at Marceline, Mo., succeeding **R. H. Allison**, who has been transferred to the Illinois division, with headquarters at Chillicothe, Ill. to succeed **G. E. Ayer**, who has resigned to engage in other business.

J. E. O'Brien, superintendent of the Wilmar division of the Great Northern, was transferred to the Dakota division with office at Grand Forks, N. D., succeeding **R. A. McCandless**, effective March 15. **C. E. McLaughlin**, superintendent of the Minot division, was transferred to the Wilmar division with headquarters at Wilmar, Minn., succeeding **J. E. O'Brien**, transferred. **R. A. McCandless**, superintendent of the Dakota division, was transferred to the Minot division with headquarters at Minot, N. D., succeeding **C. E. McLaughlin**, transferred.

F. L. Richards, assistant superintendent of the Chicago, Milwaukee & St. Paul, with headquarters at Sioux City, Iowa, was promoted to superintendent of the Sioux City and Dakota division, with same headquarters succeeding **L. B. Beardsley**, who was appointed assistant superintendent of the same division, succeeding Mr. Richards, effective March 10. **L. A. Turner**, was appointed trainmaster of the Iowa division

with headquarters at Marion, Iowa, succeeding B. F. Hoehn, promoted to superintendent of the Milwaukee terminals, succeeding W. B. Hinrichs, who was appointed stationmaster at Milwaukee, Wis., succeeding C. W. Mitchell, transferred, effective March 1. D. W. Kelly, has been appointed trainmaster of the Superior division with headquarters at Green Bay, Wis., succeeding H. M. Gillick, transferred to the Hastings and Dakota division, with headquarters at Aberdeen, S. D., succeeding M. J. Flanigan, promoted to superintendent of the Dubuque division, effective March 1. W. F. Ingraham, was appointed trainmaster of the Sioux City and Dakota division, with headquarters at Sioux City, Iowa, succeeding C. H. Buford, who was transferred to the LaCrosse division, effective March 1. J. C. Hoffer and F. A. Miller were appointed assistant trainmasters of the Chicago Terminals, the latter succeeding B. G. Dolan, transferred, effective March 10.

Henry Douglas Pollard, whose appointment as assistant general manager of the Central of Georgia, with headquarters at Savannah, Ga., has already been announced in these columns, was born in October, 1872, at Aylett, Va. He was educated in the public schools and at Aberdeen Academy; he also took short courses at the University of Virginia, and at Drexel Institute, Philadelphia, Pa. In 1891, he began railway work as a rodman on construction work with the Baltimore & Ohio, and in 1893, he was appointed assistant resident engineer of construction, at Wellsville, Ohio, on the Ohio Southern, now a part of the Detroit, Toledo & Ironton. From 1894, to 1898, he was assistant engineer maintenance of way on the Philadelphia division of the Baltimore & Ohio; the following year he served as transitman on the Central of Georgia. In 1900, he was appointed resident engineer of construction, and subsequently served consecutively as supervisor of track, trainmaster, roadmaster and from June, 1905, to 1910, as superintendent at Macon, Ga., on the same road. He was appointed assistant superintendent of the Sorocabana Railway, at San Paulo, Brazil in 1911, and later, was inspector general of the Campana Auxiliaria, at Santa Maria and Porto Alegre, Brazil. In 1913 he returned to the service of the Central of Georgia as valuation engineer and two years later was elected president of the Wrightsville & Tennille, with headquarters at Tennille, Ga., which position he held until his recent appointment as assistant general manager of the Central of Georgia as above noted.



H. D. Pollard

Traffic

J. V. Gilmour, advertising agent of the Chicago & Eastern Illinois, with headquarters at Chicago, has resigned to engage in other business.

R. W. Smock has been appointed general agent of the Los Angeles & Salt Lake with office at Pasadena, Cal., succeeding Russell Ball resigned to go into other business.

F. J. Burke, assistant general freight agent of the Texas & Pacific, with headquarters at New Orleans, La., will, in addition to his other duties, have charge of industrial development of the property.

John Fairman has been appointed, pro tem., general passenger and freight agent in America of the London & North Western Railway of England, with office at New York, succeeding A. G. Wand, who has relinquished active service.

T. P. Hinchcliff was appointed general agent of the Chicago, Burlington & Quincy, at Detroit, Mich., succeeding E. T.

Swan, resigned, effective March 1. G. A. Shields, traveling freight agent, with headquarters at Burlington, Ia., has been appointed acting division freight and passenger agent, at Quincy, Ill., succeeding Frank A. Hart, temporarily assigned to the staff of the regional director at Chicago.

Engineering and Rolling Stock

T. W. McBeath, traveling fireman of the Canadian Government Railways, with office at Moncton, N. B., has been appointed master mechanic, with headquarters at Moncton.

W. A. Guild, division engineer of the Atchison, Topeka & Santa Fe, with headquarters at Chillicothe, Ill., has been promoted to district engineer, with headquarters at Topeka, Kan., succeeding M. C. Blanchard, promoted.

A. Leckie, division engineer of the Kansas City Southern, with office at Kansas City, Mo., has been appointed division engineer of the Southern division, with headquarters at Texarkana, Texas, vice R. H. Gains resigned to accept service with another company; and W. J. Lank has been appointed division engineer of the Kansas City Terminal division, with headquarters at Kansas City, Mo., vice Mr. Leckie.

W. F. Ackerman, shop superintendent of the Chicago, Burlington & Quincy, at Havelock, Neb., was appointed acting superintendent of motive power of the lines west of the Missouri river, succeeding T. Roope, granted leave of absence, effective March 1. E. G. Johnson, general master mechanic, with headquarters at Lincoln, Neb., has been appointed assistant superintendent of motive power, with the same headquarters, and his former position has been abolished.

Purchasing

W. F. Wright has been appointed assistant to the purchasing agent of the Louisiana & Arkansas, with office at Texarkana, Ark.

Obituary

Joseph Smith Leeds, manager of the Santa Fe Refrigerator Despatch Company, died in Chicago on March 12.

H. M. Hollister, who retired as treasurer of the Fairbanks, Morse & Co., Chicago, three years ago, died March 5, in that city, at the age of 80 years.

H. D. Teed, superintendent of telegraph of the St. Louis-San Francisco, with headquarters at Springfield, Mo., died at his home at St. Louis, on March 8, age 45 years.

Jacob W. Miller, formerly second vice-president and general manager of the New England Navigation Company, died on March 8, at his home in New York City. He was born in June, 1847, at Morristown, N. Y., and graduated from the United States Naval Academy at Annapolis, Md., in 1867. From 1882 to 1886 he was vice-president and general manager of the St. Louis, Fort Scott & Wichita Railroad, now a part of the Missouri Pacific. He subsequently served as general manager of the New York, Providence & Boston Railroad and the Providence & Stonington Steamship Company. From April, 1892, to the following August he was second vice-president of the New York, New Haven & Hartford, and later served as second vice-president and general manager of the New England Navigation Company and other steamship lines controlled by the New Haven. He resigned from the steamship service to become the executive head of the Cape Cod Canal Construction Company when the construction of the canal was begun in 1909.

A DOMINICAN RAILWAY INCREASES ITS RATES.—The Samana & Santiago Railway, which runs from the port of Sanchez, on the Bay of Samana, to the towns of La Vega, Salcedo, Pimentel, Moca, and San Francisco de Macoris, in the cacao-growing region of the Dominican Republic, has announced an increase in its tariff on both freight and passengers, effective February 4. The reason given for the raise is the extraordinary cost of all materials required for the upkeep of its property.—*Commerce Reports.*

EDITORIAL

Railway Age

EDITORIAL

DAILY EDITION

The government is devoting considerable attention at the present time to the standardization of equipment for use on the railways under government control. At present efforts to standardize equipment are being directed towards new motive power and rolling stock. Within certain limits standardization of equipment and materials is desirable, but it can be carried to such a point that efficiency is materially reduced. It can also be carried to such a point that modernized ideas and new devices of merit will be eliminated without a trial. When standardization approaches this point its power for harm is greater than that for good. Through such organizations as the R. S. A. and the A. R. E. A. standardization is proceeding along the proper lines. Designs of material for adoption are submitted to the associations only after careful and thorough investigation and study has been made by committees working in conjunction with the manufacturers. By this method new devices may be submitted and tried out and those having merit can be substituted for or adopted in place of existing standards. Along these lines standardization is progressive, not retrogressive. The associations are doing good work and all members should see that standardization proceeds along right lines.

The Associations and Standardization

On another page is an article describing the activities of the various members of the Railway Signal Association who are now serving in a military capacity. An effort has been made to present as accurate a list of men now in service as it was possible to obtain from the records. It is to be hoped that all members knowing of others who are in the service or who may enter the service in the future make it a point to notify the secretary of the Association in order that the R. S. A. Roll of Honor may be kept complete and up-to-date.

R. S. A. Members in Military Service

The association can look with pride upon its members who have already entered military service. It goes without saying that these men will live up to the high reputation which railway men from this continent have already earned in the present war. A number of the members have been drafted into the government service, but a greater number have volunteered and been assigned to special regiments, for which duty their special technical and practical experiences especially fits them. To date about 30 members have entered government service and several of this number are already in active duty "over there."

Each member of the Railway Signal Association who is in the army should be represented by a star in a service flag, which should be displayed at future meetings. This method of evidencing patriotism has been adopted by almost all organizations as a constant reminder of absent members who are fighting for liberty. An R. S. A. service flag would also be a reminder for those who stay at home that they have an equally patriotic duty to perform in keeping the transportation facilities of our country

operating with the highest degree of efficiency. The men who have given up their civil life to do the actual fighting should have our support at all times—let us get behind them.

It is to be noted with satisfaction that there continues to be a good attendance of signal men at the regional committee meetings of the Railway Signal Association. Through the activity of these committees the work of the Association is not confined to certain parts of the country, but covers all sections, and a large number of the younger men engaged in signal work have an opportunity to attend such meetings when they are unable to attend the stated meetings. The information obtained at such meetings is always of a constructive nature and, as the younger men are encouraged to take part in the discussion of matters before these meetings, their interest in the Association is not only increased, but their work also has an added interest for them. For the meetings to be of the greatest value, the regional chairmen should arrange a program in advance that will be of general interest to the signal men in their vicinities. These meetings should of necessity be arranged far enough in advance that proper notice may be sent to the men interested. Knowing the subject to be discussed, the men attending these meetings will make a study of conditions that affect their work and be in a position to take an active part in any discussion. It is to be hoped that signal officers will recognize the good being done by the regional committee meetings by encouraging their men to attend whenever it is at all possible, for these regional committees will naturally have a very important part to play in the advancement of good signaling practice.

Regional Committee Meetings

One year ago this month the outlook for a signal convention was decidedly bad. Just prior to the time of the convention a strike of the train service employees of the railways was threatening which would have rendered it impracticable to hold either the R. S. A. or the A. R. E. A. conventions. The crisis was ended when the conference Committee of the railways gave full authority to the government mediators to settle the controversy. As a consequence the attendance the first day or so was small compared to the attendance when normal conditions prevail, although considering the circumstances the attendance was much better than was expected. Many events have transpired during the last 12 months which have been of very great importance not only to the country as a whole but to the railways as well. The two outstanding events of this period are the entrance of the United States into the world war and the assumption of control of the railway systems of the country by the Government. On the assumption of government control con-

The R. S. A. and Existing Conditions

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ditions from a railroad officer's standpoint, were naturally confusing. With this condition of affairs existing there was doubt as to whether the various railroad organizations should proceed with their plans for holding the conventions as scheduled before this action. The association has accomplished excellent results heretofore in connection with matters relating to the signal field and considering the important part signals play in the movement of traffic it is essential and fitting that the R. S. A. should continue its good work. If ever there was a time when all members should get behind the Association and boost the good work, that time is the present.

A Fine Display of Courage and Enterprise

THE MEMBERS OF THE AMERICAN RAILWAY ENGINEERING ASSOCIATION, the Railway Signal Association and the National Railway Appliances Association deserve the warmest commendation for having had the intelligence and the courage to hold their conventions and exhibit as usual this spring.

The *Railway Age* is not among those publications that have contended for "business as usual" during the war. "Business as usual," as that phrase has been generally employed, means conducting as usual those businesses which are not essential to carrying on the war, as well as those which are. This is impossible; and it would be undesirable if it were possible. The main business of the nation as long as the war lasts will be that of conducting the war; and during this time every other consideration and object must be subordinated to the object of triumphing over the nation's enemies. Any business the conducting of which "as usual" will not contribute toward winning the war must be put on an entirely new basis.

But the railroad business is not one of those which are not essential in time of war. On the contrary, it is of all industries the one whose efficient management is the most essential to the winning of the war. Since this is the case, it follows that nothing which has been done in the past to maintain and increase the efficiency of the railways should now be discontinued, and that everything new which can be done to maintain and increase their efficiency should now be done.

The conventions of the various railway associations have been held, and the various exhibits of railway equipment and appliances have been given in the past, upon the assumption that the full discussion by railway men, from all over their country, of problems common to them, and the inspection by them of the improved and new devices brought forward by the various railway equipment and supply companies, would tend to maintain and increase the efficiency of the railways. Has that assumption been false or true? If it has been false, then railway conventions should not have been held or exhibits given when the railways were under private control, and the railway men and railway supply men have hypocritically or foolishly wasted their time and their companies' money on them. On the other hand, if the conventions and exhibits did increase efficiency under private control, they will do so under government control, and it would be hypocritical or foolish to discontinue holding them under government control.

Indeed, if there was good reason for having them under private control, there is even more reason for having them under government control; for there is greater need for the utmost efficiency than there ever was before; and since the railways are being operated as a

single system it is more than ever the duty of railway officers freely to exchange views and information which will be of use to all of them in their work.

That the conventions and exhibits of the various associations in the past have contributed toward increasing the physical and operating efficiency of American railways the *Railway Age* has not the slightest doubt; yet since this country entered the war, and especially since government control was adopted, many conventions and exhibits have been discontinued. We believe that most of the organizations which have adopted this policy have taken counsel of timidity, rather than of courage and good judgment. The Railroad Administration has never issued an order or a statement, nor given any intimation of its views, so far as we know, tending to discourage conventions and exhibits.

Whatever others may have done, the Railway Engineering Association, the Railway Signal Association and the National Railway Appliances Association, being sure that their conventions and exhibit are legitimate and helpful activities, have gone ahead and arranged to hold them this year as usual. It required much courage to do this. The final decision had to be made some months ago, in the midst of a winter of such terrible severity, and a demoralization of transportation so unprecedented, that they might have shaken the stoutest hearts.

The *Railway Age* congratulates the officers of these associations on the sound judgment and great courage they have shown. And now that the convention and exhibit are being held, let all make the very most of them.

We venture especially to urge upon all railway officers that it is not only their opportunity, but their peculiar duty, this year to visit the exhibit as often and study it as much as they can. In the first place, the railway supply companies have shown wonderful enterprise and courage in preparing such an exhibit as they have under the conditions that have existed; and it would be positively mean for railway officers not to show their appreciation of what they have done. In the second place, because of the labor situation, there never in history was such acute need for railway engineering and maintenance of way officers to inform themselves regarding the efficiency-producing devices which the railway supply craft is offering to them.

The associations have done well in deciding to carry on business "as usual" this spring. Let those attending so do their work that when the week is ended they can look back upon it as the most useful week's work for the railways of America, and the people of America, that they have ever done!

The Influence of Passing Sidings on Track Capacity

ONE OF THE SUBJECTS ASSIGNED to Committee 10—Signaling Practice, was to report on the problem of signaling single track roads with reference to the effect of signaling and the proper location of passing sidings on the capacity of the line. Part of the work done in this connection has been to apply and test formulae and methods on sections of roads.

In this connection an analysis of the effect of passing track locations on an 88-mile section of line was presented. This particular piece of line is used exclusively for freight service and has no large yards or junction points. The running time of the trains as presented in parts of the report was obtained by computation from the tractive efforts of the locomotives in use with their full theoretical tonnage for ruling grades. As more uni-

form results are obtained than would be possible by taking actual figures from riding trains unless the average of a large number were obtained, an analysis was made, using all the present passing tracks with their present capacity and a schedule worked out graphically showing existing conditions. The minimum time between trains was found by ascertaining the maximum sum of the schedules between passing sidings. It was found that, in using all the present passing tracks, cases existed where they were so close together that the delayed time was large. Furthermore, certain of these tracks could be eliminated, and the minimum time between trains could still be maintained, with a decrease in the delayed time to southward trains waiting at meeting points. Another schedule was also worked out showing the proposed rearrangement of passing sidings in order to obtain the maximum capacity of the line. In this rearrangement it was proposed that certain existing tracks be extended to 100 cars capacity, these extensions to be in the direction which would give the best balance of time, taking into consideration curves, grades, highway crossings, etc.

In connection with this study the assumption was made that when a track is operating at full capacity each train will meet an opposing train at each passing siding. A comparison between the present and the proposed methods shows that the theoretical capacity in trains per day under present methods would be 27 on a basis of 100 per cent, and that, under proposed methods, this could be increased to 45 or 167 per cent and that the theoretical capacity measured in freight cars per day under the present arrangement was 1,863 on the basis of 100 per cent while that under the proposed method would be 4,500 or 242 per cent. The analysis made by this committee shows what a decided effect the proper location of passing sidings has upon the capacity of a main track. At the present time this subject is worthy of the most careful consideration by operating officers and where it is found that a material increase can be effected the necessary steps should be taken to increase the track capacity. The indications are that little trouble will be experienced by the railroad officers in getting the necessary money from the government to carry out betterments of this character.

The R. S. A. Registration

THE ATTENDANCE AT THE Railway Signal Association meeting far exceeded the expectations of the most optimistic members. It was thought that the conditions on the railways of the country might be of such seriousness as to prevent the officers and employees from attending the convention in as great numbers as they have in the past. The registration yesterday showed that there were 61 associate, 14 junior and 123 active members in attendance, or a total of 198 members. In addition there were 14 visitors present, making a total attendance of 212.

Of the active members attending the meeting last year, 17 came from points east of Buffalo and Pittsburgh, while the registration this year showed that 39 active members came from the same section. These figures show that the members are taking an active interest in the work of the Association at a most favorable time and are entering into discussions which are of especial interest.

Early in the year it was thought by some that the Association should cancel its meetings while present conditions continued to exist. That this would have been unwise was amply demonstrated by the work of Committee X—Signaling Practice, with especial reference to

the study made by this committee on the relocation of passing sidings to increased track capacity.

This committee has demonstrated that by the proper relocation of passing sidings on unswitched lines, track capacity can be increased as much as 65 per cent. Another signal engineer was able to demonstrate that, with the proper relocation of passing sidings, it was unnecessary to build a cut-off that was thought necessary.

By work such as this the Signal Association is performing a very great service to the roads when increased track capacity at the present time is of such great importance.

Tickets for the Annual Dinner

Tickets for the annual dinner which will be termed a "War-Fare" dinner, will be placed on sale in the corridor outside of the Convention hall at twelve o'clock this noon. The dinner will be held as usual in the Gold Room of the Congress Hotel on Wednesday evening. The speakers will include Sir Edmund Walker, president of the Canadian Bank of Commerce, Toronto, who will speak on "Canada's Part in the War"; Edward N. Kelsey, governor of the International Association of Rotary Clubs, whose topic will be "Good Fellowship," and Rev. Stephen K. Mahon, the title of whose address will be "Unsolved Problems." It had been hoped that William G. McAdoo, director-general of railways, would be present, but he was forced to decline the invitation owing to the pressure of his duties.

The A. R. E. A. Convention Program

The American Railway Engineering Association will assemble in the Florentine Room of the Congress Hotel for its 19th annual convention at ten o'clock this morning. Following the address of the president and the presentation of the reports of the secretary-treasurer, the reports of the standing and special committees will be taken up in the following order:

Tuesday, March 19—

- Signals and Interlocking.
- Conservation of Natural Resources.
- Buildings.
- Track.
- Water Service.
- Records and Accounts.

Wednesday, March 20—

- Electricity.
- Yards and Terminals.
- Economics of Railway Labor. Illustrated use of labor-saving devices.
- Ballast. Illustrated use of mechanical tampers.
- Economics of Railway Operation.
- Uniform General Contract Forms.
- Roadway.

Thursday, March 21—

- Iron and Steel Structures.
- Wooden Bridges and Trestles.
- Masonry.
- Ties.
- Stresses in Railroad Track.
- Rail.
- Signs, Fences and Crossings.
- Rules and Organization.
- Wood Preservation.

It is planned to devote most of Wednesday to the consideration of the report of the Committee on Economics of Railway Labor and to other phases of the labor problem.



The R. S. A. Stated Meeting in Session

Railway Signal Association Stated Meeting

Complete Abstracts of Reports of the Committees Presented
at Monday's Sessions With Discussions

THE MARCH STATED MEETING of the Railway Signal Association was held in the Auditorium Hotel, Chicago, on Monday, March 18. The morning session was called to order at 9:45 by President W. N. Elliott, signal engineer, New York Central Lines East, and adjourned at 12:45 p. m. The meeting reconvened at 2:15 and continued until 4:30 p. m.

After the meeting was called to order Mr. Elliott announced the death on February 2 of Charles C. Rosenberg, secretary-treasurer, and expressed briefly the esteem in which Mr. Rosenberg was held by the association.

To enable all who desired to express their appreciation of the association's and the individual members' loss in Mr. Rosenberg's death, the President announced a memorial service would be held as near three o'clock as possible. During this service resolutions were presented by F. P. Patenall, signal engineer of the B. & O., as follows:

WHEREAS, Almighty God, in the exercise of His divine will, has removed from this world and from our midst our late secretary-treasurer, C. C. Rosenberg, and

WHEREAS, It is but just that a fitting recognition of Mr. Rosenberg's many virtues should be had; therefore we, members of the Railway Signal Association, have paused in our labors to pay our last sad tribute to his memory, and to express our deep appreciation of the many and lasting obligations that we

as members and friends owe to him, and by words and outward tokens, to express our sorrow for the irreparable loss our association has sustained by his death.

THEREFORE, BE IT RESOLVED, That in the death of C. C. Rosenberg, this association laments the loss of an efficient officer, and a man whose utmost endeavors were exerted for its welfare and prosperity; a friend and companion who was dear to us all; a citizen whose upright and noble life was a standard of emulation to those about him.

RESOLVED, That the heartfelt sympathy of the members of this Association be extended to his sorrowing family in their affliction.

RESOLVED, That these resolutions be spread upon the records of the Association, and an engrossed copy thereof be sent to the family of the departed.

On motion, duly seconded and carried, the resolutions were unanimously adopted.

In order to carry on the work of the secretary-treasurer, the Board of Direction at its meeting on February 17 last elected H. S. Balliet, assistant terminal manager, Grand Central Terminal, as assistant secretary-treasurer to serve until the next annual

meeting, with full authority to perform the duties of treasurer, as specified in the constitution. Mr. Balliet has been performing these duties since that time. The Board has now elected Mr. Balliet secretary-treasurer, to serve until the next annual meeting.



W. H. Elliott,
President

At the morning session before the committees submitted their reports the president introduced Frank Rhea of the Department of Commerce, Washington, D. C., who gave a brief talk on trade opportunities in foreign countries. His address appears elsewhere in this issue.

The proceedings of the convention were interrupted during the morning session while James A. Davis of the War Savings Committee for Cook County gave a brief talk on "Stimulating an appreciation of the principles of the Association as to the advantages to accrue through thrift, as well as the patriotic motive in helping raise funds with which to win the war."

Frank Rhea Speaks on Trade Opportunities

AT THE OPENING OF YESTERDAY'S session of the Railway Signal Association Frank Rhea, of the United States Department of Commerce, spoke on Trade Opportunities in the Far East. Mr. Rhea, who is a member of the Railway Signal Association and also of the American Railway Engineering Association, was formerly connected with the Interstate Commerce Commission, resigning over a year ago to accept an assignment with the Department of Commerce to investigate the markets for railway supplies in Australia and Asia. Mr. Rhea has just returned from a year in those countries and is now engaged in the preparation of his report. In discussing his observations yesterday morning Mr. Rhea spoke in part as follows:

"I have just returned from the far East and am now engaged in making up my report. I spent one month in New Zealand, four months in Australia, and seven months in China, Japan and Manchuria. The object of the trip was to investigate the markets for those classes of railway materials, equipment and supplies, which could be furnished by our American manufacturers. In New Zealand and Australia I saw little in the way of railway signals which we could incorporate to advantage in our American practice. In New Zealand, Mr. Wynne, the signal engineer, has worked out the best arrangement of a pick-up and discharge of tyre tablets which I have ever seen. I watched it working a great many times with trains moving at speeds of about 30 miles an hour and never saw a single failure.

"In New Zealand and Australia the general arrangement of signalling in the past has followed the British Board of Trade methods. In Australia, however, they are adopting three speed three position American signaling very rapidly, this already having occurred to a considerable extent in South Australia and Victoria, and to some extent in New South Wales and Queensland, while it will undoubtedly be adopted in Western Australia.

"One very excellent arrangement which I investigated was installation of selective telephones for train running, under an arrangement which they call "central control" and continue to use all the other staff apparatus. This arrangement was giving excellent results and it is probable that this scheme goes about as far in expediting the traffic as practical, while still retaining all the features of complete safety of operation. The British railroad man looks with suspicion on the word "despatching." In fact, to him the despatching method of running trains is synon-

The secretary made the request that the regional committees send in their reports for the next meeting before June 1.

Committee XIII on Electrical Testing presented a drawing covering an adjustable resistance which gave rise to spirited discussion. While some of the members wished to have this drawing accepted for submission at the annual meeting, feeling that while the resistance would not meet all conditions it was a step in the right direction and improvements could be made later as found necessary. The majority voted not to consider it for presentation to the annual convention.



Frank Rhea

ymous with careless train running. Therefore, in referring to this method I found it better to use the word "central control" instead of telephone despatching.

The labor situation in Australia probably deserves all that has ever been said of it, but the conditions are strikingly different from those with which we are familiar in America, in that the common labor is the organization which entirely dominates the situation, rather than the skilled and more highly paid trades. The railways are manufacturing many of the requirements in their own shops, at times doing this at a higher cost than that for which they could be purchased, but doing so for the reason that labor demands employment. The organizations of the railways are more highly departmental than anything we have in the United States. In fact, this is so much so that I have termed it the branch method of organization, the cleavage between the branches being very distinct, and extending in every instance to the administrative head of the department. The method of train operation is what I have termed the "station master method." By this I mean that instead of despatching methods of running trains, the trains are controlled and directed by the station master at each station as they proceed over the line. This method is no doubt necessary in such countries as China and Japan, but is not as expeditious an arrangement as the one above described under central control, or as our despatching methods.

In China and Japan the railways are organized and operated much along the same methods as in Australia, except that the station master method is much more of a necessity on account of the class of help employed by the railroads. The Japanese railways are all government owned and are exceedingly interesting instances of the results of government ownership. The South Manchurian railway, which is actually owned by the Japanese government and administered by the colonial department, is probably one of the most successful cases of government ownership in the world today. The employees of the Japanese railways, however, are of all intents and purposes a part of a military organization. Every employee is ranked and graded, and every official is in uniform, even to the extent of carrying a small sword. We have heard a great deal about the aggressiveness of the Japanese, but if their position is to be understood one has to take into account the fact that they have an inadequate supply of steel and fuel and that their anxiety to secure control of

adequate supplies is one of the reasons why they are attempting to secure these supplies from China. The Chinese railways are operated under the same scheme of organization. There is no doubt that China is one of the best examples in the world today that trade follows investment. The financial control of the Chinese railways has in the past very largely determined the awarding of the business. In my report I expect to make certain suggestions regarding the refunding of certain of the Chinese railway obligations. This suggestion is made for the reason that the Chinese railways today are earning good returns on the investment, and there is no doubt that additional railways can be built and earn handsome returns in the future.

In Australia the American signalling concerns have representatives on the ground who are looking after the business in a very satisfactory manner, and it is probably

about as well taken care of as any other branch of the railway market.

I would like to call attention to two points which I consider important in the handling of foreign business. One is the necessity of sending either seasoned, experienced men, or younger men if they are of good material, but it should be understood that they should go under contract for very considerable periods, at least for five years, and preferably for ten years. The other point is the necessity of American concerns protecting their interests by taking out patents in Japan. The issuing of patents in Japan is done in accordance with the international agreement on patent laws. While American concerns may do very little business in the future in Japan, in my opinion it is necessary to protect American interests in competitive territory by devices which may be made in Japan in case the patent situation is not protected.

Report of Committee VII—Direct Current Relays



THE COMMITTEE submitted reports on the following subjects:

1. Recommended resistance of track relay.

2. Table showing minimum resistance allowable in series with track battery for track circuits.

The committee presented the following statements on which it based its conclusion relative to the use of the 2-ohm vs. the 4-ohm relay:

1. Because of its lower operating voltage, the 2-ohm relay will operate with a lower ballast resistance.

2. The 2-ohm relay is less susceptible to leakage current from adjacent battery entering track circuit through insulated joints.

3. The energy consumption for the 2-ohm relay on equal track circuits is approximately fifty per cent less when the track is occupied. When the track is not occupied the energy consumption will be less when the ballast resistance is less than five ohms per thousand feet.

4. The length of track circuit may be increased with the use of the 2-ohm relay if no foreign current is present and the resistance between the battery and track is not less than the recommended limiting resistance.

5. On track circuits of equal length the 2-ohm relay gives equally as good protection against broken rail where no foreign current is present.

6. On track circuits of equal length, the 2-ohm relay will release with a higher shunting resistance across the rails when foreign current entering the track circuit is less than .350 amperes.

7. Considering track circuits of equal length and with other conditions equal, no definite recommendations can be made in favor of either the 2-ohm or the 4-ohm relay where foreign current is present, on account of there being conditions where each has its advantages over the other.

8. With a foreign current present, the 2-ohm relay on a track circuit of its maximum operable length will receive more combined foreign and track battery current than will be received by a 4-ohm relay on a track circuit of its maximum operable length.

9. When a battery lead or a rail is broken and the

track circuit between the break and the relay is shunted, the 2-ohm relay will be more susceptible to foreign current than the 4-ohm relay. With the track circuit not shunted, the 2-ohm relay will be more readily picked up by foreign current only when the current enters the track circuit through a resistance less than 5 ohms.

In view of the above statements, the committee recommended the use of the 2-ohm relay with caustic soda battery, provided the recommended limiting resistance is used in series with the battery. The recommended limiting resistance should also be used in series with the battery wherever the 4-ohm relay is used with caustic soda battery.

It was recommended that the above statements be accepted for presentation to the Annual Convention for approval and submission to letter ballot for insertion in the Manual.

Table of Minimum Resistance Allowable in Series with Track Battery

The committee recommended that the past practice of using a battery of three gravity cells in multiple (without added external resistance) and a 4-ohm relay be adopted as a basis of a standard in determining the limiting or external resistance for use in connection with track circuit operation.

The following table is computed on the above assumption and covers batteries containing every known type of primary or storage cells.

Battery Voltage Limits.		Minimum Resistance between Battery and Track Ohm.
4-ohm Relay.	2-ohm Relay.	
.37-.51	.19-.35	.1
.52-.76	.36-.52	.2
.77-1.01	.53-.69	.3
1.02-1.26	.70-.86	.4
1.27-1.51	.87-1.03	.5
1.52-1.77	1.04-1.21	.6
1.78-2.02	1.22-1.38	.7
2.03-2.27	1.39-1.55	.8
2.28-2.52	1.56-1.72	.9
2.53-2.77	1.73-1.89	1.0
2.78-3.02	1.90-2.06	1.1
3.03-3.27	2.07-2.24	1.2
3.28-3.52	2.25-2.41	1.3

The voltage given in the table refers to the maximum operating voltage of the track circuit battery when the current from the battery is the minimum possible with a .06 ohm train shunt, with the recommended resistance between battery and track, and with assumed adverse operating conditions. This operating voltage can be determined for a battery of any type, number and arrangement of cells, by measuring at 21 degrees C. (70 Fahr.) the voltage of the whole battery when its discharge is

25 amperes, if 4 ohm relays are to be used, or 1.7 amperes, if 2-ohm relays are to be used.

It was recommended that this table be accepted for presentation to the Annual Convention for approval and submission to letter ballot for insertion in the Manual.

Committee: E. G. Stradling (C. I. & L.), chairman; James Anderson (N. Y. C.), vice-chairman, F. F. Ambach (B. & O. S. W.), B. H. Ayers (I. & N.), C. W. Burrows, D. M. Case (Southern), A. R. Fugina (I. & N.), E. W. Kolb (B. R. & P.), H. W. Lewis (L. A.), A. F. Pratt (Frie), C. A. Veale (S. P. Co.).

Discussion

E. G. Stradling (chairman): The first half of the report on relays is presented for discussion, not for motion.

E. G. Hawkins (N. Y. C.): Does section 3 of the report refer to equal track circuits?

Mr. Stradling: If we had them equal, we would have to have all track conditions equal.

Mr. Hawkins: It refers to power rather than current?

Mr. Stradling: No, more to current. To effect saving on your batteries is the idea.

T. S. Stevens (A. T. & S. F.): Referring to paragraph six, does that mean the current measured between its possible source and the track, or across the rails?

Mr. Stradling: Across the rails. I would like to make a motion that the Association approve the use of the two-ohm relay with a caustic soda battery, this motion to be submitted to a letter ballot.

Mr. Hawkins: Referring back to number three, if all things were equal, you would think with the circuit occupied, the consumption of the current would be the same.

Mr. Stradling: With your two-ohm relay you can put more resistance in the consumption of your batteries, which will choke back the flow of the current.

A. R. Fugina (L. & N.): As to the matter of determining what the ballast resistance is of your track circuit, that can be done by taking your R. S. A. formulas, that have been developed by the Committee on Testing, and finding what the balance of resistance is.

F. B. Wiegand: I would like to ask the committee if they recommend track circuits of equal length or greater length when using two-ohm relays?

Mr. Stradling: Equal with the four-ohm relay.

Mr. Wiegand: What I would like to determine is whether the committee recommends a track circuit of equal length or greater length, when using a four-ohm relay than when using a two-ohm relay.

Mr. Stradling: We recommend greater for the two-ohm relay.

B. T. Anderson (D. L. & W.): In paragraph 3 reference is made to ballast resistance less than five ohms per thousand feet. I would like to get the percentage of all track circuits that are less than five ohms.

Mr. Stradling: I don't know that I can answer you on that.

Mr. Anderson: Do you recommend the use of the two-ohm relay on all track circuits, or just on track circuits less than five ohms?

Mr. Stradling: On all track circuits.

P. M. Gault: I would like to ask if the committee has considered any other relay than the two-ohm relay? They compare the two-ohm with the four-ohm, but they have mentioned no other resistance. That would lead us to think from this report that there are but two types of track relays.

Mr. Stradling: Our answers here are from 35 railroads, which shows that there were no other resistances

used except four ohms, consequently we compared the two-ohm with the four-ohm.

H. G. Morgan (I. C.): The Illinois Central has been using relays of three ohms quite considerably. We have found that the total energy consumption for dry as well as wet conditions will be practically the same and from 8 to 10 per cent less than the two-ohm relay on the same track circuit, and our experience seems to be that the three ohm relay will operate with more efficiency on the track circuits on the voltages that are within the range. You can operate on our track circuit on two-ohm relays as well as you can on three, but with the three ohm relays you can do it at less cost. They will operate with less cost and a higher voltage resistance than the two-ohm.

G. H. Dryden (B. & O.): I understand that in the conclusion the two ohm relay is worked only where a constant battery is used.

Mr. Stradling: That is true.

Mr. Dryden: Are we not producing a dangerous condition, if the two-ohm relay is considered unsafe unless a particular battery is used for its operation? Can we force our repairmen to keep one type of battery on the circuits constantly? Again, in criticizing the same subject one year ago, I stated at that time that I did not understand why the three gravity cells in multiple with added external resistance to a four-ohm relay should be adopted as a basic standard covering the external resistance in connection with track operation. I am of the same opinion still, that this basis of conclusion was wrong, and that the safe working current to relay coils is the proper basis for the conclusion of this committee. I will ask to hear something on that subject.

Mr. Wiegand: Another point, with reference to the committee recommending the use of long track sections, when using the two-ohm relay. I would like to know why the committee recommended the longer track section when in article 8 they say, "With a foreign current present, the two ohm relay on a track circuit of its maximum operable length will receive more combined foreign and track battery current than will be received by a four-ohm relay on a track circuit of its maximum operable length." And then in article 9 they say: "When a battery lead or a rail is broken and the track circuit between the break and the relay is shunted, the two-ohm relay will be more susceptible to foreign current than the four-ohm relay." Would it not be better to confirm the two-ohm relay to the same length of track circuit as the four-ohm relays?

Mr. Stradling: We give you these arguments relating to foreign current conditions for your information. We know that there are many track circuits where you do not have foreign current, and probably will not have, and therefore why not make them as long as possible and use the two-ohm relay?

Mr. Anderson: I question whether it is clear to all the members, as to what the committee is actually recommending, as superior. Do I understand that the committee is recommending the two-ohm for 100 ft track circuits?

Mr. Stradling: We recommend it for all lengths of track circuits, but give you the information so that you will have the advantage of being able to use it for longer track circuits, in the case of the two-ohm relay.

Mr. Anderson: I am considering the conditions on roads where the track circuits run anywhere from 200 to 500 ft. in length. I think most of the members will agree that on a short track circuit in interlocking limits the four ohm relay can be operated at less cost than the two-ohm relay. It seems to me unless it is generally

understood that is the case it would be foolish to recommend the two-ohm relay if it will cost more for battery material.

Mr. Fugina: It will be difficult to recommend a relay for all conditions. We do not recommend the two-ohm relay as one which can be used for every track circuit, and be the safest relay that may be used and also the most economical. We are attempting only to recommend the relay that generally is the best for the battery. For that reason we have set out in these conclusions certain conditions in which the two-ohm relay is not as advisable as the four-ohm relay. Likewise there are some conditions obtaining where the four-ohm relay is not advisable to be used, and those of us who are in charge of this work know the conditions under which we may simply use a two-ohm relay, the conditions under which we should use a four-ohm relay, and also the conditions under which we should use the larger relays.

L. R. Mann (M. P.): I notice the committee says: "In view of the above statements, your committee recommends the use of the two-ohm relay with caustic soda battery, provided the recommended limiting resistance is used in series with the battery." What is the object of that provision?

C. F. Stoltz (C. C. C. & St. L.): The idea is if you have a storage battery which carries about two volts, there is nothing to be gained by putting enough resistance into it to consume the wattage and get your voltage down to operate a two-ohm relay. If you have plenty of voltage, there is no necessity for going to the lower resistance relay.

The idea of the motion was to recommend that the association sanctioned the use of a two-ohm relay as a safe proposition.

Mr. Mann: Would it not be advisable in cases where there is plenty of voltage that they use the eight-ohm relay?

T. S. Stevens: As I understand the recommendation of the committee, they simply ask us in a conservative way to lend our sanction towards using the two-ohm relay. I think the committee's recommendations are very good and very conservative, and I hope the resolution will meet with the approval of this meeting for submission to the annual convention.

Mr. Mann: I think the motion of the committee is good and would support that if they would qualify it; that is, I don't know that the two-ohm relay has been in enough practical use to make an absolute recommendation.

Mr. Dryden: Our road is using two-ohm relays. I think we have at least 300 or 400 in use. The point that we want to bring out is whether or not it is a safe relay provided we increase our voltage. Is it a safe relay if we multiple ourselves? Is it a safe relay if we use a caustic soda battery of higher voltage? In this committee's report they should not confine themselves to the use of a certain battery, but rather to a certain voltage or working current. The relay is safe under normal operating conditions, regardless of the kind of battery used.

Mr. Stoltz: As to the safety of the two-ohm relays, there are probably 35,000 or 40,000 four-ohm relays being operated by caustic soda batteries at the present time, and the Association has never given any sanction to caustic soda batteries with four-ohm relays without external resistance. There is a greater chance of an unsafe condition with a four-ohm relay and no external resistance in a caustic soda battery, much greater than there is with a two-ohm relay and external resistance.

Ray Marshall (G. N.): The report refers to the feasibility of operating track circuits of greater length where the two-ohm relays are used than with the four-ohm. That might be misleading, for the reason that often after track circuits are installed, conditions in the territory change, and where originally no foreign current was found it appears later. Would it not be better to standardize the length of track circuits, and apply either two or four ohm relays as conditions require?

A. Dobson (N. Y. H. N. & H.): I would like to straighten out the last part of that clause which speaks of foreign current entering track circuit through resistance of less than five ohms. Foreign current enters the track circuit usually along the rails. There will be one track circuit perhaps at some place where foreign current comes onto that particular track circuit, but all the other track circuits that are affected by this particular source of foreign current receive this current through the rails, therefore that current has to flow through or upon the insulated joint. That brings us to the point at once that in the great majority of cases where foreign current is found on track circuits, it enters that track circuit through resistance considerably greater than five ohms, because it must at least flow through the insulated joint before it reaches the track circuit, as well as through the other resistance which it may encounter between the source and the rails.

In regard to the amount of current which is supposed to be flowing along the rails, not across the track, it does not matter what the resistance of the relay is usually, the amount of foreign current that will flow from rail to rail will be the same whether the relay is two ohms or four ohms, on an average, and the resistances back of them are so great that a resistance of two or four ohms but very slightly affects the current.

There is another point that has not been brought out in this meeting. It is stated that the four-ohm relay would be safer in cases where a potash battery was used if all the resistance between the battery and the track was gone. A four-ohm relay would be safer under those circumstances than a two-ohm relay. That is true as a bald statement, but the thing that operates a track relay is the shunt, and it is the resistance of the shunt upon which depends the amount of current that will flow from the relay. To give you just roughly some figures that will show the difference under those two conditions with no resistance between the rail and the battery, with a two-ohm relay and a shunt across the battery end, the resistance of the shunt necessary to lower the current enough for the relay to drop away is something like .0016. With a four-ohm relay, under the same conditions the resistance necessary to lower this current enough for drop-away purposes is .0014, a very slight difference when you speak of it in actual figures.

Mr. Stradling's motion was then seconded and carried.

Mr. Stradling: The final portion of our report relates to the "Battery voltage limits." The committee feels that the table given is vitally important to the railroads using caustic soda batteries, either with four- or two-ohm relays.

Mr. Anderson: As I understand this table, it refers to only one type of potash battery—it does not refer to the potash track battery?

Mr. Stradling: It refers to any battery that has this voltage, even to the storage battery.

E. G. Hawkins (N. Y. C.): Referring to the latter part of the paragraph, where it refers to the discharge in connection with the four-ohm relays in 2.5 amperes, if the four-ohm relays are to be used, or in 1.7 amperes,

if two-ohm relays are to be used, is it necessary to discharge the 2.5 amperes with four ohms and only 1.7 amperes with two ohms?

R. W. Frwin (Nat. Carbon Co.): The current figures there as shown in that part of the paragraph are merely to enable you to determine at what place in this table your batteries should come under, and we have

used here the minimum of a .06 ohm train shunt, and we have assumed the most adverse operating conditions. You ask why there is a difference in the two relays. The current value for the relays was the standard R. S. A. value, and these vary with the train shunt permissible and the different current values that go with the voltage life.

Report of Committee III—Power Interlocking



THE COMMITTEE reported progress on the subject, "Prepare unit specification for electric motor switch operating and locking mechanisms," and also submitted drawings of typical circuits for power interlockings. The circuits were assigned last year, but were not completed in time for submission to the annual convention.

Progress was reported on the subject, "Prepare Specification for Fiber Conduit." The report is about completed, and it is expected to be presented for discussion at the New York

meeting.

Progress was reported on the subject, "Prepare Unit Specification for Electric Interlocking Machine." The committee also submitted a report, "Requisites for First Range Voltage, Electric Interlocking." A report on this subject was submitted at the last annual convention, and referred back to the committee. The committee has considered the recommendations made at the annual convention, and again submitted the report for discussion at this meeting.

Typical Circuits for Power Interlocking

The subject matter presented under this heading consisted of three drawings for Federal Signal Company's electric interlocking. They are for:

- 110-volt d.c. one-arm non-automatic signal.
- 110-volt d.c. switch and lock movement.
- 20-volt d.c. switch and lock movement.

The committee submitted the circuit drawings for Federal Signal Company's Electric Interlocking, and asked their acceptance for approval at the next annual convention, as information.

Requisites for First Range Voltage

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1. The rated voltage for the operation of the switch mechanism shall be 20 volts.
2. The time required for the operation of the switch mechanism shall not exceed 30 seconds at rated voltage, nor shall the time exceed 40 seconds with voltage at 20 per cent below rated voltage.
3. Provision shall be made in the design of the switch mechanism to prevent an unauthorized movement.
4. The switch mechanism shall be so constructed as to permit an emergency operation. Provision to be made for automatically interrupting the operating circuit during such emergency operation.
5. Rails of track circuit shall be connected in series so far as practicable.
6. Signals governing movements from the siding shall be of the { automatic
semi-automatic stick } type.

7. Normal and restricted speed signals governing movements on the main line, shall be of the automatic semi-automatic type.

8. Approach signals or slow boards shall be installed on the main line.

9. Approach locking shall be installed

10. Repeater or lock indication for switches and signals shall be provided at point of control.

11. Operation of switch mechanism shall be controlled by section locking.

12. The circuits controlling the switch mechanism shall provide protection from unauthorized movements due to disarrangement of conductors.

13. The normal and restricted speed signals shall be so controlled that unless all switches, movable point frogs and derails over which they govern, are in proper position and locked, the signals will assume the stop position.

14. The opening through which the hand crank for emergency operation is to be applied on the switch mechanism shall be provided with a weatherproof cover attached to mechanism case and equipped for purchaser's standard switch padlock. Location to be conspicuously marked.

The committee submitted the Requisites for First Range Voltage Electric Interlocking, and asked their acceptance for approval at the next annual convention, as information.

Committee F. B. Wiegand (N. Y. C.), chairman; J. S. Raymer (P. & L. E.), vice-chairman; W. Pileging (U. P.), vice-chairman; Daniel Gosling (Un. Ter. Co.), A. B. DuBray (L. C. C.), N. S. Lynch (Mo. Pac.), J. W. Macfarlane (K. C. Ter. Co.), O. R. Unger (Mo. Pac.), J. B. Weid (L. & N.), G. A. Zichke (U. P.), B. J. Schmidt (T. & O. C.), H. L. Kilian (N. Y. C.), H. H. Orr (C. & T. L.), L. A. P. (W. Wash.), J. C. Scaman (N. Y. C.), T. C. Sofer (C. & O.), W. C. Silda (N. Y. C.), A. H. Schum (M. C. R. & I.), G. H. Bernette (Monongahela Ry.), W. D. Carroll (P. & O.), G. A. Motry (B. & O.), G. Toft (P. R. R.), L. E. Kinn (P. & O.), E. C. Hitebeck (N. Y. N. H. & H. C.), G. M. Conner (W. Va. Term. Co.), G. R. Scantling (P. R. R.), Charles S. (A. L.), G. C. Whitney (N. Y. M. & W. Long. S. C.), (N. Y. C.), Thom Birdseye (P. R. R.), Walter T. (O. C.).

Discussion

Chairman Wiegand: The committee has submitted the drawings for submission to the annual convention. I move they be accepted.

(Motion seconded and carried.)
Mr. Wiegand: The committee again presents a report on requisites for first range voltage, electric interlocking.

A. R. Lugina (G. N.): The electric interlocking 3 and 4 are rather advisable, though I am not entirely sure. I would like to know just how they expect this to be done, how are you going to control the unauthorized movement.

Mr. Wiegand: The committee's report is only on what might be termed requisites covering the construction of structures. Sub-committee B is now handling the units

of specifications. In the specifications which will be submitted with our next report, I feel that that will be taken care of, and the report will show just how it can be done. Just now I could not say.

Mr. Fugina: Are the low voltage machines that are now being placed on the market manufactured according to this provision?

Mr. Wiegand: That is something I could not say. I understand, however, that requisites can be made. The committee are working with the manufacturers, and so far as I know there has been no question in regard to meeting this particular requisite.

The committee offers a suggestion. It desires to re-word section 7 as follows: "Signals governing normal

and restricted speed movements on the main line shall be of the automatic, semi-automatic type."

In 8 a change in the wording is recommended by the committee: "Signals that may give approach indication or slow board shall be installed on the main line." In 13, a change in wording is suggested: "Signals that may give the normal or unrestricted speed indications shall be so controlled that unless all switches, movable point frogs and derails over which they govern are in proper position and locked, the signals will assume the stop position."

(On motion the recommendations were approved and the committee was excused, with the thanks of the Association.)

Report of Committee VI—Standard Designs



THE COMMITTEE PRESENTED ten drawings; one of which is a revision of a previous issue, eight are new designs, and one is presented for discussion.

The following revised and new drawings were submitted (with the exception of 1258, which is submitted for discussion only) for discussion and presentation to the annual meeting for approval and submission to letter ballot:

1362—Ladder Parts. (New.)

1363—Ladder Hand Rails. (New.)

1364—Ladder Platform. (New.)

(New.)

1365—Ladders for Ground Mast Signals. (New.)

1366—Ladders for Bracket Mast Signals. (New.)

1371—Ladder Clamps and Stays. (New.)

1372—Ladders for Bracket Posts. (New.)

1376—Double Tang Ends. (New.)

1065—Signal Blades. (Change in title only—revised.)

1258—Assembly of Fittings for Locking Switches Mechanically at Interlocking Plants. (New.)

Committee: F. P. Patenall (B. & O.), chairman; J. C. Mock (M. C.), vice-chairman; W. A. Hanert (N. Y. C.), C. J. Kelloway (A. C. L.), B. H. Mann (Mo. Pac.), F. W. Pflieger (U. P.), W. M. Post (P. R. R.), M. E. Smith (D. L. & W.), R. E. Trout (St. L.-S. F.).

Manufacturers' representatives: I. W. Hackett (Fed Sig. Co.), W. P. Neubert (U. S. & S. Co.), H. B. Taylor (Hall Sw. & Sig. Co.), S. N. Wight (Gen. Ry. Sig. Co.).

Discussion

Mr. Patenall: Your committee presents 10 drawings, one of which is a revision of the previous issue with some new designs, and one is presented for discussion. We would like to have you first discuss the drawing on ladder parts. The attempt of the committee at this meeting is to present a plan which we hope will hold good for some time. The object is to provide a ladder which will be applicable to all types of signals, keeping in mind the matter of providing more safety for our men working on these masts. We ask the approval of the plan for presentation to the annual meeting, and final submission to letter ballot.

Mr. Morrison: How much will this increase the cost of signals?

Mr. Patenall: This committee has not made any study of what the additional cost of the ladder will be, but in

a general way we would assume that the platform will add two or three dollars to the cost of the ladder.

C. A. Dunham (G. N.): The committee has stated that one of the main objects is to make it a little safer for the man who has occasion to climb the signal masts. I would like to ask if the increased width of the ladder shown at the head of the drawing as 1 ft. 11 in. in width will not introduce a complication wherever signal masts are located between tracks on minimum clearances?

Mr. Patenall: With a new design used in connection with the signal mast, either in the case of the mechanism or a wider platform used in connection with the mast, the ladder will prohibit the placing of the signal unless you have sufficient track centers and of course the fact that you do use a wider platform means that your clearance diagram may be encroached on by this particular arrangement.

Mr. Dunham: In the light of what has just been said, there would seem to be considerable objection to adopting a standard requiring a ladder 1 ft. 11 in. in width for general use.

Mr. Patenall: You understand that the lower arm on the standard signal was located in reference to clearances, and that being the case its platform, if provided, will also be well outside the clearance diagram, so that we do not experience any difficulty in applying these platforms, and in the case of any particular mast, in connection with which you desire to use these platforms, we would assume that the particular mast is outside of the standard clearance diagram today.

(The drawing was accepted for presentation to the annual meeting for approval and submission to letter ballot.)

Mr. Patenall then presented plans 1363, 1364, 1365, 1366, 1371 and 1372, having to do with ladder parts, all of which were approved for presentation to the annual meeting and submission to letter ballot. Similar action was taken on plans 1376 and 1065.

Mr. Patenall: I want to make a personal appeal to this meeting on the question of painting signal blades, as well as an appeal to reduce the number of different dimensions. I communicated this last year with 89 railroads on the subject of painting and sizes of signal blades, and Heinz' 57 varieties of pickles were not in it when it came to signals. We ought not to allow a condition to exist in this country where we have so many varieties and sizes. I hope next year at this time someone will be able to report that 95 per cent of the railroads are using R. S. A. standard blades.

At the meeting in New York last year there was considerable discussion on the question of a plan which

would show the mechanical locking of switches. The plan, 1258, you have before you bears out the recommendation made by Committee II, and we present this plan for argument and discussion. The members will note particularly the operating rod and the lock rod are inclined vertically, rather than in the ordinary way. As a matter of strength, the committee has to concede that there is a great deal in placing switch rods in that way, although that is not a new method. You will note the adjustable arrangement of the lock rod, which admits of fine adjustment. Another specialty is in the adjustment of the operating switch rod sockets, which is a detail I think the members might desire to study rather carefully. This plan embodies also the rectangular block. We would like to hear from the members on this particular point.

Mr. Stradling: I would like to offer a suggestion in the connection of the switch block or lock rod to the front rod, that the same bolts be used for that connection that are used for getting the adjustment on the front rod.

Mr. Patenall: I think the point made by Mr. Stradling is quite apropos. There is apparently a means of saving two volts by doing what he says. I would also like to hear from the members who use adjustable rail braces as a general practice.

Mr. Dunham: Plan 1258 certainly embodies many important features. If this plan is adopted it means a very appreciable departure from what is now general practice in several details. The lock or plunger casting, as we usually call it, now in general use, so far as I know has generally been very satisfactory, and if that is true, then what is the necessity for adopting a new design which requires the use of several parts not now standard? There is another point. Gage plates, as shown here, are insulated by means of turning the ends up, which may be a very good insulating proposition, but is there not objection from the standpoint of such ends being turned up and raising something in the track that a man would fall over?

I would also like to ask the committee if the spacing of the first head rod and the lock rod is in accordance with the dimensions submitted for approval by Committee II at various times. Touching the question that Mr. Patenall raised concerning the use of adjustable rail braces. My own experience is that the solid rail brace is best. The occasion for the use of an adjustable rail brace comes about largely from the ties being driven down, and when the signal repair man feels that he needs an adjustment, he tries to introduce it perhaps by stretching the rail brace, when what he really needs is to have the ties tamped up to the rails. The tendency is for the track gage to spread a little, and you do not really correct the matter properly by adjusting the rail brace.

The only occasion, as I see it, for the use of an adjustable rail brace is to overcome the wear in the brace. I am assuming, of course, that the brace is sufficiently rigid to stand the strain without bending.

Mr. Morrison: In our experience we found that it was difficult to keep the switches sufficiently tight, but by the introduction of the adjustable rail brace we have overcome that difficulty. Perhaps we are shy a few section men to keep our ties tamped; perhaps we have heavy motive power, and perhaps we use our switches a great deal at big terminals, but the adjustable rail brace has overcome our difficulties satisfactorily.

F. J. Ackerman (Kansas City Terminal): The terminal proposition, of course, at Kansas City, is decidedly different, and what I may say would not apply in a good

many instances. We have used the adjustable rail brace in that terminal territory since 1911. From past experience and observation I should say that results have been very good in this, and that I consider that we have been able to keep those adjustments and save much labor which might be required otherwise in resetting risers or shrinking plates.

As to the locking device, we have experienced no difficulty in keeping the switches in proper adjustment, which we could not have done if we had the solid rail braces.

F. B. Wiegand (N. Y. C.): We have been using the non-adjustable rail brace and up to the present time we have found no necessity for any adjustable brace. It is our practice to use the blade that is cut in the center, and so far we have found no necessity for tying the blades together as shown on the drawing.

Paul M. Gault (I. C.): I have been wondering whether the triple rods, as shown here, will prevent turning of the points. The rods we have been accustomed to use are made flat, and offhand it would appear to me that the points would tend to roll in this type of rod. Also, as to the method of insulating the tie plates. Many roads are having satisfactory results by cutting off a few inches of the tie plates.

Mr. Patenall: The purpose of the position of the rods as shown on this drawing is specifically to prevent the point turning. Under the old methods of applying the rods flat, we know that we did not get the results which we expected. It seems to have developed on some railroads that there has been a tendency for the point to turn under obstruction. That is not a point particularly made by this committee, but was given as a reason for the application of the rod by the committee.

It is a very difficult thing, in drawing a plan of this kind, to decide whether we shall have adjustable rail braces or whether we shall not. Someone called attention to the drilling as shown on the plan. We have no authority at this time for the drilling, other than the standard drilling of the A. R. E. A., and until that is changed we must abide by that plan. Someone mentioned the gage plate. This, of course, is the gage plate. An application which leaves a space between the plates on the tie without any connection at all cannot be considered a gage plate.

The committee has attempted to make tests which will give evidence as to the possibility of the relative resistance to strain between this type of plate and the lapped plate. In our opinion, the butt plate, such as is shown on this plan, will under all conditions of service stand up materially longer than a lapped plate because the stresses which take place are on the bolt, whereas with the lapped plate that stress is on the insulated bushing.

Mr. Dunham: Plan 1258 does not indicate how much the butt plate for insulating gage plate will stand above the base of the rail. I have in mind that this will be an obstruction, and objectionable on that account.

Mr. Patenall: If you will refer to the two drawings shown below you will get a very fair idea as to the comparative height of the plate, taking the rail into consideration. I should say offhand that two inches above the top of the tie would be a maximum height for that butt. It depends on the thickness of the plate. We are considering the use of 3/4 in. plate and that may increase the height. Whatever it is, it will only be sufficient to get the bolts and nuts clear. I understand that 2 3/4 in. is the maximum dimension over all.

C. A. Christofferson (N. P.): Anything that stands above the track, between the rails, is very objectionable. We have been using lapped plates, and have had some in

use for eight or ten years. I watched the insulation of that plate very carefully, and cannot see any wear on the insulation, nor can I see any reason why there should be wear on it, if the gage plate is properly fastened to the tie with lag screws. As to the front rod, it seems to me it would be a better plan to make the fastening for the lock rod down closer to the point, in order to get both of the ends the same length. I do not think there is any need of having any rod or rod piece. That means these rods each have to have a longer lock rod fastened in the center of the track.

J. Beaumont (I. C. C.): One year ago we changed from the vertical switch rod to the flat rod, and it was done for the purpose of securing more ample clearances and a higher degree of strength against track obstructions on trains. If this rod is placed on edge it will necessitate providing approximately three inches clearance below the rails in order to keep No. 1 rod clear at the ground. While that may not seem to be a serious matter, to my mind it means more clearance to meet this standard successfully under operating conditions than to provide for the flat rods. A rod of this kind, set on edge, is more easily bent by track obstructions.

Caleb Drake (C. & N. W.): I would like to disagree with Mr. Dunham's statement as to the adjustable rail brace lasting over a period of years. It is my experience that a 3/4-in. rail brace on heavy traffic might better be figured in months. I think the committee ought to be encouraged in the investigation of adjustable rails.

Mr. Morrison: I might say for Mr. Dunham's information that we have used the tie plate as shown on this plan for a number of years, and have not experienced

any difficulty on account of men stumbling over it, or its being struck by dragging equipment.

Mr. Dunham: I am perfectly willing to agree to this: that those wrought-iron or steel braces may last only a comparatively short time, but whether that enters the problem is not the real objection to the adjustable rail brace problem. The main reason that men have felt that they require an adjustable rail brace comes about from the fact that a wrought-iron or steel brace is not sufficiently rigid to maintain the track at the original gage, and for that reason adjustments are sought. I think the committee would do very well to ascertain what the practice is on our railways before suggesting the use of an adjustable rail brace.

Reverting to the insulated gage plate, shown in plan number 1258, I am very sure there is a substantial objection to an obstruction 2 3/8 in. in height being placed between the rails as indicated. The Northern Pacific are using an insulated gage plate or lock joint riveted together. Gage plates so insulated have been in use for a period of eight or ten years with entire satisfaction. That sort of construction is not objectionable, and it is economical.

Mr. Stradling: I believe the lapped joint to the gage plate would stand probably 1 1/2 in. or more above the base of the rail. It looks to me that we could frame it so as to turn this insulation upside down and have it out of the way. With regard to the adjustable rail brace, I feel you would either have to have an adjustable rail brace or an adjustable head rod to take care of the wear, and the adjustable rail brace has the feature of introducing more parts probably than a solid rail brace.

Report of Committee XIII—Electrical Testing

THE COMMITTEE PRESENTED drawing 1422, Adjustable Resistance for Testing, and asked that it be given consideration at the March meeting with a view of having it approved at the next annual meeting for submission to letter ballot.

Due to the obvious difficulty of drawing a specification of practical value for an adjustable resistance for testing purposes, the designs of which may vary so widely, the committee decided that a drawing should be prepared for this subject; this design is for practically all general testing purposes. The drawing is in sufficient detail and specific, so that the instrument may be purchased in the open market by reference to the drawing. Drawing 1422 was prepared with this end in view. Suggestions from manufacturers of similar apparatus, with reference to a number of details were followed by the committee. Several instruments, which were made in practical accord with this drawing, have given very satisfactory service.

Committee: P. M. Gault (I. C.), chairman; C. Drake (C. & N. W.), vice-chairman; M. A. Baird (Erie), H. Combs (L. P. & W.), C. A. Cotton (A. T. & S. F.), C. E. Earhart (A. & V.), T. Holt (Penna. Lines West), E. E. Ireland (C. I. & L.), G. W. Kydd (B. & O.), F. D. Morehart (C. M. & St. P.), T. J. O'Meara (N. Y. C.), D. W. Rosenzweig (So. Pac.), C. O. Seifert (B. & O.), C. F. Smith (U. P.), W. N. Spangler (P. R. R.), C. G. Stecher (C. & N. W.), L. L. Whitcomb (N. Y. C.)

Discussion

Chairman Gault presented an outline of the report and moved that it be presented to the annual meeting for submission to letter ballot.

L. R. Mann (M. P.): I notice the dimensions of this adjustable resistance are given at 13.5 in. over all. One that we have been using you can stick in your pocket.

The idea of having a small one that can be carried in that way is good. Did the committee go into the matter of small resistances?

F. P. Patenall (B. & O.): I ask whether these resistances can be purchased in the open market?

Mr. Gault: It was not made primarily for convenience in carrying, but as a testing instrument, if it were made smaller, it would be found impossible to get the necessary tubes on the inside.

R. E. Trout (Frisco): I am wondering how the committee came to suggest making the drop-away 500 on slot coils of a 1000-ohms resistance. I have in mind with this type of resistance shunt it would be necessary to cut off part of the cells of the operating battery. Would it be possible to have the instrument so you could insert enough resistance to avoid doing this?

Mr. Gault: In the lower right-hand corner you will find a diagram which shows the method of wiring.

Mr. Trout: I had in mind a series resistance with the circuit in the shunt on the battery. In a great many cases the battery feeds not only the slot coil in which you are making the test, but the mine relay in the rear.

E. G. Stradling (C. I. & L.): Referring to the diagram in the corner, it would appear you first have 60 ohms on your theoretical resistance, and then you move your switch and add 50 more, giving 110, and your next step would be an additional 100, so you have those steps in between 150 and 110.

Mr. Gault: Simply by moving the slide back in the tube you can get successive steps up to 350 ohms.

T. S. Stevens (Santa Fe): I do not think we have had quite enough information from the committee as to the necessity for as large a resistance as this. I would

like to ask the committee if that is the smallest practicable resistance, or if it is the best, whether something smaller could be designed which could be used by men other than regular inspectors?

Mr. Gault: There may be smaller tubes which would be satisfactory for the particular checks, such as a main tinner having only one type of product would require, but the committee did not think it would be of any use to design an instrument that could not be used by the general inspectors on any railroad.

R. W. Irwin (Nat. Carbon Co.): According to this wiring diagram, you cannot get any resistance between 210 and 250; in other words, the first two of the resistance tubes on the inner side must not be larger than

protest against the adoption of the report. There are a number of things that I consider the Association ought not to stand for. One is the fact that resistance is not continuous. You cannot get resistance between 110 and 150.

These units, which are mounted within the tube, are carefully filled in with insulating material so as to prevent the current from going out as much as possible. Asbestos wool is about as good an insulator and as poor a heat conductor as could be obtained. Furthermore, the cylinder is wound on bakelite, and while it is true bakelite is not a definite term, and there are a number of different qualities of bakelite, they are all non-conductors of heat.

Advance wire has been specified. Advance wire is a trade name. They might have specified several other wires which are also trade names. They might have specified constantin. I have taken a number of pieces of apparatus in which constantin was specified and put in Advance, and it was substantially the same.

I think the experience of the people who are manufacturing these rheostats should be taken into consideration. During the last week I have bought 15 slide wire rheostats, and the insulating wires are wound with nichrome. It might be interesting to say just a word about these rheostats I speak of. They represent the result of considerable study both in this country and abroad, and commercial experience in this country and abroad running back over maybe 20 years, and the wire is wound on a copper tube, covered with a burnt enamel, which gives perfect insulation and good conducting power.

There may be a few other points, but I have not tabulated them, and the criticisms I have made are those that occur to me as I look at this report. I think it would be much wiser for the Association to refer this matter of a rheostat back to the committee, rather than to go on record as favoring a design which we know could be improved.

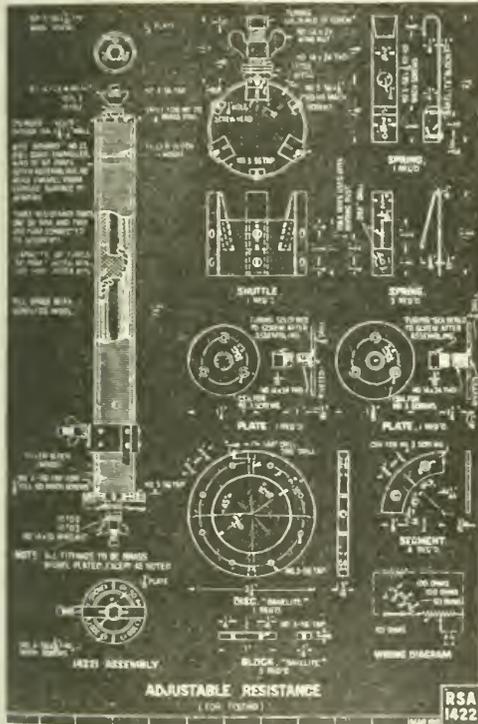
Mr. Gault: In regard to this tube, it may appear to be perfectly heat insulated, but your committee took this identical tube and tested it to its marked capacity for, I believe, three hours, and it heated very slowly.

In regard to the trade names mentioned, Advance wire and bakelite, your committee went into the specifications for that wire at quite some length, and the wire that was best suited for the manufacture, in our estimation, was a wire called Advance wire. I may be wrong, but I don't believe that is a patent wire. Bakelite, while a more or less general term as commonly applied to signals on railroads, is rather definite. It was necessary to have some kind of a support for the wire that would not warp and get out of shape in the rain, and would stand a reasonable amount of rough usage.

In regard to the continuity of the resistance, I don't believe that you will have any difficulty in making room for proper resistance on that wire. There is a small gap between 110 and 140 and another one between 210 and 240. I don't believe the men that tried to make had any difficulty on that account.

Mr. Petrucci: The resistance unit presented here is more for the specific purpose of being furnished to an inspector whose duty it is to make sliding contact in the inspections. I have to agree with Mr. Stevens that a smaller instrument might be of service for the use of reporting measurements and inspection.

Mr. Gault: I do not agree that this could not be generally used on railroads. The committee had no specific instructions to design a tube for one particular use. We therefore took it for granted you wanted something that could be used for any purpose. There could be



Details of the Resistance Unit

the resistance on the coil wire on the outside in order to get continuous resistance.

I. R. Mann (M. P.): I believe it would be possible to get any resistance or any carrying capacity in a much smaller space. The long tube, instead of being straight, can be in a circle.

R. B. Arnold (C. & N. W.): As to the covering of the wire to protect it from mechanical injury. The resistance units are put in tool boxes on motor cars and might be easily injured. I believe that a covering of some sort could be put over that tube and a sliding contact extended out through a slot so that you can move the slide back and forth and get it in the same working condition and still have protection to the wire.

C. W. Burrows (Bureau of Standards): I had not intended to take any part in this discussion, but I do not feel that I should sit here without raising my voice in

modifications made and parts of this tube omitted if you wished to make a cheaper tube. This is a practical unit and I cannot see any reason why we should not at least give it a trial.

Mr. Hawkins: There has been a lot of criticism as to not being able to get an adjustment between 110 and 150. Maybe the committee would be willing to adopt a slip, whereby they could slip over on the end and get that adjustment.

The President: The committee is willing to accept that suggestion. With this last acceptance I put the motion as to drawing 1422.

(The motion was defeated.)

The President: I will ask the committee to take the suggestion and criticisms that have been made on this subject and bring in a report at the next meeting.

The committee was excused with the thanks of the Association.

Report of Committee II Mechanical Interlocking



THE COMMITTEE PRESENTED A REPORT to the March meeting on unit specifications for painting interlocking machines, block signals and apparatus and materials used in connection therewith, with request that same be given consideration.

1. GENERAL.—All material must be of highest quality, and unadulterated. When request is made by purchaser, samples of mixed paint or its ingredients proposed for use shall be furnished for laboratory analysis.

2. MATERIAL.—Paints must conform to the purchaser's formulas and requirements when so specified, otherwise the best recognized practice shall be conforming to.

3. COMPOSITION.—The paint must consist solely of oil, gums, drier and pigment, in proper proportions, by weight.

4. VOLATILE MATTER.—The volatile matter must not exceed 5 per cent of the weight of the paint.

5. OIL.—The oil must be pure, raw linseed oil.

6. DRIER.—The drier must consist of a pure turpentine drier, free from benzine mineral oils and resins, and must be mixable with linseed oil without curdling.

7. PIGMENT.—The pigment must be so finely ground that when thumbnail test is applied, no feeling of grittiness shall be apparent.

8. COLOR.—The shade of the paint must conform strictly to the purchaser's specification.

9. DRYING.—Paint must dry so that next coat can be applied at expiration of 48 hours.

10. REJECTION.—Paint failing to meet the above requirements will be rejected. Where inspection is made at destination, shipment will be returned to the manufacturer, who must pay freight charges in both directions.

Shop Painting

11. CLEANING. (a) Outside iron connections, switch and signal fittings, not machine finished, also signal mast, both inside and out, before shipment from works, shall be thoroughly cleansed and given either a priming brush or dipping coat of red oxide or graphite paint:

(b) Machine finished surfaces, before shipment or before being exposed to the open air, shall be coated with white lead and tallow or the equivalent, in the form of a thick coat of paste which will have sufficient body and firmness to resist weather and prevent rusting, and will readily wipe off with cotton waste.

Field Painting

12. CLEANING.—Surfaces shall be thoroughly cleaned so that all loose or easily detachable mill scale, rust,

grease and dirt or other foreign substances are removed before paint is applied.

13. APPLICATION.—(a) Paint shall be well mixed, uniformly applied, thoroughly worked into all joints or open spaces, and each coat must be thoroughly dry before the application of the succeeding coat.

(b) Surfaces to be painted which will be inaccessible after erection must be given two coats before being assembled.

(c) Paint shall not be applied to outside surfaces in freezing weather, nor to wet surfaces.

(d) Priming coats shall be applied as soon as is consistent with the progress of the work.

(e) Finishing coats shall be applied in sufficient time for same to be dry when the installation is completed.

14. IRON WORK.—(a) Iron work (except interlocking machine, detector bars, gauge plates, iron foundation piers), not galvanized, shall be painted one priming coat and two finishing coats. Galvanized iron pipe shall be painted at threads, pipe rivets and wherever galvanizing is damaged.

(b) The following specific finishing coats shall be used:

	Color
Signal bridges and brackets.....
Signal masts.....
Dwarf signals.....
All connections.....

15. MACHINE.—(a) Machines shall receive one priming and one finishing coat as follows:

	Color
Machine from top of lever shoe to foundation supports, except finished part.....
Lever above shoes, except finished parts of latch handles.....
Block and interlocking mechanical signal.....
Block and interlocking power signal.....
Distant mechanical signal.....
Distant power signal.....
Dwarf signal.....
Switch.....
M. P. frogs.....
Switch and lock.....
Facing point lock.....
Mechanical and electrical bolt lock.....
Check lock.....
Crossing gate.....
Hand release.....

(b) Sufficient varnish to be mixed with last coat to produce a good gloss finish.

16. WOODWORK.—(a) Woodwork, such as junction, relay, bell, cable, battery boxes and closets, also trunking

and capping, shall be given one priming coat and finishing coats as follows:

Color	Number of Coats
.....
.....
.....

(b) Inside of trunking shall not be painted.

17. BRIDGING Interlocking stations and other buildings shall be painted as follows:

Color	Number of Coats
.....
.....
.....

Committee: C. J. Kelloway (A. C. L.), chairman; F. E. Whitcomb (B. & A.), vice-chairman; Samuel Miskelly (C. R. I. & P.), vice-chairman; G. W. Chappell (N. Y. N. H. & H.), C. S. Foster (P. R. R.), Oswald Frantzen (N. Y. N. H. & H.), G. W. McClelland (P. & R.), W. B. Morrison (D. L. & W.), Chas. Stephens (C. & O.), J. I. Vernon (N. Y. N. H. & H.), G. N. MacDougald (Virginian Ry.), E. K. Post (P. R. R.), R. W. Taylor (B. & O.), E. J. Relph (N. P.), Larsen Brown (A. T. & S. F.), Wm. Dawson (N. Y. C.), E. C. Carrol (C. & N. W.), F. E. Mack (C. & E. I.), W. F. Zane (C. B. & Q.), H. F. Lomas (I. C. R. R.), F. E. Jacobs (C. & W. I.).

Discussion

Vice-Chairman F. E. Whitcomb outlined the assignments of the committee and presented the report on subject 6 for submission to letter ballot.

F. B. Wiegand (N. Y. C.): I suggest the elimination of the words "proposed for use" in the third line.

Mr. Whitcomb: The committee will accept that change.

L. F. Howard (U. S. & S. Co.): In paragraph 7 that test for pigment I understand will procure a pigment which is practically of the same degree of fineness which is used in painting carriages and automobiles. I want to call attention to that so as to be sure there is no misunderstanding as to quality.

Mr. Wiegand: I would like to suggest a change in number 12, cleaning, "Surfaces must be thoroughly cleaned and all loose or easily detachable mill scale, rust, grease and dirt, oil or other foreign substances removed before paint is applied."

Mr. Whitcomb: I will accept that.
J. A. Peabody (C. & N. W.): It what has been stated is true relative to pigment, it seems to me that if a question that should be thoroughly considered before we adopt it, because here is a place where we certainly can save money, if any place. We do not need any such pigment as that for the protection of signal poles and relay poles.

Mr. Whitcomb: The idea was this, to have a pigment test that could be readily applied. All these other test most anybody can apply.

Mr. Peabody: If that has not been looked into, I think it should be, because it means a considerable cost.

Mr. Whitcomb: This was taken up pretty thoroughly by the committee with the structural engineers, and I don't think there was any one of them that objected to it.

F. P. Patenall (B. & O.): From the explanation given by Mr. Howard, I would think the committee is exactly right. If there is any place you can waste money on a railroad, it is in buying bad paint. I believe the committee ought to adhere pretty closely to what it has stated in its specifications.

C. Drake (C. & N. W.): I think it should be left optional in section 16, as to whether cedar trunking and capping should be painted.

Mr. Whitcomb: There is no objection whether you want to paint any of this trunking or not.

Mr. Drake: I understood this trunking and capping should be given one priming coat and finishing coat.

The President: The committee will accept the suggestion and arrange it so that that paragraph will be optional. There being no objection, these specifications will be presented to the annual convention for approval and submission to letter ballot for insertion in the manual.

Report of Committee XI—Batteries and Switchboards



IN REVISING DIRECTIONS for installation of storage batteries the committee presented for preliminary discussion and criticism directions for installation of lead type stationary storage battery, which if adopted will replace obsolete material now in the Manual.

Now that this type of battery is being used to a considerable extent in place of the gravity battery, the expensive installation of a battery well or chute does not appear to be warranted. It is felt by the committee that better inspection

and maintenance can be secured by the use of a box and that in most cases a material reduction of original cost will also be effected.

In revising specifications for soda primary battery and arranging with Committee VI for preparation of plan for 1000 A. H. primary battery jars, the committee is considering the revision of drawing 1043, R. S. A. Signal Cell, so as to eliminate the porcelain jar and to provide

in its place a round jar for the new 1000 A. H. cells.

The committee desired to have a discussion and expression of opinion on the following questions:

1. In addition to the round jars, should the standard drawing provide additional 500 A. H. and 1000 A. H. jars of a different shape?

2. If so, should such jars be rectangular or square, i. e., should it design a new square jar of those two sizes which will admit the use of both the round and plate type elements or should it follow the present design of rectangular jars which are in use on a number of roads and which use the same rectangular cover for both sizes of jar?

3. Should a solution line similar to the electrolyte line in the storage battery jar be provided with primary battery jars?

4. How close to the top of the jar is it advisable to bring the solution, bearing in mind the serious results which may be caused by spilling the solution in handling the jars in and out of battery chutes or wells?

Directions for Installation of Lead

Type Stationary Storage Battery

1. HOUSING.—(a) Battery should be isolated in a room or box, as the acid fumes given off during charge

are of a corrosive nature. This space should be well ventilated and lighted, and as dry as practicable.

(b) Inside of housing should contain no exposed metal work other than lead. If this is not practicable, such metal parts should be protected by at least two coats of acid-proof paint.

(c) Floor of battery room should be sloped, to provide proper drainage.

(d) Floor shall be preferably of vitrified brick, joined with pitch.

2. SUPPORTS.—Batteries should be supported on wooden racks or shelves of sufficient strength to prevent sagging or placed on layer of sand on floor of battery box. They should be arranged so as to permit access for inspection and cleaning and for the removing of any cell or element.

3. ERECTION.—(a) Fill the sand trays level with top with clean, dry sand, space trays uniformly on support so as not to touch the adjacent trays.

(b) Clean the jars and press them into sand until they have solid bearing and are in proper alignment.

(c) Scrape the contact surfaces of connecting straps of elements to insure good electrical connection.

(d) Place a positive and a negative group inside each jar in such a manner that the positive and negative plates will alternate with the two end plates negative. Arrange the groups so that the positive group of one cell will connect with a negative group of the adjacent cell. Straighten the plate lugs to prevent them from touching each other.

(e) Bolt the connecting straps together with the bolt connectors, making each connection tight. Connect rows of cells with lead tape or rubber-covered copper wire. Cover all bolt connectors and exposed copper with vaseline.

(f) Connect the charging circuit wires to the battery terminals with the positive wire of the charging circuit connected to the positive or dark brown element terminal.

(g) Before proceeding inspect all connections carefully to insure that they are tight and properly made, positive to negative; be sure that the charging current at proper voltage and under control is available and that the initial charge can be started immediately and can be continued to its completion.

(h) Unpack the wooden separator parts, which include wooden sheets and dowels. Insert the sheets into the dowels, with the grain of the sheets crosswise to the grain of the dowels. Place the separators between adjacent positive and negative plates with the dowels vertical. Place the glass hold-down in position on each cell.

(i) Immediately after separators are placed in position the cells should be filled with electrolyte to a height of three-quarters ($\frac{3}{4}$) of an inch above the tops of the plates or to the electrolyte line. The electrolyte should be of 1.210 specific gravity at 70 degrees Fahr., in accordance with R. S. A. specification.

(j) The initial charge must be started immediately after the electrolyte has been added to the cells.

4. INITIAL CHARGE.—(a) The initial charge should take from 40 to 60 hours at the normal charging rate, and should not be interrupted until the charge is complete, unless the temperature of the electrolyte exceeds 110 degrees Fahr. In this event, stop charging until the battery cools.

(b) Adjust the charging current to the normal eight-hour charging rate and maintain this value throughout the charge. Readings should be taken on every cell with a low reading voltmeter immediately after starting the charge, to insure that all the connections are properly

made, positive to negative, and that no short circuits exist.

(c) At half-hour intervals during the course of the charge, read the battery voltage and also the specific gravity of one or two selected cells. The voltage and specific gravity should rise as the charge progresses, and near the end of charge, each should have reached maximum value. Continue to charge for three hours after the maximum values have been reached. At the end of the charge, all the cells should be gassing freely and the specific gravity of the electrolyte in every cell should be stationary.

(d) If, at the end of charge, the electrolyte is not at 1.210 specific gravity at 70 degrees Fahr., it should be adjusted to this value, at the proper height above the plates.

(e) To raise the specific gravity, electrolyte of a higher density, or, if this is not available, electrolyte of 1.210 specific gravity should be added before next charge. To lower specific gravity, water should be added. If necessary, remove a part of the solution from battery before adding electrolyte or water.

(f) Water used in batteries should either be distilled or from a source which has been tested and approved for storage battery use.

(g) As the cells give off hydrogen during charge, an open flame should not be permitted near battery.

Committee: R. B. Elsworth (N. Y. C.), chairman; A. B. Himes (B. & O.), vice-chairman; J. G. Bartell (L. V.), G. E. Beck (N. Y. C.), W. E. Boland (So. Pac.), E. G. Hawkins (N. Y. C.), W. H. Higgins (C. R. R. of N. J.), J. F. Jacobs (C. R. R. of N. J.), T. L. Johnson (D. L. & W.), S. J. Knowlton (P. R. R.), A. H. McKee (O. W. R. & N.), L. F. Viellard (L. I.), C. O. Warner (N. Y. N. H. & H.), A. H. Yocum (P. & R.).

Discussion

(Vice-Chairman Himes called attention by number to the outline covering the directions for the installation of lead type stationary storage battery, asking for criticisms as each item was brought up for discussion. He brought out that the battery manufacturers had complained of the word "pitch" being used for joints, in vitrified brick floors, claiming that it hardens and will crack out. He stated that the committee has agreed to accept the criticism.)

T. S. Stevens (Santa Fe): Why not R. S. A. petroleum asphaltum? That won't harden and it is being used a great deal now.

Mr. Himes: The committee will accept Mr. Stevens' suggestion and look into the petroleum asphaltum.

Mr. Wiegand: I would like to refer to paragraph G of 3, erection. It says, "before proceeding," and I was wondering if that was before proceeding with the erection or proceeding with the charge.

Mr. Patenall: Proceeding needs correction.

Mr. Himes: The committee will change the wording of paragraph 3-G, as suggested.

Mr. Wiegand: In 3-H we speak of wooden separator parts; in 3-J we speak of separators. I was wondering if the same term could not be used in both paragraphs?

Mr. Himes: It hardly seems necessary after referring in paragraph 3-H to wooden separator parts which, of course, we know consist of the veneer and the pins, and so forth, supporting it, to repeat again the word "parts" in the following paragraph.

Mr. Wiegand: I think that word "parts" could be eliminated from H and have the paragraph read, "wooden separators."

The President: The committee will accept that suggestion.

H. M. Beck (Elec. Stor. Bat. Co.): Under number

one the statement is made that "battery should be isolated in a room or box." This is correct with the open type batteries, but there is a type of cells that is being put on the market which is intended to be used without a separate battery room, and on that account it would be a little more accurate if these directions were so changed as to refer to batteries of the unsealed or open type.

Upon the question of the use of pitch, which has been brought out, we have had some very sad experiences in our battery room with the use of compounds which are too brittle, where it is put in with the tile, especially if the temperature gets at all below normal, it not only chips, but it separates from the tile and allows the acid to go through to the foundation, to the concrete, and it attacks the concrete and causes a great deal of trouble. This is something which is very difficult to remedy after it has once occurred. On that account we try to pay particular attention to getting the right kind of compound at the start.

Number 3, under erection, Section A, specifies that sand trays should be filled with dry sand. I have found in going around not infrequently, ordinary building sand used for that purpose, and it is attacked by acids. I think that we usually specify what is known as bar sand or silica sand, which is not attacked by acid.

Section G, under 3: It is stated that the charge should start immediately after electrolyte is put in there. This is a wise precaution, but it is not necessary. There is no special harm results if a considerable period is allowed to elapse, and it is more convenient to handle it in this manner.

Number 4, initial charge A, states that this should not be interrupted until the charge is complete, unless the temperature of the electrolyte exceeds 110 deg. F. In this event, stop charging until the battery cools. I have often had cases where they have taken special pains to have men on the job and carry this on when it would take over 100 hr. In such cases it saves a good deal of time and trouble to interrupt a charge at night, and there is no injury results to the cells from doing so, if the charge is finally carried to the complete maximum.

That same section says that that charge will take from 40 to 60 hr. That is about right in round numbers, but it is much safer practice to go by the maximum load than by any fixed time, and therefore I would like to specify that the charge shall be continued to the maximum average of gravity, and for 10 hr. after the maximum has been reached.

With reference to Section D, it says that at the end of the charge the specific gravity shall be adjusted to 1.210. This again means a good deal of unnecessary labor, because it was quite an operation to adjust the specific gravity of a number of cells, 50 or more, to exactly the same point, and we find it is perfectly satisfactory to allow some leeway, and the practice of our construction department is to consider anything from 1.205 to 1.215 as perfectly satisfactory.

T. S. Stevens: I want to endorse what Mr. Beck has said as representing very clearly the Santa Fe practice, particularly about 4 (f). We work to the maximum without any specific time of charging at all, and in order to insure that we get that, after certain limited time, perhaps 1/2 hr. during the charge, instead of using 4 (c) we take the specific gravity of each cell until the charge is complete, and we know then that each cell has had its proper charge.

I should think it inadvisable to begin to adjust the electrolyte at the end of the charge. You do not know what subsequent charges are going to do to your electrolyte. It may be after a 10-hr. maximum you have

not done the job, until you discharge the batteries, and possibly discharge it twice, and you find that the specific gravity goes up, and you find you adjust the gravity, only to have to reduce it again. Mr. Beck is right in the fact that we have no need to work to 1.210 specific gravity.

R. B. Arnold (C. & N. W.): With reference to paragraph (h) on page 23, I believe it would be well to have some construction of that paragraph to take care of wooden separators after they have been unpacked and before they are inserted into the battery with electrolyte in and left in that condition over night, as sometimes occurs. I have found wooden separators on top of the box after they have been left over night, in some cases are dried out so that they are not good for further use.

Under paragraph (c) on page 24, I think that the best practice is to add water before the charge is begun in order to have the water thoroughly circulated with the acid, but I do not figure it good practice, if you wish to raise the specific gravity of the electrolyte to add electrolyte. I think that is an instruction of the battery companies, which is not good practice, that after you put in your density of acid, which you wish to specify, and then you find that the electrolyte has gone down in density, that you can remedy it by adding density to increase the specific gravity.

Mr. Himes: The committee will consider the point brought out by Mr. Beck, and present a report covering these items at the next meeting.

(A motion that the specifications as here revised be submitted to the annual meeting for approval and submission to letter ballot for insertion in the manual was carried.)

Mr. Himes: Subject 6 is entitled, "Revise specification for soda primary battery and arrange with Committee VI for preparation of plan for 1000-a, h primary battery jars."

Mr. Patenall: I would think to provide a rectangular jar for the 500-a, h. battery might result in making the application of setting up of the battery a little more compact than our present receptacle. On the other hand, I want to have the committee tell me why it should be necessary to have two types of jars when I can get nearly all the service I want out of one type. Of course, the same argument would apply with the 1000-a, h. cell. I understand some railways insist that for the 1000-a, h. battery they get either a square or a rectangular top jar. I think the committee should be rather careful in making recommendations in that direction.

Mr. Himes: The committee has not made any recommendation that we adopt any other size or shape of jar, but for some time past several railroads throughout the country have been using the 500-a, h. rectangular jar cell, and, as stated by Mr. Patenall, two or three companies have demanded square or rectangular jars for the 1000-amp. cell. Does the Association desire us to draw specifications for a square or rectangular jar, and will they use all elements and specify they shall be in square or rectangular jars and thus cut down the number of standards?

Mr. Trout: It seems to me it would be inadvisable to design a square or rectangular jar. Possibly it would not take care of the different types of design.

Mr. Trwin: Referring to what Mr. Patenall said, I believe the manufacturers would be delighted if we had only one type of jar and one type of cell. We want to get what the railroads wish but it would be much easier for us if we had to give only one thing.

(The motion made by Mr. Himes, that the rounded jar only is desirable as a standard, was put to vote and carried.)

Report of Committee X—Signaling Practice



THE COMMITTEE SUBMITTED reports on the following subjects:

Report on the problem of signaling single-track roads with reference to the effect of signaling and proper location of passing sidings on the capacity of the line.

Report on the feasibility of separating into distinct types of their own, the signals for train operation, and the markers or signs which indicate the location or position, or both, of information signs and switch signs for conveying information to trainmen and design suitable day and night (if necessary) markers or signs for switches, derauling switches, stop signs, slow signs, resume speed signs, water station and trackpan markers, highway crossing signs, etc.

Follow developments of automatic train control devices and report regarding such as comply with the A. R. A. requirements.

The Problem of Signaling Single-Track Roads

Further work on this subject was done in applying and testing formulas and methods on pieces of roads and the committee presented an analysis of the effect of passing track location on eighty-eight miles of line.

The analysis of this line is simple, due to the fact that there are no large yards or junction points and that it is used exclusively for freight service. The traffic consists almost entirely of solid tonnage trains between yards at South Pekin and Bend. The running time of these trains as used on sheets 1, 2 and 3 was obtained by computation from the tractive efforts of the locomotives in use, with their full theoretical tonnage for ruling grades. By the use of this method uniform results are obtained which are not possible when taking actual figures obtained by riding trains, unless the average of a large number are obtained, and the speed and time of a train at any point can be found, which is of considerable advantage in locating new passing tracks. These figures are checked by train dispatchers, and by actual figures obtained by riding several trains.

Sheet 1 is an analysis using all the present passing tracks with their present capacity. In this and succeeding analyses the stop for water north of Womac made by all southward trains is not necessary for locomotive requirements, but is made according to rule to relieve the water station at Bend.

It must be remembered that the minimum time between trains is determined by finding the maximum sum of schedules between passing sidings as shown in column K, sheets 1, 2, 3 and 5.

In using all the present passing tracks there are cases where they are so close together that the delayed time is large. Certain of these tracks can be left out and still maintain the same minimum time between trains (it may be advantageous to do this even though the minimum is increased slightly), with a decrease in the delayed time to southward trains waiting for meeting. On sheet 2 is shown an analysis using only the passing sidings which can be used to best advantage in eliminating delayed time.

Sheet 3 shows the schedule as worked out under the

proposed rearrangement. In this rearrangement the following existing tracks are to be extended to 100-cars capacity, the direction of the extension being that to give the best balance of time, due consideration being given to grade, curve, highway crossings, bridges and other conditions affecting passing track location. Green Valley, Allen, Luther, Hubly, Sweetwater, Barr, Siding No. 2, Archer, Lick, Lemmon, Girard and Womac. Three new passing sidings of 100-cars capacity are proposed at Brando, Mile Post 7¼ and Mile Post 94¾. In addition, Bend Yard lead should be extended north into Gillespie interlocking plant, Luther passing track south into Luther interlocking plant, Lick water station moved south to the coal chute with a penstock installed between main and passing track, and a penstock similarly installed at the water station at Lemmon. This will require a total of 7.92 miles of track, but will release 2.33 miles of track at Compro, Virden and Siding No. 3, now used for passing sidings.

Sheet 5 shows a comparison of the sum of the schedules between adjacent passing sidings and the delayed time to southward trains waiting for meeting, as obtained from columns K and L of sheets 1, 2 and 3.

Sheet 6 shows a comparison of the capacity of main track under the different arrangements shown on sheets 1, 2 and 3, giving in an easy comparable form the essential features and results which may be expected from the proposed rearrangement. All figures are based on the assumption that when operating at full capacity each train will meet an opposing train at each passing siding.

The committee recommended that the matter on the capacity of single track be accepted, and printed in the Proceedings as information.

Separating into Types Signals for Train Operation

In the investigation of this subject, the committee developed the following:

Some of the so-called signs govern train operation just as much as the movable semaphore of an interlocking or block signal system and these signs are recognized in the Standard Code of the American Railway Association as signals. See note to the definition of fixed signals, page 235, Rule Book of the American Railway Association, January, 1916, reading as follows:

"The definition of a 'Fixed Signal' covers such signals as slow boards, stop boards, yard limits, switch, train order, block, interlocking, semaphore, disc, ball or other means for displaying indications that govern the movement of a train."

Under this definition stop boards, slow boards, etc., are in fact signals. Work was confined to designing the signs that fall under the above definition and those that are closely related to them, namely, those that convey instructions to an engineer, although they may not "govern the movement of a train."

As a guide to the work, inquiries were sent out to all railroads represented in the A. R. E. A. Standard plans were received from 43 roads and these were tabulated as to type, painting, etc.

Designs were submitted for the following signs:

1. Stop.
2. Speed limit or slow.
3. Resume speed.
4. Yard limit.
5. Station one mile.
6. Yard one mile.
7. Junction one mile.
8. Crossing one mile.
9. Draw one mile.
10. Highway crossing whistle post.
11. Flanger sign.

SOUTH PEKIN TO BEND

ANALYSIS OF CAPACITY OF MAIN TRACK WITH PRESENT ARRANGEMENT 'A' OF PASSING SIDINGS

	Capacity at Passing Tracks	SOUTH			NORTH			SOUTH			NORTH			Totals
		A	B	A+B	D	E	D+E	H	I	H+I	J	K	J+K	
		Running	Coal & Water	Special Meeting	Running	Coal & Water	Special Meeting	Running	Coal & Water	Special Meeting	Running	Coal & Water	Special Meeting	
South Pekin	Yd	19	19	21	21	40	18	29	21	50	0			
Green Valley	75	19	19	20	20	39	18	39	20	59	46			
Allen	75	19	10	23	21	21	50	18	44	21	65	20		
Luther	75	14	14	15	10	25	43	18	34	23	63	42		
Hubly	75	20	20	15	15	35	18	40	15	55	50			
Sweetwater	79	16	16	17	17	33	18	34	17	51	52			
Culver	75	12	12	16	16	30	18	32	18	50	55			
Barr	75	12	12	16	16	30	18	32	18	50	55			
Tower "BX"	75	12	12	16	16	30	18	32	18	50	55			
Siding No 2	81	31	31	38	38	69	18	51	38	89	16			
Bondo	75	20	20	20	20	40	18	40	20	60	20			
Archer	75	17	17	17	20	37	54	18	32	37	69	36		
Lick	75	12	12	12	12	24	18	24	12	36	41	61		
Compro	63	5	5	5	5	10	18	15	5	20	30	75		
Lemmon	75	13	13	15	15	30	18	33	15	48	57			
Virden	75	34	10	44	41	85	18	64	41	105	0			
MCConn	85	15	15	16	16	31	18	35	16	51	54			
Wamac	81	23	23	25	25	48	18	33	25	58	0			
Siding No 3	75	23	23	25	25	48	18	33	25	58	0			
Tower "ON"	75	23	23	25	25	48	18	33	25	58	0			
David	Yd													
Totals		289	40	319	315	30	355	684	290	619	355	574	604	

SHEET 1 OF 6 SHEETS

C - Coal
W - Water

SOUTH PEKIN TO BEND

ANALYSIS OF CAPACITY OF MAIN TRACK WITH PRESENT ARRANGEMENT 'B' OF PASSING SIDINGS

	Capacity at Passing Tracks	SOUTH			NORTH			SOUTH			NORTH			Totals
		A	B	A+B	D	E	D+E	H	I	H+I	J	K	J+K	
		Running	Coal & Water	Special Meeting	Running	Coal & Water	Special Meeting	Running	Coal & Water	Special Meeting	Running	Coal & Water	Special Meeting	
South Pekin	Yd	19	19	21	21	40	18	29	21	50	0			
Green Valley	75	19	19	20	20	39	18	39	20	59	46			
Allen	75	36	10	46	41	85	18	64	41	105	0			
Luther	75	34	34	34	10	44	78	18	54	44	98	7		
Hubly	79	20	20	15	15	35	18	40	15	55	50			
Sweetwater	79	16	16	17	17	33	18	34	17	51	52			
Culver	75	12	12	16	16	30	18	32	18	50	55			
Barr	75	12	12	16	16	30	18	32	18	50	55			
Tower "BX"	75	12	12	16	16	30	18	32	18	50	55			
Siding No 2	81	31	31	38	38	69	18	51	38	89	16			
Bondo	75	20	20	20	20	40	18	40	20	60	20			
Archer	75	17	17	17	20	37	54	18	32	37	69	36		
Lick	75	12	12	12	12	24	18	24	12	36	41	61		
Compro	63	5	5	5	5	10	18	15	5	20	30	75		
Lemmon	75	13	13	15	15	30	18	33	15	48	57			
Virden	75	34	10	44	41	85	18	64	41	105	0			
Girard	75	15	15	16	16	31	18	35	16	51	54			
MCConn	85	23	23	25	25	48	18	33	25	58	0			
Wamac	81	23	23	25	25	48	18	33	25	58	0			
Siding No 3	75	23	23	25	25	48	18	33	25	58	0			
Tower "ON"	75	23	23	25	25	48	18	33	25	58	0			
David	Yd													
Totals		289	40	329	325	30	355	684	170	355	555	524	125	

SHEET 2 OF 6 SHEETS

C - Coal
W - Water

SOUTH PEKIN TO BEND

COMPARISON OF SUM OF SCHEDULES AND DELAY TO TRAINS WAITING FOR MEETING

	PRESENT						PROPOSED	
	A			B			C	
	K	L	K+L	K	L	K+L	Delay	
South Pekin	50	0	50	0	52	0		
Green Valley	35	46	81	38	4	42		
Allen	95	40	104	1	62	0		
Luther	63	42	98	7	62	0		
Hubly	55	50	105	55	8	63		
Sweetwater	53	52	105	53	22	75		
Culver	53	52	105	53	22	75		
Barr	53	52	105	53	22	75		
Tower "BX"	53	52	105	53	22	75		
Siding No 2	89	16	105	16	54	5		
Bondo	89	16	105	16	54	5		
Archer	85	20	105	20	63	0		
Lick	63	36	99	3	63	0		
MP 74 1/2	4	61	65	12	58	5		
Compro	30	75	105	30	75	0		
Lemmon	40	57	97	47	58	5		
Virden	40	57	97	47	58	5		
Girard	40	57	97	47	58	5		
Marye-County Conn	155	0	155	0	62	1		
MP 84 1/2	51	54	105	51	63	0		
Wamac	51	54	105	51	63	0		
Siding No 3	58	0	58	0	37	0		
Tower "ON"	58	0	58	0	37	0		
David	58	0	58	0	37	0		
Totals	914	604	1518	125	553	62		

SHEET 3 OF 6 SHEETS

Present, column A taken from sheet 1
Present, column B, " " " 2
Proposed, column taken from sheet 3.

SOUTH PEKIN TO BEND

ANALYSIS OF CAPACITY OF MAIN TRACK WITH PROPOSED ARRANGEMENT OF PASSING SIDINGS

	SOUTH			NORTH			SOUTH			NORTH			Totals
	A	B	A+B	D	E	D+E	H	I	H+I	J	K	J+K	
	Running	Coal & Water	Special Meeting	Running	Coal & Water	Special Meeting	Running	Coal & Water	Special Meeting	Running	Coal & Water	Special Meeting	
South Pekin	20	20	22	21	47	18	30	22	52	0			
Green Valley	19	19	20	20	39	18	39	20	59	4			
Allen	18	10	28	20	48	18	48	20	68	0			
Luther	14	14	15	10	25	43	18	34	23	63	0		
Hubly	20	20	15	15	35	18	40	15	55	5			
Sweetwater	16	16	17	17	33	18	34	17	51	10			
Culver	16	16	17	17	33	18	34	17	51	10			
Barr	12	12	16	16	30	18	32	18	50	13			
Tower "BX"	12	12	16	16	30	18	32	18	50	13			
Siding No 2	15	15	19	13	34	18	35	19	54	3			
Bondo	16	16	20	20	40	18	40	20	60	7			
Archer	15	15	24	24	43	18	39	24	63	0			
Lick	11	10	21	12	27	48	18	36	27	63	0		
MP 74 1/2	19	19	15	15	38	18	39	19	58	5			
Compro	19	19	15	15	38	18	39	19	58	5			
Lemmon	18	18	20	20	38	18	38	20	58	5			
Virden	18	18	20	20	38	18	38	20	58	5			
Girard	19	19	25	23	42	18	39	23	62	1			
MCConn	15	15	25	25	48	18	33	25	58	0			
MP 84 1/2	23	23	24	24	47	18	33	24	57	0			
Wamac	23	23	24	24	47	18	33	24	57	0			
Siding No 3	15	15	15	15	30	18	30	15	45	0			
Tower "ON"	15	15	15	15	30	18	30	15	45	0			
David	15	15	15	15	30	18	30	15	45	0			
Totals	283	30	313	335	25	350	669	295	609	350	959	62	

SHEET 3 OF 6 SHEETS

C - Coal
W - Water

Data for Analysis of Track Capacity

The committee was not ready to report on the switch target, derail sign and trackpan sign and there may be others, although most if not all of the other signs come under the general heading of information signs.

It was recommended that all of the information signs, such as trespass signs, section limits, right-of-way limits, city limits, end of double track, etc., be of such shape as not to conflict with the designs submitted.

Where a preliminary sign not covered by the designs submitted is needed in the rear of an information sign, it was recommended that it be made in the same form and general character as signs numbered 5 to 9.

For stop, speed-limit, and resume-speed signs (which affect all trains), the committee followed the semaphore type and generally accepted aspects. For signs 4 to 9, inclusive, it was not practicable to follow the semaphore type and, in these cases, it was considered that the object to be accomplished was the greatest visibility and distinguishability as to form. For signs 10 and 11, the signs in present use vary widely but the variations do

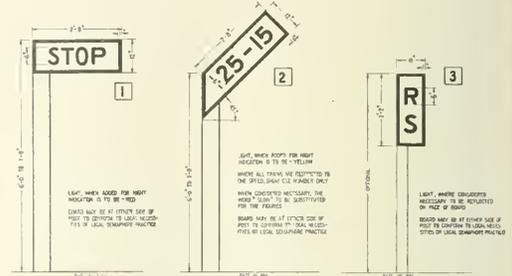
In the designs the committee confined themselves to outlines and did not undertake to specify materials from which the signs may be constructed.

No recommendations were made as to standard location of these signs. This appears to be an important matter and one in which uniformity is essential. On this point the committee asked for further instructions.

The committee recommended that the above matter be submitted to letter ballot.

Developments of Automatic Train Control Devices

On this subject, the committee had not learned of



Proposed Standard Signs

anything new of which they might make a report. As an aid to those taking up the subject, it is desirable the following data in regard to classification of devices and reports of official tests made by the Block Signal and Train Control Board and by the Bureau of Safety, Interstate Commerce Commission of train control devices, be given as information.

The train control devices that have been tested and those that have been developed to the extent that models have been made or patents issued may be divided into the following classes or type:

1. Mechanical trip.
2. Electric contact rail.
3. Insulated track rail.
4. Magnetic inductive.
5. Inductive.
6. Hertzian wave or wireless.

Devices Tested

ROWELL-POTTER SAFETY STOP.—This included an automatic signal system, with signals operated by power stored by a passing train, and a mechanically operated train stop.

Tested on the C. B. & Q., near Aurora, Illinois, between December, 1908, and May, 1909. Report of test published in second annual report of Block Signal and Train Control Board.

HARRINGTON TRAIN CONTROL AND ALARM.—An overhead mechanical trip, and audible cab signal.

Tested on Erie, near Englewood, N. J., between January, 1910, and May, 1910. Report of test published in third annual report of Block Signal and Train Control Board.

LA-CROIX TRAIN CONTROL SYSTEM.—An automatic stop and cab signal system of the intermittent contact rail type.

Tested on Staten Island Rapid Transit, between March and May, 1911. Report of test published in fourth annual report of Block Signal and Train Control Board.

WARTHEN CAB SIGNAL AND TRAIN CONTROL SYSTEM.—A cab signal and automatic train stop of the intermittent overhead contact type.

**SOUTH PEKIN TO BENLD
COMPARISON OF CAPACITY OF MAIN TRACK
WITH VARIOUS ARRANGEMENTS OF PASSING TRACKS**

Delay to Southward Train in Minutes = Sum of differences between the maximum and each individual sum of schedules toward and from adjacent stations, it being considered that trains are so dispatched that there is no delay at terminal. (See Sheet 5)	Schedules in Minutes		Theoretical Capacity, in Trains per Day	Proposed Capacity, in Trains per Day	Freight Trains per Day	Passenger Cars per Day
	Southward	Northward				
Maximum sum of schedules to and from adjacent stations, including time entering and leaving sidings (See Sheet 5)	13	274	604	610	255	27
Number of trains on road at one time	13	274	604	610	255	27
A. Using all siding with trains that will clear on shortest siding (63 Cars)	13	274	604	610	255	27
B. Using sidings which cars are used to best advantage in eliminating closed time and transfers that will clear on long sidings (33 Cars)	10	254	625	499	355	27
Sidings used: Green Valley, Luther, Sweetwater, Siding No. 2, Archer, Lick, Lemmon, Girard, Womac						
Proposed extension of passing sidings at Green Valley, Lick, Luther, Mully, Sweetwater, Lark, Siding No. 2, Archer, Lick, Lemmon, Girard and Womac. New passing siding at Bend and T-2, and M-3. All to be 100 car capacity. Extension of Bend Yard Lead North into "ON" Interlocking Plant and Luther passing siding South into Luther Interlocking Plant. Move Lick Water station south to Carl Chute, and install Bend track between Main and Passing Tracks. To be followed by Automatic Signals.	17	255	62	600	359	45
1823 Cars Present A						
1620 Cars Present B						
4500 Cars Proposed						

SHEET 6 OF 6 SHEETS
Graphical Representation of Car Capacity

Data for Analysis of Track Capacity

not appear to be material. Designs were submitted conforming to signs that are in quite general use.

It was thought that the limitations of restricted clearances were so varied that it was hardly practicable to design a sign to meet all conditions and it was therefore suggested that the designs submitted could be modified to meet the requirements of each case. Sketches were drawn up to indicate how the designs submitted could be modified to fit track spacing of thirteen feet without encroaching on the clearance limits recommended by the A. R. E. A.

Tested on the B. R. & P., near Rochester, N. Y., in April, 1911. Report not published.

RAILWAY AUTOMATIC SAFETY APPLIANCE Co.—An automatic stop device, of the mechanical trip type, controlled electrically.

Tested on the Pere Marquette, near Saginaw, Mich., between March and May, 1911. Report of tests published in fifth annual report of Block Signal and Train Control Board.

JONES SIGNAL SYSTEM—An automatic train stop of the mechanical trip type, electrically controlled.

Tested on the New York Central, near La Salle, N. Y., in March, 1915. Report not published.

GRAY THURBER TRAIN CONTROL SYSTEM—An automatic train control system using a short section of insulated track and an insulated portion of the train.

Tested on the P. Ft. W. & C., near Pittsburgh, in June, July and December, 1912. Also from April to July, 1914. Report published as part of the report of the Chief of Division of Safety, Interstate Commerce Commission for 1914, as House Document 1482, 63rd Congress, 3rd Session.

AMERICAN TRAIN CONTROL Co.—An automatic train control system of the intermittent electrical contact type.

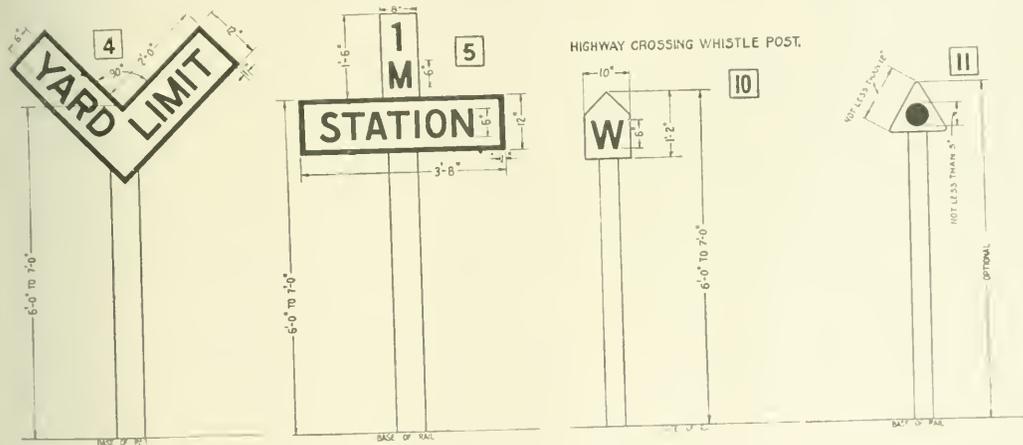
Tested on the Maryland & Pennsylvania, near Balti-

Committee: I. A. Peabody (C. & N. W.), chairman, W. J. Eck (Sou. Ry.), vice chairman, C. C. Anthony, H. S. Ballet (N. Y. C.), C. A. Christofferson (N. P.), C. E. Denney (N. Y. C. & St. L.), C. A. Dunham (G. N.), W. H. Elliott (N. Y. C.), G. E. Ellis (I. C. C.), J. V. Hanna (K. C. Term. Co.), J. G. M. Leisenring (I. T. S.), H. K. Lowry (C. R. I. & P.), L. C. Mock (M. C.), F. P. Patenall (B. & O.), A. H. Ridd (P. R. R.), W. B. Scott (S. P. Ry.), T. S. Stevens (A. T. & S. F.), R. Wheelwright (G. T.)

Discussion

J. A. Peabody, Chairman, read the preliminary printed portion of the report, and said:

With regard to paragraph 2, report on the problem of signaling single-track roads with reference to the effect of signaling and proper location of passing sidings on the capacity of the line, I want to take this opportunity of calling your attention to the analysis of location of sidings on single-track lines. We did some work on our road, and in the case of the first piece of track we tried this on I guaranteed our superintendent we would increase the capacity 65 per cent. That was without the signals at all. The traffic conditions have changed on that piece of track so that we have not had to use the capacity fully, but we really obtained wonderful results. Trains are going over the line in a way they never did before, but,



Proposed Standard Signs

more, in November and December, 1914. Report of tests published as House Document 1541, 63rd Congress, 3rd Session.

GOLLOS RAILWAY SIGNAL COMPANY—An automatic train control system of the intermittent electric contact type.

Tested on the C. B. & Q., near Aurora, Ill., from August to October, 1915, and from February to April, 1916. Report of tests published as House Document 1192, 64th Congress, 1st Session.

WOODING TRAIN CONTROL SYSTEM—An automatic train control system of the intermittent electric contact type.

Tested on the D. L. & W., between Hoboken, N. J., and Newark, in May and June, 1915, and from January to April, 1917. Report of tests published as House Document 251, 65th Congress, 1st Session.

The committee recommended that the above matter on automatic train control be accepted, and presented to the association as information.

of course, we have the signals, as well as relocated passing tracks and longer passing tracks, which all go toward accomplishing this effect.

At this time, when it is going to be so necessary for all of us to increase the capacity of our lines with the least amount of labor and material, I believe it is especially necessary that we should go into this subject. I know one other signal engineer who was called on to pass on the question of the capacity of a line, and what could be done with it, as against building a second one, which was supposed to be necessary. He was not to be confused with the officials that the trouble was not necessary, and with the passing tracks properly located, there is more than the necessary capacity for some part to come.

We hope to go on with this work also in connection with double track as well as single track, and I am convinced there is a large amount of work along that line that can be done. I do not know of any department of the railroad better qualified to go at it than the signal department.

I move that this part of our report be accepted as information.

(Motion put and carried.)

Mr. Peabody then read paragraph 6 and said:

We have presented a series of designs which we offer, and recommend that they be submitted to the annual convention for presentation to letter ballot. I so move.

Caleb Drake (C. & N. W.): Should not these designs show the thickness of the material?

Mr. Peabody: I do not think that is at all necessary. They can be designed of various materials.

Mr. Peabody then read paragraph 10.

The President: This general subject is now open for discussion.

Mr. Gault: I think there should be some distinction in the shape between signs requiring a stop and those merely for information.

J. C. Mock (M. C.): A train does not have to stop because the sign is put up and says one mile to the junction. That is information to the engineer.

The President: It has been moved and seconded that the signs or markers shown be accepted for presentation to the annual meeting for approval and submission to letter ballot for insertion in the manual.

(Motion carried.)

The report of the committee was accepted, and the committee was excused with the thanks of the Association.

Report of Committee XVI—Harmonizing of Specifications

THE FOLLOWING OUTLINE of work has been assigned this committee:

1. Harmonize and make complete in accord with accepted standards the wording and requirements of specifications and subject matter desirable or as assigned by the Editing committee.

2. Any matter affecting a committee must be approved by the chairman of said committee before presentation to the Association. The committee desires to report progress, and calls the attention of the Association members to the following:

At a joint meeting of the Editing committee, Harmonizing committee and Committee VIII, on November 9, 1917, the sections and paragraphs at variance in the re-

ports of both the Harmonizing committee and Committee VIII, as submitted at the convention in Atlantic City, were harmonized satisfactorily to the members of these committees.

Committee: F. B. Wiegand (N. Y. C.), chairman; H. S. Balliet (N. Y. C.), G. H. Dryden (B. & O.), W. H. Elliott (N. Y. C.), R. B. Elsworth (N. Y. C.), P. M. Gault (I. C.), E. G. Hawkins (N. Y. C.), R. C. Johnson (B. R. T.), C. J. Kelloway (A. C. L.), L. R. Mann (Mo. Pac.), C. H. Morrison (N. Y. N. H. & H.), F. P. Patenall (B. & O.), J. A. Peabody (C. & N. W.), E. G. Stradling (C. I. & L.).

Discussion

This report was received as information and the committee excused with the thanks of the Association.

Report of Committee VIII—A. C. Automatic Block Signaling

THE COMMITTEE SUBMITTED A NEW SET of specifications to cover a. c. motor semaphore signals. These specifications are divided into 21 different headings which cover the various phases of motor semaphore signals as follows:

(1) Requisite sheet (information for same), (2) alternative proposal, (3) mechanism housing, (4) joints in masts, (5) semaphore spectacle, (6) roundels, (7) operating, connection, mechanical, at base of mast; (8) bearings, (9) semaphore shaft, (10) mechanism, (11) circuit controller, (12) wiring, (13) motor, (14) hold clear device, (15) dielectric tests, (16) insulation, (17) inspection, (18) packing, (19) marking, (20) tests, (21) requisite sheet.

Committee: C. H. Morrison (N. Y. N. H. & H.), chairman; H. K. Lowry (C. R. I. & P.), vice-chairman; F. J. Ackerman (K. C. Term.), B. T. Anderson (D. L. & W.), J. A. Beoddy (N. & W.), J. D. Elder (M. C.), W. F. Follett (N. Y. N. H. & H.), E. C. Grant (U. P.), R. C. Johnson (B. R. T.), J. B. Lamb (Southern), H. G. Morgan (I. C.), W. W. Morrison (N. Y. C.), G. H. Packwood (St. L. M. Ry.), L. V. Parle (S. P.), E. B. Smith (N. Y. C.), F. C. Stuart (E. J. & E.), G. K. Thomas (A. T. & S. F.), L. F. Vieillard (L. I.), F. E. Wass (N. Y. C.), Edgar Winans (A. T. & S. F.), G. H. Wion (Vie. Gov't Ry.), Leroy Wyant (C. R. I. & P.), B. F. Oler (P. R. R.).

Discussion

C. H. Morrison, Chairman: Since submitting this report the committee has held three meetings, and in reviewing the specification, as submitted, has deemed it advisable to introduce several changes and begs leave to postpone action on this specification until the next meeting, when it will be re-submitted.

The President: Unless there is some objection, the request of the committee will be acceded to.

Mr. Morrison: The specifications we have submitted, with a few exceptions, were prepared by a committee of eight last year. Unfortunately the sub-committee turned over to the committee of eight the completed specification too late to submit at the annual meeting. It includes not only the mechanism, but the entire signal. On account of the signal mechanism being so closely associated with the design of the signal mast, it was necessary to include in the specification for the mechanism the mast. For instance, there is the question of housing of the mechanism in case it is placed at the face of the pole; the method of operation between the mechanism and shaft and spectacle in case the mechanism is placed at the top of the pole. We gave the instructions given to us by the Committee on Committees very careful consideration, and owing to the fact that the specification was almost complete, we deemed it advisable, on account of the close association of other parts of the signal to the mechanism, to include in the specification the signal mast parts.

The President: This matter will be referred to the Committee on Committees.

Canadian Pacific Meeting at the Coliseum

Among the early arrivals at the Coliseum yesterday morning were E. Keough, assistant engineer maintenance of way, Canadian Pacific, with 13 roadmasters from as many different divisions on the eastern lines of that road. This is the third year Mr. Keough has brought a similar party to the exhibit. As one-third of the roadmasters on the line have attended the exhibit each year, all of those on the eastern lines have now had an opportunity to visit Chicago and study the display at the Coliseum.

Corporate and Operating Expenses Separate

(From our Washington Correspondent)

Director-General of Railroads McAdoo issued a circular yesterday ordering that after April 1 expenses of railroad offices at New York or elsewhere, devoted to financial and corporate matters as distinguished from operating matters, must cease to be charged against operating expenses, except as expressly authorized by him. This is taken to indicate that all financial and corporate, as distinguished from operating expenses, will be required in time to be paid by the railroad companies from the guarantees made to them by the Government.

Special Meeting of Committee No. 8, R. S. A.

The chairman of Committee 8, on A. C. Automatic Block Signaling, announced that a special meeting of that committee will be held in Room 401 of the Auditorium Hotel at 2:30 p. m. today.

N. R. A. A. Annual Meeting

The National Railway Appliances Association will hold its annual meeting and election of officers in the Coliseum at eleven o'clock this morning. The reports of the retiring officers will be presented and other necessary business transacted.

Union Pacific Men Go to Washington

E. E. Adams, consulting engineer of the Union Pacific, and F. W. Sercombe, assistant controller, with headquarters at New York, have been appointed assistants to R. S. Lovett, director of the Division of Capital Expenditures on the staff of the director-general at Washington.

A. N. Talbot Heads New

U. S. Construction Division

A. N. Talbot, professor of civil engineering at the University of Illinois and chairman of the special committee of the American Railway Engineering Association on Stresses in Track, has been appointed chairman of the newly created construction division in the war department to carry on the immense building program of the government, involving an expenditure of over one billion dollars and the employment of hundreds of thousands of workmen. This is a recognition of Professor Talbot's ability which will be welcomed by his many friends among the members of the Engineering Association. Professor Talbot was also elected president of the American Society of Civil Engineers at its annual meeting held in New York in January.

The Material Situation

The Western Society of Engineers has prepared a special program for a meeting to be held in its rooms in the Monadnock Block this evening. The subject for consideration will be the material problem as it affects engineers. The conditions in the structural steel plants will be described by F. J. Llewellyn, division contract manager of the American Bridge Company. The situation in the lumber industry will be described by Hermann Von Schrenk, consulting timber engineer, St. Louis, Mo., while the conditions in the Portland Cement Industry will be outlined by B. F. Affleck, president of the Portland Cement Association. A special invitation is ex-

tended to the members of the American Railway Engineering Association to attend this meeting and to participate in the discussion of this topic which is of so much concern to engineers at the present time.

A. R. E. A. Board of Direction Meets

The Board of Direction of the American Railway Engineering Association met in the English Room of the Congress Hotel yesterday forenoon to complete plans for the convention and make preparations for the coming year. Fourteen members were present.

No June Meeting of Railway Signal Association

The Board of Direction of the Railway Signal Association has announced that no stated meeting of that association will be held in New York this year, but that this meeting will be consolidated with the annual convention which will be held in September as usual.

Wood Preservers' Meeting

The Executive committee of the American Wood Preservers' Association will meet at the Sherman Hotel at 6:30 this evening to formulate plans for the year's work. In view of the unsettled conditions in the industry, a number of important problems will be presented for consideration.

Movies of the Tie Tamper

The Ingersoll-Rand Company presented a moving picture film of its pneumatic tie tamper in action in the Green room at the Congress Hotel at 5:30 yesterday afternoon. This program will be repeated at the same hour this afternoon and at 12:30 on Thursday. All railway men are invited to see this film and to observe tie tampers in action.

The Roadmasters Meet

A meeting of the Executive committee of the Roadmasters' and Maintenance of Way Association will be held at the Auditorium Hotel this evening. The taking over of the operation of the railroads by the government has created a number of problems for this Association which will be discussed at this meeting and the course of procedure outlined.

The President's Annual Dinner

J. G. Sullivan, president of the American Railway Engineering Association, gave a dinner in the English Room of the Congress Hotel last evening to the members of the Board of Direction and the Committee on Arrangements. These dinners have become an annual event through a custom which has been followed for a number of years. The number attending the dinner last night was somewhat larger than in the year previous, a hopeful indication of the attendance at the convention.

On the Union Pacific

(A Jap section farmer reports.)

To you, let er will ans— Bull and calf see an high on hill, no bull no feed no see, come down on track— Calf come, too, be wagon crossing street line on crossing same time come No. 9. Don't know time but time was dark. Calf run. Bull get by. Bull broke into cannot skin. U. T. me.

Railway Signal Association Registration

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 Wevat, Alfred.

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 Hobson, J. S., Western Mgr., Union Switch & Signal Co., 917 People's Gas Bldg., Chicago, Ill.
 Howard, L. Frederic, Chief Engr., Union Switch & Signal Co., Swissvale, Pa.
 Hudson, E. F., Vice Pres. & Gen. Mgr., Waterbury Battery Co., 30 Church St., New York, N. Y.
 Hunt, H. E., Engr., Electric Storage Battery Co., 19th St. and Allegheny Ave., Philadelphia, Pa.
 Jacobs, Harry M., Sig. Accessory Dept., General Electric Co., Schenectady, N. Y.
 Jones, F. H., Asst. Res. Mgr., General Railway Signal Co., 1248 People's Gas Bldg., Chicago, Ill.
 Kyle, W. T., Sales Agt., Page Steel & Wire Co., 30 Church St., New York, N. Y.
 Lavarack, F. C., Gen. Sales Mgr., The Signal Accessories Co., 30 Church St., New York, N. Y.
 Lepreau, F. J., Vice-Pres. & Div. Mgr., Thos. A. Edison, Inc., Primary Battery Div., 30 Church St., New York, N. Y.
 Lorenz, J. M., Salesman, Central Electric Co., 4425 Ellis Ave., Chicago, Ill.
 McGuinness, F. V., Mgr., Ry. Dept., Edison Storage Battery Co., Orange, N. J.
 Manuel, W. N., Rep., Corning Glass Works, Corning, N. Y.
 McCarthy, D. L., C. R. S. & S. Co.
 McClintock, W. M., C. R. S. & S. Co.
 Miller, P. W., Rep., Kerite Ins. Wire & Cable Co., 30 Church St., New York, N. Y.
 Murray, Wm. B., Engr., Miller Train Control Corp., Danville, Ill.
 Nelson, G. A., Spec. Rep., Waterbury Battery Co., 30 Church St., New York, N. Y.
 Newcomb, E. W., Pacific Coast Rep., Thos. A. Edison, Inc., Primary Battery Div., 921 Crocker Bldg., San Francisco, Cal.
 Reichard, W. H., Asst. Gen. Mgr., Fed. Sig. Co., Albany, N. Y.
 Renton, Jos. A., Kerite Ins. Wire & Cable Co., 30 Church St., New York, N. Y.
 Saunders, J. E., Asst. Chief Engr., Union Switch & Signal Co., Swissvale, Pa.
 Sawyer, E. T., Sales Engr., Edison Storage Battery Co., Orange, N. J.
 Shaver, A. G., Cons. Elec. & Sig. Engr., Room 857 People's Gas Bldg., Chicago, Ill.
 Sheene, Henry R., Res. Mgr., Union Switch & Signal Co., Ry. Exchange Bldg., St. Louis, Mo.
 Simmen, P. J., Pres., Simmen Automatic Ry. Sig. Co., 157 1/2 Niagara St., Buffalo, N. Y.
 Spicer, V. K., Spec. Rep., Union Switch & Signal Co., People's Gas Bldg., Chicago, Ill.
 Stewart, H. W., General Electric Co., Schenectady, N. Y.
 Talbert, W. W., Resident Mgr., Union Switch & Signal Co., People's Gas Bldg., Chicago, Ill.
 Thomas, L., Res. Mgr., General Railway Signal Co., 1248 People's Gas Bldg., Chicago, Ill.
 Thompson, H. G., Vice-Pres., Edison Storage Battery Co., Orange, N. J.
 Underhill, J. Delmar, Salesman, The Okonite Co., 501 Fifth Ave., New York, N. Y.
 Van Steerburgh, W. R., Car. of The Okonite Co., 501 Fifth Ave., New York, N. Y.
 Vogel, F. W., Pres., Chicago Kerosene Signal & Supply Co., 74 People's Gas Bldg., Chicago, Ill.
 Woodbridge, J. Lester, Flee. Signal Co.
 Waitt, Walter G., Asst. Factory Mgr., National Carbon Co., Cleveland, Ohio.
 Ware, H. C., Sales Engr., Federal Signal Co., 1129-30 Monmouth Block, Chicago, Ill.
 Whall, F. R., Gen. Mgr., C. B. Whall Co., 170 Summer St., Boston, Mass.
 Young, J. W., Rep., Kerite Ins. Wire & Cable Co., 30 Church St., New York, N. Y.

The Railway Signal Association and the War

An Outline of the Activities of the Members in Military and Naval Work. A Number of Men Already in Active Service

MARSHAL JOFFRE called the present conflict a "railway war" as long ago as 1914. When the history of this war is written the railways of the world will no doubt receive proper credit for their important part in the conflict. The railway weapon, or "The Fifth Arm," as it has been called, will be one of the essential and determining factors for the winning of the war. Had it not been for the well organized railway systems of France at the time of the battle of the Marne, history might have had an entirely different story to chronicle. Germany, with all her vaunted efficiency, would have been utterly unable to make the showing she has to date were it not for her perfectly organized railway systems.

No army in the field, no matter how large or small,

overseas duty. How nobly they have responded is common knowledge to all. The glorious part a small unit of these men took in the battle of the Cambrai is but an indication of what may be expected from them on a larger scale. These men have been selected from all classes of the service and all railroad organizations are no doubt represented by men in such service. In this connection the Railway Signal Association has had three of its standing committee members enter the service.

These members consist of Lieut. R. M. Phinney, who was formerly a member of committee No. 4—Direct Current Automatic Block Signaling; Capt. E. L. Adams, formerly vice-chairman of committee No. 9—Wires and Cables, and Capt. W. M. Vandersluis of committee No.



Capt. W. M. Vandersluis

Lieut. R. M. Phinney

Capt. E. L. Adams

can fight unless the necessary supplies and equipment reaches it when needed. In this war there may be considered to be two general divisions: the fighting forces and the production forces. It is unnecessary to dwell upon the important part to be played by the production forces, as without the proper spirit and work of these forces the fighting division would be of little or no use. The connecting link between the two forces is the transportation unit. The breakdown of either one of the three units means catastrophe. With the transportation link as the unit connecting the other two it is plain to see what an important bearing this unit has upon the whole outcome of the war. Realizing the importance of this unit, all men engaged in transportation are bearing their share of the burden towards a victorious ending to the present conflict only when they do their utmost to facilitate the smooth operation of this machine.

In order to preserve an unbroken link in this unit from our country to the fighting line over 3,000 miles away it is necessary that the fighting division have numbered among its men experienced men in the transportation field in order to operate efficiently the military railroads that it is necessary to construct from the port of debarkation in France to our fighting lines. It was necessary that the railroads of our country furnish the men for this

10—Signaling Practice. In addition to the above members, Harley E. Johnson of the nominating committee has also entered the service.

Capt. E. L. Adams was appointed senior signal engineer, Bureau of Valuation, Southern district, Interstate Commerce Commission, with headquarters at Chattanooga, Tenn., in 1914, and remained in the service of the Bureau of Valuation until September 3, 1917, when he was called into the military branch as a captain of engineers in the United States Officers Reserve Corps, and was sent to Ft. Leavenworth, Kan., for further training. On December 5, 1917, he was attached to the 112th Engineer Regiment at Camp Sheridan, Montgomery, Ala., and received orders in January, 1918, for overseas duty. He arrived in France about February 1, 1918. His company and regiment number are unknown, his address being U. S. Expeditionary Forces, France.

Capt. Adams is well known in the Railway Signal Association, in which he has been a very active member. In 1908 he was vice-chairman on the special committee of the Railway Signal Association for storage battery jars and accessories for automatic signal work, and in the same year he also served on a special committee on rubber-covered wire. In 1909 he served as vice-chairman on a special committee reporting on wires and

cables. This committee in 1910 was designated as Committee No. 9. He served continuously as vice-chairman of Committee No. 9 from 1909 to the time of his entering the army in 1917. In addition to the above assignments he also served on Committee No. 4—Automatic Block, from 1911 to 1915, inclusive.

Lieut. Robert M. Phinney was assistant engineer in the signal department of the Chicago & North Western when he accepted a commission as first lieutenant in the 115th Railway Telegraph Battalion, under Major Sherwood's command, in January, 1918. Lieut. Phinney has taken an active part in the Railway Signal Association work and served on Committee No. 4—D. C. Automatic Block Signals—continuously from 1913 until the time of his entering the army. In 1917 he was vice-chairman of this committee. In 1915 he also served on Committee No. 9—Wires and Cables.

Capt. W. M. Vandersluis was appointed signal engineer of the Illinois Central on December 16, 1912, which position he held until he was called into the service, after having accepted a captain's commission in the United States Officers' Reserve Corps. He was called to Ft. Leavenworth training camp on September 5, 1917, and was assigned to the 35th Engineers at Camp Grant, Rockford, Ill., on December, 1917. He received orders in January, 1918, for overseas duty and arrived in France about February 1, 1918. His company and regiment number are unknown, as he was unassigned at the time of leaving.

Capt. Vandersluis took an active part in the Railway Signal Association. In 1907 he was chairman of Committee No. 7 on Copper and Iron Wires for Pole Lines. From 1914 to 1916, inclusive, he was chairman of Committee No. 4—Automatic Block. In 1915 he was on a special committee on Contracts. In 1916 and 1917 he served on Committee No. 1—Signaling Practice, and in 1916 he was also on a special committee on Harmonizing of Specifications. In 1917 he also served on the committee of committees and on the finance committee of the Board of Direction.

In addition to the above members of standing committees who are now in military service, Major R. F. Morkill, signal engineer of the Grand Trunk, has been another active member in the Railway Signal Association. Major Morkill enlisted as a supernumerary second lieutenant in the Canadian Engineers early in October, 1914. He was at once sent to England for training and was sent to France about February or March of 1915. He served in France until June, 1915, when he was made a full lieutenant and transferred to the Royal Engineers. He was then sent to England on special work and remained there until the latter part of December of the same year, when he again returned to France, and has been there continuously since. He was successively promoted to Captain and Major and was presented with the Military Cross in the New Year's honors of January, 1917. In August, 1917, he was transferred to the Grand Headquarters staff and placed in charge of all of the signaling on the British railways in the occupied portions of France and Belgium. Before going to press a wire was received reading that "Major Morkill's present title is Railway Signal Engineer, and he is a staff officer to the chief railway construction engineer."

Another member who has taken an active part in the Railway Signal Association is Major Azel Ames, Jr. Major Ames has been connected with the New York Central Lines, the Block Signal and Train Control Board and with the Kerite Insulated Wire & Cable Company. In 1907 and 1908 he was chairman of Committee No. 12, Rubber-Covered Wires, and in 1908 he also served on

Committee No. 1 on Signaling Practice, and on Committee No. 7, Subjects and Definitions. He is at present a Major in the 61st Regiment, Coast Artillery, and is located at Fort Screven, Savannah, Ga.

In addition to the above men, records show that the following men have entered some branch of the service: W. G. Atwood, Assistant District Engineer, Bureau of Valuation, Interstate Commerce Commission, Chattanooga, Tenn.; A. M. Bears, signal supervisor, C. P. R.; P. E. Carter, sales engineer, General Railway Signal Company, New York; C. W. Cochran, engineer maintenance of way, C. C. & St. L., Galion, Ohio; D. K. Crawford, signal draftsman, A. T. & S. F., Topeka, Kan.; C. M. Deardorff, sales engineer, General Railway Signal Company, Chicago; C. L. Falk, signal maintainer, Wabash, St. Louis, Mo.; John H. Finney, manager, Washington office, Aluminum Company, Washington, D. C.; John S. Hall, transportation student, C. P. R., Montreal; R. B. Johnson, assistant engineer, General Railway Signal Company, of Canada, Lachine, P. Q.; C. B. Keers, signal construction foreman, A. T. & S. F., Topeka, Kan.; Roy Kimple, signal draftsman, N. Y. C., Cleveland, Ohio; F. Kingsley, associate editor, Electric Railway Journal, New York; W. Landesburg; E. R. Lindsey, signal inspector, C. & E. I., Chicago; C. A. Lyon, signal draftsman, I. C., Chicago; W. P. Martin, signal inspector, I. C., Chicago; William J. Payne, inspector, Saxby & Farmer, Ltd., Montreal; J. M. Perrin, senior signal engineer, Interstate Commerce Commission, Bureau of Valuation, San Francisco; M. Roginsky; S. E. Rollins, signal draftsman, I. C., Chicago; O. B. Ruggles, signal supervisor, B. & M., Salem, Mass.; F. J. Ryan, signal draftsman, I. C., Chicago; D. A. Sarnickia; C. D. Symes, signal inspector, D. W. & P., Virginia, Minn.; E. A. Warner, Jr., commercial department, Union Switch & Signal Company, Swissvale, Pa.; H. F. Johnson, signal inspector, C. & O., Richmond, Va.

In addition to the above members who are in military service, C. E. Denney, assistant to the president of the N. Y. C. & St. L., for some months past put in a good part of his time at Washington as general agent, American Railway Association, in the office of Col. Littell, quartermaster's office, who was in charge of cantonment camps. Mr. Denney was looking after the transportation end of the work in this department.

F. A. Bushnell Appointed on

Regional Director's Staff

F. A. Bushnell, purchasing agent of the Great Northern at St. Paul, has been appointed a member of the Regional Purchasing Committee on the staff of the regional director, R. H. Ashton, in place of Ira O. Rhoads, purchasing agent of the Southern Pacific, whose appointment was announced last week.

Reunion of Santa Fe Men

The fourth annual luncheon of the past and present members of the Santa Fe Signal Supervisors' Committee was held in the French room of the Congress Hotel on Monday noon. Those present were T. S. Stevens, signal engineer, L. Brown, assistant signal engineer, and H. Hobson, signal supervisor of the Santa Fe. G. R. Cowherd, signal engineer, El Paso & Southwestern, B. T. Anderson, assistant signal engineer, Delaware, Lackawanna & Western; H. K. Ferguson, secretary, Austin Company, and J. S. Holman and J. E. Saunders of the Union Switch and Signal Company.

First War Show of Railway Appliances Association

Importance of Transportation During World Conflict
Increases Need for Coliseum Exhibition

THE CHANGING CIRCUMSTANCES attending the prosecution of the war, the uncertainties following the assumption of control of the railways by the government, the dormant condition of the railway market, the heavy demands of munitions and other war contracts on railway supply factories and the necessity of railway men giving almost unremitting attention to their official duties—all were factors which tended to discourage the exhibition of railway devices at the Coliseum this year. Some of the more timid members of the National Railway Appliances Association were for a time opposed to holding the show, but the courage, foresight and sound judgment of the officers and directors of the organization prevailed and one of the largest expositions of railway devices and materials ever held is now a fact. The association makes no apology for conducting its first show in war time and rightly so, for never before have there been so many new railroad officers for whom it will prove of material practical assistance and educational benefit as this year. E. H. Fritch, secretary of the American Railway Engineering Association, reports that 103 members are now with the colors, and, needless to say, the appointment of their successors and the incidental changes in railroad organization involved thereby have modified the personnel of railroad construction and maintenance of way departments, as it has never been changed before in so short a time. That the judgment of the officers of the supply association was well founded was evidenced by the unusual demand for individual passes to the show after the usual allotment of 12,000 invitations had been sent out. A large share of these special requests came from the East, a section of the country from which many thought the attendance would be light on account of unprecedented operating difficulties resulting from the war.

From the point of view of government control the exhibition is particularly well justified, for the paramount problem confronting Mr. McAdoo is to increase the capacity of the transportation system of the country and to do it quickly. It is common knowledge that he contemplates more extensive additions and betterments than have been undertaken for many years and the execution of this program demands the best brains and the most conscientious efforts of railroad officers and railway supply men alike. It is especially fitting, therefore, on the eve of this period of quickened activity, that leading engineers, both in railroad service and in the supply industry, should gather together to exchange ideas and to appraise the latest developments in the design and manufacture of railway appliances. It has been well said that transportation, next to our military and naval arms, is the most important factor in the successful conduct of the war. It is consequently vital that inventive genius

be stimulated to the utmost to the end that all means possible be utilized to make our railroads more efficient in the performance of their important function. The value of the Coliseum show is, therefore, even greater than in times of peace and of even more benefit to the railway officer, no matter how heavily burdened he may be with his regular duties. As yet no dependable prophet has appeared to forecast the date of the termination of the war and hence it is the wiser course to prepare for all exigencies which may arise in a long struggle. If the conflict does last for several years longer the holding of a railway appliance show this year and in succeeding years will prove one of the most effective means of stimulating progress in railway methods and practices and thereby making final victory more certain.

For the very purpose of making possible the most extensive and varied exhibition of devices, the association increased the number of available spaces in the Coliseum, with the result that 267 booths are occupied this year as compared with 237 in 1917. So far as possible old exhibitors were given their old spaces, while others were assigned booths on the basis of "first come, first served."

The annual railway appliances exhibition has reached such large proportions that its successful management and economical conduct demand organizing genius and executive ability of no mean order. The experience of each succeeding year has proved profitable in pointing the way to further innovations in policy and methods, and this year's preparations for the show were carried on with particular expedition. Whereas much of the work of constructing booths and placing exhibits had to be done hurriedly in 1917, this year 102 work orders were in before March 1 and 90 per cent of the appliances for display were in Chicago before March 8, despite the unusual delays in transportation. All freight moving to the show is consigned directly to the secretary of the association, who provides special shipping tags for this purpose, and as soon as it arrives it is placed in storage, from which it is removed to the Coliseum as soon as the booths are completed. In a like manner all work connected with decorating and wiring the hall, constructing the booths, etc., is handled by the association to prevent delays and confusion resulting from the closing of individual contracts for this work by the exhibitors. This plan has the added advantage of preventing the exaction of exorbitant prices, for contractors must base their bids on the basis of dealing with the association again in succeeding years. The methods, above outlined, are an indication of the painstaking efforts of the officers and directors of the association to carry on the exhibition most economically and efficiently. The one end which they aim to achieve is to make the show pay for itself and



E. H. Bell,
President



C. W. Kelly, Secretary
 P. C. Jacobs
 F. J. Johnson

M. J. Trees, Vice-President
 J. B. Strong
 G. C. Isbester

H. M. Sperry, Honorary Director
 E. E. Hudson
 J. Alexander Brown

produce the maximum results from the amount expended. Needless to say the exhibition is not a profit-making undertaking and any surplus which may be made is carried over to the succeeding year.

The railway appliances exposition is new not only to many railroad officers, but to a considerable number of railway supply representatives who have taken the places of those who have gone to the colors. Practically all railway supply companies have contributed their share of men to our armed forces. Perhaps the most prominent member of the National Railway Appliances Association is Lieut.-Commander George C. Isbester, a director of the association, and now in the service of the U. S. Navy as a paymaster in the supply department at Chicago. Several firms have service flags displayed at their booths to indicate the numbers of their employees who have responded to the call of the government.

The officers and members of the board of directors of the National Railway Appliances Association are as follows: President, E. H. Bell, Railroad Supply Company, Chicago; vice-president, M. J. Trees, Chicago Bridge & Iron Works, Chicago; secretary, C. W. Kelly, Kelly-Derby Company, Chicago; honorary director, H. M. Sperry, publicity representative of the Union Switch & Signal Company, the General Railway Signal Company, the Hall Switch & Signal Company and the Federal Signal Company, New York. Directors: P. C. Jacobs, H. W. Johns-Manville Company, Chicago; J. B. Strong, Ramapo Iron Works, Hillburn, N. Y.; J. Alexander Brown, Pocket List of Railroad Officials, New York; Lieut.-Commander G. C. Isbester, United States Navy, Chicago; E. E. Hudson, Waterbury Battery Company, Waterbury, Conn.; F. J. Johnson, American Hoist & Derrick Company, St. Paul, Minn.

Edwin H. Bell, president of the association, is president of the Railroad Supply Company, Chicago. He was born in Philadelphia, Pa., and has been a resident of Chicago since 1896. After attending the public schools and graduating from the Blirstown Academy, Blirstown, N. J., he took a course in business training in the Pearce Business College at Philadelphia. In 1890 he was employed in the general manager's office of the Lehigh Valley at Buffalo and in 1897 he entered the employ of the Railroad Supply Company. In 1906 he was elected vice-president of his company and continued in that capacity until January, 1916, when he was elected president to succeed Henry S. Hawley, deceased. A large part of the success of the exhibit this year is due to the courage of Mr. Bell in advocating the importance of proceeding with plans for the display when some members of his cabinet thought for a time that it should be postponed this year.

New R. S. A. Committee Chairmen

AMONG THE CHAIRMEN of committees of the Railway Signal Association this year there appear the names of four new men. Committee No. 5—Maintenance and Operation—is headed by L. R. Mann. Committee No. 12—Contracts—was headed by C. A. Christofferson, but as he refused to accept the chairmanship, R. C. Johnson was reappointed in his place. Committee No. 13—Electric Testing—is headed by P. M. Gault, and Committee No. 16—Harmonizing of Specifications—is headed by F. B. Wiegand. Of these four new committee chairmen Mr. Johnson and Mr. Wiegand served as heads of committees last year. This leaves Mr. Mann and Mr. Gault as the only new members heading committees.

Mr. Mann was appointed on committee No. 5 in 1909

and in 1910 he was made vice-chairman, in which capacity he acted from 1910 to 1918, when he was appointed chairman. In addition to being chairman of committee No. 5, he is also chairman of the St. Louis Regional committee and as a member of the Board of Direction is on the convention arrangements committee.

It will be the duty of committee No. 5 during the present year to prepare instructions for the maintenance of mechanical interlocking plants and of stationary and portable storage batteries. It shall also be the duty of this committee to investigate and report on methods of handling trains by signal indications without train orders, a very live subject at the present time, inasmuch as the elimination of a large number of train orders will do much to keep the long trains moving, which otherwise would have to stop at various train order stations to sign for 31 orders.

Mr. Mann has had an extensive and varied experience in signal work. He began with the Chicago & Alton in 1900, being engaged on the construction and maintenance of automatic block signals from 1900 to 1902 and serving from a laborer to a signal foreman on this line.



L. R. Mann

P. M. Gault

In 1902 he went to the General Railway Signal Company as a mechanic on the construction of electric interlocking and served as mechanic and as foreman with this company in 1902 and 1903. From 1903 to 1904 he was connected with the Lake Shore & Michigan Southern on the maintenance of interlocking and block signals between Erie, Pa., and Buffalo, N. Y. In 1904 he accepted a position as general foreman on the maintenance and construction of signals on the Atlantic Coast Line and was located at Waycross, Ga. He served in this capacity until 1905, when he was appointed supervisor of signals on the Missouri Pacific, serving in this capacity until 1916, when he was appointed general signal inspector for the Missouri Pacific-Iron Mountain system, which position he holds at present.

P. M. Gault, the new chairman of committee No. 13 on Electric Testing, became a member of the Railway Signal Association in 1909 and served on committee 7, covering Definitions in 1913 and 1914, and on a special committee in 1914 on Methods of Recording Signal Performance. He has been connected with committee 13 since 1915, and acted as vice-chairman in 1916 and 1917. In addition he is the chairman of the Chicago Regional committee.

Committee No. 13 has been assigned to prepare, for this year, instructions for testing relays, indicators and

signal repeaters; to prepare tables of standard ranges and scales for electric testing instruments; standard forms for recording results of tests, and a specification for adjustable resistances to be used in testing purposes.

Mr. Gault is a 1906 graduate in electrical engineering at Ohio State University. After graduation he entered the service of the Pennsylvania Lines West of Pittsburgh as a signal apprentice and was assigned to the eastern division of the P. F. W. & C. After completing his apprenticeship course he was appointed signal inspector of the Chicago Terminal division in 1910. In

April, 1913, he resigned his position with the Pennsylvania Company and entered the service of the Illinois Central as supervisor of signals of the Illinois division, with headquarters at Champaign, Ill. In April, 1914, he was promoted to signal inspector, working out of the signal engineer's office. In January, 1915, he was promoted to the position of office engineer in the signal department. This position he held until October, 1917, when he was promoted to pilot signal engineer in the valuation department. In February, 1918, he was promoted to assistant engineer in the valuation department.

N. R. A. A. Has Attractive Exhibit at the Coliseum

Re-arrangement of Space Necessary to Accommodate Exhibitors;
Thirty-six New Companies Have Displays

THOSE WHO HAD HARBORED THE faintest doubt regarding the success of the National Railway Appliances Association exhibit this year had their fears completely allayed by the appearance at the Coliseum at nine o'clock yesterday morning when this organization opened its tenth annual show. With a few minor exceptions, all exhibits were ready and the universally expressed opinion is that the show, as a whole, presents a better appearance than in any previous year. There is just as much enthusiasm, just as much effort to interest and instruct the visitors, and just as much optimism as at any previous show, with the difference that the increased experience of the exhibitors has enabled them to display their devices to better advantage each year. Special pains have been taken through various ingenious methods to explain appliances more thoroughly and, as nearly all materials and appliances shown have seen actual service, the supply firms, as heretofore, are not overlooking opportunities to demonstrate actual results secured.

The display will continue as usual for four days, Monday to Thursday, inclusive, and, according to established precedent entrance is by means of tickets, a large number of which have been distributed among railway men. However, a pass or other evidence of railway employment will admit one.

While the improved appearance has been brought about in part by a more artistic treatment of the decorations of the hall and individual booths, a unity of treatment of the booth arrangements has been most effective in accomplishing the desired result. The idea as carried out has been particularly effective in the Annex, which has been made an integral part of the show. A material improvement was made last year in placing the main entrance to the exhibit in the Annex, and this plan has been retained this year with excellent results.

The most important change this year is the rearrangement of the aisles, which consists primarily of the elimination of the main east and west center aisle. This has been effective in increasing the available exhibit space, these changes having provided for 31 additional booths. While familiar devices and familiar faces greet the eye in the many corners of the show, a large number of new features present themselves in the displays of 36 new exhibitors who occupy 58 exhibit spaces in addition to the 119 old exhibitors. The accommodation of the newcomers presented one of the most formidable problems in arranging for this year's show. One outcome of this was the arrangement for 31 extra exhibit spaces, as noted above, while the remaining space was provided through the release of 27 spaces by old exhibitors. Thus the 119

firms who occupied 236 spaces last year make use of only 209 this year. For most part this reduction in space has been accomplished without any change in the policy of the exhibitors, although some of the signal companies are not showing as complete displays as in former years.

While somewhat broader in its scope this year, there has been no change in the firmly established policy of providing an educational display of devices interesting to men in the railway engineering and maintenance of way field. While occurring simultaneously with a convention of higher officers of these departments, special efforts have been made to reach the men in subordinate positions, a policy which has borne fruit in an ever-increasing attendance of supervisors and roadmasters with not a few foremen.

List of Exhibitors

The following is a list of the firms presenting exhibits, with the devices on display and the names of the representatives present at their booths:

A. G. A. Railway Light and Signal Company, Elizabeth, N. J.—A. G. A. railway grade crossing signal; highway danger signal; railroad signal lights—unison flash, single flash and steady light. Represented by J. K. Howard, C. S. Tiemann, A. G. Shaver and H. E. Gifford, Jr. Spaces 39 and 40.

Adams Motor & Manufacturing Company, 3914 Castello Avenue, Chicago.—Inspection motor cars. Represented by W. E. Adams, L. Gerhardt and A. P. Greuter. Spaces 218 and 218½.

Adams & Westlake Company, Chicago, Ill.—Signal lamps and lanterns; switch locks. Represented by G. L. Walters, A. S. Anderson, W. J. Pierson, C. B. Carson and H. G. Torney. Spaces 87, 88, 106 and 107.

Ajax Rail Anchor Company, Chicago.—Rail anchors. Represented by H. G. Elborg, A. W. Holmberg and H. W. Reynolds. Space 89.

Alexander Crossing Company, Chicago, Ill.—Continuous rail crossing. Represented by Lewis Alexander, P. E. Scott, G. P. Alexander and L. C. Keenan. Spaces 228, 229 and 230.

Alger Supply Company, Chicago.—Represented by J. M. Fitzgerald and O. S. Flash. Space 167.

Allih-Prouty Company, Danville, Ill.—Electrically operated door hardware; fire door hardware; freight and warehouse door hardware. Represented by A. Ver, Martin, H. R. Maxwell, I. D. Cotterman and F. E. McChesney. Space 181.

American Hoist & Derrick Company, St. Paul, Minn.—"American" railroad derrick. Represented by F. J. Johnson, C. C. Austin and Clark Hook. Space 88½.

American Kron Scale Company, New York, N. Y.—Railroad portable scale and railroad auto platform. Represented by W. W. Camp, F. Ohnel, C. F. Lester, T. M. Abranson and F. M. Franklin. Space 214.

American Steel & Wire Company, Chicago, Ill.—Steel fence posts; woven wire railroad fence; wire nails; rail bolts. American Signal wire. Represented by B. P. Ayers, J. F. Alexander, I. P. Shaughan, J. W. Collins, W. W. Miller, Jr., C. S. Knight, Jr., B. H. Rider, C. F. Wilson, William Powell, M. F. To, F. J. Conkling and P. J. Hinchey. Spaces 70 and 71.

American Valve & Motor Company, Cincinnati, Ohio.—Poage water columns; economy switch stands; Anderson interlocking

switch stands; Anderson safety switch appliances. Represented by J. T. McGarry, F. C. Anderson, J. De Pinal and D. Higgins. Spaces 130, 131 and 132.

American Vulcanized Fibre Company, Wilmington, Del.—Vul-Cot fiber insulation for railway signals. Represented by C. V. Sutton, C. C. Bell, W. A. Jordan, Wm. Maxwell and John Barron. Space 126.

Anti-Creep Corporation and Anchor Company, New York.—Bowman efficiency rail anchor. Represented by W. E. Burke, T. B. Bowman, Bob Evans, Orlando Metcalf and Ellsworth L. Mills. Space 192½.

Armco Iron Culvert Manufacturers, Middletown, Ohio.—Corrugated culverts; roofing; metal lath and other products for railway use made from rust-resisting Armco iron. Represented by B. G. Marshall, Thomas Smith, G. F. Ahlbrandt and F. B. Milhoan. Spaces 99 and 100.

Asbestos Protected Metal Company, Pittsburgh, Pa.—Asbestos protected metal; roofing and siding; A. P. M. gypsum roof construction; A. P. M. Waugh glazing construction; A. P. M. McAllister ventilators. Represented by John H. Vance, J. T. O'Neill and A. McAllister. Space 169½.

Associated Manufacturers of Malleable Iron, Cleveland, O.—Malleable iron castings of many kinds for cars, trucks and automobiles; testing machines. Represented by S. H. Standish, W. A. Draves, A. O. Buckius, F. C. Rutz and Jas. T. Llewellyn. Spaces 221 and 222.

Austin Company, Cleveland, Ohio.—Plans, specifications and views of standard railway and industrial building units. Represented by H. K. Ferguson, W. L. Bailey, W. F. Chambers and E. M. Haas. Space 150½.

Ayer & Lord Tie Company, Chicago, Ill.—Crosoted wood blocks for floors; crosoted materials. Represented by A. H. Noyes, W. H. Blythe and L. S. Eifel. Space 225.

John Baker, Jr., Chicago.—Asphalt for all purposes; Aspha-Way and Aspha-Bric for freight and ware house flooring, team-track paving, station platforms, etc. Represented by R. M. Elder and others. Space 201.

The Barrett Company, New York.—Barrett's specification roofing and bridge waterproofing; semaphore roofing; Everlastic Tylike shingles; Carbosota for wood preservation; Tarvia for railroad grade crossings and station platforms; Tar-Rok for sub-floor construction; Holt roof connections for interior drainage. Represented by C. F. Ames, C. T. Bilyea, W. S. Babcock, G. R. McVay and J. J. Ross. Spaces 107½ and 108.

Benjamin Electric Manufacturing Company, Chicago, Ill.—Various forms of lighting fixtures for right-of-way and maintenance of shops; industrial signals and electrical specialties; panel boards. Represented by G. B. Weber, A. E. Lubeck, M. J. Cleary, Ray Prior, J. T. B. Addington, O. L. Johnson, W. Cotrel and C. B. Harlow. Spaces 149½ and 150.

Bethlehem Steel Company, Bethlehem, Pa.—New Century adjustable model 51A switch stand; Steelton positive switch stand model 52A; U. S. A. non-adjustable switch stand. Represented by R. W. Belknap, J. F. Hennessy, E. B. C. Goyne, E. E. Goodwillie, Stanley H. Smith, Neil E. Salsich and K. C. Banks. Spaces 199 and 216.

Boss Nut Company, Chicago.—Boss lock nuts, bolts, nuts and rivets. Represented by J. A. MacLean, J. W. Fogg, C. Beaumont, W. G. Willcoxson and A. W. MacLean. Space 169.

L. S. Brach Supply Company, Newark, N. J.—Railway signal lightning arresters; crossing bells; telegraph apparatus; signal accessories. Represented by G. Gort, A. G. Brach and L. S. Brach. Space 2.

Bridges & Building Association, Chicago, Ill.—Represented by C. A. Lichty. Space 226.

Bryant Zinc Company, Chicago, Ill.—Models 1, 2 and 3 auto flags; gong type crossing bells; locomotive type crossing bells A. C. or D. C.; annunciators; relays; lightning arresters; resistance units; channel pins; bond wires; rail contacts; testing instruments; blue vitriol; battery zincs; battery coppers; primary batteries; signal accessories. Represented by A. F. Klink, Stanley C. Bryant, H. F. Worden, J. P. Costigan, W. P. Graves and A. Muller. Spaces 153 and 154.

The Buda Company, Chicago.—Motor cars; electric trucks; track drills; jacks; bumping posts; electric crossing gates; tool grinders; replacers; switch stands. Represented by F. E. Place, Wm. P. Hunt, Jr., L. M. Viles, M. A. Ross, R. B. Fisher, H. L. Miller, J. L. Artmaier, H. C. Beebe, C. H. Bull, W. C. Dyer, J. J. Gard, H. E. Arends, R. C. Horton, W. F. Hebard, E. Conant, R. M. Smith, M. A. Evans, A. C. Fiero, L. R. Griffin and P. G. Pendorf. Spaces 61, 62, 63, 64 and 65.

Carbic Manufacturing Company, Duluth, Minn.—Carbic portable acetylene lights; portable, low-pressure, acetylene generator for oxy-acetylene welding and cutting; Carbic combination portable light and oxy-acetylene cutting generator for wrecking outfit use. Represented by Gordon Paterson and C. H. Bolinder. Spaces 171½ and 172½.

Carnegie Steel Company, Pittsburgh, Pa.—Aeroplane crank case; submarine signal disk; aeroplane crank shaft; tractor gear; automobile fly wheel; turbine disk; rolled steel car wheel. Represented by Edwin S. Mills, N. M. Hench, C. B. Friday and Samuel Fray, Jr. Spaces 52½, 53, 71½ and 72.

Cast Iron Pipe Association, Chicago, Ill.—Cast iron pipe. Represented by F. E. Hutchins, R. C. McWane, W. E. Clow, L. J. Elliott and W. J. O'Day. Space 202.

Chicago Bridge and Iron Works, Chicago.—Model tanks and washout valve. Represented by M. J. Trees, H. C. Brown, C. M. Ladd, L. McDonald, F. L. Cook, R. M. Campbell, H. B. Horton, K. I. Small, H. B. Murphey, George T. Horton, O. A. Bailey, W. R. Manock, F. E. Lee and S. A. Poyer. Spaces 51 and 70.

The Chicago Flag & Decorating Company, Chicago.—Bunting signal flags; U. S. flags and flags of all nations; service flags. Represented by Geo. L. Glendon, Thos. Glendon, L. G. Magnusson and Walter Glendon. Space 186.

Chicago Malleable Castings Company, West Pullman, Chicago.—The Thomas rail anchor tie plate; Wightman rail joint. Represented by James S. Llewellyn and Warren M. Osborn. Space 142.

Chicago Pneumatic Tool Company, Chicago.—Oil-driven air compressor; oil engines; speed recorders; air and electric tools and rock drills. Represented by C. E. Walker, J. C. Campbell, C. A. Schumacher, C. B. Coates, E. C. Stroup, M. C. Reed and Geo. W. Favor. Spaces 115 and 116.

Chicago Railway Signal & Supply Company, Chicago.—Railway signaling apparatus and highway crossing protection devices. Represented by E. W. Vogel, C. N. Suhr, W. C. Martin, W. H. Dayton, Wm. M. McClintock, C. R. Ahrens, D. J. McCarthy and A. H. Anderson. Spaces 96, 97, 77 and 78.

Chipman Chemical Engineering Company, Inc., New York.—Photographs and other data on Atlas "A" weed killer and the progress of the Atlas "A" method. Represented by B. G. Thompson and E. N. Townsend. Space 205.

Cleveland Tractor Company, Cleveland, Ohio.—Tractors, industrial and farm. Represented by B. R. Tewksbury, K. P. Drvsdale, C. Hougland and H. L. Greenfield. Space 185.

Crerar, Adams & Company, Chicago, Ill.—Track drills; Eureka bonding drills; Calumet die starters; Herules and Standard trucks; waste hammers; Joyce, Cridland jacks. Represented by Russell Wallace, W. I. Clock, Geo. Bassett, Arthur Martin, Charles Gregory and R. Bullard. Space 28.

D. & A. Post Mold Company, Three Rivers, Mich.—"D. & A." cement fence post machines; post reinforcements; specimen concrete fence posts; rod spacers; tie wires; etc. Represented by G. H. Dougherty. Space 36.

Detroit Graphite Company, Detroit, Mich.—Paint and colors of all kinds. Represented by L. D. Mitchell, A. H. Kuersl, W. D. Waugh, W. C. Bradford, J. J. Hogan, A. N. Bachner and T. R. Wyles. Space 108½.

Diamond State Fibre Company, Chicago.—Diamond fiber track insulation; ferrules; washers; end posts; continuous, Webber and Braddock angle plates; waste baskets; trucks; etc. Represented by Theo. Herkert. Space 13.

Paul Dickinson, Inc., Chicago.—Smoke jacks; chimneys and ventilators. Represented by A. J. Filkins, W. H. Dayton and L. G. Kelley. Space 98.

Dilworth, Porter & Co., Inc., Pittsburgh, Pa.—Represented by W. F. Schleiter. Space 27.

Dixon Crucible Company, Joseph, Ives City, N. I.—Lubricating graphite and eraphite productions. Represented by J. E. Simson and I. A. Biel. Space 118.

The Domestic Engineering Company, Dayton, Ohio.—Delco light—a direct connected electric light and power plant. Represented by I. K. Stover. Space 14.

Duff Manufacturing Company, The, Pittsburgh, Pa.—All types of lifting jacks. Represented by B. N. Thulin, C. A. Methfessel, E. A. Johnson and T. A. McGinley. Space 91.

Edison Storage Battery Company, Orange, N. I.—Edison nickel-iron-alkaline storage batteries. Represented by H. G. Thompson, F. Y. McGuiness, W. F. Bauer, E. T. Sawyer and H. J. Butler. Spaces 20 and 21.

Edison, Thos., Inc., Bloomfield, N. I.—The 400 and 500 ampere hour multiple plate battery; 500 single plate battery; 400 and 500 ampere hour heat resisting glass jars. Represented by F. I. Le Proux, I. P. Rodman, P. A. Garrity, E. W. Brown, E. W. Newcomb, B. F. Hines, R. J. Frost and L. W. Willis. Spaces 18 and 19.

Electric Railway Improvement Company, Cleveland, Ohio.—Portable rail bonding devices; Erico portable welder; Erico featherweight arc weld rheostat; Erico portable oil furnace. Represented by W. E. Huber, F. H. Neff, M. T. Stanton and L. I. Rucker. Space 1.

The Electric Storage Battery Company, Philadelphia, Pa.—Axle lighting equipment; railway signal batteries; car lighting batteries. Represented by Godfrey H. Atkin, T. Milton, T.

Pardee, Wm. Heritage, J. A. Pitts, H. M. Beck and W. E. Dunn. Space 60.

The Eymon Continuous Crossing Company, Marion, Ohio.—Continuous rail crossing. Represented by J. H. Fymon and Byron F. Wilson. Space 170.

Fairbanks, Morse & Co., Chicago.—Fifteen horsepower, type "Y," oil engine direct connected to 9 kw. generator in operation; standpipe, motor cars; centrifugal pumps; scales; electric motors. Represented by A. A. Taylor, L. H. Matthews, E. C. Golladay, F. J. Lee, G. W. Lewis, W. B. Lewis, D. K. Lee, F. M. Condit, F. P. Drinker, J. P. Flanagan, E. E. Pendray, H. E. Vergosen, E. J. Vergosen, E. J. Coverdale, J. D. Daggett, H. E. Vogel, Geo. J. Akers, G. Howard, H. J. Renkin, H. G. Balke, C. R. Demis, F. Lang, R. F. Koops and C. R. Story. Spaces 73-76 and 92-95.

Fairmont Gas Engine and Railway Motor Car Company, Fairmont, Minn.—Railroad mowing machine; section motor car; inspection car; handcar engine. Represented by F. E. Wade, D. G. Shephard, R. B. Ballard and W. F. Kasper. Spaces 41, 42 and 43.

Federal Signal Company, Albany, N. Y.—Reception booth. Represented by Carl Henze, W. H. Reicherd, H. C. Ware and C. N. Beckner. Spaces 56 and 57.

Frictionless Rail, The, Boston, Mass.—Demonstrating the uses of the frictionless rail. Represented by F. A. Barbey, S. W. Simonds, T. F. Dwyer, Jr., and Geo. Bryant. Spaces 133 and 134.

General Electric Company, Schenectady, N. Y.—Represented by W. J. Clark, H. L. Monroe, C. Darticos, A. P. Jenks, W. H. Sigourney, John Roberts, H. W. Stewart, H. M. Jacobs and L. W. Shuge. Spaces 35, 36 and 37.

General Railway Signal Company, Rochester, N. Y.—Represented by S. G. Johnson, F. L. Dodgson, L. Thomas, F. H. Jones, W. R. Young, J. R. Wills, H. W. Lucia, W. H. Workman, E. E. Jester and J. A. Geneser. Spaces 47 and 48.

Gould Storage Battery Company, Depew, N. Y.—Storage batteries. Represented by G. R. Berger, W. S. Gould, R. Graham, R. C. Hull and W. H. Conant. Spaces 157 and 157½.

William Graver Tank Works, Chicago.—Storage tanks; water softeners; water filters. Represented by W. R. Toppan. Space 138.

Grip Nut Company, Chicago.—Grip nuts. Represented by W. E. Sharp, B. H. Forsythe, H. E. Passmore, A. Roberts, J. E. Weatherford and C. J. Wymer. Spaces 190 and 191.

W. & L. E. Gurley, Troy, N. Y.—Engineering and surveying instruments: Transits, levels, plane tables and alidades, compasses, leveling and stadia rods, hydraulic current meters, water stage registers, etc. Represented by H. M. Dibert and W. S. Hopkins. Space 69½.

Hall Switch & Signal Company, New York, N. Y.—Reception booth. Represented by H. W. Wolff, J. A. Ritter, H. L. Hollister, D. R. Day and W. J. Gillingham. Spaces 85 and 86.

Hatfield Rail Joint Manufacturing Company, Macon, Ga.—Hatfield rail joints. Represented by U. R. Hatfield. Space 166½.

Hayes Track Appliance Company, Richmond, Ind.—Hayes derails. Represented by R. W. Slautterback, E. L. Ruby, S. W. Wallace, W. Harding Davis and S. W. Hayes. Spaces 140 and 141.

Hazard Manufacturing Company, Wilkes-Barre, Pa.—Signal wires and cables; wire rope. Represented by Albert W. Gabriel, Geo. P. Cady, H. B. Pfisterer, Geo. G. Steinbrenner, L. W. Allen, W. S. Hart, Thomas Keefe, C. P. Brodhun and L. W. Bevan. Spaces 3 and 4.

Hegeman-Castle Corporation, Chicago.—Clapp fire resisting paint; tool steel gears and pinions; electric arc welders; Anglo-American Varnish Company's products; target enamels. Represented by Walter H. Evans, B. A. Hegeman, Jr., C. C. Castle, E. D. Hillman and A. C. Sullivan. Space 137.

Hoeschen Manufacturing Company, Omaha, Neb.—Hoeschen crossing signals; track instruments and annunciators. Represented by F. K. Davis, G. H. Carlson and E. Willrodt. Space 181.

Hubbard & Company, Pittsburgh, Pa.—Track tools of various kinds. Represented by W. H. Remmel, J. V. Smith, Geo. H. McCammon, J. W. Hubbard and O. W. Youngquist. Space 143.

Ingersoll-Rand Company, New York—"Imperial" pneumatic tie tampers; "Imperial" gasoline and electric motor-driven gang car with portable air compressors for operating tie tampers; pneumatic spike hammers for cut spikes; pneumatic spike drivers for screw spikes; pneumatic rail drills; pneumatic wood boring machines. Represented by W. H. Armstrong, C. W. Melcher, J. P. Gillies and Chas. Dougherty. Spaces 206 and 208.

International Filter Company, Chicago, Ill.—Showing the chemical feed of a water softener. Represented by W. N. Waterman, A. L. Hodges and Geo. H. Brown. Spaces 170½ and 171.

The International Steel Tie Company, Cleveland, Ohio.—International steel twin tie; International steel crossing foundation. Represented by Wm. P. Day, W. C. Mahon and W. E. Heglaw. Spaces 200 and 215.

Iowa Gate Company, Cedar Falls, Iowa.—Railroad fire gates. Represented by Albert Sauer and J. B. Clay. Space 193.

Johns-Manville Company, New York, N. Y.—Asbestos built-up roofing; asbestos ready roofing; asbestos shingles; smoke jacks; pipe and boiler insulation; piston packages; fibre conduit. Represented by J. E. Meek, J. C. Younglove, G. A. Nicol, P. C. Jacobs, J. M. Borrowdale, Geo. Christenson, C. S. Chingman, F. W. Doty, H. Flanagan, C. D. Folsom, R. A. Hamaker, W. J. Hennessy, F. J. Horne, D. L. Jennings, W. H. Lawrence, C. E. Murphy, J. G. Newman, W. D. Otter, C. M. Patten, A. G. Pickett, H. B. Sewell, J. H. Trent, E. T. Wade and F. H. Willard. Spaces 171, 175, 176 and 177.

O. F. Jordan Company, East Chicago, Ind.—Spreader car model. Represented by Walter J. Riley and Robert F. Bressler. Space 220.

Kalamazoo Railway Supply Company, Kalamazoo, Mich.—Hand, push and velocipede cars; motor cars; track drills; track jacks; gauges and levels; electric valve grinders; electric rock drills; steel wheels; wood center wheels. Represented by Jno. McKinnon, D. A. Stewart, W. N. Sidnam, N. C. Study, F. E. McAllister, H. B. Miller, C. Jackson, W. Winterle and L. W. Bates. Spaces 22, 23, 24 and 25.

Kaustine Company, Inc., Buffalo, N. Y.—Sanitary waterless toilet and urinal. Represented by G. W. Hanbrook and D. A. Evans. Space 158.

Kelly-Derby Company, Chicago.—Warehouse and trailer trucks; semi-Diesel oil engines; perfect rail brace and tie plate combined. Represented by F. W. Adams, H. L. Bachman, W. H. Day, O. K. Fischer, H. H. Fry, W. B. Holcomb, Edw. E. Johnson, C. W. Kelly and F. G. Koehler. Spaces 11 and 30.

The Kerite Insulated Wire & Cable Company, Inc., New York.—Kerite insulated wires and cables. Represented by B. L. Winchell, Jr., George A. Graber, W. H. Fenley, J. A. Hamilton, P. W. Miller, J. W. Young and J. A. Renton. Spaces 49, 50, 68 and 69.

The Kettle River Company, Minneapolis, Minn.—K-R-Gunite battery vaults; K-R-Gunite telephone booth. Represented by J. L. Weatherly and C. H. Marquess. Space 168½.

Keystone Grinder and Manufacturing Company, Chicago.—Keystone grinders and attachments. Represented by S. S. Newman and John Wincerantz. Space 194.

Kilbourne & Jacobs Manufacturing Company, Columbus, Ohio.—Reception booth fitted with pictures of all-steel automatic air dump cars. Represented by J. Stanton Mossgrove and David Greene. Space 45.

Lackawanna Steel Company, Lackawanna, N. Y.—Abbott rail joint plates and Lackawanna hook shoulder tie plates; safety head angle bars. Represented by C. R. Robinson, A. P. Van Schaick, J. L. Henech, C. H. Hobbs, G. A. Hagar, F. E. Abbott and A. H. Weston. Spaces 33 and 34.

Layne & Bowler Company, Memphis, Tenn.—Working model Layne vertical turbine pump; turbine parts; shutter screen and Keystone wire wrapped screen for railway water supply. Represented by W. C. Curd and R. S. Charles. Space 90.

The Lehon Company, Chicago.—Mule-hide plastic car roofing; Mule-hide burlap-back car roofing; Mule-hide canvas coach and engine cab roofing; Per-hona insulating paper for refrigerator cars; Mule-hide cap strips and sill covers; Mule-hide building roofing; Mule-hide asphalt shingles; Mule-hide Slate-Kote roll roofing; Mule-hide treated fabrics and membranes. Represented by Tom Lehon, D. B. Wright, Wm. I. Orr and F. A. Magerni. Space 109.

Lipman Refrigerator Car & Manufacturing Company, Blois, Wis.—Refrigerator car equipment; A. B. C. system of refrigeration and heating; A. B. C. car door. F. M. car door. Represented by C. F. L. Lipman, F. Lipman, W. W. R. Unso, A. B. Melville and C. H. Woodward. Space 0.

Long Company, Chas. R., Jr., Louisville, Ky.—Signal rollers and bridge paints; line lead bearings; and general line of station and bridge parts. Represented by Charles R. Long, Jr., Harry Vissinger, G. S. Turner, W. H. Heikman, M. E. Keig and S. W. Russell. Space 80.

The Lufkin Rule Company, Sarisaw, Mich.—Measuring tapes, steel and woven; straight tie rods; mule-horn scales; spring joint folding wood rules. Represented by R. O. Lufkin and J. S. B. McGee and Frank G. Brown. Space 121.

M. W. Savelly Company, Portland, Me.—Vaughan rail binders; Vaughan split straighteners; anchor guard rail clamps; Vaughan guard rail binders; Vaughan switch heater (new design). Represented by D. F. Vaughan and C. Z. Vaughan. Spaces 82 and 101.

Mason & Whyte Rope Company, Kenosha, Wis.—Wire rope of every description and for every purpose; model of wire

rope and wire mills built to scale. Represented by Edw. E. Robirds, Geo. S. Whyte, Jas. A. Boope and M. M. Gross. Space 89½.

MacRae's Blue Book Company, Chicago.—MacRae's Blue Book. Represented by Albert MacRae, L. R. Rollins, Lloyd Simonson, E. B. Cooke and Thos. H. MacRae. Space 9.

The Madden Company, Chicago.—Three men rail layer; Blair tie spacer; Wagner switch point straightener; Harris-Muff ballast screen; Richter blue flag derail; Richter automatic derail and turntable lock; Chicago steel fence post; Madden rail carrier. Represented by H. C. Holloway and T. D. Crowley. Space 195.

Marsh & Truman Lumber Company, Chicago.—Bloxonend flooring. Represented by M. G. Truman. Space 213.

C. F. Massey Company, Universal Concrete Products Company, Canadian Concrete Products Company, Chicago.—Reinforced concrete products; battery well; battery box; house; culvert pipe; telegraph pole; flag pole. Represented by C. F. Massey, Jos. F. Love, J. E. Moody, P. Kircher, E. M. Hatheway, Chas. Gilman, H. E. Burns, Dan R. Brown, J. J. Gruenfeld, E. C. Alexander, A. M. Swenson and B. O. Brooker. Spaces 54 and 55.

McGraw-Hill Publishing Company, New York, N. Y.—Complete list of the papers published by this company. Represented by Wm. Buxman, J. E. Mason, E. J. Hunt and Fay Crabs. Space 8½.

Mercury Manufacturing Company, Chicago.—Mercury tractor type "L"; Mercury trailer standard warehouse. Represented by John R. Bensley, W. W. Pace, Wilton Bentley, L. R. Millar, William I. Lott, S. F. Proctor and H. B. Johnson. Spaces 10 and 29.

The Alexander Milburn Company, Baltimore, Md.—Portable carbide lights; oxy-acetylene welding and cutting outfits and apparatus. Represented by S. B. Moats. Space 5.

Miller Train Control Corporation, Danville, Ill.—Miller train control cab instrument mounted on engineer's air brake valve and stand, together with full size cut-away section of the control, shoe bar, etc. Instrument will be connected with air to show operation. An automatic stereopticon will show slides of actual photographs as well as printed matter of an educational value. Represented by W. B. Murray, H. B. Miller, J. N. Garber, E. Murray and P. E. Herren. Spaces 197 and 197½.

Monroe Calculating Machine Company, Chicago, Ill.—Monroe calculating machines. Represented by H. H. Doty. Space 9.

Mudge & Co., Chicago.—Mudge motor cars. Represented by Burton W. Mudge, Robert D. Sinclair, Karl J. Eklund, Herbert Deeming, William B. Ross, George W. Bender, Fay E. Posson, Charles M. Mudge, Jean K. Yanatta, Clyde P. Benning, Hugh U. Mudge, Clive Hastings, Ellsworth Ingalls, Charles W. Simpson, William C. Jacobs, V. Pageit, Charles C. Smith and Frank Berz. Spaces 146, 147, 127 and 128.

National Carbon Company, Inc., Cleveland, Ohio.—Columbia R. S. A. No. 72 HV primary signal batteries; Columbia track batteries; storage batteries; Columbia dry batteries; Hot Shot batteries; carbon brushes; lighting, moving picture and photographic carbons; welding and searchlight carbons; Columbia flashlights and flashlight batteries; carbon telephone specialties—special forms in carbon. Represented by Chas. S. Pfisterer, W. H. Arkenburgh, J. M. Spangler, W. R. Pfisterer, R. J. Cox, L. W. Fischer, C. W. Wilkins, Wallace O'Connor, A. E. Pratt, R. W. Erwin, W. G. Waitt, R. C. Woods and R. S. Geraghty. Spaces 151 and 152.

National Concrete Machinery Company, Madison, Wis.—National reinforced concrete line; corner and brace fence posts for right-of-way fencing; National molds and reinforcements for concrete fence posts; Toohy timber dapper, a new device adapted for framing quickly and economically all sizes of bridge timbers and for framing car sills and other timbers used in car repairing work. Represented by I. B. Evans, M. H. Hovey, V. E. Rogers, E. A. Everett, W. Harding Davis, W. M. McClintock and Frank Sanders. Spaces 158½ and 159.

National Lead Company, New York.—Dutch Boy red-lead. Represented by A. H. Sablin and F. M. Hartley, Jr. Space 81.

The National Lock Washer Company, Newark, N. J.—Nut locks. Represented by F. B. Archibald, J. Howard Horn, R. L. Cairncross and A. T. Thompson. Space 192.

National Malleable Casting Company, The, Cleveland, Ohio.—Holdfast rail anchor; wedge lock anchor; malleable iron tie plates; malleable iron bridge washers; spools and angle washers; malleable iron rail braces. Represented by L. S. Wright, J. J. Byers and T. W. Aishton. Space 102.

National Railway Appliance Association, Chicago, Ill.—Enrollment booth. Represented by A. H. Kuerst, G. R. McVay, G. E. Geer, Thos. H. MacRea and W. G. Wilcoxson. Spaces 198 and 217.

National Surface Guard Company, Chicago.—Cattle guards (new design); rail saws; tie tongs. Represented by C. F.

Hately, C. C. Zimmerman, H. O. Conklin and H. A. Smith. Space 211.

Geo. P. Nichols & Brother, Chicago.—Electric turntable tractor; model of electric transfer table. Represented by Geo. P. Nichols, S. F. Nichols, R. M. Gaston and N. Fries. Space 173.

Northwestern Motor Company, Eau Claire, Wis.—Railway motor cars. Represented by R. R. Rosholt and R. F. German. Spaces 196 and 196½.

Ogle Construction Company, Chicago.—Hoisting machine and miniature steel automatic coating station. Represented by R. A. Ogle, L. S. Murphy, C. F. Bledsoe, Edw. Ernst and M. W. Powell. Spaces 12 and 31.

Okonite Company, The, New York, N. Y.—Reception booth. Represented by H. Durant Cheever, J. D. Underhill, W. R. Van Steenburgh, D. Woodhead, J. M. Lorenz, R. N. Baker, A. L. McNeill, E. G. Wilson, L. H. Irvine and C. S. Nolloth. Spaces 16 and 17.

O'Malley-Bear Valve Company, Chicago, Ill.—Valves and locomotive blowoff cocks; lock shield valve for oxy-acetylene service; globe; angle and "Y" valves for all service. Represented by Thomas O'Malley, Edward O'Malley, Joseph Gallagher, J. E. Brown, Jas. Pigott, G. A. MacLean, Herman Crews and Walter Morris. Space 114.

The P. & M. Company, Chicago.—Vaughan rail anti-creeper; P. & M. rail anti-creeper; Henggi rail anti-creeper; bond wire protectors. Represented by Fred N. Baylies, S. M. Clancey, J. D. Griswold, D. T. Hallberg, H. A. Hawes, R. D. Hawley, Geo. E. Johnson, J. E. Mahoney, Wm. A. Maxwell, Philip W. Moore, Fred A. Poor, John Reagan, W. H. Reeves, John Ritchie, P. V. Samuelson and L. S. Walker. Spaces 122-123.

Page Steel and Wire Company, New York.—"Copperweld" bare and weatherproof wire; bond wires; tie wires; nails; Armco (American ingot) iron wire; plain, galvanized and welding wire. Represented by W. T. Kyle, C. B. Semple, J. A. Roesch, Jr., F. W. Walters and W. S. Krenz. Spaces 182-183.

W. W. Patterson Company, Pittsburgh, Pa.—High-grade hard-made tackle blocks; wood blocks; manila rope; wire cable. Represented by W. W. Patterson, Jr. Space 145.

The Peyton Safety Rail Joint Company, Centralia, Ill.—Peyton safety rail joints. Represented by W. Perry, C. W. Witver, J. M. Brown, C. Rettinghouse and M. C. Hughes. Space 172.

Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa., Des Moines, Iowa, Chatham, Ont.—Railway water tanks; railway coaling station; railway oil tanks. Represented by W. W. Hendrix, Max Whitacre, C. L. Todd, W. P. Cogswell, W. J. Klinking, A. C. Pearsall, Herbert Miller, J. E. O'Leary, H. A. Da Lee and W. V. Bickelhaupt. Spaces 83 and 84.

The Pocket List of Railroad Officials, New York.—Pocket List of Railroad Officials. Represented by J. Alexander Brown, Harold A. Brown and Charles L. Dinsmore. Space 26.

Positive Rail Anchor Company, Marion, Ind.—Rail anchors; switches; guard rails; tie plates; rail braces; switch point protectors; heel plates. Represented by Frank M. Robbins, J. A. Shouly, L. C. Ferguson, A. H. Told, E. A. Le Beau and W. Harding Davis. Spaces 178, 179 and 180.

Geo. A. Post, New York.—Arch-neck railway spike. Represented by Geo. A. Post, James R. Steele, E. H. Walker, W. Eckels and Geo. A. Post, Jr. Space 204.

The Protective Signal Manufacturing Company, Denver, Colo.—Railway signal equipment—bells; relays; oscillators; time units; wig-wag signals; etc. Represented by Archie M. Adams, Will C. Neahr and Walter E. Wegner. Spaces 167½ and 168.

Pyrene Manufacturing Company, New York, N. Y.—Fire extinguishers; hose; reels; chemical engines. Represented by R. G. Henderson, W. D. Dorry, J. M. Johnston and H. V. Boykin. Space 160.

The Q. & C. Company, New York.—Compromise joints; Bonzano-Thomson rail joints; derails; replacers; skid shoes; emergency knuckles. Represented by C. F. Quincy, F. F. Kister, Jay V. Wescott, Edgar M. Smith, J. L. Terry, Roger B. Quincy, E. Ray Packer, William W. Hoit and A. R. Horn. Spaces 120 and 139.

The Rail Joint Company, New York.—Continuous, Weber, Wolhaupter and 100% Standard joints; continuous, Weber and Troy insulated joints; continuous step joints. Represented by V. C. Armstrong, W. P. Thomson, Benj. Wolhaupter, E. A. Condit, Jr., E. L. Van Dresar, Jas. A. Greer, Alex. Chapman, E. F. Schermerhorn, F. C. Webb, R. W. Payne, G. H. Larson, C. B. Griffin, R. W. Smith, W. S. Boyce, H. C. Hickey and Chas. Jenkinson. Spaces 79 and 80.

The Railroad Supply Company, Chicago.—Tie plates; derailleurs; wig-wag crossing signals; d. c., a. c. and motor-driven bells; relays; testing instruments; lightning arresters; annunciators; electric crossing gates; signal supplies and accessories. Represented by E. H. Bell, H. M. Buck, M. J. Fox, F. M. Hill, P. W. Kohnen, F. Lull, R. S. Prentice, A. H. Smith, H. G. Van Nostrand and F. C. Webb. Spaces 104 and 105.

Railway Age—See Simmons-Boardman Publishing Company. Space 46.

Railway Electrical Engineer.—See Simmons-Boardman Publishing Company. Space 46.

Railway Maintenance Engineer. See Simmons-Boardman Publishing Company. Space 46.

Railway Mechanical Engineer.—See Simmons-Boardman Publishing Company. Space 46.

Railway Review, Chicago.—Railway Review. Represented by Willard A. Smith, Harold A. Smith, W. M. Camp, C. L. Van Auken, A. E. Hooven; J. E. Gougeon, Chas. L. Bates and J. L. Lammedec. Space 44.

Railway Signal Engineer.—See Simmons-Boardman Publishing Company. Space 46.

Kamapo Iron Works, Hillburn, N. Y.—Manganese switch points; switch stands; switch slide plates. Represented by Thomas E. Akers, Arthur Gemunder, W. C. Kidd, Douglas E. Snow and James B. Strong. Space 109½ and 110.

Reading Specialties Company, Reading, Pa.—Guard rail clamps; car and engine replacers; rail benders; rail joints; tie spacers; rail straighteners. Represented by B. J. Buell and J. J. O'Monnell. Spaces 45 and 46.

Roadmasters' and Maintenance of Way Association of America, Sterling, Ill.—Represented by P. J. McAndrews and Miss Anna McAndrews. Space 227.

Ross Foundry Company, Henry, Chicago, Ill.—Hardick lock and covered turnbuckle for switch adjustment. Represented by I. A. Ogden and William Hardick. Space 189.

Southern Pine Association, New Orleans, La.—Pine and its different treatments. Represented by Dr. H. Von Schrenk, A. L. Kammner and H. W. Mehlitz. Space 203 and 202.

Squire Cogswell Company, Chicago.—Volkhardt water service hydrants and valves and specialties; Hawk kerosene torches. Represented by Willis C. Squire and Chas. P. Cogswell. Space 161½.

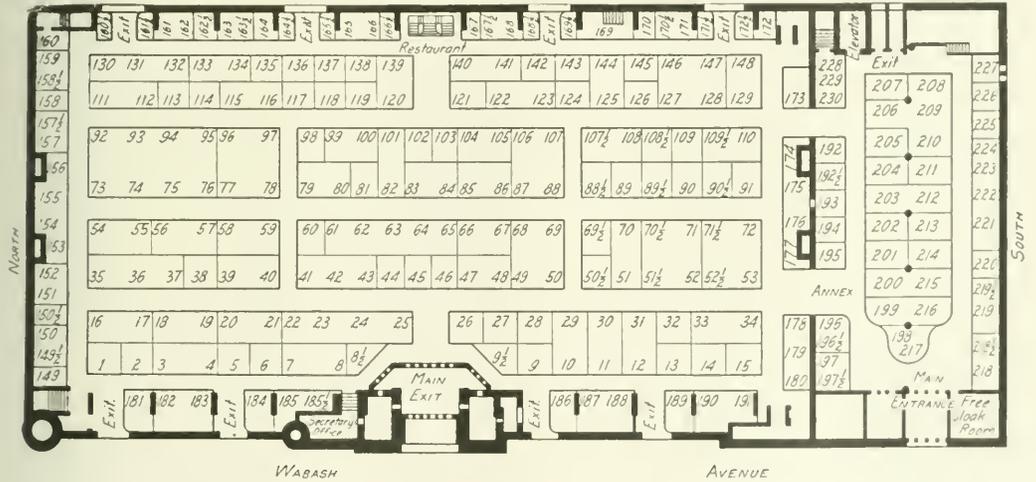
Standard Asphalt & Refining Company, Chicago.—Mineral rubber mastic floors; acid-proof floor; waterproofing; pipe coating; roofing; damp proofing; paving; insulation; liquid coatings; acid-proof tank linings. Represented by R. F. Trumbull, H. C. Kichle, F. L. Hedrich, George A. Thornton, J. M. Woodruff and Charles Muller. Spaces 161 and 162.

Swain Company, Chicago. Journal box publisher; journal box loose pulley and shattering cups; solid lubricators for all sizes of crank pin cups; metallic packing for all rods. Represented by Wm. H. Holmes and C. H. Holman. Space 187½.

Templeton, Kenly & Co., Ltd., Chicago.—Simplex car and track jacks; Simplex pole pulling jacks; Simplex emergency jacks; Simplex automobile jacks; Simplex shipbuilder's jack. Represented by A. C. Mills, W. B. Templeton, H. B. Burlow and J. H. Hummel. Space 32.

Toledo Scale Company, Toledo, Ohio.—Automatic dial scales; built-in type freight-house scale; self-contained type dormant scale; portable platform automatic dial scale. Represented by C. E. Moore, C. H. Haggood, H. O. Hum, W. B. Pantall and H. D. Ridge. Space 15.

Track Specialties Company, New York, N. Y.—Trasco guard



Floor Plan of the Coliseum and Annex, Showing Booth Numbers

Safe Lock Switch Machine Company, Lexington, Ky.—Safe lock switch machine. Represented by Curtis Dougherty, D. M. Case and C. F. Jones. Spaces 163 and 163½.

Sellers Manufacturing Company, Chicago.—Sellers' anchor bottom wrought iron tie plates. Represented by J. M. Sellers, G. M. Hogan, R. A. Van Houten and R. J. Platt. Space 124.

Signal Accessories Company, New York.—Signal material. Represented by F. C. Lavarack and C. R. Ahrens. Space 119.

The Silver Steel Company, New York.—The Silver steel tie. Represented by Jos. A. Silver. Space 164½.

Simmons-Boardman Publishing Company, New York and Chicago.—Railway Age; Railway Maintenance Engineer; Railway Signal Engineer; Railway Mechanical Engineer; Railway Electrical Engineer. Represented by L. B. Sherman, Samuel O. Dunn, Henry Lee, C. R. Mills, Frank S. Dinsmore, F. H. Thompson, H. H. Simmons, H. H. Marsh, J. H. Bryan, J. M. Rutherford, R. H. Smith, E. R. Walker, E. T. Howson, W. S. Lacher, K. E. Kellenberger, J. G. Little, A. F. Stuebing, G. L. Lacher, E. T. Owens and T. E. Crossman. Space 46.

Simple Gas Engine Company, Menasha, Wis.—Gasoline engines with clutch and chain drive for railway motor cars, three, five and six horsepower. Represented by John P. Hrubecsky, F. J. Oberweiser and John G. Walter. Space 165½.

T. W. Snow Construction Company, Chicago.—Oil and water cranes. Represented by T. W. Snow and Derby Snow. Space 50½.

Superior compromise joint; Superior derailers; rail benders; guard rail braces; adjustable rail shims. Represented by W. B. Lee. Space 207.

Union Switch & Signal Company, Swissvale, Pa.—Represented by A. L. Humphrey, G. A. Blackmore, L. E. Howard, W. P. Neubert, J. P. Coleman, J. E. Saunders, C. O. Harrison, H. A. Wallace, J. F. Talbert, W. P. Allen, Aaron Dean, H. W. Griffin, J. J. Cozzens, T. H. Patnall, J. L. Brastow, J. S. Hobson, W. W. Talbert, S. E. Gillespie, V. K. Spicer, J. L. Loomis, Geo. Marloff, J. D. Rott and H. R. Shinn. Spaces 66 and 67.

U. S. Wind Engine & Pump Company, Batavia, Ill.—Models and samples of railway water stations, water tanks, water columns, railroad double-acting pumps, stock water tanks and pump switch stands. Represented by I. E. W. Leitch, C. F. Ward, G. E. Vermilyer, J. P. Prior and F. B. La Salle. Spaces 111 and 112.

Verona Tool Works, Pittsburgh, Pa.—Track tools; track jacks; levels; gages; nut locks. Represented by H. Fischer, E. Woodings and H. C. Mott. Spaces 129 and 148.

Volkhardt Company, Inc., Stapleton Station, S. I., N. Y.—Non-freezing water hydrants. Represented by Wm. Volkhardt and Willis C. Squire. Space 160½.

The Walls Frogless Switch and Manufacturing Company, Kansas City, Mo.—Swing rail frog. Represented by C. E. Ennis and W. J. Stoneburner. Spaces 219 and 219½.

Waterbury Battery Company, Waterbury, Conn.—Waterbury unit cylinder primary battery; Waterbury plate type primary battery; Waterbury track battery; Schoenmehl primary battery; Gordon primary battery. Represented by C. B. Schoenmehl, G. A. Nelson, E. E. Hudson and S. J. Hough. Space 38.

Wayne Oil Tank & Pump Company, Ft. Wayne, Ind.—Oil tanks and self-measuring pumps. Represented by B. F. Geyer. Space 135.

West Coast Lumberman's Association, Seattle, Wash.—Lumber in various dimensions cut from Douglas fir. Represented by C. J. Hogue and D. H. Davis. Spaces 187 and 188.

Western Electric Company, New York, N. Y.—Railway telephone and selector dispatching circuits; flood lights; train lights; motor generator equipments for signaling. Represented by Jack C. Binning, Geo. Hull Porter, G. K. Heyer, T. J. Rider, H. K. Olmstead, F. A. Ketcham, Walter P. Hoagland, Will J. Davis and L. A. Muttart. Spaces 58 and 59.

The Wyoming Shovel Works, Wyoming, Pa.—Red Edge track shovels. Represented by G. E. Geer, H. C. Emery and H. T. Potter. Space 103.

Yale & Towne Manufacturing Company, New York, N. Y.—Locks; door closers, chain hoists. Represented by G. C. Fishleigh, L. W. Kregner, R. J. Kleinsmid and E. A. McGuire. Space 113.

Albany Regional Committee Report*

IN many parts of the country signal failures are often experienced during the winter months from frost collecting on motor commutators or contacts. This presents a problem to the signal departments to be solved with each recurring winter. Frost and moisture in signal mechanism and motor cases was discussed at length at this meeting. Some of the contributing causes of frost failures may be due to poorly fitted motor shields, motor shields cracked, poor gaskets for motor shields and mechanism doors, ventilators closed, no ventilators, high mica, causing brushes to arc and warm up commutator.

Frost failures were generally found to occur between 7 a. m. and 12 o'clock noon, depending principally upon the rays of the sun. Opening mechanism doors to clean motors when frost is forming on rails and iron poles will result in a frost failure. Failures from ice on motor commutators usually occur after a warm winter day when the temperature drops suddenly toward evening, just as the sun goes down. Motor and mechanism will have a sweating appearance and the motor commutator will have a very fine coating of ice. It has been found good practice not to open a case in severe cold weather unless absolutely necessary and at other times not before 10 a. m. and not after 3 p. m. on a sunny day. At these times the necessary work should be done in as brief a time as possible. Signals located close to a hill or mountain are less troubled with frost than those some distance away, while a signal located in a ravine near a mill pond seems to be an ideal spot for frost.

Some of the various methods employed in trying to counteract the effects of frost were the use of a wooden commutator shield, a special enlarged door, alcohol in mechanism case, alcohol on a sponge in commutator shield, the sealing up of bottom of mechanism, the installation of new gaskets for commutator shield and painting the outside of the mechanism case with aluminum. Others tried placing a packing of charcoal in mechanism cases but this did not seem to remedy the trouble. It is the opinion of most maintenance forces that proper ventilation is lacking in signal poles and mechanism cases and that providing a means for the proper circulation of air around the signal mechanism has been found to reduce frost failures materially. Another member present advised that on one section where consider-

able frost trouble was experienced this was remedied by closing up the ventilators with waste, plugging the hole in the bottom of the case with waste and setting small bottles of alcohol in the bottom of the cases, which seem to be most affected with the frost. No further trouble was experienced on these signals, but when they were cleaned in the spring the ones that had the alcohol in the cases had rusty mechanisms and bearings which was undoubtedly caused by the alcohol. Glycerine and vaseline were tried by placing them inside of the glass shield, covering the entire surface, but this did not prevent frosted motors. The same member stated that if the thermometer is higher than 10 deg. above zero it is too warm for frost to take effect, and if it is lower than 10 deg. below zero it is too cold for it to form unless it warms up very fast during the morning.

"Split Spark" Lightning Arrester

THE "SPLIT SPARK" lightning arrester, manufactured by the Chicago Railway Signal & Supply Company, Chicago, is unique in its construction and effects in protecting signal apparatus on railroads. This arrester is the invention of Fred B. Corey, for many years with the General Electric Company at Schenectady, N. Y. The over all dimensions are 5½ in. long by 3 in. high. The porcelain base, which is hollow, condamp and insect proof.

The two R. S. A. standard binding posts at the ends are for "line" and "instrument." The middle binding post is the "ground." This binding post has a carbon disc, and immediately on each side of it there are two knurled nuts, presenting many fine points toward the carbon ground disc, to which the lightning discharges to



Split Spark Lightning Arrester

ground. In the hollow base there are three sets of coils of heavy wire wound upon a fiber tube. These coils are impregnated, and the entire case is sealed, making it damp and insect proof.

One of the coils is a choke coil, while the other two are compensating coils, wound in reversed directions and connected direct to the incoming "line" binding post. These compensating coils divide the incoming static or lightning discharge, so that a positive discharge takes place between both gaps simultaneously. One particular feature of this arrester is that it has two positive discharge paths and is so designed mechanically that a fixed distance is kept between the points at all times.

*From the abstracts published in the R. S. A. Journal for March, 1918.

All coils are wound with heavy cotton-covered magnet wire, and the choke coil is the only coil offering resistance to the regular current going to the instrument, the compensating coils being connected directly to the incoming binding post.

To protect alternating current instruments the choke coil is eliminated. Extensive tests have shown that this arrangement offers no impedence and that lightning discharges are always equal between the two discharge points.

A Portable Motor Driven Conveyor

A NEW TYPE OF PORTABLE belt conveyor designed to be moved easily by one man, and which will handle loose materials such as coal, coke, ashes, crushed stone, sand or gravel and sacks, packages, boxes and manufactured products with equal facility, is being built by the Portable Machinery Company, Inc., of Passaic, N. J. The machine is operated either by an electric motor or gasoline engine and is known as a scoop

storage pile or the conveying distance. The machines are particularly adapted for filling in or extending embankments by conveying cinder or other filling materials



The Machine Showing the Belt Conveyor and Sprocket Drive



Increased Storage Capacity Is Gained by Using the Conveyor in Flights

conveyor because of the feature whereby the conveying belt receives its load of loose material through a scoop at the lower end which can be pushed or buried completely in the material to be handled.

The conveyor is built of steel and is mounted on wheels attached to the upright supports of the conveyor. The lower end of the conveyor is attached to the lower end of these uprights by pipe section members forming a triangle. The conveyor may be moved easily from place to place by inserting two pieces of pipe in the ends of the horizontal members for use as handles.

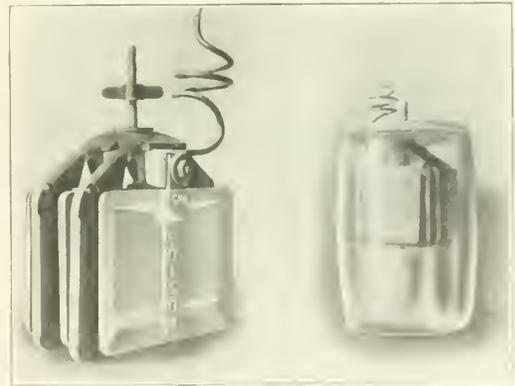
The power is transmitted to the conveyor from the driving motor, which is mounted on the horizontal supports by means of a chain and sprocket connection to a shaft extending underneath the conveyor. From a sprocket on the other end of this shaft the power is transmitted to the driving sprocket, which is located at the upper end of the conveyor.

In handling loose material the machine has a capacity of one ton in 1½ min., and in unloading loose materials from hopper or drop-bottom cars the lower end of the conveyor can be run under the car and the materials elevated from the track level, a distance of from 6 to 9 ft., to the storage pile. The conveyors can be used in sets of two or more to increase either the height of the

from hopper-bottom cars and discharging at the top of slope, thus obviating the necessity of an additional track along the top of the embankment.

Edison Multiple Plate Primary Cell

THOMAS A. EDISON, Inc., has made an important improvement in primary batteries in the form of a multiple plate type cell which embodies a combination of two copper oxide plates and three zinc plates as illustrated below. The method of assembly provides for two copper oxide plates suspended in copper-plated steel frames which are clamped automatically into the



Multiple Plate Primary Battery

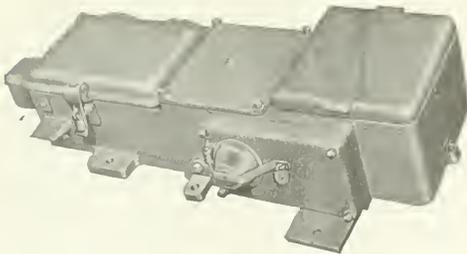
side of the plate, thereby insuring positive contact. The zinc plates are suspended from a rigid hanger bolted on to a cross bolt, the center zinc suspension having a jamb nut on each side.

The new element presents a very compact and rigid assembly, the mechanical structure of which insures a permanent fixation of the plates with the least amount of inactive material in its construction and thereby obtaining the minimum amount of displacement in the solution. As

shown in the illustration, horizontal slots are counter-sunk into the bottom panels of the zinc plates, the purpose of these slots being to indicate by their perforation the exhaustion of the cell. The design of the zinc plates is such as to enable the entire surface area to be maintained intact throughout the life of the cell, thus avoiding a decreasing surface as the cell becomes exhausted. The slots also provide a more positive means, and at a more definite point, for determining when the battery is ready for renewal. The physical improvement brought about by this latest development is the exposure of additional surface area of zinc and copper oxide plates at a greater height in the solution, thereby presenting a greater surface area of the elements in a more active solution. The effect of these physical improvements in the cell is to enable it to maintain a more constant voltage at any given discharge rate between the beginning and end of its life and to reduce to a minimum the CR drop in a cell when subjected to heavy discharges, especially under cold temperatures. The multiple plate type assembly is now being furnished in 400 and 500 ampere hours capacity to fit R. S. A. jars and covers and when furnished with barrel-shaped heat-resisting glass jars is known as Edison type M-404 and M-504, respectively. It is universally adaptable to all signal circuits, line circuits, track circuits, crossing bell circuits, low voltage switch machine circuits and signal lighting circuits.

U. S. & S. Co. New and Improved Devices

DURING THE LAST few years considerable economy in the operation of electro-pneumatic interlocking plants has been effected by the introduction of minor improvements in detail parts, the sum total of which has allowed a decided decrease in the amount of compressed air necessary for the operation of this type of interlocking. The improvements made in the switch valve have been responsible for a considerable portion of the saving in air. The Union Switch & Signal Company's improved Style "C" cutoff type valve is so designed that compressed air is held normally in only one



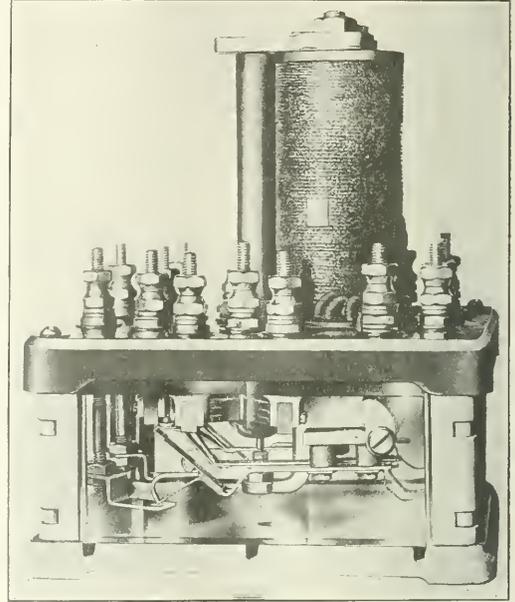
Style "M" Low Voltage Switch and Lock Movement

chamber and against only one electrically-operated pin valve. Another improvement in this valve has been the elimination of external tubing for interconnection of air chambers. The casting is now provided with internal ports for the flow of air between its chambers. The changes made in this style valve do not detract in any way from the recognized safety features which are characteristic of electro-pneumatic interlocking.

Style "M" Low Voltage Switch and Lock Movements

The Style "M" switch and lock movement recently developed was designed primarily to operate railway

switches when provided with electrical energy. Realizing that this movement would have an extensive application in connection with the low voltage operation of outlying switches, consideration was given the fact that it might be necessary at times for the switch to be thrown over by hand, due to battery failure or disconnection. Because of the fact that the trainmen who would be required to operate the switch under these circumstances might not be acquainted with the mechanism, the open-



Special Model 12 Neutral Polar Relay

ing for the reception of the hand crank was made prominent and a switch lock is used for fastening the cover of this opening in place. This was so located to bring it where it could not be overlooked. As an additional precaution, "Crank here" in raised letters has been placed in the gear case immediately over the hand crank opening. The point at which the crank is applied in the train of gears is such that no time is lost in throwing the movement over by hand.

Relay for Handling Low Voltage Switch Movements

In order to provide for the satisfactory control of low voltage switch and lock movements now being installed quite generally, the Union Switch & Signal Company has equipped its standard model 12 neutral polar relay with a special arrangement of contact-making parts. This relay is equipped with four front and two back contacts, which are arranged so that two silver-to-graphite contacts will ordinarily be depended upon for carrying the motor current, while two graphite-to-graphite contacts will break last as the relay is de-energized, in this way taking care of breaking the current used by the motor without injuriously affecting the contact parts. This relay provides a pressure of two ounces per contact when normally energized, as do all of the standard Model 12 and 13 Union relays.

EDITORIAL

Railway Age

EDITORIAL

DAILY EDITION

What virtue is there in the conservation of natural resources if human rights are sacrificed? The only answer

Conservation and the War

to this is that the conduct of the War for Freedom justifies a dissipation of the natural wealth of the world at a rate not previously dreamed of, and according to methods that would be considered disgracefully wasteful in sober times of peace. However much the demands of the moment may positively require an almost ruthless waste, such as the destruction of the beautiful roadside elms of France for trench timbers, the rights of posterity demand the practice of conservation wherever it does not interfere with the adequate supply of war needs. Just as the lavish expenditure of money on the part of the government demands a corresponding frugality on the part of the people, so it devolves upon railroad men to practice conservation even more than in the past. One unfortunate effect of the present emergency has been a tendency to discontinue the practice of treating timbers for railway structures, and to use inferior grades of lumber. Cheap or makeshift measures may be necessary in some places and even desirable for temporary arrangements, but the fallacy of such practices where avoidable will be demonstrated all too quickly in a far shorter life than could be expected of standard construction.

Prior to the building of the Grand Central terminal in New York, the New York Central conducted experiments

Promoting Safety in Passenger Stations

several years before deciding on the nature of the flooring and the grade of ramps to be used in the station building. The studies included experiments with 15 or 20 different flooring materials and nearly as many different inclinations of ramps. Before and since that time individual roads have carried on similar experiments previous to the construction of passenger stations. The fact that it was considered necessary to make these experiments emphasizes the importance of the work of the Committee on Buildings and the value of its recommendations on provisions to insure safe walking in and about passenger stations. While it does not follow that these studies and recommendations will entirely relieve individual roads from carrying on their own investigations when planning new passenger facilities, it does follow that their work is simplified. The knowledge of what others have done and the character of the results obtained presented in the concise manner of this report offer a foundation on which a road may build its own conclusions. Another point to be considered in providing for the safety of the public in passenger stations is the wide difference in the characteristics of the suburbanite as contrasted with the infrequent traveler. Facilities which will insure safety and the prompt movement of experienced travelers will not in all cases answer for the inexperienced. This phase of the question has been fully considered by the Committee on Buildings. The suggestions made in the report are

of a constructive nature and should prove to be of value to railway men in working out the details of station design.

The committee on water service is to be commended for calling attention to the importance of an adequate organization to supervise water service

Importance of a Water Service Department

problems, although it could well have placed more emphasis on this subject. It is true that on most roads water service is handled as an adjunct to some other department or branch of the service without any direct concentration of responsibility. The fact that this is the common practice does not, however, demonstrate its correctness. Rather, the improvements which have been effected on the few roads which have concentrated responsibility for the construction, maintenance and operation of water stations in one distinct department indicates that this common practice is wrong. The importance of a proper quality of water is being realized now more than at any time in recent years because of the necessity of securing the maximum service from each locomotive. This is leading to a realization of the importance of studying the quality of the water delivered at each individual station, which in itself is the work of a specialist. The increased demand for water resulting from the heavy traffic is also necessitating the reconstruction of many stations to provide the requisite capacity. This increased consumption is also requiring pumping for longer intervals and increasing the costs of operation, which in turn suggests larger and more modern pumping equipment. This and the other phases of the water service problems are of sufficient importance to justify the utilization of specialists in water service matters rather than leaving them to be solved by other men whose primary responsibilities are in other directions.

The preparation of the arrangements for the present convention of the American Railway Engineering Association was facilitated materially by

The Con- vention Attendance

a common feeling among the officers and directors in favor of a meeting this year, notwithstanding the postponement of several other railway conventions. In fact, some of those in charge were especially impressed with the idea that the convention could be made of particular value this year, and that with a proper arrangement of the program many railway men would make a special effort to attend because of the opportunity to discuss the questions of the hour. The correctness of this position is borne out by the large attendance yesterday. The registration of members totaled 293 or 4 more than the number reported for the first day last year. This is in addition to 75 guests who registered. While this is a smaller number than was registered two years ago, the enormous burden placed on all railway officers under prevailing conditions makes it

difficult for many to leave their work and the attendance recorded evidences the high value which the members place on the convention now in progress.

Government Interference

With Railways

PRESIDENT SULLIVAN'S ABLE ADDRESS to the Railway Engineering Association yesterday calls attention forcibly to the danger that when governments begin to interfere with the development and management of railroads, their interference will become excessive, unwise and harmful.

In Mr. Sullivan's own country, Canada, the government began some years ago to stimulate railroad construction by a varied policy of subsidies and guarantees. If kept within reasonable limits this policy might have been beneficial. But the government, for various reasons, carried it to great excess. Mr. Sullivan did not mention the fact, but it is well-known that one of the main reasons why the policy was carried to such excess was that the political parties of Canada began to seek public favor by competing with each other in subsidizing railroad development. In consequence, the railroads became greatly over-built, and the country has on its hands a large mileage which has and will have for years only a very small business; which is unable to earn a return upon the investment on it; and which has become a heavy burden upon the Canadian taxpayers.

As Mr. Sullivan showed, the national and state governments in the United States have gone to the opposite extreme. Instead of over-stimulating railroad development, they have for years so held down the rates and restricted the net earnings of the companies, that the expansion of facilities has been almost stopped. In consequence, in the midst of a great war, the government has considered it necessary to take control of the operation of the railways in order to save them and the country financially and to promote greater development and more efficient operation of transportation facilities.

The presentation of these incontrovertible facts inevitably suggests some most important questions regarding the future of the railways of Canada and of the United States, both during the war and after its conclusion. The government of Canada has thus far left the operation of that country's railways in the hands of their usual managers. The government of the United States has taken control of operation in this country. In both countries there is an active propaganda for government ownership.

It was necessary for the government of this country to come to the rescue of the railways if they were to be saved from financial disaster. Whether it was desirable for it to assume control of their management is very doubtful. Whether it is desirable for it to make radical changes in the organizations and operating methods is still more doubtful. Certainly there is nothing in the past railway experience of either Canada or the United States to lead anybody to believe that the substitution of government methods for private initiative and enterprise will improve railway management.

Whatever the effects of government control may be during the war, when both public men and railway men are influenced by patriotic considerations of the most potent character, there can be little doubt in the mind of any well-informed man as to what would be the results of government management of the railways of Canada or the United States in time of peace. Government

subsidies have disastrously over-stimulated railroad development in Canada, and to the extent that government ownership has been tried in that country it has resulted in inefficiency and heavy losses to the taxpayers. Government regulation has stopped railroad development in the United States. These facts constitute a record of un-wisdom on the part of the governments of these countries in dealing with railways which argues powerfully in favor of less government interference and greater room for the exercise of private initiative and enterprise on railways.

No step could more fatally handicap the commerce and industry of Canada and the United States after the war or do more harm to all classes of their people, than the adoption of government ownership of their railways.

The A. R. E. A. Studies Labor

IN SPITE OF THE FACT THAT over one-half of the total expenditures of the engineering and maintenance of way departments goes for labor, the American Railway Engineering Association failed to give any concerted attention to this subject until last year. While the failure to realize the importance of this subject is to be regretted, the Board of Direction is to be commended for undertaking the consideration of this subject a year ago through the formation of the committee on Economics of Railway Labor. This committee has before it a wider field for investigation and study than any other committee of the Association and the results of its investigation, if intelligently made, will be of greater value to the roads. It is not surprising, therefore, that the committee covered only a small part of the field assigned to it during the first year of its existence, for its time was necessarily spent in large measure in organizing for work in future years. Important as the hiring and the housing and feeding of men are, which the committee reported on yesterday, these are only two of a large number of problems coming within the province of this Association for study.

The labor problem is one of many ramifications. The effect of seasonal employment, the determination of the best methods of performing work and thereby increasing the output of the men, means of stimulating effort by special rewards, etc., the relative adaptability of various classes of labor to the laying of rail, ballasting, section work, and other problems and the training of men and particularly of foremen, are only a few of the many important problems which this committee should undertake to study at the earliest opportunity. With the overshadowing importance which the labor problem has now assumed in engineering and maintenance of way work, it would not be surprising if the Board of Direction should find it advisable to organize one or more additional committees and to subdivide the work now confronting the committee on Economics of Railway Labor, in order that these problems may receive adequate consideration in the immediate future. The American Railway Engineering Association can perform no greater service for the railways of the United States and Canada at present than to undertake aggressively the study of the problems of labor as reflected in railway work.

The report of the committee will be presented today, and should call forth a most interesting and instructive discussion.

Somewhere in America

"What time does the next train leave?"

Agent: "Don't know; haven't heard from Mr. McAdoo this week."

Track Committee Meeting

There will be a meeting of the Track committee in the Green Room of the Congress Hotel today at nine o'clock.

Veteran Railway Man Dies

Richard H. L'Hommedieu, formerly assistant to the vice-president of operation of the Michigan Central, died at Detroit, Mich., on March 18, at the age of 68 years.

C. C. Higgins Goes With Frisco

C. C. Higgins, consulting engineer with J. W. Kendrick, Chicago, has been appointed assistant to the vice-president of the St. Louis-San Francisco, with office at St. Louis, Mo., effective March 15.

The Labor Committee Meets

Several members of the committee on Economics of Railway Labor gathered at luncheon at the Chicago Engineers' Club to discuss the presentation of their report before the convention today. Owing to the rapidity with which conditions in the labor market have changed since the completion of the report of the committee in December, this meeting was called for the purpose of considering certain revisions in the report as printed before its presentation to the convention.

Today's Convention Program

The reports scheduled for presentation at the convention today are as follows:

- Electricity.
- Yards and Terminals—War Emergency Yard Improvements.
- Economics of Railway Labor—Illustrated Use of Labor-Saving Devices.
- Ballast—Illustrated Use of Mechanical Tampers.
- Economics of Railway Operation.
- Uniform General Contract Forms.
- Roadway.

While it is planned to present seven reports, it is expected that most of the day will be devoted to the consideration of the report on Economics of Railway Labor, including descriptions of labor-saving devices, which will be illustrated by slides. It is expected this report will create active discussion.

A Correction for Mr. Talbot

In yesterday morning's issue we stated that A. N. Talbot, professor of civil engineering at the University of Illinois, had been appointed chairman of the newly-created construction division of the War department to carry on the immense building program of the government. This information was based upon a statement appearing in the daily papers and credited to the War department. Like the report of Mark Twain's death, which he stated was "greatly exaggerated," we find that there was some confusion relative to the position which Professor Talbot had accepted. The fact is that the newly-created construction division of the War department is simply a new title for the cantonment division. Coincident with this change in title, the duties of the construction division have been enlarged somewhat. In making preparations for the immense building program of the construction division the War department called in a temporary advisory committee, of which Professor Talbot was chairman, for the purpose of considering and

advising on the methods to be pursued in the execution of this work. Professor Talbot was advised of his appointment while in New York last Tuesday and went to Washington immediately, where he conferred with the other members of the committee, completing the report in time to return to his home in Urbana, Ill., Saturday evening. We are glad to make this correction in order that the friends of Professor Talbot may be correctly informed regarding this appointment.

J. B. Jenkins Enters Active Military Service

J. B. Jenkins, valuation engineer of the Baltimore & Ohio and for several years chairman of the Track Committee, received a commission as major in the army several months ago and has recently been called into active service. This accounts for his absence from the convention for the first time in several years.

B. & B. Committee Meeting

The executive committee and interested members of the American Railway Bridge and Building Association will meet at the Congress Hotel at four o'clock this afternoon to discuss plans for the convention of this association, which will be held next October. A number of important questions are to be considered, including a possible change in the location for the meeting selected last fall.

Indianapolis Track Elevation to Be Completed

(From Our Washington Correspondent)

Director-General McAdoo yesterday ordered track elevation work at Indianapolis to be continued to completion, with some modifications of the original plans. Over \$7,000,000 have already been expended and about \$6,000,000 more will be required. The decision is based on a report made by Commissioner Harlan of the Interstate Commerce Commission.

Wood Preservers Committee Meeting

Approximately 10 members of the executive committee of the American Wood Preservers' Association took dinner together in the Delft room of the Hotel Sherman last night and discussed a number of problems confronting the association. The meeting adjourned at 8 o'clock to permit the members to attend the meeting of the Western Society of Engineers. The committee will meet at lunch tomorrow to complete the work before it.

Attendance at N. R. A. A. Exhibit

The National Railway Appliances Association exhibit at the Coliseum has been very well attended during the first two days. Visitors attending seem to be particularly interested in the exhibit of labor-saving devices. On Monday, March 18, there was a total of 2,442 visitors. This figure does not include exhibitors and their representatives. At 5:30 last night there was a total of 3,669 visitors and the total registration of exhibitors and representatives at that time was 921, making a total of 4,590 for yesterday. At last year, the total number of exhibitors and representatives for last year was 1,028. The registration of manufacturers for Monday was 38 and for yesterday 91, the secretary stating this is approximately one-third better attendance than last year. The Bridge and Building Association had a total registration of 67 yesterday.



The American Railway Engineering Association Convention in Session

American Railway Engineering Association Proceedings

A Report of the Tuesday Sessions, Including the President's Address
and Several Committee Reports and Discussions

THE NINETEENTH ANNUAL CONVENTION of the American Railway Engineering Association was called to order in the Florentine room of the Congress Hotel at 9:45 yesterday morning by President John G. Sullivan, chief engineer of the Canadian Pacific, Lines West. The convention room was unusually well filled at

the time the meeting was called to order, and many other members and guests registered during the day. In order to give more time for the consideration of the reports, the reading of the minutes of the last meeting was dispensed with and the convention passed immediately to the president's address.

Address of President John G. Sullivan

Since we last met in this Auditorium, events have occurred in this country of such world wide importance that ordinary problems, business and occupations are more or less disorganized. It is therefore gratifying to see such a large assembly at this, the 19th annual meeting of your Association. It is an evidence that you have come here determined to do what you can to help solve the all important problem of winning the war. What our members are doing in the service of their Country is indicated by this Service Flag you see before you; and what your committees have done during the year you will better realize when you have the reports they are to present.

One of the most serious problems that the railroads on this continent will have to meet in the next year or so is the one of Labor. Committee No. 22, studying the question of Economics of Railway Labor, has prepared for a very full discussion of this serious problem and it is hoped that all members of the Association will be present at this discussion, beginning Wednesday morning.

On behalf of the Association your President invited the director general of railways—the Hon. W. G. McAdoo—to send a representative to take part in this dis-

ussion. The Hon. Mr. McAdoo replied in part as follows:

"While I appreciate the suggestion and recognize the value of a discussion of this character, my organization has not been expanded to a point where, at this time, anyone can be spared. I hope you will have a very successful meeting."

Your President also sent a similar invitation to the Hon. W. B. Wilson, secretary of labor, to which we have received no written reply. If, however, there are any employees from the Department of Labor at the meeting, we will be very glad to hear from them and have them enter into the discussion.

The Railway Situation and Politics

A study of the railway situation in the United States for the past 30 years indicates that the boom year for construction was in 1887, when nearly 13,000 miles of new railway was constructed. In the years 1894 to 1897 this rate of construction dropped to less than 2,000 miles per year. From 1900 to 1907 the average was about 5,000 miles per year. It gradually decreased from that time until 1917, when the construction was less than 1,000 miles. In Canada, the rate of construction from 1901 to

1904 averaged about 500 miles. This rate gradually increased until 1913 when it reached a maximum of 3,000 miles. It has dropped from that time until the present and the track mileage last year was actually decreased on account of some lines being taken up; the steel being shipped to France.

During the past ten years we have not suffered in Canada through adverse railway legislation or regulation, but on the contrary the people and the country are suffering from the encouragement of legislation to unnatural rapid development, resulting in the expenditure of enormous sums of money and the building of unnecessary railways; railways that cannot for the present, or any time in the near future, pay operating expenses, to say nothing of paying interest on the investment.

The annual report of the Department of Railways and Canals to March 31, 1916 shows, for the nine years beginning with 1907 to 1916, that the Government had expended over \$22,000,000.00 per year on government railway construction. Their working expenses during this same period have exceeded their revenue by \$2,000,000.00 and at the present time the working expenses are considerably over \$1,000,000.0 per year greater than the revenue. In addition to this expenditure made directly by the Government, the Federal and Provincial governments have guaranteed the interest on bonds up to a sum between three-quarters of a billion and one billion dollars. During this same period they have also granted large sums of money in the way of subsidies to privately owned railways; some provincial Governments going so far as to get rich contractors to organize railway companies (tempted no doubt by the bait of profits on construction) to build railways where the present railway companies of Canada could not be tempted to build, even though the bonds might be guaranteed by the Government. Would it therefore be any great surprise, if assuming this great world war was not being carried on, public opinion regarding railways as represented by legislation would not show signs of modification in Canada and if we should hear threats of anti-railway legislation of the most radical character? Nevertheless, as already explained, the railway troubles of Canada are not due any more to the efforts of railway promoters and builders than to an uninformed and over-sanguine public opinion. Is it not logical to assume that similar boom conditions existed in the United States prior to the year 1887? Then came the Interstate Commerce Commission; followed by numerous State Commissions. A study of the Interstate Commerce Commission reports show that, for the past 30 years, probably only for two or three years did the dividend paid on the stocks of the companies amount to over 5 per cent on the total stock, while for 6 or 7 years the interest was less than 2 per cent and that never in that time has over 68 per cent of the stock paid any dividend; while there were years when less than 50 per cent of the railway stock of the United States paid any dividend. These reports also show that the interest on the bonded indebtedness never amounted to 5 per cent and there was always a considerable percentage of bonds

which paid no interest. The report also shows that by either comparing the tons of freight handled, or more properly, the tons of freight carried one mile, the business of the country has increased nearly twice as fast as the capital invested. These reports also show that the number of cars and locomotives in service has not kept pace with the business. We must, of course, take into account in considering this factor, the increased weight of the individual locomotives and the increased capacity of the cars. These reports also show that the miles of track have not increased anything like the rate of increase in business. More significant is the rate of increase of sidings and yards. The reports do not separate passing sidings from terminal yards and other business yards, but when one considers the necessarily large increase in the mileage of passing sidings required for an increase in business it is almost self-evident that the increase in terminals and business-tracks has not kept pace with the business. It may seem strange to you that I should bring up this subject at this time when the "house is on fire" and when the Government has stepped in and has asked all hands to lend a hand to put out the fire, making no reference to what has caused the trouble, it only being initiated by a very few discredited radicals that the railwaymen were to blame for the setting of the fire. It is generally conceded that lack of capital has been the cause of the difficulty and that capital has been frightened away by anti railway legislation and regulation. A great many are apt to blame our Governments for this condition, when as a matter of fact, it is you and I, citizens and voters of this country, (the responsible parties) who are actually to blame and it is for this reason that I have brought up the subject and wish to discuss politics. I wish to emphasize that we Engineers as a body are more to blame than any



John G. Sullivan,
President

other class of men, for the reason that we take less interest in politics than any other body.

Another reason why I wish to discuss this subject somewhat further is the fact that if we do not win this war, nothing much matters. If however, as we all hope, Democracy will come out victorious, our responsibilities will be the greater and we must meet those responsibilities with courage and do our duty as men.

To make my meaning a little more clear, I will ask you to consider how you railroad men would think the railways of the country would be managed if all the offices were filled by office seekers rather than by men chosen on account of their ability and fitness to fill the office. I venture to say that there are very few chief engineers of this room who did not protest at their first promotion to take charge of a location party or a party in construction. I further venture to say, that there is not a leading engineer in this room who at some time did not have the experience of having a roadman or stakeman mistaken for the chief of the party, and I will go further and say that if his party had been a political organization the chances are ten to one that the roadman or stakeman would have been in charge of the party. Only the other day I asked a prominent citizen of a town in Western Canada, how it happened that a certain party had been elected a Mem-

ber of Parliament. His reply was, "The other man had a larger acquaintance and was better known." Every railroadman should realize that his own welfare depends on the welfare of the country and the company for whom he is working, no matter whether he is a section laborer, chief engineer or president, and he should take the same interest in selecting representatives to the legislature who will make laws controlling the actions of the railroads, as he would in selecting directors of a railroad if he was a stockholder.

In conclusion, let me impress on you the necessity of taking an active interest in politics, not alone in going to the polls and voting for the least objectionable office seeker, but by taking an active interest in choosing the candidates and, if necessary, sacrificing time and other interests to become officers if called upon to do so, remembering that when this war is over, the responsibility placed on the voters of democracies will be greatly increased and especially so in the United States where you have gone one step further than democratic Canada and other less radical democracies, by the fact that you not only elect your legislative bodies, but you also elect your judiciary and executive officers by popular vote. And realize further, that you need honest, intelligent and capable representatives more in times of prosperity than you do in times of adversity. In the meanwhile, let us join hands with the Government, put our shoulders to the wheel and do all in our power to win this war for freedom and democracy. Then after the victory, let us not shirk our duty, but assume the responsibility of self government, making sacrifices where necessary and thereby making democracy a real success.

Report of the Secretary

The following report on the general affairs of the Association for the past year is respectfully submitted:

Number of members at last annual report.....	1,370
Admitted during the year.....	(8)
Deaths.....	8
Resigned.....	29
Dropped.....	26
	63 63
Net gain for the year.....	17
Total membership.....	1,387

One hundred and three members of the Association are in the military service of the United States and Great Britain or with the Canadian expeditionary forces in France. Captain L. V. Manspeaker, U. S. R., died on February 9, 1918.

The losses by death during the year were as follows:

A. H. Stead	James Burke
Prof. C. L. Crandall	W. S. Davies
H. A. Weaver	C. W. Beam
Captain L. V. Manspeaker, U. S. R.	G. F. Cotter

By references to the Financial Statement it will be noted that the cash balance on hand at the end of the fiscal year, December 31, 1917, was \$30,894.48. The Association has subscribed for \$3,500 of Liberty Bonds and \$1,000 of the Canadian Victory Loan.

In addition to the usual number of Bulletins and the annual volume of the Proceedings, issued during the year, the General Index to the Proceedings has also been published. This latter publication will make the vast amount of data in the several volumes more readily accessible.

The reports presented for consideration by the respective standing and special committees are of great value and interest. Taking cognizance of the prevailing conditions, several of the committees have submitted information that is of distinct service at the present time.

The chairmen, vice-chairmen and members of the several committees deserve credit for the good work per-

formed during the past year, more particularly in view of the fact that such work has been performed under difficulties due to the war conditions.

Financial Statement for Calendar Year Ending December 31, 1917

Balance on hand January 1, 1917.....\$30,809.38

RECEIPTS	
Membership Account	
Entrance Fees.....	\$ 1,130.00
Dues.....	5,538.50
Subscriptions to Bulletin.....	5,538.50
Binding Proceedings and Manual.....	620.30
Badges.....	22.90
Sales of Publications	
Proceedings.....	4,068.88
Bulletins.....	708.79
Manual.....	1,159.00
Specifications.....	68.90
Leaflets.....	134.35
General Index.....	346.25
Advertising	
Publications.....	2,835.80
Interest Account	
Investments.....	562.50
Bank Balance.....	122.91
Annual Meeting	
Sales of Dinner Tickets.....	1,032.50
Miscellaneous.....	19.48
American Railway Association	
Rail Committee.....	5,659.20
Total.....	\$29,567.86

DISBURSEMENTS	
Salaries.....	\$ 5,962.66
Proceedings.....	5,607.90
Bulletins.....	5,039.89
Manual.....	43.20
General Index.....	1,134.78
Miscellaneous Stationery and Printing.....	499.82
Rents.....	1,140.02
Light.....	30.40
Telephone and Telegrams.....	147.47
Equipment.....	57.50
Supplies.....	396.26
Expressage.....	518.96
Postage.....	786.27
Exchange.....	56.25
Audit.....	200.00
Impact Tests on Electrified Railways.....	250.99
Annual Meeting Expenses.....	1,819.80
Miscellaneous.....	116.39
Rail Committee.....	5,674.20
Total.....	\$29,482.76

Excess of Receipts over Disbursements.....\$ 85.10

Balance on hand December 31, 1917.....	\$30,894.48
Consisting of:	
Railroad Bonds.....	\$25,574.57
Liberty Bonds.....	2,500.00
Canadian Victory Bond.....	991.08
Cash in S. T. & S. Bank.....	1,803.83
Petty Cash Fund in Secretary's office.....	25.00
Total.....	\$30,894.48

STRESSES IN TRACK FUND	
Balance on hand January 1, 1917.....	\$ 4,126.36
Received from interest during 1917.....	110.39
Total.....	\$ 4,236.75
Disbursements.....	\$ 1,547.78

Balance of fund on hand in Standard Trust & Savings Bank, December 31, 1917.....\$ 2,688.97

REPORT OF THE TREASURER	
Balance on hand January 1, 1917.....	\$30,809.38
Receipts during 1917.....	\$29,567.86
Paid out on audited vouchers during 1917.....	29,482.76
Excess of Receipts over Disbursements.....	\$ 85.10
Balance on hand December 31, 1917.....	\$30,894.48
Consisting of:	
Railroad Bonds.....	\$25,574.57
Liberty Bonds.....	2,500.00
Canadian Victory Bond.....	991.08
Cash in S. T. & S. Bank.....	1,803.83
Petty Cash Fund in Secretary's office.....	25.00
Total.....	\$30,894.48

STRESSES IN TRACK FUND	
Balance on hand January 1, 1917.....	\$ 4,126.36
Received from interest during 1917.....	110.39
Total.....	\$ 4,236.75
Paid out on audited vouchers during 1917.....	1,547.78

Balance of fund on hand December 31, 1917.....\$ 2,688.97

The amounts listed above are in a safety deposit box of the Merchants' Trust and Safe Deposit Company, Chicago.

Respectfully submitted,
Geo. H. BREMNER, Treasurer.

Report of the Committee on Buildings



THE COMMITTEE had no recommendations to make as to the Manual, but submitted a series of definitions pertaining to the subject of "Buildings" as a progress report. The committee also submitted a report on safety-tread devices for stations and a report on the relative merits of high and low platforms for passenger stations.

Definitions

STATION.—A building for the accommodation of passengers or freight at termini or an intermediate points.

PASSENGER STATION BUILDING.—A building serving as a starting point or stopping place for passengers.

FREIGHT STATION BUILDING.—A building used exclusively for the receipt, storage, transfer, or delivery of freight.

COMBINATION STATION BUILDING.—A building used jointly for the accommodation of passengers, and for the receipt and delivery of freight.

TRANSFER SHED.—A long platform, generally covered and placed at distributing points on a railroad system, where loads for miscellaneous destination may be redistributed into full carloads for final delivery. These are sometimes combined in a freight house layout and called transfer platforms.

TRANSFER CRANE.—A stationary crane, having side supports and bridge framed together, spanning tracks, and used to facilitate the handling of heavy commodities from cars to tracks or vice versa.

GANTRY CRANE.—A power-driven crane with supports and bridge framed together, made to travel on a level grade, spanning tracks and running parallel to same, used for loading or unloading heavy commodities.

SHOP BUILDINGS.—Various structures for the making of repairs to locomotives, engine erecting, boiler and blacksmith work, car building and repairing, dry kiln for lumber, and other branches of work.

ROUNDHOUSE.—A semi-circular building, containing locomotive stalls centering toward a turntable or yard. These houses equipped with drop pits for cleaning and repair of locomotives; truck, driver and tender wheel pits at right angles to drop pits and covering at least two stalls for dropping the several wheels mentioned. Houses are sometimes fitted with traveling or stationary cranes for removing various parts of locomotives. When a house is built in rectangular form, the name "roundhouse" would hardly apply. The name "engine-house" would no doubt be more suitable.

TURNTABLE.—A revolving platform for turning locomotives or cars.

TRANSFER TABLE.—A traveling platform driven transversely for moving locomotives or cars from one parallel track to another.

COALING STATION.—A structure or appliance for the storing and delivering of coal to tenders.

SAND HOUSE.—A structure for the drying and storing of sand and delivering same to locomotives by gravity.

OIL HOUSE.—A structure above ground or a basement pit for the storage of oil tanks containing the various oils used for locomotives, cars and shop requirements.

WATER STATION.—A large receptacle or structure, built of wood, concrete or metal, for the storage of water supplying engine tanks and yard facilities.

PUMP HOUSE.—A building at or near a water supply station, containing the pumping apparatus.

SIGNAL TOWER.—A tower or structure from which to display a semaphore or other signal or to operate mechanical signals approximately to same.

INTERLOCKING TOWER.—A tower or structure containing the mechanism for operating the switches and signals in yards when of the interlocking type.

HOSE HOUSE.—A structure containing hose and other equipment in yards or other places for fire protection.

WATCH BOX.—A shelter at a road or street crossing to protect the crossing watchman.

TOOL HOUSE.—A storage place for shelter and safety of tools or other equipment used for track maintenance.

SECTION HOUSE.—A structure for housing section foreman and family.

BUNK HOUSE.—A structure for housing track or other railway laborers.

SUBWAYS.—An underground passageway at certain types of passenger stations leading from main building across under tracks. Where intermediate platforms occur, inclines or stairways are provided, leading from the main passage up to the train floor level. By this arrangement passengers are enabled to reach or leave trains without crossing tracks. Subways are sometimes used for other purposes, such as the handling of baggage in place of stairs or inclines. Elevators are installed at certain points for raising and lowering trucks from the sub to the main floors of buildings.

STOCK YARD.—An enclosure for stock, usually built with a running board fence. The enclosure is subdivided into pens facing on alleys or runways. This runway connects up with an incline and loading platform. Pens are sometimes fitted with feeding racks and water connections for taking care of stock till ready for loading, and shipping to destination.

POWER HOUSE.—A structure containing apparatus for supplying power, air, steam and current for various purposes.

SUB STATION.—A structure containing apparatus for transforming and distributing electrical current.

WAREHOUSE.—A building used for the storage of freight.

STOCK HOUSES.—Buildings for the storage and distribution of miscellaneous materials used in railway work. Oil basements are sometimes built in connection with

storehouses. Tanks are placed in an underground basement and filled by gravity from tank cars. Oil is distributed from the main floor by self-measuring pumps.

SCRAP BINS AND PLATFORMS.—A facility for the collection of cuttings and other merchantable scrap until disposed of.

CAR REPAIR SHEDS.—Buildings grouped in connection with car repair yards for shop work of various kinds in connection with same. These buildings are sometimes built with open sides, when more than one track, house provision should be made for ample light from overhead for lighting the working space between lines of cars.

ICE HOUSE.—A structure for the storage and distribution of ice for trains or other uses and the protection of perishable freight.

OFFICE BUILDING.—A structure for the accommodation of clerical, telegraphic, engineering or other forces.

REST ROOM.—A structure containing rest and recreation rooms, sleeping quarters, lunch rooms, lockers, baths, etc., for the accommodation of trainmen and other employees at terminals.

PIER (Dock or Wharf).—A covered or open structure extending out into the navigable waterway, or parallel to the shore of same for the receipt or delivery of freight from or to vessels with tracks on or adjacent to same, where used in connection with railway terminal.

LOCOMOTIVE WASHING PLATFORM.—A slightly depressed platform under engine tracks in terminals. These are used for washing and cleaning engines, and are drained to sewer.

THAWING SHED.—An insulated, heated structure used for thawing out frozen commodities in bulk at export terminals.

MONITOR.—A raised portion of roof to obtain light or ventilation from vertical sides or ends.

PENT HOUSE.—A projection above the roof of a building to provide exit onto roof, house elevator machinery or other similar purposes.

BENT.—A structural unit in a trestle or framed structure, placed at regular intervals.

PLATFORMS.—A raised walk upon which passengers alight from railroad cars. Platforms are built of wood, concrete, brick or cinders.

SAW TOOTH TRUSS.—A special form of room construction built in bents having a vertical or slightly sloping face. This portion of bent is glazed and usually built facing the north, so as to obtain light without sun rays.

ELEVATOR.—A building used for storage, cleaning, grading and distribution of grains.

TRAIN SHED.—Usually built covering two or more tracks. Roof and sides generally fitted with skylights or prismatic skylights and slots for ventilation.

BUTTERFLY SHEDS.—Usually a one-post structure having spreading eaves with drainage sloping back to center of same.

UMBRELLA SHEDS.—Same as butterfly, but roof slopes to outer edges. These sheds are built on depot platforms between lines of track and afford only partial protection to passengers.

SCALES.—An apparatus for weighing freight and baggage. In freight houses the dial scales are generally used. They afford quick reading of weights, and tend to rapid handling of loads over scale platforms. Track scales are used for weighing loaded or empty cars.

SCALE HOUSE.—A small structure generally built in con-

nection with track pit and scales. Scale beams are brought up inside of building.

Provisions to Insure Safe Walking in and About Passenger Stations

Avoid steps and stairways where inclines and ramps can be satisfactorily used instead. Avoid any combination of sloping surfaces and steps.

Consider both the general design and details of stairway construction with a view of handling crowds of people with the individuals moving in parallel lines with ease and with safety, against slipping and falling, keeping such movement free from interference by other lines of travel. Place important stairways conspicuously in the main line of travel, keeping such travel in straight lines where possible. Arrange so that crowds at the head and foot of stairways can naturally assemble and disperse, with a minimum amount of confusion and cross-currents of walking. To this end, provide corridors or vestibules at the top and bottom of stairways, where possible, using the same width as for the stairway. Such corridors should open directly into the room served without any funnel-shaped entrances, and with plenty of room for quick distribution. Locate minor stairways away from regular lines of travel, and avoid combinations of service or minor stairways, with main stairways. Consider possible lighting arrangements, particularly from natural light, avoiding locations where stairways will be poorly lighted in cloudy weather or where they will appear dark to a person entering them from bright sunlight.

For main stairways, use a straight run of steps and landings wherever architecturally possible. Where turns cannot be avoided, provide landings and, if possible, restrict the turn to ninety degrees.

Proportion the width according to the character of traffic handled, the extent to which hand baggage will be carried, and the maximum stairway capacity desired during rush hours. Be guided by experience with local requirements rather than by thumb rules, bearing in mind that main stairways should be maintained wide enough so as not to check the movement of crowds, and that the width of minor stairways should often be determined by the rate at which people may continue to move away from them. Bevel, or round, landings to maintain a constant width, and keep people moving in concentric, or parallel lines. Where two stairways unite at a landing and form a single stairway, make the width of the latter equal to the combined widths of the other two. For minor and service stairways, use no width less than 3 ft. between hand rails.

The pitch of stairways, i. e., the inclination as determined by the dimensions of treads and risers, and the frequency and proportion of landings, should be such that stairways may be ascended with ease, and as nearly as may be with a free natural walking step. To fix the pitch and landings properly, the following should be approximately observed:

Provide treads not over 13 in. nor less than 11 in. in width, and risers not over 7 in. nor less than 6 in. in height; and make the sum of two risers and one tread be between 25 in. and 26 in. The width of treads should be taken as the horizontal distance face to face of risers. Where stairways require more than 16 risers, provide intermediate landings, keeping the length of single flights as near to 10 or 12 risers as may be possible. Use no steps with less than three risers. Where feasible, provide the same height of risers and width of treads for all stairways used by the traveling public in any one building. Always make risers and stringers of closed construction. Make the width of landings in the direction

of travel not less than four feet. Avoid, if possible, all minor entrances on landings or at the top or bottom of main stairways. If this cannot be done, provide suitable lengths of landings, so that doors can be opened and used freely by any minor class of traffic without, in anywise, causing interference with travel at the main stairway.

Provide hand rails on both sides of all stairways and center rails on stairways eight feet wide, and additional rails to keep the distance between adjacent hand rails not less than 3 ft. nor more than 6 ft. Where intermediate hand rails are used, a double hand rail is recommended. Place center line of hand rails at least 5 in. from face of sidewalls, or 8 in. center to center for intermediate hand rails. Make section of hand rail rigid to give uninterrupted travel for a secure grip. Provide a hand rail without sharp drops or raises, extend it beyond the last riser and turn it downward so that it offers no entanglement for clothes or baggage. Curve hand rails at all bends on landings. Provide such balustrades and hand rails as will prevent small children from falling or getting through them. In this connection, consider the use of curb to divide stairs under the center hand rails. Place top of hand rail 34 in. above tread, measured on line of face of riser. On the open side of stairways, provide barriers at least 42 in. high, to guard against accidental falls of persons over the balustrade. At intermediate hand rails, provide newels not less than 6 ft. high, and secure the rails to them without encroaching on hand clearance. Provide newels which will not present sharp edges and corners.

Obtain the necessary drainage at the ends of the treads, and not by sloping the surface in the line of travel. Where used, the nosings on treads should be limited to a projection of 1 in. Provide approved safety treads on all main stairways, using a renewable type securely fastened. Make the length of safety tread 4 to 6 in. shorter than that of the stair tread, and use a width of safety tread of from 5 in. to 8 in. Place the surface of the safety tread flush with the surface of the balance of the stair tread. Consider means, such as color schemes, which, used in connection with safety treads, will clearly indicate the location of the steps, particularly the outer edge or nosing. The use of wide safety treads, particularly those covering the entire width of the step, are of questionable necessity and value, as they present a uniform appearance for the entire flight of steps, and make it difficult for people to clearly see where they are stepping.

Where feasible, enclose, or roof over, all outside stairways not only to keep off sleet and snow, but also to prevent a slippery condition, due to rain and mud. Do not provide open risers. In choice of safety treads for outside stairways, consider means which will have to be used during winter weather to maintain the surface of steps in good condition.

Place no signs, mirrors or other objects of interest where they will attract the attention of persons using stairways, except such signs as are necessary to direct travel.

In making lighting arrangements, consider that many people with poor eyes cannot, at best, see very clearly in descending stairways, particularly when the appearance of the treads is uniform throughout. Provide ample natural and artificial light, avoiding direct light and shadows, and making certain that lights from adjacent rooms do not shine directly into the eyes of people using stairways.

In the choice of materials and arrangements, consider the maintenance conditions that will exist in daily use, particularly those in wet and stormy weather just before

stairways are cleaned, and also give consideration to that poorest condition of safety tread and other parts which will exist just before renewal is required and made.

Design and Merits of High and Low

Platforms at Passenger Stations

While very few railroads in this country have adopted platforms level with the car floors, they have always been the standard in use in Great Britain.

It is recommended that the following be taken into consideration in considering the adoption of high platforms:

(1) The facility and rapidity with which trains may be loaded or unloaded.

(2) The prevention of the public crossing the track.

(3) In stations below the street level, a saving of about 3 ft. in the vertical height to be traveled by the passengers.

(4) They form a convenient place for the housing of ducts, cables, signal equipment and sometimes elevator machinery.

They have certain disadvantages when used in conjunction with our present system of terminal operation:

(1) (Most important) The cost of changing passenger equipment to serve both high and low platforms.

(2) The difficulty of trucking across the tracks.

(3) The necessity for a special form of baggage trucks having a low floor.

(4) The disadvantage of placing a switch within the limits of the platform.

The committee recommends that the Association recommend to the Master Car Builders' Association that all cars in future be so constructed that they will fit either high or low platforms.

Conclusions

1. The committee recommended that the definitions be received as a progress report.

2. It recommended that the conclusions and recommendations relative to safe walking surfaces about passenger stations be approved and published in the Manual.

3. It recommended that the conclusions regarding high and low platforms at passenger stations be adopted and published in the Manual.

The committee recommended that the other subjects be reassigned for the coming year.

Committee: M. A. Long (B. & O.), chairman; G. H. Gilbert (Southern), vice-chairman; Geo. W. Andrews (B. & O.), D. R. Collin, W. H. Cookman (P. R. R.), C. G. Delo (C. G. W.), W. T. Dorrance (N. Y. N. H. & H.), K. B. Duncan (A. T. & S. F.), C. H. Eake (M. R. & B. T.), A. T. Hawk (C. R. I. & P.), F. F. Harrington (Virginian), F. A. Harrison (A. T. & S. F.), A. Larsen (S. N. E.), J. W. Orrock (C. P. R.), S. B. Phillips (U. P.), R. V. Reamer (C. R. of N. J.), C. W. Richey (P. R. R.), John Schenck (C. N.), Z. H. Sikes (N. Y. C.), W. J. Watson.

Discussion

M. A. Long (chairman): We have ten subjects, and the committee this year concentrated its work on subject No. 6, "Report on Safety Tread Devices for Stations Exposed to the Elements," and on No. 8, "Report on Design and Merits of High and Low Platforms at Passenger Stations." The other subject we did work on, but these portions of the report are only offered as progress reports.

Referring to subject No. 6, I want to call attention to the fact that we have changed the title to make it broader in scope. It now reads: "Provisions to Insure Safe Walking in and About Passenger Stations." The wording "safety tread" seemed to us to touch on a small part of the subject, and therefore we have made the title broad

enough to cover the whole subject of safety walking in and about a passenger station layout. This subject was treated very fully.

We ask that the first part of the report be received and published in the proceedings. Our conclusions we recommend for acceptance and to be published in the Manual.

The President: The chairman is of the opinion that this subject has been given pretty careful consideration by the committee, and unless there is some desire to the contrary, it will be sufficient to take these as a body, and if there is no discussion you will probably suggest a motion that these be published as recommended. We will read the titles and give time for discussion. If we hear none we will assume that there is absolutely no discussion or adverse criticism. The matter of pitch and landings is rather important here, and I would like to have a little time given to that.

C. E. Lindsay (N. Y. C.): In our experience, we

have had quite a number of accidents on stairways, and our investigations disclosed that the grade of the stairway, of the flight, was the important thing. Slight variation of rise or tread did not cut so much figure as long as the nosing was in a uniform grade line. Did the committee cover that point?

Mr. Long: The committee covered that point. We canvassed the situation very thoroughly, especially in New York, and got what we found was a good average, which that recommendation will give you.

The President: If there is no further discussion, these conclusions will be adopted and printed in the Manual.

Mr. Long: Subject No. 8. This report was recommended for publication in the Manual. The committee would request that this be turned back for another year.

The President: If there is no objection the subject will be reassigned to the committee.

The committee was dismissed with the thanks of the association.

Report on Conservation of Natural Resources



THE COMMITTEE PRESENTED a digest of previous reports to show at a glance the ground which has already been covered and the more important features of the reports which have already been made. This abstract outlined the results of the committee's investigations into the subject of timber conservation, particularly including reforestation, treatment of wood, protection of forests from fire, and the utilization of the by-products of timber. This report tended to show the excessive waste which has accompanied the use of timber up to the present time.

Coal Resources of Canada

The coal reserves of Canada are considerable, but a large proportion is unsuitable for use in the ordinary way as locomotive fuel. The coals of Manitoba, Saskatchewan and portions of Alberta are lignite or sub-bituminous coal, high in moisture, and cannot be used as locomotive fuel on account of the liability of setting out fires from excessive sparking. In 1916, the railways of Canada consumed over 8,675,000 tons of coal and nearly 50,000,000 gal. of fuel-oil, both of which have, during the last few years, steadily increased in price. On account of our large imports of coal and fuel-oil, anything that can be done to increase the efficiency of generating power from coal or to economically curtail the use of fuel-oil by the substitution of Canadian coal or lower grade "sparking" fuels should be investigated and introduced as soon as possible. Coal or lignite burned in the powdered form does not produce sparks, but burns in a similar manner to a gas. During the last few years this class of fuel has been used with success in connection with locomotives, stationary boilers, and various metallurgical industries. It is anticipated that, within a short time, it will be used to a much greater extent in Canada.

Water Power for Railway Purposes

The interest which railways have in water powers may be classed as indirect and direct. The former is probably

by far the most important of the two and relates to increase in traffic brought about by the industrial development which water powers have made possible. The direct connection between railways and water powers comes through their electrification by utilizing the latter in the supply of hydro-electric energy. That main line electrification of railways has not been more extensive in Canada is not due to lack of water power possibilities, but rather owing to the more important factors connected with this question, such as amount of traffic, frequency of service, etc. Thus far, if we exclude street and suburban lines, railway electrification in Canada has been confined to serve special purposes such as in the Canadian Northern tunnel, at Montreal; the St. Clair tunnel of the Grand Trunk, and the Detroit tunnel of the Michigan Central.

While main line electrification on a large scale for purely economic reasons may yet be far remote, we may look forward to a number of possibilities in the near future from the indirect benefits of electric operation. These often are controlling in any installation, and among them may be mentioned smoke elimination in tunnels and underground terminals, overcoming the smoke nuisance on surface lines in large centers, and increased comfort, speed and attractiveness in passenger service. Whatever may be the future of electrification in Canada, and whether conditions warrant it to be effected on a large or small scale, the generously distributed water powers of this country will always be an additional incentive in any project of this character.

Considerable work has been done by the Canadian Pacific in the direction of tree planting to replace portable snow fences. This work was first carried on in the prairie provinces, and the results secured are reported as being quite satisfactory. It may be interesting to know that on a section of the Canadian Government Railways—between Campbellton, N. B., and Bathurst, N. B.—there are spruce hedges primarily planted in order to protect the track from snow drifts, and which have in the course of years not only proved effective in that respect, but have appealed to the artistic taste of travelers.

Treated Timber

One difficulty in the way of the general use of treated ties by Canadian railways is the fact that there are, so far as known, only five plants in Canada at which rail-

way ties can be given preservative treatment on a commercial scale. These plants are at Vancouver, B. C.; Transcona, Man.; Fort Frances and Trenton, Ont., and Sydney, N. S. It will thus be noted, for example, that for Quebec and the greater portion of Ontario, no tie-treating plants are conveniently accessible. From one-third to nearly one-half of the ties used in Canada are jackpine. The increasing price and decreasing supplies of accessible material of this species suitable for the manufacture of ties, are necessarily bringing about serious consideration of the use of hardwoods, including birch, maple and beech. Of these, there are very large supplies of birch available in the more northerly forests of eastern Canada. Beyond any question, the hardwoods are admirably adapted to use as railway ties, providing they are given preservative treatment. This is indicated by the fact that between two and a half and three million ties of beech, birch and maple are now used annually in the United States. The use of these species has increased rapidly, the use of birch being first reported on a material scale in 1915.

In Canada, the use of birch for railway ties is in its infancy. Experience generally appears to indicate clearly that the use of birch ties without preservative treatment is undesirable, since the life of such ties is restricted to four or five years. However, with preservative treatment, the evidence indicates that such ties will have a life of twenty to twenty-five years.

Specific information with respect to this has been secured from the New York Central and Toronto, Hamilton & Buffalo. G. W. Vaughan, engineer maintenance of way of the New York Central, reports that during the past four years the company has used about 98,000 yellow or red birch ties. All of these have been treated with creosote at a cost of approximately 31cts. per tie. Mr. Vaughan states that he considers the life of birch ties untreated to be four years and treated, about 20 years. R. L. Latham, chief engineer, Toronto, Hamilton & Buffalo, reports that his company has been using from 20,000 to 25,000 birch, beech and maple ties per annum during the past three years. Of these, approximately 40 per cent. were birch, mostly yellow birch. All of these ties have been given a treatment of approximately 2½ gal. of creosote per tie. Mr. Latham considers the average life of an untreated tie to be approximately five years and of a creosoted tie from 20 to 25 years. The experience of this company is that beech, birch and maple all take treatment nicely and give splendid service when given the proper creosote treatment.

It is believed that the railways in Canada could render a very great service in forest conservation by investigating most carefully the possible use of yellow birch for railway ties and by bringing about, in one way or another, the construction of additional plants for giving preservative treatment to ties and other timbers.

Relation of Railways to Conservation Projects

Forest fire protection is a conservation problem in which the railways are interested both directly and indirectly. Information received through the Fire Inspection department of the Railway Commission indicates that on the whole very gratifying progress has been made in the direction of reducing fire losses along railway lines, due to railway agencies. Large areas of cut-over and burned-over non-agricultural lands along railway lines throughout Canada are again growing up to young forest, and it is of great importance that such reproducing areas be saved from further damage by fire. Such a course would add greatly to the attractiveness of the country from a tourist point of view, to say nothing of reducing

damage claims and the prospect for future freight traffic when such forests reach maturity. Considering the enormous areas involved, the prospects for future freight traffic from areas now carrying young forest growth are well worth the most careful consideration. Such areas will also serve as a source of supply for cross-ties, poles, posts and other timbers necessary to railway maintenance and operation.

Scrap Reclamation

The attention of the committee has been called to recent developments in saving and using what has heretofore been considered scrap material. Among the notable examples of this comparatively new industry are the plants of the Atchison, Topeka & Santa Fe at Corwith, Ill., near Chicago; the plant of the Chicago & Northwestern at the West Chicago shops of that company, and others. Another feature of economy worthy of mention recently developed is that of repairing frogs and switches by the oxy-acetylene method. It is being successfully used by a number of railroads.

Future Work

The committee recommends that the following subjects be reassigned for the coming year.

Report on the relation of railways to the different conservation projects, reviewing work that has been done by each company up to the present time, and make recommendations on policies economical for railways to follow.

Report on measures for the conservation of human life and energy, in order to promote efficiency.

Committee: R. C. Young (L. S. & I.), chairman; S. N. Williams, vice-chairman; R. H. Ashton (C. & N. W.), W. K. Barnard, C. B. Brown (Intercolonial), Moses Burpee (Ba. & Ar.), C. H. Fisk, E. E. King, C. F. Koppisch (S. N. E.), William McNab (G. T.), J. L. Pickles (D. W. & P.), J. W. Votey (Univ. of Ver.), W. C. Willard.

Discussion

(Prof. S. N. Williams, vice chairman, read the printed statement regarding the assignment of work of the committee and continued in part as follows:)

Before passing on to the conclusions of the report, there are one or two points which I wish to present to you. In the first place, we have practically received orders throughout the nation at the present time to save. That order could not be expressed more briefly and yet fully in case we undertook to send it across the waters to some distant point on the other side of the globe.

One of the most recent movements with reference to economy is the use of pulverized coal. The daylight saving plan, which has been discussed so much during recent months, has been officially approved by the Government and will be shortly put into operation.

There is one thing I have regretted to see, and that is according to the Federal Fuel Administration, 30,000,000 tons of impurities, such as slate, rock, etc., mixed with the coal which was sold in the various states. On the other hand there is one thing which I have seen with pleasure, and that is, that the New York, New Haven & Hartford estimates that the yearly fuel saving has amounted to more than 1,300,000 tons of coal, based on comparison of actual performance of locomotives in December, 1917. The Pennsylvania lines have announced recently that they have been specializing in car conservation with excellent results, chiefly by permitting the intensive utilization of car space.

A statement is made in the *Railway Age* of January 11, 1918 that the Canadian Pacific has developed 419 ready-made farms, each complete with house, barn, fencing, well, and a portion of the land under cultivation. In

9 months it has colonized nearly 500 bona fide emigrant settlers on its lands, and deserves to be classed as a nation builder. Also it makes loans of \$2,000 to new settlers on certain lands, extends payment for all farms over a period of 20 years.

I regret very much to see that the fire losses in this country have been increasing. In the year 1917 they were \$30,000,000 more than in 1916. I do not dare to tell you what the total was.

One of our subjects is the conservation of human life. A well known statement may be quoted here—"human life and human efficiency are the two most precious things on earth." The United States Public Health Department is doing great service in the prevention of the spread of

some of the communicable diseases. In that same connection we might remember that the Bureau of Mines in Washington has done a great deal of work in spreading information as to the saving in the use of coal.

We recommend that subjects 5 and 6 be reassigned for the coming year, and that these appendices be received as information, and we regret that space did not allow a larger and more complete presentation of the subject.

(R. K. Graham (A. T. & S. F.)) gave a brief account of the reclamation work done by the Santa Fe in its scrap yard at Corwith (Chicago), Ill. He described the various buildings making up the plant and outlined the results secured. The committee was then dismissed with thanks.)

Report of Committee on Signals and Interlocking



FIVE PLATES COVERING revisions of symbols were submitted to bring the Manual in accordance with revisions adopted by the Railway Signal Association. It was recommended that these five plates of symbols, the first four of which are revisions of those now shown in the Manual, and the fifth being a new one, be adopted and inserted in the Manual in place of those now shown.

R. S. A. Specifications

The committee submitted the following list of matters acted upon by the Railway Signal Association at its convention in 1917 and adopted by letter ballot:

Alternator (Specifications).	Test.
Battery, Storage:	
Alkaline, Instructions for Maintenance of.	
Electrical Instruments, D. C., Specifications for Ranges and Scales.	
Ground Apparatus, Made, for Lightning Arresters (Specifications).	
Hand Lantern Globes (Specifications).	
Impedance Bond (Specifications).	
Lightning Arresters, Made: Ground Apparatus for (Specifications).	
Pipe Lines, Field Construction of.	
Reactors, Air-cooled, for Line and Track Circuits (Specifications).	
Resistors for Line and Track Circuits (Specifications).	
Switchboard Material (General Specifications).	
Switchboard Material (Requisite Sheets).	
Transformers, Single-phase Line, Oil-immersed Self-cooled Outdoor type (Specifications).	

Drawings.

Ballast and Rail Resistance Test Chart.....	RSA 6
Cable Post, Relay Box, Mountings.....	RSA 1374
Deflecting Bars.....	RSA 1069
Deflecting Stands, Horizontal Adjustable.....	RSA 1396
Electrical Instruments, Scale Ranges for.....	RSA 1378
Ground Resistance, Test for.....	RSA 1377
Hand Lantern Globes.....	RSA 1394
Lightning Arrester Grounds.....	RSA 1424
Rail Resistance Chart, Ballast and.....	RSA 6
Relay Boxes—Size "A" and "B".....	RSA 1182
Relay Box—Size "A" (Details).....	RSA 1184
Relay Box—Size "B" (Details).....	RSA 1183
Relay Box and Cable Post Mountings.....	RSA 1374
Relay Box Fittings.....	RSA 1369
Relay Box Inlet Bracket.....	RSA 1367
Relay Box Linings and Terminal Boards.....	RSA 1368
Thermometer (Stationary Lead Type Storage Battery).....	RSA 1375
Track Circuit Test Chart.....	RSA 4

It was recommended that this list of Railway Signal Association specifications and standards be published in the Manual, as supplementary to the list heretofore inserted.

Separation of Signals Into Types

The sub-committee assigned to report on the feasibility of separating into distinct types of their own (a) the signals for train operation and (b) the marker or sign which indicate the location or position, or both, of information signs and switch signals for conveying in-

formation to trainmen, reported that some of the so-called signs govern train operation just as much as the movable semaphore of an interlocking or block signal system and that these signs are recognized in the standard code of the American Railway Association as signals. The note as to the definition of fixed signals from the rule book of the A. R. A. reads as follows: "The definition of a 'Fixed Signal' covers such signals as slow boards, stop boards, yard limits, switch, train order, block, interlocking, semaphore, disc, ball or other means for displaying indications that govern the movement of a train." Eleven designs were submitted covering the following signs: stop, speed limit or slow, resume speed, yard limit, station one mile, yard one mile, junction one mile, crossing one mile, draw one mile, highway crossing whistle post, flanger sign.

The sub-committee was not ready to report on the switch target, derail sign and trackpan sign. It was recommended that the signs submitted be adopted and included in the manual. It was recommended by the committee that the report on the comparative merits in various locations of alternating current and direct current for operation of automatic signals be discontinued, as it was agreed the comparative values of the two systems depend entirely upon local conditions.

Recommendations for Next Year's Work

The committee considers that no further work can be done on the investigation of the relative merits in various locations of alternating current and direct current for the operation of automatic signals, and recommends that same be considered closed.

It further recommends that the following subjects be continued:

1. Make critical examination of the subject-matter in the Manual and submit definite recommendations for changes.
2. Report on the problem of signaling single-track roads with reference to the effect of signaling and proper locations of passing sidings on the capacity of the line.
3. Report on the specifications adopted by the Railway Signal Association, which, in the judgment of the committee, warrant consideration, conferring with the committee on Track on any appliances affecting track.
4. Report on the desirability of providing in connection with an automatic signal system:
 - (a) An overlap.
 - (b) Approach restricting speed indications.
5. Report on the various types of light signals for day and night indications.
6. Report on the feasibility of separating into distinct types of their own, the signals for train operation, and the

markers or signs which indicate the locations or position, or both, of information signs and switch signs for conveying information to trainmen, and design suitable day and night (if necessary) markers or signs for switches, derailing switches, stop signs, slow signs, resume speed signs, water station and trackpan markers, highway crossing sign, etc.

7. Report on requisites of signal locations for automatic block signals for single-track roads.

8. Report on automatic train control.

10. Report on applications of aspect indicating that train must take siding at a non-interlocked switch.

Committee: J. A. Peabody (C. & N. W.), chairman; W. J. Fek (Southern Ry.), vice-chairman; Azel Ames, C. C. Anthony, H. S. Balliet (N. Y. C.), A. M. Birt (N. P.), C. A. Christofferson (N. P.), C. E. Denney (N. Y. C. & St. L.), F. L. Dodgson (G. R. S. Co.), C. A. Dunham (G. N.), W. H. Elliott (N. Y. C.), G. E. Ellis (I. C. C.), M. H. Hovey, J. G. M. Leisenring (I. T. Co.), H. K. Lowry (C. R. I. & P.), J. C. Mock (M. C.), F. P. Patenall (B. & O.), A. H. Rudd (P. R. R.), W. B. Scott (S. P.), A. G. Shaver, T. S. Stevens (A. T. & S. F.), W. M. Vandersluis (I. C.), B. Wheelwright (G. T.).

Discussion

J. A. Peabody (chairman): Our committee were assigned 10 subjects, on which we are giving definite reports on four. Instead of going through these generally to start with, I will take up each one individually. First, the revision of the Manual.

(This was accepted and approved for publication in the Manual.)

Mr. Peabody: In part 2, report on handling signaling and proper location of sidings on single-track roads, we simply report progress. We have made considerable progress on this subject, and were able to make our report to the Signal Association, which will be reported to this association next year.

The next report on subject number 3, report on specifications adopted by the Railway Signal Association, we submit in Appendix B and move that this be printed in the Manual as information.

C. A. Lindsay (N. Y. C.): At the last convention we established a precedent in this regard, in the acceptance in blanket of the recommendations of the Railway Signal Association. I have the highest respect for the work done by that association, and ordinarily this association can accept most of its conclusions without questions.

It seems to the Committee on Outline of Work that it would be wise before accepting the entire blanket that now and hereafter recommendations of the Railway Signal Association be received and submitted to such a committee as may seem proper, for the purpose of criticism and report at the following convention. I move that this report be received for printing in the Manual subject to the criticism of such committees as the Committee on Outline of Work may deem necessary.

Mr. Peabody: It hardly seems to me that that is necessary, inasmuch as we are submitting this question as information to the members, and not to be adopted as standard by this association.

Mr. Lindsay: Our association does not adopt standards, and the Manual has a certain prestige, and carries with it the approval of this association of everything that is printed in the Manual. I think we ought to be very careful, and I think the Committee on Signals ought not to object to having its work reviewed by the other committees.

C. W. F. Felt (A. T. & S. F.): I think it is therefore desirable to follow the course outlined by Mr. Lindsay.

Mr. Peabody: It may clear the atmosphere a little if I read the title under which this appears in the Manual.

It reads: "List of the findings, conclusions, standards and specifications contained in the Manual of the Railway Signal Association." That does not in any way make this association responsible for these findings. It is simply put there as a convenience for the members of this association in finding this information.

Mr. Lindsay: If we are to take that attitude, that the word of the Railway Signal Association is the last word on signal appliances of all kinds, we might as well not have any Signal Committee.

(After further discussion of this matter, a motion offered by Mr. Lindsay, that the information in appendix B be submitted to the committees interested, and next year again brought before the association with the approval of these committees, was carried.)

(Mr. Peabody here read paragraph 6 of the preliminary portion of his report and also appendix 6 in full.)

W. C. Cushing (P. L. S. W. S.) said in part:

"I am at variance with the committee in its initial point with reference to its report on the feasibility of separating into distinct types of their own; the signals for train operation, and the markers or signs which indicate the location or position or both, of information signs or switch signals for conveying information to train men."

After presenting an analysis of the status of a fixed signal as outlined in the Standard Code and a discussion of the purpose of the various signs in the control of train movements, Mr. Cushing continued:

"It seemed very desirable to me, therefore, to have all of these signal adjuncts of a different form from the main signal system, and as that main signal system is very generally of the semaphore type, it seemed best to have all of the other adjuncts of a different type.

"I do not like the use of the semaphore arm for slow and stop posts at railroad crossings, and for track men when carrying on track work, and for switch signals, etc. They are all fixed in position and the stop post must always be passed in the stop position, whereas the general idea and plan of the semaphore signal is one whose aspects can be changed in order to indicate different train movements."

J. L. Downs (I. C.): This subject is an old one and it is one in regard to which many experts differ. All signs affect train movements to a greater or less degree. The fixed signal in a permanent "stop" position is just as important as any semaphore movable signal that would be at "stop" when stop is desired or "proceed" when proceed is desired. Therefore, it may seem to some that it should carry the same design as the other signals. I am in favor of Mr. Cushing's motion that this matter be deferred until it is gone into more by the association before it is finally adopted.

J. C. Mock (M. C.): The desirability of classifying into their various uses these signals is not, as indicated, a very easy distinction—there are some of them that are on the border line between the one and the other classification, whatever basis you assume for the classification.

The definition of a fixed signal is one of fixed location, which indicates a condition affecting the movement of a train. Very clearly these first three signals do affect the movement of a train. If it were not for the fact that they are a permanent location, giving only one indication, they might quite properly be made to conform to the ordinary semaphore arm indication, and I think very properly, because they do affect the movement of the train just as truly as any signal. The other signals, with the sign in the middle standard, are more nearly information signs, and may not affect the movement of the train; they are too far distant to require any action at

that location, but they invariably will be followed by a signal that does affect the movement of the train.

I think in the past there has been effort made in designing signs of this class or signals, to reduce the lettering to the minimum. In other words, we have here a stop signal lettered stop, whereas the idea as I took it was that we might get away from lettering. The same method has been carried all the way through, and in view of that fact I want to submit the amendment that this matter be referred back to the committee for further consideration on this point.

Mr. Lindsay: As railroading work has developed, we have gotten away from the idea that we must never pass a red blade wherever it is exposed, because we do it every day, mile after mile, train after train. Perhaps Mr. Cushing's objection to the shape of the stop sign might be overcome if we would make a pointed stop and proceed sign. The slow speed sign and the resume speed sign are of great importance with us, and we have adopted a sign that shows reasonably well in daylight and is illuminated at night, with perforated lettering on the front.

My objection to the arm signs is comparatively trivial, but where a yard limit at a junction and a crossing and a drawbridge are all together, near to a station, the place would look like a graveyard. Would not it be possible to have the lettering for those signs put on one sign, so that one stencil can be made to take care of all of them?

Mr. Stevens: It is probably proper that the action suggested should be taken, but the committee will be at a loss to present anything which means exactly what the signs mean that they have presented. They can present you a horizontal board with the word "stop" painted in red, or several different schemes of that kind, which will all mean that a train must stop at that particular point, and do certain things after it has stopped that the rules provide for.

The same argument applies to the 45-deg. sign marked 25 and 15. You can install a horizontal yellow board, or you can mark a horizontal board "slow" and put these numbers on, or you can install the sign as suggested by this committee, which is the almost universal method of indicating caution, or some form of reduced speed.

The same thing is true for the resume speed sign, and the effect on the train will be absolutely the same. It will take permission at that point to resume whatever speed is allowable.

We get away from the daylight sign and come to tackle the night problem, and here is where the difficulty comes in again with getting away from signal colors, because you have only three, red, yellow and green, that you can use satisfactorily. Lunar white, perhaps, is a possible color. But directly you get into the illumination of the signs, you must use the same things that are used on the movable semaphore arms. So I think if those things should be referred back to the committee, it is questionable whether they could submit something else to the association to which there would not be objection.

Louis Yager (N. P.): It seems to me that the association ought to act on this suggestion, that the committee has taken upon itself, to utilize the characteristic aspect of signals, but for the immovable fixed signal, it seems to me that is a step that is to be taken. It will not do any good, as I see it, to submit this back to the committee unless they get some intimation as to how the association feels on the point.

L. M. Perkins (N. P.): I understand this motion to refer this back to the committee will first come to a vote, and I hope it does not pass. I would offer an amendment to that motion, that it be referred for revision in details, and not in general shape. (This was not seconded.)

Mr. Patenall: I would like to point out one factor that must be considered under the field of signaling. If you adhere to various designs of markers by day, do not forget that you cannot have that shaped light at night.

Mr. Cushing's criticism is really the most constructive that we have heard to-day, although I am sorry I cannot align myself in his favor. The appearance of the first three signs would probably portend a simple design. At the same time there is a wonderful difference as to what the engine man is to do. It is not the position that would show that indication of what he is to do, and for that reason there seems to be so little conflict in the designs that we submit in comparison with signals with operative arms, that there is a very small amount of criticism in that direction.

(Mr. Cushing's amendment to the original motion, that the matter be referred back to the committee for further study, failed to carry. The original motion, that the information be adopted and printed in the Manual, was carried. The committee was then dismissed.)

Report of Committee on Rules and Organization

FOR FIVE SUCCESSIVE YEARS the directors have assigned to the committee on Rules and Organization the study of scientific management. Throughout this time very little has been done, apparently, because of a lack of interest on the part of the Association. A thorough and exhaustive consideration and discussion should be had of the necessity and the utility of organization. A like treatment should then be given to the resources which may be used in its development. Having shown the need and discovered the resources, attention should be given to their application and a means of solution presented for any specific problem.

It is hoped that some interest may be aroused among the members and a discussion started which will bring forth a series of monographs. Out of the abundant experience and careful thought of our members we should give freely to the world in its hour of trial. The discussion in the beginning might well be abstract and scientific.

At a later date it should pertain directly to the practical and important application of scientific principles to railroad operation. It will be conceded that a careful study of the subject in the unrivaled manner available in our society will achieve far better results than individual study, and no better justification for our being exists at present. To facilitate the study and discussion, the committee submitted a bibliography in which one can readily find abundant information and suggestions for various methods of treatment. Charts have been secured illustrating the maintenance organizations on many of the leading roads. These charts can be furnished by the committee on request, and if desired they may at a later date be published in a Bulletin.

Committee: Jos. Mullen (C. C. & St. L.), chairman; F. D. Anthony (D. & H.), vice-chairman; O. F. Barnes (Erie), W. C. Barrett (L. V.), L. L. Beall (A. B. & A.), H. L. Browne (C. R. I. & P.), J. B. Carothers (C. F. & F. W.), S. E. Coombs (N. Y. C.), E. J. Correll (C. H. & D.), Curtis Dougherty (Soo),

H. H. Edgerton (C. G. W.), W. H. Finley (C. & N. W.), B. Herman (Soo), A. J. Himes (N. Y. C. & St. L.), F. D. Lakin (Eric), B. M. McDonald (N. Y. C.), H. A. Osgood (Wab.), F. T. Reister, W. H. Rupp (G. T.), P. T. Simons, R. B. Warden (M. P.).

Discussion

(In the absence of the chairman, the report was presented by A. J. Himes [N. Y. C. & St. L.])

Mr. Himes: There is one subject of more than ordinary interest at the present time, to which the committee has given attention during the year—"The Science of Organization." However, the committee has been busy with other work during the past year, and there appears to have been no demand for a report on the science of organization, and so it has been put aside from time to time for what seemed to be more pressing work.

Certain matter in appendix A suggests the idea that it may be possible, when we have given a sufficient amount of study to the subject of administration and organization, to have a field book covering the subject, enumerating the principles, and stated rules which can be profitably studied and used in great organizations to learn the way more quickly and more perfectly than is done usually in a brief experience.

The bibliography which is presented has been compiled from the library of the American Society of Civil Engineers, and from the New York public library. There are many good books not found in this list, some of them of recent date, which will be added thereto.

It is probably worth while to call attention to the difference between scientific management and scientific organization. I have synopses of four or five different books, among which is "The Principles of Scientific Management," by Frederick W. Taylor, another by Major (now Colonel) Hine and one by Harrington Emerson. These men are all talked of, and I want to point out that whereas Emerson and Taylor gave us scientific management, and the efficiency of the individual, Hine deals with the efficiency of the organization, two things which are very distinct and quite opposite to one another.

Both Taylor and Hine have in mind the elimination of the friction and loss of efficiency due to the chain which commonly prevails between the primary units of an organization and the principal officers.

We have, of course, to consider and compare the divisional and departmental organizations, line and staff, Hine's unit system and all other forms that may be presented by the different roads represented in the Association and these forms of organization which have been collected by the committee. We have a very great many which I hope some day to put into your hands, so that they may be compared, and it is very much desired that you will all contribute your experience and knowledge.

I want to call your attention further to the type of organization which pervades our thought, to which we, perhaps most of us, would unhesitatingly subscribe our approval, and to suggest that you give it some careful thought. That is, a single-headed organization of dominant leadership.

Now, are we right about that? Things are undergoing a change, and to compare with that we have the representative organization in which the interests of the primary units shall be paramount. Now, what do you think about that, or, did you ever think of it at all? Is it possible that we shall have an efficient executive organization in which the leadership shall be representative and responsive to the primary units of the organization?

The President: Just at the present time, when the world has had a great lesson in what organization can do, this committee certainly can do a great and wonderful work, and I think that Mr. Himes has outlined a possibility of work that we should all take to heart, and anything we can do in furthering that interest we should do, and what we should do is to study. We have too many organizations to say that any one of them is perfect. We should make a study of them, and as Mr. Himes says, if we condense the information we get from the study of them we will get some good results.

(The committee was dismissed with thanks.)

Report of Committee on Water Service



A CONSIDERABLE NUMBER of changes in the Manual were recommended for adoption. These changes consisted principally of revisions in wording to clarify the meaning. They referred to definitions of scale-forming materials, to methods for the removal of these objectionable ingredients, and to definitions of foaming and means of eliminating or reducing it.

The committee also presented reports on five other subjects, Federal regulation of drinking water, relative merits

of continuous and intermittent water softeners, rules for the care of boilers, organization of the water service department and definitions of terms used in railway water service.

Complying With Federal Regulations in Regard to Purity of Drinking Water Supplied to Trains

The Public Health department now has seven cars fitted as traveling laboratories for checking the quality

of water supplies, but these of late have been used mostly for military purposes. The establishment of additional headquarters for the various sanitary districts has also been delayed on account of the fact that many men trained in this work are now being engaged for work for the army.

The principal steps in advancement were the adoption of new standard methods of analysis, and an amendment to the regulations pertaining to drinking water supplies, requiring a certificate showing not only that the water conforms to the bacteriological standards as outlined in last year's report, but also that it is from a supply which is not exposed to contamination. This enlarges the scope of the regulations and assures a greater probability of a suitable water being furnished than could be expected under a semi-annual bacteriological test alone. The sanitary survey governs features in connection with the matter of water supply which in a great measure are susceptible to correction and control.

It is contemplated by the Public Health department to call a conference in the near future of the State Health authorities for the purpose of standardizing water inspections as well as to define the requirements in source and method of supply. If it is the pleasure of this Association, the committee will be pleased to report on the engi-

neering and maintenance matters of interest brought out at this meeting.

Relative Merits of Continuous

and Intermittent Water Softeners

A survey of the field indicates that there are now in service on American railroads, approximately 550 water-softening plants, at which about 30,000,000,000 gal. of water are softened annually. In addition to this a large amount of water is partially treated in roadside tanks with soda ash alone, with no allowance for sedimentation. The total amount of water consumed annually for steam purposes by these railroads is approximately about 450,000,000,000 gal., or nearly 6.7 per cent. of the total water used for steam purposes is completely treated. The continuous type of plant seems to predominate, about 70 per cent. of the total number of plants installed being of that character.

As to the comparative economy of continuous and intermittent plants, the operating costs seem to be very nearly the same in well-designed plants of both types. The amounts of chemicals required should be the same in either type, although improper design in the agitating facilities of some types has been found to allow a part of the lime reagent to settle into the sludge before reaction has taken place. Investigation as to running repairs required indicates that these are so largely influenced by the design and location of the plant and the daily attention given to its operation that no general comparison of the two types can be made on this basis. The labor cost generally should also be the same, as with any type of treating plant in railroad service, the constant attention of a man is highly desirable and decidedly economical. There seems to be little difference in the fuel or power item, although conditions vary in different localities. The large variety of type of the many plants installed precludes a general comparison as to interest and depreciation.

The following are the general advantages of the two types:

Intermittent

1. The most advantageous arrangement for an intermittent plant consists of two settling tanks of road tank height, to serve alternately as treating and settling tanks. This arrangement provides duplicate tank facilities and increased the ratio of storage capacity to daily consumption.

2. The intermittent plant is of the most simple construction and its operation is readily understood by the low paid class of service usually engaged for this work.

3. The cost of maintenance of the type of intermittent plants generally in use is small, the necessary repairs simple, and the materials for making them readily available.

4. The uniformity of treatment is certain, large amounts of water being treated at a time, and the opportunity for error is slight.

5. The intermittent plant has no intricate or expensive parts to deteriorate, as are frequently present in some continuous types.

6. A portion of the old sludge remains in the tank and is mixed with the water on each addition of reagents. This acts as a foundation for the newly formed molecules of sludge, causing precipitation in larger particles, and thereby hastening the settling.

Continuous Type

1. In large plants, the continuous type can be designed to afford more economy in ground space.

2. It will handle a larger volume of consumption on a smaller rate of flow, since the action is continuous and there is no dead time for settling.

3. Where the pumping station is located at some distance from the delivery tank, some types of continuous plants adjacent to the point of delivery are advantageous.

4. At terminals, or where proper attention can be given to the plant at stated periods, attendance at continuous plants can be performed more readily by employes engaged primarily in other duties, but this brings uncertain results due to divided responsibility, and is, therefore, of doubtful advantage.

5. In a certain type of continuous plant, very thorough and gradual mixing is secured by introducing the water and reagents at the bottom of the mixing tank and keeping a portion of the old sludge continually agitated with the incoming mixture, thereby aiding reaction and sedimentation.

Rules for the Care of Boilers in Pumping Stations

Duties of Attendant: The pumper, station agent or other person in charge of the local water supply will be held responsible for the condition of the entire plant. His first duty will be to see that there is an ample supply of water available for locomotive use at all times. In case of trouble that affects the water supply he must wire the chief dispatcher as well as the water service foreman, stating fully the trouble and what is needed for repairs. He must make frequent inspections of all parts of the plant, make all repairs within his power and avoid sending for repair man except when absolutely necessary. He will be responsible for the safe-keeping and economical use of supplies furnished to the water station and place orders for fuel and supplies in ample time to avoid a shut-down of the plant.

Pumphouse: The attendant must keep the pumphouse neat and clean and take every precaution against loss or damage by fire. Waste or other combustible material must not be stored in the pumphouse. Oil and gasoline must be stored outside in proper receptacles. Cinders must not be dumped close enough to the house to endanger it. Proper places must be provided for all tools and they must be returned to their proper places after using.

Machinery: Machinery must be inspected daily and adjustments made to increase its efficiency and to prevent wear or breakdown. Particular attention must be given to the packing and lubrication of all parts. The attendant must be familiar with the location and purpose of all steam and water pipes, valves, levers, etc., so that in case of accident or leaks the valves controlling same may be properly used. When ordering repair parts for any piece of machinery the attendant must always give the name of manufacturer, shop number of the machine and repair number of the part wanted.

Boilers: Attendant must see that the boiler contains a sufficient amount of water before starting a fire and shall see that the gage-cocks, water glasses and safety valves are clean and in good condition. Fire must be cleaned frequently of clinkers. Ashes must not be allowed to accumulate beneath the grate. If muddy water is used, boilers must be blown down frequently. In doing this, boiler must be filled full of water and blown down to one gage with not over 30 lb. of steam. Foaming is due to a dirty boiler and can be stopped by blowing down and filling with fresh water. The boiler must be washed out once a week or oftener if, in the judgment of the water service foreman, it is necessary. Flues must be cleaned of ashes and soot frequently. If it develops, when the plant is operating, that no water appears in the water

gless the valve below the water column should be opened. If water then appears, the flow to the boiler can be increased; if not, fire must be pulled and boiler cooled before turning any water into the boiler. Where more than one shift is in charge of the pumping plant each oncoming man should be notified of any defects by the man leaving. Should the safety valve stick and steam gage show over-pressure, draft doors should be closed and boiler allowed to cool off to pressure at which valve is supposed to work before any repairs or adjustments of the safety valve is attempted.

Oil Engines: The attendant must be provided with a copy of and must be governed by the manufacturer's printed instructions for operating the particular type of engine in his charge. To secure economical and satisfactory operation, engines must be properly lubricated, the attendant must see that all moving parts are free from dirt, properly oiled and work easily. Lubricating oil must be fluid enough to be fed readily through the oiler. When the oiler is filled the lubricating oil should be run through a fine mesh strainer inserted in a funnel. The cover of the oiler should be in place at all times except when filling it. The oiler should be drained occasionally and washed out with gasoline. This applies also to the bearing oil cups. The machinery to be driven should be detached from the engine until the engine is in motion.

Before starting see that the tank contains fuel and that a supply of cooling water is available. Thermometers are frequently provided which show the temperature of the cooling water around the cylinder. When running the thermometer should register 140 to 180 deg. F. The most favorable temperature will be different with different fuels and the attendant should note the temperature at which the operation is best and attempt to keep it reasonably close to that figure. The temperature can be held at that point by regulating the supply of water to the cylinder jacket by means of the valve provided for that purpose. The pump, piping and water jacket of the engine must be drained when the engine is not in use to prevent freezing and cracking of the cylinder.

Fuel for an oil engine should be strained at the time the storage tank is filled. In some types of engines fuel is injected into the cylinder through a spray nozzle. Irregular operation may be caused by foreign matter in the oil sticking in the spray nozzle or in the check valve in the injector pump. The small hole in end of spray nozzle must be cleaned occasionally.

If a loss of compression is noticed, the piston should be inspected. The piston rings should be free in their grooves. If they stick, the compression or explosion will blow past them and the combustion will be poor, due to poor compression. Any accumulation of carbon which tends to stick to the rings should be washed out with gasoline.

Water Tanks: They should be filled at each pumping to prevent shrinkage of the wooden tanks, or deterioration in the sheets of metal tanks, as well as to safeguard the water supply in case of accident to the pumping plant. Tank spouts and grab ropes must be maintained at standard clearance. Defects in spouts, valves or discharge pipes must be reported at once. The attendant must watch engines take water and report unnecessary waste. Damage to fixtures or appliances by engines taking water must be reported to the water service foreman, giving date, train and engine number.

Water Columns or Stand Pipes: Water columns should be inspected frequently and maintained in good working order. Lifting rods should be tightened, leaky glands repacked and locks and rollers adjusted. On

double track, water column should be swung in the direction of traffic and locks maintained in such position that they hold the water column parallel to the track.

Electric Motor: The motor, control and pump should be inspected at least once each week, at which time the parts should be thoroughly cleaned and all contacts should be carefully inspected to see that they make and break at the proper time and that contact surfaces are clean. All wearing parts should be well lubricated and special attention should be given to the motor bearings. The building where the motor is located should be kept clean. No paper or oily waste should be allowed to collect in switch boxes or near a motor or any electrical contact or wires.

Waste must not be used around the commutator or brushes and gasoline or sandpaper must not be used to clean the commutator. If the motor sparks excessively the proper official should be notified.

The motor should be watched carefully for overheating. The commutator should not be allowed to be come worn or grooved by the brushes.

Any displaced wiring must also be reported. No attachments should be made to the wiring as serious damage may be done to the equipment and there is danger of personal injury. A fuse must never be replaced with anything but a proper fuse. If one of a higher ampere rating is used it may cause serious damage to the motor. The fuse is the electrical safety valve and should no more be tampered with than a steam safety valve. A test lamp should be used to find blown fuses, thus avoiding chances of electric shocks. A gage should be supplied to each alternating current motor to test the space between motor and field poles. If gage will not pass freely the bearings need immediate attention.

On pump motors controlled from a distance, the remote control starter located in the pumphouse should be tested frequently to see that it starts the motor properly. It should be inspected frequently and any badly burned contacts reported.

Organization for Railway Water Service Department

Establishing a water department organization does not necessarily mean that the division forces are materially changed where water service men are locally employed,

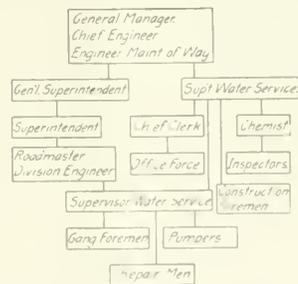


Diagram of Suggested Organization

but that the local officers and the engineering department are relieved of the duties incidental to the design and development of water facilities and the work placed in the hands of those trained along this particular line. That there is an urgent need for such an organization has been proved by the results obtained on roads that have established a department to handle this very important feature of railroad operation.

Inquiries as to the method of handling water supply were sent out to a number of railroads. Replies were

received from 38 railroads representing a mileage of 136,991. The total number of water stations was 7816. Of roads reporting seven have separate water departments, while on 20 roads the water supply is handled by the bridge and building department; on eight roads by the divisional water department, and on three roads jointly by the maintenance of way and motive power departments.

The graphical chart submitted herewith represents a complete water department organization and may be readily adapted to any road with such modifications as may be necessary for a road of greater or lesser mileage. For example, where there are no treating plants in service the work of making water analysis would probably come under the engineer of tests or outside chemists, rather than a department chemist.

The chart submitted represents the best practice in present water department organization on American railroads, and while it is not exactly typical of any particular water department organization, the committee feels that it embodies the best features of the existing water department organization.

Definitions of Terms Used in Railway Water Service

Group "A"—Wells

- ARTESIAN WELL.—A flowing well from which the water is caused to rise above the surface of the ground by subterranean pressure.
- DEEP WELL.—A well having a depth of 100 ft. or greater.
- SHALLOW WELL.—A well less than 100 ft. in depth.
- DRILLED WELL.—A well made by drilling or boring.
- DRIVEN WELL.—A well constructed by driving the casing and then removing the material inside the casing.
- DUG WELL.—A well made by digging or excavating.
- WELL CASING.—A pipe forming the wall of a well.
- WELL SCREEN.—A perforated device, usually a slotted or wire-wound pipe for the admission of water into and the exclusion of other matter from a well.

Group "B"—Water Tanks

- TANK.—A basin or reservoir above ground for the storage of liquids.
- TANK TOWER.—That portion of the tank structure between the tank and its foundation.
- TANK VALVE.—The valve for delivery of water from the tank.
- OUTLET PIPE.—The pipe for delivery of water from the tank to the spout.
- TANK SPOUT.—An adjustable spout for delivery of water from the outlet pipe to the tender.
- INDICATOR.—A device for indicating the height of water in tank.
- FLOAT VALVE.—A valve operated by a float controlling the height of water in tank.

Group "C"—Pipe Lines

- INTAKE LINE.—A line of pipe through which the water flows from the source of supply to the intake well.
- SUCTION LINE.—A line of pipe through which water is drawn by suction to the pump.
- DROP LINE.—A vertical line of pipe through which water is lifted out of a well.
- DISCHARGE LINE.—A line of pipe from the discharge of pump to tank, or distribution system.
- SERVICE LINES.—Lines of pipe through which the water is distributed.

Group "D"—Water Columns

- WATER COLUMN.—An apparatus for delivering water into the tender at a distance from the tank.

Group "E"—Internal Combustion Engines

- INTERNAL COMBUSTION ENGINE.—A prime mover in which the power is derived from the explosive force of the fuel, compressed and ignited in a cylinder, acting directly against a piston.
- TWO-CYCLE ENGINE.—An internal combustion engine receiving a power impulse during each revolution.
- FOUR-CYCLE ENGINE.—An internal combustion engine receiving a power impulse during each second revolution.
- GASOLINE ENGINE.—An internal combustion engine using gasoline, naphtha or other volatile petroleum fuels.
- GAS ENGINE.—An internal combustion engine using natural or manufactured gas as fuel.
- OIL ENGINE.—An internal combustion engine that may be started and operated on a non-volatile oil of lower specific gravity than gasoline without passing the oil through a carburetor, mixing valve, or preheating the oil, in which the fuel is ignited by a bulb, tube or plate heated from previous combustion.
- DIESEL ENGINE.—An oil engine in which the combustion is due to the heat generated by compression.

Group "F"—Water Treatment

- UNTREATED WATER.—Water not subjected to treatment.
- TREATED WATER.—Water subjected to treatment.
- UNDERTREATED WATER.—Water to which insufficient chemicals has been added.
- OVERTREATED WATER.—Water to which an excess of chemicals has been added.
- INCrustING SOLIDS.—Matter in the water which forms scale on tubes and sheets of boilers.
- NON-INCrustING SOLIDS.—Matter in the water which does not form scale.
- SUSPENDED MATTER.—Matter in the water which may be removed by coagulation, sedimentation or filtration.
- AERATION.—Bringing the water into intimate contact with air in order to introduce oxygen for the oxidation of iron or organic matter, and for washing out gases and volatile odors.
- FILTRATION.—A process of passing water through layers of sand or other porous material for the removal of suspended matter or bacteria.
- SETTLING TANK.—A reservoir in which water is retained for the sedimentation of suspended matter.
- REAGENT.—A chemical used for the treatment of water.
- HARDNESS.—The quality of water caused by dissolved incrusting solids or by acidity.
- SLUDGE.—Resultant precipitant formed by sedimentation or by removal of incrusting solids in water treatment.

Group "G"—Pumps

- PUMP.—An apparatus for raising or transferring water or other fluids.
- RECIPROCATING PUMP.—One in which the piston or plunger alternately draws the water in and discharges it from the cylinder.
- SINGLE ACTING PUMP.—One in which one end of the plunger only acts on the fluid column.
- DOUBLE ACTING PUMP.—One in which the plunger acts upon the fluid column both upon the forward and return stroke.
- PISTON PUMP.—One in which a finished cylinder is closely fitted with a reciprocating piston.
- PLUNGER PUMP.—One in which the reciprocating part is a solid plunger which does not come in contact with the cylinder walls, but enters the cylinder through packing glands.

DIRECT ACTING PUMP.—One in which the piston is reversed by an impulse derived from itself at or near the end of each stroke.

ROTARY PUMP.—One in which two revolving pistons rotate in a pump case which they completely fill; the pistons alternately draw in and discharge the water.

CENTRIFUGAL PUMP.—One in which the pressure necessary to raise the water is derived from the velocity of a revolving impeller.

AIR LIFT.—An apparatus for introducing compressed air into a well and thereby raising water out of the well.

Conclusions

The committee requested the following action on its report:

1. That the changes in the subject-matter on Water Service under the heading, "Revision of Manual," be adopted and substituted for the matter now given in the Manual.

2. That the report on methods for complying with Federal Regulations in regard to purity of drinking water supplied to trains be received as information.

3. That the subject of the design of impounding reservoirs be reassigned to the committee for completion during the coming year.

4. That the report on the relative merits of continuous and intermittent water softeners be received as information.

5. That the report on rules and examination questions for the care of pumping stations be adopted by the Association and inserted in the Manual.

6. That the report on organization for railway water service departments be received as information.

7. That the definitions of terms be adopted by the Association and inserted in the Manual.

8. That Subject No. 8, on suitable types for water meters for use in rail water service, be reassigned to the committee for study and completion during the coming year.

Suggested Subjects for Next Year's Study and Report

1. Make a final report on the design of impounding reservoirs and conditions under which they are economical.

2. Make a final report on suitable types of water meters for use in railway water service, methods followed in testing and reading meters, and checking the consumption of city water.

3. Continue the study of methods for complying with Federal regulations in regard to the purity of drinking water supplied to the public and employes on interstate trains.

4. Submit plans and recommendations for typical water station layouts.

5. Make a study of prevalent locomotive flue failures alleged to be due to improper water conditions and suggest remedies.

6. Revision of the Manual.

Committee: A. F. Dorley (M. P.), chairman; J. L. Campbell (E. P. & S. W.), vice-chairman; J. T. Andrews (B. & O.), C. A. Ashbaugh (G. C. & S. F.), R. C. Bardwell (M. P.), F. T. Beckett (C. R. I. & P.), E. H. Brown (N. P.), C. Bucholtz (Eric), C. C. Cook (B. & O.), R. H. Gaines (K. C. S.), E. M. Grime (N. P.), W. C. Harvey (C. G. W.), C. R. Knowles (I. C.), E. G. Lane (B. & O.), J. D. Mathews (S. P.), W. A. Murray (N. Y. C.), E. H. Olsen (A. T. & S. F.), W. A. Parker (St. J. & G. I.), H. N. Rodenbaugh (Southern).

Discussion

A. F. Dorley (Chairman): Subject I was placed in the charge of a sub-committee, of which Mr. Campbell was chairman. In two articles the committee recom-

mends some decided changes in the essence of the subject matter in the Manual, but the other revisions consist of changes or improvements in the diction only, and involve only minor changes in the recommended practice. The Manual now reads: "The greatest disadvantage in treating water is the increased tendency to foam, due to the reaction of soda ash on the sulphate of lime and magnesia."

When the treatment of water on the railroads was first undertaken all those who engaged in it acted very cautiously, and the treatment was usually limited to the point where foaming would not occur, but gradually road began to complete the treatment to the point where all the suspended matter or the incrusting solids were removed, and they have found that by a proper education of the engine men in the handling of waters that are inclined to foam that with a judicious use of anti-foaming compound water can be handled, even though it is treated, irrespective of the foaming content or foaming solids. This article just quoted from the Manual is frequently used as an adverse argument by those who are not friendly disposed to water treatment. I move that this article be omitted from the Manual.

The President: If there is no objection the omission of this latter is approved.

Mr. Dorley: Under the head of "Foaming and Priming," the following occurs in the Manual: "Foaming from treated water is due to the presence of sodium salts, as a result of treatment for incrusting sulphates, together with such quantities of the alkali salts which may have been present in the raw water. This condition is aggravated by and to a large extent due to the presence of suspended matter in the water.

"Concentration of foaming solids in locomotive boilers reaches the critical point at about 100 grains per gallon. Concentration above this point must be avoided by changing the water, or else trouble from foaming will be experienced." The committee suggests that this paragraph be made to read:

"Concentration of foaming solids in locomotive boilers reaches the critical point between 100 and 200 grains per gallon, depending upon the character of the foaming solids and the amount of suspended matter in the water. To prevent foaming, the concentration must be kept below that point."

That means in any particular water, which has a fixed critical point—which may be anywhere from 100 to 200, for that particular water its concentration must be kept below its concentration point.

I move that this change be adopted.

The President: If there is no objection, the suggested revision will stand approved. It is so approved.

Mr. Dorley: We report on subject No. 2, "Methods for Complying with Federal Regulations in Regard to Purity of Drinking Water Supplied to Trains." This subject has been watched, and progress reports are being made by R. C. Bardwell, the chairman of the sub-committee.

On Subject 3, "Make Final Report on Design of Impounding Reservoirs, and Conditions Under Which They Are Economical," the committee reports progress.

The report on subject 4, "Relative Merits of Continuous and Intermittent Water Softeners." After a railway has decided to go into the problem of water purification, either on a district or at any particular point, the most important thing to decide is the question of the type of softener. As a rule, when railways begin water purification they have not any well developed plans of their own and they naturally turn to the manufacturers of water softeners for advice and help. Then the deciding

factor is frequently one of price. Each type has its own particular merits which fits it and makes it suitable for particular conditions, and this report is offered with the hope that it may be of some service to railroads who are about to install water softeners. This part of the report is offered as information only.

Subject 5: "Rules or Examination Questions for Care of Boilers in Pumping Stations." We would like to offer for your consideration and for insertion in the Manual the subject matter coming under the sub-head, "Duties of Attendant." (This was accepted without comment. Mr. Dorley then offered some corrections to the proposed "Rules or Examination Questions for Care of Boilers in Pumping Stations," after which the report was approved for insertion in the Manual.)

Mr. Dorley: In handling the report on subject 6, the sub-committee sent out inquiries to quite a number of roads to ascertain just what organization the water department had, and they found that the practice with reference to the care of water service varies more widely on American railroads than perhaps any other branch of the service, and the committee submits a chart showing a typical organization that, with some modifications, we believe can be made to fit into the existing organization of practically any road. There are a few large roads that have a distinct water department and the results secured on these roads prompts the committee to recommend that some such line-up of organization be considered on other railroads. This report is offered to the Association as information only for the time being.

On subject 7, "The Definitions of Terms Used in Railway Water Service," are offered for insertion in the Manual.

A. N. Talbot (U. of Ill.): With reference to the first definition, "Artesian Well," I call attention to the fact that this is the old definition of artesian well, a flowing well, but in modern practice we include in the term "artesian well" any well in which the water rises a con-

siderable distance above the level of the stratum from which it comes. It need not be a flowing well. The Association will be going against what is pretty well established practice if this definition is adopted.

C. E. Lindsay (N. Y. C.): Under the rules we are not allowed to discuss definitions on the floor of the convention, and, therefore, under these circumstances we are forced into the position of taking these definitions as they are, or rejecting them. We have, however, a good precedent in the case of the report of the Committee on Buildings, which submitted its report with the distinct understanding that the definitions would be open for discussion for a year, and I think it is a good course to pursue.

The President: I think Mr. Lindsay's position is correct, and I am personally of the opinion that the Association will yet get to the point where the materials that go into the Manual will be subject to letter ballot. The committee says that it will be able to take this matter up for another year if the members will really give them suggestions so that the report can be put in shape so that it can be adopted next year. It will also take into consideration Prof. Talbot's definition of artesian wells, or rather his comment regarding them.

(This matter will be postponed one year, and will be reported then with corrections.)

Mr. Dorley: Appendix G is headed, "Pollution of Wells from Overlying or Adjacent Cinder Deposits." It is generally known that the deposits of cinders such as we have around railroad terminals add a perceptible pollution to water they come in contact with, but it has not generally been known that the effects of cinder deposits would be as far reaching as they were found to be in East St. Louis, where the overlying cinder deposits in yards were found to be a very perceptible contamination to underlying ground waters.

(The committee was dismissed with the thanks of the Association.)

Report on Records and Accounts



THE COMMITTEE HAS NO specific recommendations to make for changes in the Manual, but submits a brief discussion on the standardization of forms and stationery. The committee desires to call attention to the desirability of reducing the number of forms used in the maintenance of way department in the interest of economy and efficiency. As an illustration may be cited the experience of an official of a large railway system, who, after making a careful analysis of the different blank forms used

in the several departments, reduced the number from 1500 to 500. This large decrease not only involved a great saving to the railroad in clerk hire and for stenographers, but it also relieved the different officials from the unnecessary labor of examining and considering the mass of details from which no adequate results would be obtained.

Another feature to which the committee would call attention is the need for standardizing the sizes of forms, stationery, specifications, drawings, etc. There is no

good reason why one railroad should use a letterhead of an odd size, like 8 by 10 in., or one of 7¾ by 12 in., or other odd dimensions. The standard size letterhead is 8½ by 11 in., which cuts from a sheet 17 by 22 in. without waste. Anything differing from that size is considered a "special," and consequently costs more money.

Specifications are also made of all sizes for no apparent reason except precedent. If specifications were uniformly written or printed on standard size sheets, it would effect a material saving and would fit in any ordinary letter file. The same argument applies to all sorts of drawings, which it would be an advantage to produce on letterhead-size sheets. The use of large sheets for drawings, except in special cases, has been discontinued in many engineering offices, the drafting now being done on letter-size paper. Instead of tracing cloth, cross-ruled thin paper from which blueprints can be made is recommended.

On pp. 759-768 of Vol. 18 of the Proceedings for 1917, the committee submitted specifications for maps and profiles, which were received as information at the last annual convention. These specifications have now been before the members for one year, but no comments or criticism have been received by the committee during the year. The committee therefore submits these specifications for maps and profiles for approval and publication in the Manual.

In response to a circular addressed to valuation engineers of railroads represented in the Association, the committee obtained a large amount of most valuable information regarding valuation forms for both field and office use. This data has been carefully studied by the committee, and after due consideration it has been decided not to recommend any additional valuation forms at this time. One reason for this conclusion is that the subject was quite fully covered in the last annual report of the committee, consisting of a large number of typical valuation forms; an additional reason is the difficulty of devising forms to cover the great variation of local conditions existing in different sections of the country. It is therefore the suggestion of the committee that the various forms collected by it be placed on file in the office of the Association for inspection and use of anyone interested.

The committee has interpreted the assignment of the subject of additional definitions to mean definitions covering valuation matters, and in accordance with that understanding it is preparing a series of definitions pertaining to valuation of railroads, but is not prepared to submit them with this report, preferring to give more consideration to the proposed glossary of terms.

The committee has gathered some data to aid it in making a report regarding various maintenance of way department forms, but owing to the unusual conditions prevailing during the past year, it has not been feasible to make a report. The information collected is being made use of in studying the matter, and it is hoped to present something to the Association at its next annual meeting that will be of value.

The committee recommended that all subjects assigned it last year, with the exception of one regarding the various methods of reproducing maps and profiles on tracing linen for permanent record, be again referred to it for the current year.

Committee: W. A. Christian (I. C. C.), chairman; M. C. Byers (W. M.), vice-chairman; F. L. Beal (L. & A.), Lester Bernstein (B. & O.), H. Bortin (C. R. R. of N. J.), W. S. Dames (Wabash), J. W. Fox (C. of Ga.), B. B. Harris, Geo. D. Hill (N. Y. C.), G. T. Kuntz (N. P.), Henry Lehn (N. Y. C.), J. H. Milburn (B. & O.), J. C. Patterson (Erie), J. H. Reinhold (M. & St. L.), R. C. Sattley (C. R. I. & P.), Huntington Smith (N. Y. C. & St. L.), H. M. Stout (N. P.), W. D. Wiggins (P. L. W.).

Discussion

Mr. Christian (Chairman): Your committee submits a short report. Twelve subjects were assigned to this committee, and the sub-committees are not in position to submit anything to the convention for approval and publication in the Manual, with the exception of subject 6: "Submit Specifications for Maps and Profiles, Co-ordinating Them with Previous Work of the Association."

We submit number 6 for approval by the convention.

The President: These specifications were held over for a year to give the members an opportunity to study them. The chairman says that they have received very little comment upon them from the railroads. It appears to me that it would be no more than just to the committee that definite action be taken at this time.

Mr. Christian: I move that the specifications as published in Volume 18, Proceedings of 1917, for maps and profiles be accepted and published in the Manual.

J. L. Campbell (E. L. S. W.): I would like to ask the committee in this connection if there will be no conflict recommended between the requirements of Map Order No. 1, of the Division of Valuation, and the specifications.

Mr. Christian: Map Order No. 1 was considered and the specifications include a large portion of that order.

W. C. Cushing (P. L. S. W. S.): That is the reason that we do not want to accept, as far as our road is concerned, these recommendations. We do find in examination of the specifications that they do conform to the Map Order of the Bureau of Valuation, and we find the sizes specified in that map order are not suitable for our records.

Mr. Christian: In reply to Mr. Cushing's objection, I wish to state that one thing that the committee tried to secure in the specifications for the maps and profiles was to determine a size that would be generally acceptable, so that all maps and profiles would be the same size. As it is now every road has a different size. The committee would like to see the sizes as specified in these specifications used.

The President: A motion has been made and seconded that these specifications as published in the proceedings of 1917 from Pp. 759 to and including part of 768 be printed in the Manual. (The motion was carried.)

Mr. Christian: I would like to refer to the subject of formulating methods for reproducing maps and profiles on tracing linen for permanent records. In the proceedings of Volume 17, of the convention held in 1916, the committee presented such data as it was able to accumulate at that time on this subject, and there has been no new development in this matter, which the committee has been able to ascertain, and it suggests that this subject be discontinued. I move that Subject No. 4 be omitted from further consideration.

The President: That will be in the hands of the Committee on Outline of Work.

Mr. Christian: On page 211 there is an appendix A entitled, "Revision of Manual."

As an illustration of the matter treated in this appendix, one official after taking office with an eastern carrier, asked to have one of each kind of forms used submitted to him for his inspection, and after doing so he cut them down from 1,600 to 500 or 600. This reduction was a saving, not only in paper, printing, labor and time, but it facilitated the work of the various departments, and that was a very good thing. We do not submit this in the form of a motion, but we call attention to the fact that there are a great many odd sizes of maps, drawings, statements, etc., used by the carriers nowadays that we could well do away with.

The President: Will the Committee on Outline of Work bear that in mind.

Mr. Lindsay: For information, I would like to ask if that Sheet 17 x 22 is the generally recognized trade size?

Mr. Christian: It is the generally recognized trade size.

Mr. Cushing: On reading this recommendation of the committee I took it up with the purchasing agent of our line because of the fact we use 8 x 10 sheets, standard size, and pointed out to him that he was wasting money by using that size, but he informed me that I was entirely wrong, that he was saving money, because we were such large consumers of paper there was no difficulty in obtaining the size required to produce 8 x 10.

It occurs to me that all that is necessary will be for the railroads to unite on a standard size, and the manufacturers will make it, and that will become the trade size. There is certainly less paper made 8 x 10 than 8 x 11, and if we do not need that extra half inch for our correspondence, we had better adopt the smaller size.

The President: The suggestion of Mr. Cushing seems to be a pertinent one, and I presume that the Committee on Outline of Work will take it up. The committee was dismissed with the thanks of the association.



Members of A. R. E. A. Committees in Military Service

Lieut-Col. H. J. Slifer
Major Henry Stephens
Major E. C. Schmidt
Capt. W. G. Arn

Major F. L. C. Bond
Major P. M. La Bach
Major T. E. Rust
Capt. H. Austill

Major C. S. Coe
Major F. E. Lamphere
Capt. F. W. Green
Capt. W. M. Vandersluis

Major Azel Ames
Major W. L. Webb
Capt. C. W. Cochran
Lieut J. S. Bassett

The Railway Engineering Association and the War

Over One Hundred A. R. E. A. Men With Colors—Many Prominent Members Now Commissioned Army Officers

MODERN WARFARE HAS developed into a keen engineering struggle demanding the highest grade of scientific skill and ability. It is not surprising, therefore, that many of the leading members of the engineering profession in this country have been called upon to assist our country in its great struggle against ruthless autocracy. The secretary of the American Railway Engineering Association reports that 103 members are now with the colors and many of these hold most important positions in the forces engaged in the prosecution of the war.

S. M. Felton, president of the Chicago Great Western, is now director-general of military railways in charge of the organization and equipment of railway regiments for service on the French railroads serving the American front. Mr. Felton has supervised the recruiting of 11 regiments of railway men which are now at work on the other side and is preparing new units for movement to France as rapidly as is practicable. In addition he organized and despatched a corps of railroad officers to Asiatic Russia for the purpose of rehabilitating the Trans-Siberian railroad. A. R. E. A. members are well represented on the regiments so far organized, holding many of the most important commissions. F. G. Jonah, formerly chief engineer of the St. Louis & San Francisco, is now major of the 12th Engineers (Rys.); Charles L. Whiting, formerly division superintendent of the Chicago, Milwaukee & St. Paul at Lewistown, Mont., is major of the second battalion of the 13th Engineers (Rys.); Benjamin W. Guppy, formerly engineer of structures of the Boston & Maine at Boston, Mass., is major of the first battalion of the 14th Engineers (Rys.); Geo. H. Webb, formerly chief engineer of the Michigan Central, is lieutenant-colonel, 16th Engineers (Rys.); W. G. Atwood, formerly assistant district engineer, division of valuation, of the Interstate Commerce Commission at Chattanooga, Tenn., is major, 17th Engineers (Rys.); E. B. Cushing, assistant general manager of the Southern Pacific lines, Houston, Tex., is major, 17th Engineers (Rys.); W. J. Wilgus, formerly vice-president of the New York Central, is now a colonel attached to the railway units and recently returned from France, where he has been serving on the military railroads, to co-operate with Director-General Felton in supervising the enlistment of men for additional railway regiments.

A. R. E. A. committees are particularly well represented in the army with one lieutenant-colonel, nine majors, eight captains, and one first lieutenant. H. J. Slifer, formerly consulting engineer at Chicago and a member of the committee on the Economics of Railway Labor, is now a lieutenant-colonel of the Twenty-first Engineers (Light Railways) in service in France. Azel Ames, formerly connected with the Kerite Insulated Wire & Cable Company and also consulting signal engineer at New York, is a major in the 61st Regiment Coast Artillery at Fort Screven, Savannah, Ga. Major Ames is a member of the committee on Signals and Interlocking. F. C. L. Bond, formerly division engineer of the Grand Trunk at Montreal, Que., and a member of the committee on Wood Preservation, is now a major assigned to Company C, 10th Battalion of the Canadian railway troops now in France. C. S. Coe, formerly engineer maintenance of way of the Florida East Coast at St.

Augustine, Fla., and a member of the committee on Masonry, is now major with the 17th Engineers (Railways) in France. Paul M. LaBach, until recently assistant engineer of the Rock Island Lines at Chicago, and a member of the committees on Economics of Railway Location and Stresses in Track, has been made mechanical and water supply engineer of military railroads in France with the rank of major. F. E. Lamphere, formerly assistant engineer of the Baltimore & Ohio Chicago Terminal and a member of the committee on Yards and Terminals, is now a major in the Quartermasters' Officers' Reserve, with headquarters at Port Newark Terminal, Newark, N. J.

T. E. Rust, until recently chief engineer of the Waterloo, Cedar Falls & Northern, Waterloo, Iowa, and a member of the committee on Signs, Fences and Crossings, is now a major in the Engineer Officers' Reserve Corps, with headquarters at Camp Lee, Va. E. C. Schmidt, professor of railway engineering at the University of Illinois, Urbana, Ill., is now a major in the conservation division of the United States Fuel Administration at Washington, where he has charge of the organization of work in connection with fuel conservation on the railroads. Major Schmidt is a member of the committees on the Economics of Railway Location and the Economics of Railway Operation. W. L. Webb, formerly public utility engineer at Philadelphia, Pa., and a member of the committee on the Economics of Railway Location, is now in France as a major with the U. S. Regular Engineers. Henry Stephens, formerly supervisor of materials of the New York Central Lines at Cleveland, Ohio, and a member of the committee on Wood Preservation, is a major with the 65th Engineers at Camp Meade, Md.

The eight committee members who now hold commissions as captains are as follows: W. G. Arn, formerly assistant engineer maintenance of way of the Illinois Central at Chicago, and a member of the committee on Yards and Terminals, 13th Engineers (Railways), France; H. Austill, formerly bridge engineer of the Mobile & Ohio at Mobile, Ala., and on the committee on Wooden Bridges and Trestles, 501st Battalion of Engineers, France; C. W. Coebran, formerly engineer maintenance of way of the Cleveland, Cincinnati, Chicago & St. Louis, and on the committee on Roadway, 321 Regular Engineers, Camp Grant, Rockford, Ill.; T. W. Fatherson, formerly engineer maintenance of way of the Chicago Great Western, Des Moines, Iowa, committee on Ballast, attached to headquarters 13th Engineers (Railways), France; F. W. Green, formerly assistant to the president of the St. Louis-Southern, St. Louis, Mo., and chairman of the committee on the Economics of Railway Operation, acting superintendent of army transport service at one of the important ports in France; J. de N. MacLeod, Jr., formerly office engineer Atchison, Topeka & Santa Fe at Chicago, and a member of the committee on Economics of Railway Operation, Engineer Officers' Reserve Corps; W. M. Vandenberg, formerly signal engineer of the Illinois Central, Chicago, and a member of the committee on Signals and Interlocking, Engineer Officers' Reserve Corps, Fort Leavenworth, Kan.; W. K. Walker, formerly engineer maintenance of way of the Wabash, St. Louis,

Mo., committee on Ballast, Engineer Reserve Officers' Training Camp, Camp Lee, Va. Jerome S. Bassett, formerly assistant engineer of the Missouri Pacific, Monroe, La., and a member of the committee on Ballast, is now a first lieutenant detailed as instructor at the Third Officers' Training Camp, Leon Springs, Tex. R. C. White, superintendent of the Missouri Pacific at Wynne, Ark., and a member of the committee on Ballast, was chief engineer and first assistant to the constructing quartermaster on cantonment construction at Camp Pike, Little Rock, Ark., last summer.

Other members of the American Railway Engineering Association who have recently received important commissions in new railway units are R. K. Rochester, superintendent of the Northwest System of the Pennsylvania Lines, who will serve as a general superintendent on the American-operated lines in France with the rank of major, and H. M. Waite, formerly manager of the city of Dayton, Ohio, who has been commissioned lieutenant-colonel.

The first member of the association who has died in military service, according to the best information at hand, is Captain L. B. Manspeaker, who passed away following an attack of pneumonia on February 9, at Camp Lee, Va.

The great importance of the expeditious movement of troops and supplies from various sections of this country to the seaboard and across the water is a problem now receiving the attention of the best brains and ability in the railway world. In this field, also, members of the American Railway Engineering Association have been and are prominent. R. H. Aishton, president of the Chicago & Northwestern, is now regional director of western railroads, with headquarters at Chicago. L. W. Baldwin, vice-president and general manager of the Central of Georgia, is now operating assistant to the regional director of southern railroads, with headquarters at Atlanta, Ga. Howard Elliott, chairman of the board of directors of the New York, New Haven & Hartford, and Julius Kruttschnitt, chairman of the executive committee of the Southern Pacific Lines, were members of the Railroads' War Board which controlled the operation of the lines in this country until the government assumed their administration last December.

But for lack of space the activities of many other members of the association in connection with the prosecution of the war might be mentioned, but suffice it to say, all, whether in active military service or still in civilian life, are doing their utmost to ensure a decisive victory over Prussian militarism.

Provocation Enough

On a slow train in Arkansas sat a native, going up to Little Rock to testify in a shooting case. A deputy sheriff got aboard at a way station conveying an excited-looking person whose wrists were heavily manacled. Prisoner and warder took a seat directly in front of the countryman.

Presently, when his curiosity had mastered him, the first traveler bent forward and tapped the deputy on the shoulder.

"Whut's the trouble with the feller you got along with you?" he inquired in a whisper.

"He's got bugs," stated the deputy succinctly.

"He's got which?" inquired the yokel in a startled voice.

"He's buggy!" The deputy tapped his forehead meaningly. "He's crazy! Understand?"

"Bugs in his head, and his hands tied?" said the countryman. "Well, no wonder he's crazy!"

The New Committee Chairmen

OF THE 22 REGULAR and 2 special committees of the American Railway Engineering Association, 7 are headed by new chairmen this year, including the two new regular committees, Nos. 21 and 22, on Economics of Railway Operation, and Economics of Railway Labor.

F. R. Layng owes his position as head of the Tie committee to his long and active service with that body, of which he was vice-chairman for two years and has been a chairman of a sub-committee for several years. As engineer of track on the Bessemer & Lake Erie, the road with the heaviest ton mileage per mile of main track of any railway in the United States, he commands distinction as being in charge of tracks containing more steel ties than are to be found on any other line. In fact, he has been largely responsible for the development of these ties in actual service. This has made him of special value in connection with the work of the sub-committee on substitute ties. Mr. Layng is a close and critical student, who develops an unbounded enthusiasm for any subject he investigates. One of his hobbies, if it may be called such, is the care of laborers. He has been a pioneer in the movement for better living and working conditions for maintenance of way employees.

Joseph Mullen is a good man for the head of the Committee No. 12 on Rules and Organization, because he is himself a good organizer. Having been occupied until recently chiefly with construction projects, his friends say the success which has attended his various assignments are the result of his ability to build up an efficient and loyal organization, coupled with a faculty for sticking to a thing until he sees it through. A large part of his railway experience has been with the Cleveland, Cincinnati, Chicago & St. Louis, principally on construction work.

O. E. Selby, chairman of committee No. 15 of Iron and Steel Structures, is another Big Four man. While he bears the title of principal assistant engineer, he is essentially a bridge engineer, having carried that title for many years. Like all true bridge engineers, he is a man of technical attainment, a close student who must be thoroughly satisfied with his conclusions before he will commit himself. Given to scientific investigation, he has presented a number of valuable monographs both to this association and the American Society of Civil Engineers. He is primarily interested in bridge work in its various ramifications, but has also spent considerable time in studies of the mechanics of track.

Committee No. 16 on Economics of Railway Location has experienced some rather turbulent times during the last two or three years, as a result of which its reports at recent conventions have been marked by brevity and have been not infrequently supplemented by emphatic minority reports. In the light of this experience it is a curious fact that, under the leadership of a new chairman, R. N. Begien, it has presented no report at all. Be that as it may, the new head of the committee is eminently fitted for the position. At present general manager and formerly chief engineer of the Baltimore & Ohio and previously occupying various other engineering and operating positions with that road, he has been wont to view engineering problems from the operating standpoint, while using engineering knowledge in the solution of operating problems. He has been an active member of this committee and has contributed several valuable reports on special investigations conducted under his direction, among which may be mentioned

Dynamometer Tests on the Baltimore & Ohio, appearing in Volume 14 of the Proceedings.

E. B. Katte, the new chairman of committee No. 18 on Electricity, is well known because of his connection with the electrification of the New York Central lines into New York City. The fact that he succeeds Geo. W. Kittredge, chief engineer of the New York Central, would seem to give some ground for the impression that the New York Central had a monopoly on chairmanships of this committee, particularly since there is still other

Southwestern, but he had hardly entered upon his new duties with this committee before the call of his country led him to join the Twelfth Engineers as a captain. It is understood that Captain Green has since been detached from his company and is at present acting superintendent in army transport service at one of the important ports in France. Although the son of a railway officer and an engineer by training, Captain Green commenced his railway career as a laborer with the Rock Island, working up through various positions in the oper-



New Committee Chairmen

F. W. Green
E. B. Katte

F. R. Layng
E. R. Lewis

R. N. Begien
O. E. Selby

good N. Y. C. timber in its personnel which will be available when Mr. Katte sees fit to give up the chairmanship. Mr. Katte comes from an engineering family. His father, the late Walter Katte, was chief engineer of the New York Central and Hudson River Railroad for 13 years and was known to engineers of the middle west as one of the founders of the Western Society of Engineers. Edwin B. Katte has been a hard-working member of the Electricity committee for a number of years, and it should make material progress under his leadership.

The new committee on Economics of Railway Operation was headed appropriately by an operating man, F. W. Green, assistant to the president of the St. Louis

ating department to the post he gave up to enter the service of the government.

The fundamental importance of the labor problem confronting the railways during the past year which promises even grayer consequences during the coming season, made it eminently fitting that the Board of Direction should provide for a new committee on the Economics of Railway Labor, and the wisdom of the directors in the appointment of F. R. Lewis as chairman, is no less certain. Mr. Lewis is probably as well known as a writer on railway subjects as through his position as assistant to the general manager of the Duluth, South Shore & Atlantic. Commencing his railway career as a rodman on the Missouri Pacific in 1885, his experience

has carried him to most of the states in middle west and southwest, with two years on United States government work on the Mississippi river and six years on the Cape Government railways of South Africa. From 1906 to

1912 he was a division engineer on the northern lines of the Michigan Central and since that time he has been largely occupied in fighting the rigorous winters of upper Wisconsin and Michigan.

Annual Meeting of Appliances Association

President Bell's Address. M. J. Trees Elected President, P. C.
Jacobs, Vice-President. Good Exhibit Showing

The tenth annual meeting of the National Railway Appliances Association was held in the Coliseum at 11 o'clock yesterday morning. E. H. Bell, president of the association, presided. In his address Mr. Bell said in part:

President Bell's Address

"Your directors and officers have had to meet many unusual and difficult problems in connection with carrying on the work of your association during the past year. We feel that our decision to hold our exhibition this year has been more than justified.

"It is unnecessary for me to recite the obvious uncertainty existing in all lines of commercial endeavor throughout our country during the past year.

"The industries of our exhibitors and members, representing devices and material used in the maintenance and construction of railroads, can only be considered as an extremely important factor in aiding our government in the prosecution of the war. We contribute to the efficiency and economy of the great transportation systems of this country. My conclusion, therefore, is that there is no reason to apologize for being here today, for, if we served a good purpose in pre-war times, we certainly can be of great service now.

"Our treasurer will give you his detail report on finances. However, I wish to say that during these uncertain times we should, in my opinion, feel grateful to our past officers and directors, who have, in years gone by, gradually built up and handed down to us a cash surplus which has placed us in a position where we can feel that our association could operate under adverse conditions for some time without financial embarrassment. In my opinion this surplus should be maintained.

"I have mentioned that we had a cash surplus, and when the second issue of Liberty Loan bonds, bearing 4 per cent per annum, was announced, your board of directors voted that it was not only advisable, but patriotic, for our association to invest in some of these bonds. Therefore, \$2,000.00 of these bonds were purchased.

"This year, in order to improve the harmony in color and to give a general lighter effect in the Coliseum, we changed the color of the fence from black to a gold bronze and repainted the bodies of the upright posts to harmonize. I believe that you will agree that the effect is pleasing. All of the flags decorating the ceiling are new. You will see that the balcony has been hidden by a bunting decoration. The same general scheme has been carried out in the annex, as we found that last year's decorations could not be materially improved upon.

"The attendance for the 1917 Exhibition was as follows:

Monday	3,442
Tuesday	5,907
Wednesday	7,509
Thursday	5,494
Total	22,352

"Many of us do not come into close contact with, and cannot, therefore, full appreciate the enormous amount of detail work necessary in carrying on the work of this association in efficiently preparing for the annual exhibition. Everything you need from the time your exhibit reaches the front door of the Coliseum is furnished you by your association or by reliable concerns who are responsible to your association for their work, and I feel that it is only fair to lay stress on the fact that your Director of Exhibits, Mr. Kelly, is entitled not only to the credit, but the thanks of this association for his most efficient work.

"I wish also to express my great appreciation to the board of directors and the executive board for their cooperation in handling the work of this association during the past year.

"I take this occasion to thank the enrollment committee under the direction of Mr. Kuerst of the Detroit Graphite Company for the efficient results they have accomplished."

Treasurer's Report

Secretary-Treasurer Kelly, in his report as treasurer, made the following report:

Cash on hand May 1, 1917, after charging for 1917 exhibit bills paid in 1918		\$15,752.75
Receipts for 1918 business:		
From memberships	\$ 4,727.50	
From space rentals	24,982.31	
From interest on deposits	496.20	
	\$30,206.01	
Estimated additional receipts	860.43	\$31,066.44
(This income is an increase over 1917 of \$2,405.27.)		
Expenditures for 1918 business:		
General supervision	\$ 1,050.06	
Estimated additional	324.18	1,374.24
Administration	6,205.76	
Estimated additional	446.67	6,652.43
Exhibition	7,796.53	
Estimated additional	11,856.92	19,653.45
Total estimated expenditures		\$27,680.12
(Which is \$3,955.23 over 1917.)		\$ 3,386.32

Would advise that the cash balance on hand of the Association up to and including March 16, 1918, is as follows:

Certificates of deposit in National City Bank	\$27,000.00
Liberty Loan	2,000.00
Accrued interest on above	406.67
Cash in hands of treasurer	600.00
Checking account, National City Bank	874.24
Total	\$30,885.91

Secretary's Report

In his report as secretary, Mr. Kelly said:

"Applications for membership and space were sent out as usual, accompanied by bulletin No. 10 and floor plan. The meeting of the board of directors for the assignment of space was held on November 12, 1917, with the result that the entire official floor space plan was filled with the exception of ten spaces, even though our floor plan arrangement affords us 31 more spaces this year than last, there having been 236 last year against 267 this year.

"Of the 267 spaces, 209 are occupied today by 119 of our 1917 exhibitors and 36 by new exhibitors, making a total number of exhibitors this year, 155.

"The annual invitations and passes were all prepared and ready for mailing, but owing to unsettled conditions were withheld until February 15, at which time 12,800 were mailed to a well selected list of railroad men, from presidents to roadmasters, on steam and electric lines; also to members of the American Railway Engineering Association, the Signal Association, Interstate Commerce Commission Engineering, staff of technical colleges and to many of the well-known railway contracting concerns. To these invitations we received acknowledgements equal to any former year, and requests for passes were in excess of former years. As a matter of fact, requests for passes have been larger in proportion from the railway people this year than from the supply concerns.

"We have taken great pains this year to thoroughly cleanse and prepare the dining room, and feel that we can personally guarantee the character of the supplies and foodstuffs to the extent that we would like to ask that as much as possible you patronize the cafe, so that we may keep the people in the building rather than invite them to some downtown restaurant which takes them away from our exhibits, which we have been planning for the last twelve months for their entertainment.

"I feel that the proposition of work orders is one which should be given some attention at this time and would like to ask the co-operation of each of our exhibitors to the extent that they help the work order cashier check up the work orders and get the accounts paid as quickly as possible so that we may have all our accounts in a good, clear manner at the earliest possible moment.

"The exit passes will be used this year the same as before, and will be issued to the exhibitor at the work order office by the cashier when paying the final bills.

"Kindly see that all parcels which you expect to take from the building are placed on your exit pass, as this will be your receipt to the association for the return of your exhibit.

"We will arrange to have bills of lading, both of freight and express for your convenience in shipping your exhibit from the Coliseum. The bills of lading and freight office will be in charge of Mr. Wertz of the Taft Carriage Company, who may be found at the secretary's office immediately after the close of our exhibition."

Election of Officers

The nominating committee, of which F. A. Poor was chairman, reported the following nominations for officers, and the nominees were unanimously elected:

President, Merle J. Trees, Chicago Bridge & Iron Works, Chicago.

Vice-President, P. C. Jacobs, Johns-Manville Co., Chicago.

Secretary-Treasurer, C. W. Kelly, Kelly-Derby Co., Chicago.

Directors for three years, T. W. Aishton, National Malleable Casting Co., Chicago; A. P. Van Schaick, Lackawanna Steel Co., Chicago.

Director for two years, L. W. Shugg, General Electric Co., Schenectady, N. Y.

On motion of N. M. Hench (Carnegie Steel Company), the board of directors was instructed to ascertain before January 1, 1919, the sense of the members of the association as to whether an exhibit should be held next year. It was felt that in view of present conditions unexpected changes might occur during the year. The board of directors retains authority to actually decide the matter.

A. R. E. A. Registration

Abbott, F. L., Insp. Eng., Lackawanna Steel Co., Buffalo, N. Y.
 Albright, C. C., Asso. Prof. C. E. Purdue Univ., Lafayette, Ind.
 Angerer, Victor, President, Wm. Wharton Jr. & Co., Inc., Easton, Pa.

Angier, F. J., Supt. Tim. Pres., B. & O. R. R., Baltimore
 Anthony, F. D., Const. Eng., D. & H. Co., Albany, N. Y.
 Armour, Robert, Masonry Eng., Grand Trunk Ry., Montreal, Can.

Armstrong, H. J., Asso. Prof. C. E., Armour Inst., Chicago, Ill.
 Bailey, A. R., Asst. Prof., Univ. of Mich., Ann Arbor, Mich.
 Baisinger, W. C., Office Engineer, Santa Fe Railway, Chicago, Ill.

Baldrige, C. W., Asst. Eng., A. T. & S. F. Ry., Chicago.
 Baldwin, A. S. (Past-President), Chief Engineer I. C. R. R., Chicago, Ill.

Baldwin, Hadley, Asst. Ch. Eng., C. C. C. & St. L. Ry., Cincinnati, O.

Baldwin, Springfield, Val. Eng., Trinity & Brazos Valley Ry., Teague, Texas.

Balliet, H. S., Assistant Terminal Manager, Gr. Cen. Ter., and Sig. Eng., N. Y. C. R. R., New York.

Baluss, F. C., Eng. B. and B., D. M. & N. Ry., Duluth, Minn.

Bardwell, R. C., Asst. Engineer, M. P. R. R., St. Louis, Mo.
 Barnes, W. C., Asst. Con. Eng., Son. Pac. Co., New York.

Bayer, F. J., Asst. Eng., Big Four Ry., Galion, Ohio.

Beckett, F. T., Eng. M. of W., C. R. I. & P. Ry., El Reno, Okla.

Begler, Edwin J., Con. Eng., Westinghouse, Church, Kerr & Co., New York.

Blaklock, M. S., Eng. M. of W., Grand Trunk Ry., Montreal, Canada.

Bloecher, Theo., Jr., Div. Eng., B. & O. R. R., Philadelphia, Pa.

Blum, Bernard, Div. Eng., Nor. Pac. Ry., St. Paul, Minn.

Boardman, H. E., Asst. Eng., Val. Dept., N. Y. C. Lines, New York, N. Y.

Boots, E. W., Asst. Eng., P. & L. E. R. R., Pittsburgh, Pa.

Bowser, E. H., Supt. Timber Dept., I. C. R. R., Memphis, Tenn.

Boyd, James, Div. Eng., G. T. Ry., Hamilton, Ont., Canada.

Bragg, R. R., Div. Eng., C. R. I. & P. Ry., Eldon, Mo.

Bremner, Geo. H. (Treasurer), District Engineer, Bureau of Valuation, Interstate Commerce Commission, Chicago.

Bridgman, J. N., Asst. Prof., C. S., Univ. of Nebraska, Lincoln, Neb.

Briggs, Z. M., Asst. Eng., Penn. Lines, Pittsburgh, Pa.

Brown, H. C., Jr., 37 West Van Buren St., Chicago.

Brown, J. M., Rock Island Lines, Eng. Dept., Chicago, Ill.

Brown, R. K., Eng. Maint., L. A. & S. L. R. R., Los Angeles, Cal.

Browne, H. L., Asst. Eng., Rock Island Lines, Cedar Rapids, Ia.

Brumley, D. J., Valuation Engineer, I. C. R. R., Chicago, Ill.

Budd, Ralph, Exec. Vice-Prest., Great Nor. Ry., St. Paul, Minn.

Buchler, Walter, Con. Eng. Wood Pres., Barrett Co., Chicago, Ill.

Burns, J. F., Asst. Eng. M. W., L. & N. R. R., Louisville, Ky.

Burpee, Moses, Ch. Eng., B. & A. R. R., Houlton, Me.

Burrell, Chas. F., Eng. M. of Way, K. & I. T. R. R., Louisville, Ky.

Burt, A. M., Chief Eng. M. W., N. P. Ry., St. Paul, Minn.

Burton, W. J., Asst. Eng., Mo. Pac. R. R., St. Louis, Mo.

Campbell, J. L., E. M. W., E. P. S. W. Ry. System, El Paso, Tex.

Chenworth, C. J., Asst. to Third V.-P., A. C. L., Wilmington, N. C.

Christian, W. A., Senior Civil Engineer in charge of Track and Roadway, I. C. C., Chicago, Ill.

Christofferson, C. A., Signal Eng., N. P. Ry., St. Paul, Minn.

Church, S. R., Man. Research Dept., The Barrett Co., New York City.

Churchill, Chas. S. (Past-President), Asst. to Pres. Norfolk & Western Ry., Roanoke, Va.

Clark, W. A., Chief Engineer, D. & I. R. R. R., Duluth, Minn.

Clements, M. F., Bridge Eng., Nor. Pac. Ry., St. Paul, Minn.

Cleveland, G. C., Chief Eng., N. Y. C. R. R., West of Buffalo, Cleveland, O.

Condon, T. L., Consulting Engineer, Monahan Block, Chicago.

Coon, C. J., Eng., Gr. Cen. Term. N. Y. C. R. R., New York.

Courtenay, W. H. (Director), Chief Engineer I. C. R. R., Louisville, Ky.

Cox, J. B., Consulting Engineer, Chicago, Ill.

Crane, F. B., Asst. Eng., C. M. & St. L. Ry., Chicago.

Crompton, Arthur, Asst. Val. Eng., G. T. Ry., Montreal, Can.

Curd, W. C., Locomotive Co., Memphis, Tenn.

Curtis, I. G., Dist. Eng., B. & O. C. T. R. R., Chicago, Ill.

Cushing, W. C. (Past-President), Ch. Eng. M. of W., S. W. Sys., Penna. Lines, Pittsburgh, Pa.

Cutler, A. S., Asst. Prof. Ry. Eng., Univ. of Minn., Minneapolis, Minn.

Dansey, J. W., Asst. Eng., A. T. & S. F. Ry., Chicago, Ill.

Darden, W. J., Consulting Engineer, St. Paul, Minn.

- Darling, F. S., Boston, Mass.
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- Deimling, J. F., Acting Ch. Eng., M. C. R. R., Detroit, Mich.
- Denney, C. E., Asst. to Prest., N. Y. C. & St. L. R. R., Cleveland, Ohio.
- Dewees, A. R., Div. Eng., P. M. R. R., Saginaw Mich.
- Dick, H. B., Dist. Val. Eng., B. & O. R. R., Cincinnati, Ohio.
- Dodgson, F. L., Con. Eng., Gen. Ry. Sig. Co., Rochester, N. Y.
- Dorley, A. F., Eng. M. W., East. Lines, M. P. R. R., St. Louis, Mo.
- Douglas, H. T., Jr., Chief Eng., C. & A. R. R., Chicago.
- Downs, L. A. (Director), Gen. Supt., Ill. Cen. R. R., Chicago, Ill.
- Dufour, F. O., Structural Eng., Stone & Webster Eng. Corp., Boston.
- Duncan, K. B., Val. Eng., A. T. & S. F. Ry., Topeka, Kan.
- Edgerton, H. H., Asst. Eng., C. G. W. R. R., Chicago, Ill.
- Edmondson, G. N., Div. Eng., N. Y. C. R. R., Rochester, N. Y.
- Elder, J. D., Div. Eng., M. C. R. R., Niles, Mich.
- Elliott, W. H., Signal Eng., N. Y. C. R. R., Albany, N. Y.
- Ellis, G. E., Sig. Eng., Div. of Safety, I. C. C., Washington, D. C.
- Elmore, J. T., Div. Eng., S. A. L. Ry., Raleigh, N. C.
- Entwisle, E. D., Ch. Eng., J. & S. C. R. R., Johnstown, Pa.
- Ericson, E. G., Prin. Asst. Eng., N. W. Sys. Pa. Lines, Pittsburgh, Pa.
- Fair, J. M., Supv., Penna. R. R., Philadelphia, Pa.
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- Faucette, W. D., Chief Engineer, S. A. L. Ry., Norfolk, Va.
- Felt, C. W. F. (Director), Chief Engineer, Santa Fe Railway System, Chicago.
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- Forrester, Charles, Supt., G. T. Ry., London, Ont., Can.
- Fox, J. W., Val. Eng., C. of G. Ry., Savannah, Ga.
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- Lahmer, J. A., Drainage Engineer, M. P. R. R., St. Louis, Mo.
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- Larsen, Albert, Res. Eng., S. N. E. Ry., Providence, R. I.
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- Lee, E. H., Vice-Prest. and Ch. Eng., C. & W. I. R. R., Chicago.
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- Lindsay, C. E. (Director), Div. Eng., New York Central R. R., Albany, N. Y.
- Little, J. G., Asst. Eng. Editor, Ry. Age, New York City.
- Long, M. A., Asst. to Ch. Eng., B. & O. R. R., Baltimore, Md.
- MacFarland, H. B., Eng. of Tests, A. T. & S. F. Ry., Chicago.
- Maney, Thomas, Gen. Roadmaster, L. & N. R. R., Louisville, Ky.
- Mann, B. H., Signal Eng., Mo. Pac. R. R., St. Louis, Mo.
- Markley, A. S., Master Carpenter, C. & E. I. R. R., Danville, Ill.
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- Morrison, W. W., Eng. M. W., P. S. & N. Ry., Kittanning, Pa.
- Morse, C. A. (First Vice-President), Ch. Eng., C. R. I. & P. Ry., Chicago, Ill.
- Motley, P. B., Eng. Bridges, C. P. R., Montreal, Can.
- Murr, L. A., Asst. Eng., S. A. L., Portsmouth, Va.
- Neff, F. H., Prof. C. E. Case School Appl. Sci., Cleveland, O.
- Nelson, J. C., Eng. M. W., S. A. L., Norfolk, Va.
- Newbegin, P. C., Maint. Eng., B. & A. R. R., Houlton, Me.
- O'Donnell, J. E., Asst. Eng., S. N. E. Ry., Providence, R. I.
- Ogle, W. F., Draftsman, C. R. I. & P. Ry., Chicago, Ill.
- Olson, E. H., Asst. Eng., A. T. & S. F. Ry., Chicago, Ill.
- Oren, F. B., Roadmaster, I. C. R. R., Mattoon, Ill.
- Orr, D. K., Chief Engineer, Monongahela R. R., Brownsville, Pa.
- Otto, J. A., Eng. Dept., Santa Fe Ry., Fort Madison, Iowa.
- Palmer, G. P., Div. Eng., B. & O. C. T. R. R., Chicago, Ill.
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- Palmer, H. A., Asst. Land Commr. G. T. R. R., Montreal, Can.
- Patenall, F. P., Signal Eng., B. & O. R. R., Baltimore, Md.
- Patterson, J. C., Office Eng., Erie R. R., New York.
- Peabody, J. A., Signal Eng., C. & N.-W. Ry., Chicago, Ill.
- Pence, W. D. (Director—Editor of Publications), Member Eng. Board, Interstate Commerce Commission, Chicago, Ill.
- Perkins, L. M., Eng. M. W., N. P. Ry., Tacoma, Wash.
- Petri, Philip, Dist. Eng. M. W., B. & O. R. R., Pittsburgh, Pa.
- Pfeifer, H. J., E. M. W., Ter. R. R. Assn., St. Louis, Mo.
- Phillips, H. C., Gen. Secretary, Prest. Conf. Committee, Philadelphia.
- Pickles, J. L., Ch. Eng., D. W. & P. Ry., West Duluth, Minn.
- Pittman, T. M., Jr., Asst. Eng., Ill. Cen. R. R., Chicago, Ill.
- Reagan, J. H., Supt. Track, Grand Trunk Ry., Chicago.
- Redgrave, W. B., Dist. Eng. M. W., B. & O. R. R., St. George, S. I., N. Y.

- Reid, J. W. (In Military Service.)
 Reumann, Robert, Asst. Engr., B. & O. R. R., Relay, Md.
 Reinholdt, J. H., Ch. Eng., M. & St. L. R. R., Minneapolis, Minn.
 Rhea, Frank, Saltburg, Pa.
 Rice, S. B., Eng. M. W., R. F. & P. R. R., Richmond, Va.
 Richardson, C. P., Asst. Engr., C. R. I. & P. Ry., Chicago, Ill.
 Ridgway, A. O., Asst. Ch. Eng., Denver & Rio Grande R. R., Denver.
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 Schram, I. H., Div. Engr., Erie R. R., Youngstown, Ohio.
 Selby, O. L., Prin. Asst. Engr., C. C. C. & St. L. Ry., Cincinnati, Ohio.
 Shaver, A. G., Con. Elec. and Sig. Engr., Chicago.
 Shields, A. C., Div. Engr., C. R. I. & P. Ry., Trenton, Mo.
 Sills, J. M., Dist. Engr., St. L. & S. F. R. R., Springfield, Mo.
 Simmons, I. L., Bridge Engr., C. R. I. & P. Ry., Chicago, Ill.
 Sisson, F. P., Asst. Engr., Grand Trunk Ry., Detroit, Mich.
 Slobotsky, Harry, Asst. Supt., S. P. Co., Lafayette, Ia.
 Slibeck, G. J., Ch. Engr., Pettibone, Mulliken Co., Chicago.
 Sloggett, L. O., Val. Dept., Ill. Cent. R. R., Chicago.
 Smith, A. Bromley, Asst. Engr., C. P. R., Montreal, Can.
 Smith, D. W., Val. Engr., Hocking Valley Ry., Columbus, O.
 Smith, G. L. G., Rail & Track Insp., Nor. Pac. Ry., St. Paul, Minn.
 Smith, Huntington, Div. Engr., N. Y. C. & St. L. R. R., Cleveland, O.
 Smith, J. E., Asst. Prof. C. E., Univ. of Ill., Urbana, Ill.
 Sparrow, L. L., Office Engr., A. C. L., Wilmington, N. C.
 Spielmann, J. A., Asst. to Gen. Supt., B. & O. R. R., Pittsburgh, Pa.
 Spittstone, C. H., Engr. Const., Erie R. R., New York City.
 Stafford, S. C., Eng., L. & N. W. R. R., Homer, La.
 Starbuck, R. D., Asst. Gen. Man., N. Y. C. R. R., Cleveland, Ohio.
 Stark, C. W., Asso. Editor, Engineering News-Record, New York City.
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 Stocker, J. A., Ch. Engr., Toledo & Ohio Cen. Ry., Columbus, Ohio.
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 Strong, J. B., Vice-Pres., Ramapo Iron Works, Hillburn, N. Y.
 Stuart, H. B., Struct. Engr., Grand Trunk Ry., Montreal, Can.
 Sullivan, John G. (President), Chief Engineer, Western Lines, Canadian Pacific Railway, Winnipeg, Man., Canada.
 Swartz, Albert, Vice-Pres., T. & W. R. R., Sylvania, Ohio.
 Talbot, A. N. (Director), Prof. Mun. & San. Eng., U. of Ill., Urbana, Ill.
 Taylor, F. J., Div. Engr., Nor. Pac. Ry., Livingston, Mont.
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 Watt, J. R., Gen. Roadmaster, L. & N. Ry., Louisville, Ky.
 Weaver, C. F., Encl. M. of Way, C. of Ga. Ry., Savannah, Ga.
 Weir, John M., Ch. Engr., K. C. Sou. Ry., Kansas City, Mo.
 Wendt, Edwin F. (Past-President), Member Eng. Board, Interstate Commerce Commission, Washington, D. C.
 Wharf, A. J., Chief Engineer, P. & P. C. Ry., Peoria, Ill.
 Wheeler, F. S., Div. Engr., Erie R. R., Buffalo, N. Y.
 Wickhorst, M. H., Engr. of Tests, Rail Committee, Chicago, Ill.
 Wilgus, W. J. (in military service.)
 Williams, A. P., Div. Engr., B. & O. R. R., Council Bluffs, Ia.
 Williams, S. N., Professor Emeritus of Civil Engineering (Cornell College, Iowa), Oak Park, Ill.
 Wilson, A. O., Div. Engr., S. A. L., Charleston, S. C.
 Wilson, W. W., Div. Engr., G. C. & S. F. Ry., G. Leaton, Tex.
 Wiltsee, W. P., Asst. to Ch. Engr., N. & W. Ry., Roanoke, Va.
 Wirth, A. A., Supr. Engr., Penna. Lino., Pittsburgh, Pa.
 Wishart, J. G., Office Engr., C. R. I. & P. Ry., Chicago.
 Wonson, S. L., Bridge Engr., M. P. E. P., St. Louis, Mo.
 Worthing, E. E., Signal Engr., Sou. Pac. Co., Houston, Texas.
 Yager, Louis, Engr. M. of Way, N. P. Ry., St. Paul, Minn.
 Young, R. C., Chief Engineer, L. S. & I. and Montreal Ry., Marquette, Mich.
 Ziegweid, A. B., Senior Civil Engr., Bureau of Val., I. C. C., Chicago.

Guests

- Anderson, J., Div. Engr., A. T. & S. F., Marechal, Mo.
 Anderson, B. T., Asst. Sig. Engr., D. L. & W., Hoboken, N. J.
 Ahlbrandt, G. F., Am. Rolling Mill Company
 Bonner, J., Supervisor, C. of Ga., Opelika, Ala.
 Barth, Kurt C., The Barrett Co., 1200 Otis Bldg., Chicago.
 Butler, J. J., Asst. to Gen. Mgr., C. & A., Bloomington, Ill.
 Ball, Edgar E., Div. Engr., A. T. & S. F., Fresno, Cal.
 Bradford, W. M., Bridge Building Supervisor, N. P., Livingston, Mont.
 Bond, L. H., Asst. Eng. M. of W., I. C., Chicago.
 Bolin, W. C., Pilot Engr., B. & O., Chicago.
 Bramon, C., Div. Eng., C. & E. L., Evansville, Ind.
 Buente, C. F., Pittsburgh, Pa.
 Ballard, E. E., Draftsman, A. T. & S. F., 1033 Railway Exchange, Chicago.
 Bebb, J. E., Asst. Bridge Engr., M. C., Detroit, Mich.
 Ball, R. B., Eng. Grand Div., A. T. & S. F., Los Angeles, Cal.
 Clark, M. B., Div. Eng., A. T. & S. F., Needles, Cal.
 Coleman, F. J., G. F., London, Ont.
 Coryell, G. E., Bridge Insp., M. C., Detroit, Mich.
 Dickinson, F., Supr. Bridges and Buildings, Walsh, Peru, Ind.
 Davis, M. B., Asst. Eng., I. C., Chicago.
 Elliott, L. Z., Eng. M. of W., C. C. C. & St. L., Minneapolis, Minn.
 Fraser, W. R., Asst. Eng., G. T., Allandale, Ont.
 Fish, R. H., Div. Supt., G. T., Detroit, Mich.
 Ferguson, H., Supt. Track, G. T., Toronto, Ont.
 McGuigan, J. F., Roadmaster, St. L.-S. F., St. Louis, Mo.
 Grant, John, Supervisor, L. E. N. E.
 Goldstraw, W., Architect, G. T., Montreal, Que.
 Gibson, F. W., Asst. Eng., Walsh, Peru, Ind.
 Gordon, H. J., Secy. to Ch. Eng., G. T., Montreal, Que.
 Gullickson, Gus, Roadmaster, N. P., Forsyth, Mont.
 George, E. C., Genl. Foreman Bridges and Buildings, G. C. & S. F., Beaumont, Tex.
 Goos, Julius H., Insp. Engr., Gt. N., St. Paul, Minn.
 Gray, B. L., Asst. Engr., C. R. I. & P., Des Moines, Ia.
 Hardiman, Wm., Genl. Foreman Bridges and Buildings, D. L. & W., Binghamton, N. Y.
 Holden, N. S., Field Eng., B. & O., Baltimore, Md.
 Hemmenway, E. O., Draftsman, A. T. & S. F., Chicago.
 Hovey, M. H., Consulting Engineer, Madison, Wis.
 Hayes, S. W., Hayes Track Appliance Co., Richmond, Ind.
 Hubbard, J. W., President Genl. Switch Co., Eau Claire, Wis.
 Henderson, S., Supt., C. & A., Bloomington, Ill.
 Holtman, Dudley F., I. C., Chicago.
 Hunter, J. W., Div. Eng., C. & E. I., Danville
 Horton, W. D., Patton Paint Co., Milwaukee, Wis.
 Kircher, Paul, Chicago.
 Love, H. J., Cleveland, Ohio.
 Little, P. R., Asst. Eng., G. T., Battle Creek, Mich.
 Lowther, W. H., Div. Engr., O. S. L., De at Ho, Idh.
 O'Leary, J., Asst. Eng. M. of W., Gt. N., Minneapolis, Minn.
 Mount, H., Asst. Engr., G. T., Ottawa, Ill.
 Miller, H. E., Asst. Eng., S. N. F., Peoria, Ill.
 McNul, J. E., Insp. Track and Roadway, A. T. & S. F., Los Angeles, Cal.
 Mead, J. C., M. C., Detroit, Mich.
 Miller, S. D., Chief Draftsman, A. T. & S. F., Amarillo, Tex.
 Mensch, Leopold J., Chicago.
 Neff, P. F., Dist. Engr., St. L.-S. F., Springfield, Mo.
 Nicholson, E., Montreal, Can.
 Nordquist, Wm., Roadmaster, N. P. R. R., Bozeman, Mont.
 Pease, B. S., Chicago.
 Rieker, O., Genl. Roadmaster, M. P., Monroe, La.
 Rist, Cha., J., Div. Engr., Penn. Marquette, Saginaw, Mich.
 Rickardt, C. A., Div. Engr., C. R. I. & P., Harbyville, Okla.
 Swartzell, Wm. C., Asst. Engr., M. P., Chicago.

Stewart, Geo. T., Asst. Eng., C. R. I. & P., Chicago.
 Scharbach, Z. F., Asst. Eng., D. L. & W., Binghamton, N. Y.
 Lindstrand, J. A., Interstate Commerce Commission, Chicago.
 Siegnes, W. A., G. T., Stratford, Ont.
 Trumbull, R. F., Std. Asphalt & Refining Co., Chicago.
 Teller, C. B., Roadmaster, C. R. I. & P., Ft. Worth, Tex.

Ventsbury, B. R., Cleveland Tractor Co., Cleveland, Ohio.
 Wharry, Wm., Supt. of Tract, G. T., Stratford, Ont.
 Webster, J. W., Val. Eng., E. I. & E., Joliet, Ill.
 Ware, H. M., Inst'man, G. T., Grand Rapids, Mich.
 Warwork, Chas., Montreal.
 Weymouth, F. A., Bethlehem, Pa.

Railway Night at the Western Society of Engineers

Three Discussions of the Material Situation and an Account of Labor Conditions in the Orient

“**R**AILWAY NIGHT” at the rooms of the Western Society of Engineers was a decided success. About 200 members and guests were present, among whom were included a considerable number of the members of the American Railway Engineering Association. Three general classes of materials were covered, namely, steel, timber and concrete, separate talks being given by representatives from each industry. Following these addresses a paper was presented by Frank Rhea on the labor situation in the Orient.

The Structural Steel Industry

F. J. Llewellyn, Division contracting manager, American Bridge Company, Chicago, presented the situation in the steel industry. He stated that the problem of the war was to turn gold into steel. The steel productive capacity of the world at the present time is 100,000,000 tons per annum, of which one-half is produced in the United States. Of this total 16,000,000 tons capacity has been added since the war began. Because of unfavorable weather early this year, about 10 per cent of this year's output has been lost, but conditions are improving and the mills are now approaching capacity production.

The car shortage has been the most serious obstacle encountered. The labor shortage has also interfered, but has not been at all serious. However, with the drain to result from the new draft requirements it is impossible to say what the condition will be later on in the year. In anticipation of this drain, boys of 17 and 18 are being trained to take the places of men. The speaker pointed out that the steel industry could claim no exemption on men except in cases where the work on which they were engaged held an A-1 priority order.

It is the opinion of the speaker that 50,000,000 tons of steel is more than can be made use of by manufacturers of this country, so there should be sufficient available to supply all reasonable needs. He believed that the fabricating shops of the middle west could readily take care of 100,000 to 150,000 tons of work in bridges and buildings this season. In conclusion he stated that the catching up process was now under way, but pointed out that the first consideration in any case was the supplying of any requirements that would help to win the war.

Timber Situation Improving

The conditions in the lumber market were presented by Herman Von Schrenk, consulting timber engineer, St. Louis, Mo., who expressed pleasure at being able to present a much more optimistic message last night than would have been possible two weeks ago. The situation has been gradually improving since the first serious congestion following the large orders placed by the Government when war was declared.

The industry has suffered from three principal ob-

stacles, car supply, labor shortage and determination of priority. The supply of lumber in the country is enormous, and the fears for a lumber famine repeatedly expressed 10 to 15 years ago have been discredited. The supply of southern pine is estimated at 350 billion ft. b. m., while the amount of uncut timber on the west coast is much greater.

In both the southern and the western fields there was a sharp congestion following the placing of the first government orders, but the rate of production was increased rapidly and 750,000,000 ft. b. m. of southern pine was supplied in the first nine months of the war. The demand resulted in embargoes of two kinds—restrictions as to sizes and curtailing of shipments for domestic use. In the South, the lumbermen were not allowed to dispose of any timbers 12 in. by 12 in. or larger. In the West the restriction covered any piece 12 in. on any face. The southern pine restrictions have been modified somewhat and the condition has been improved also by the use of laminated timbers.

The supply of the smaller sizes of lumber is ample, partly through their incidental production in the manufacture of larger sticks, and partly through a curtailing of the private building operations since the opening of the war. The hardwood industry has been more largely restricted and the market is in what may be termed a “receptive attitude.”

Conditions in the Cement Industry

By B. F. AFFLECK

President Portland Cement Association, Chicago.

The cement plants of the United States have a capacity of about 120,000,000 bbls. of Portland cement annually. The maximum year's consumption, (in 1916) was 94,552,296 barrels. Under ordinary conditions all of the producing capacity can probably never be employed in any one year because at no time is it likely that normal conditions as affecting production, labor and the use of cement will prevail throughout the entire country.

From the foregoing statement it will readily be seen that the engineer in charge of railroad or other construction will have no difficulty in obtaining all of the Portland cement he may need provided cement makers are able to obtain material, labor, fuel, transportation and the numerous other smaller but none the less essential supplies.

Although the Portland Cement Association carefully refrains from any activities relating to prices or commercial transactions, I think I may with propriety say that the cost of making cement has been rising steadily at all or nearly all plants for many months. Wage rates have increased very substantially and, as is often the case, labor efficiency has diminished and the cost of fuel, explosives, material, repair parts, in fact everything entering into the production of cement has advanced so that while cement prices are now about as high as, or higher

than for some 12 or 15 years, the net return to most companies is quite meagre, and is likely to be, unless prices are advanced. Another cause contributing largely to this result is the fact that production and shipments at most plants are very much below normal, the statistics showing shipments from all plants in the United States for January and February to have been 31 per cent less this year than last. Production is curtailed because of inability to obtain material, fuel and labor, and shipments are curtailed by reason of inability to obtain cars. There is apparently a desire on the part of the cement user to use a normal quantity of cement but this desire does not materialize into actual demand for various reasons.

Of these reasons the railroad officer is chiefly concerned with those having a relation to railroad facilities and I give it as my judgment that most of our troubles are traceable to inadequacy of these facilities or, to state it more accurately, a sudden overloading of our transportation system. The railroads should not be blamed for this condition any more than we should blame a bushel basket because it will not hold a bushel and a half.

In the admirable article by Samuel O. Dunn, editor of the *Railway Age*, in *Colliers'* of March 9, he compares the two five-year periods ending with 1906 and 1916 and quotes James J. Hill, who in 1907 said that during the following five years there should be invested in railroad facilities, \$5,500,000,000 instead of which only \$1,500,000,000 was invested during the following nine years. On the basis of that reasoning the railroads are now about five years behind the country. He states further that until Government control was adopted, Government regulation compelled competition, thereby making it impossible to use existing facilities to the best advantage. This is not said in criticism of the railroads. They have, for the most part, undoubtedly been managed well and efficiently and had Government authority recognized their needs and permitted them to earn adequate revenue, there can be no doubt that large quantities of stocks and bonds would have been sold and the proceeds put into equipment, improvements, extensions and enlargement of facilities, and at a time when labor and material were both comparatively cheap and plentiful.

Cement, unlike other materials of construction cannot be used alone. For every ton of cement the builder must have from four to eight tons of sand, stone, pebbles, slag or brick, and while I can assure you that the cement makers can furnish all the cement you may need, provided cars, labor and materials are obtainable, it will do you no good unless the other materials are also available, and they are to a great extent dependent also on these same factors—cars, labor and material.

I will take advantage of this opportunity to say a word concerning the use of cement in bulk instead of in packages. It has been demonstrated conclusively on many works of various kinds that cement can be received and handled in bulk as readily as in packages, and in many instances with a considerable economy. The cement maker offers cement in bulk at a lower price than in packages, the difference representing substantially the saving to him in labor. There is another reason, however, why the cement user should receive cement in bulk if he possibly can. Cotton is about three times as high in price today as normally. The demands of our Government and the Allies are very large and the material is scarce. It will readily be seen that to wear out cotton cement sacks unnecessarily is not only an economic waste which should be prevented, but it tends further to advance the price of everything else made of cotton, thereby increasing the cost of conducting the war.

As far as railroad construction is concerned, I believe

it goes without saying that the Government now realizes so completely the necessities of the railroads that there will be a classification which will give this particular work a place very close to the head of the list. I need scarcely say that those in authority at Washington having complete responsibility for the railroads during the war desire their capacity increased and operation to be at maximum efficiency. This result cannot be accomplished without a great deal of new construction for which, if it is authorized, the Government will certainly arrange for necessary materials.

May I mention briefly two other means of transportation—highways and waterways. A very large percentage of the freight handled by rail has its initial or final movement, or both, over the highways. Practically all food and package freight belongs in this class. It seems to me the railroads should encourage the construction of good roads in every way possible. They supplement rather than compete with rail transportation. It is true that trucks are now handling much freight which under normal conditions would move by rail but this is for the most part short haul traffic which is unprofitable to the rail lines and on which they cannot, even in normal times, furnish as rapid service as the truck which can handle direct from store door to store door.

As to the waterways, it is doubtful if we can afford at this time to spend much money or effort in connection with the inland, artificial waterway of shallow draft. The results would be too small and the time consumed too long. The limitations of such waterways greatly reduces their value in relation to their cost. They serve only those immediately adjacent to them, others being under the necessity of getting their freight to and from the water's edge with rehandling often at both ends. The railroad has not that limitation.

Concerning the natural deep waterways, requiring a relatively small expenditure to make them available, while laws were passed divorcing steamship lines from railroad ownership or control, it is to be hoped that under Government operations such arrangements will be resumed as will enable the railroads to use steamboat connections to the best possible advantage.

This will, of course, necessitate the construction of ships, barges, and lighters for lake and harbor navigation. For this purpose, if it appears that there will not be an adequate supply of material or labor to build ships of steel or wood, it may be that relief may be had by turning to concrete. While the term concrete ship suggests cement this is something of a misnomer. The percentage of reinforcing steel in a concrete ship's hull is so large that I am told the actual cost of the steel bars in a concrete ship is about 12 times the cost of the cement. The largest vessel ever built of concrete and the only ocean-going concrete ship ever built in this country was launched at San Francisco last Thursday. The Portland Cement Association received by special messenger this morning a moving picture of the launching, which I believe you will be interested in seeing.

This ship was built by the San Francisco Shipbuilding Co. from designs by McDonald & Kahn of San Francisco. It is 336 ft. long, 141 ft. wide and 30 ft. deep. It was christened "Faith" and has a dead weight capacity of 5,000 tons. Immediately after launching, she was towed to the Union Iron Works for installation of engines, boilers and machinery and by June 1 will have made her trial trip.

In conclusion let me repeat the cement industry stands ready to meet any demands the railroads or the Government may make or to submit only to its ability to obtain coal, material supplies, transportation and labor.

Labor Conditions in Japan and China

By FRANK RHEA

United States Department of Commerce, Washington, D. C.

I have been asked to talk about the labor and economic conditions prevailing at present in China and Japan. I can only give you the benefit of my observations gathered in a period of seven months. There are two conditions which have been generally supposed to exist both in China and Japan, namely, that there are no limits to the amount of labor and time available for doing anything. This is still true in China, but the results of the war have changed the situation very materially in Japan, and I am satisfied that it is a fact that today there is a shortage of labor in almost every line of industry in Japan. It is possible that this is not as acute now as during the time when I was in Japan last year. The reason, if so, is on account of Japan not being able to obtain the necessary supplies of steel.

The purpose of my investigation was to ascertain the possible markets for railway materials, equipment and supplies, such as could be furnished by American manufacturers. My reports on Australia and China are taking somewhat of the form of reference reports and as a matter of fact my investigation was really one more of materials than of labor and economic conditions. However, after going over the matter in a preliminary way, in each country, I concluded that in order to report intelligently on the possibilities of the markets, it was necessary to study the labor conditions, the supplies of raw materials and the iron and fuel resources of the countries. Today the supply of steel is the problem which concerns Japan more than any one question, and they are thoroughly aroused to the necessity of securing an adequate supply from the standpoint of defense. This desire and also to supplement their present inadequate supply of fuel explains many features of the so-called Japanese aggression. It is true, however, that the Japanese show more capacity for organization and administration than any other division of the yellow race. They are also seeking permanent markets for their home factories and look to China as their natural markets. At the present time, however, the coal production is being restricted on account of the shortage of labor. An estimate was made to me that this shortage of labor amounts to as much as 25 per cent of the labor which could actually be utilized.

Wages in the industrial districts have increased very substantially.

There is some discussion going on in Japan today regarding the lifting of the restrictions on the bringing in of other labor, particularly from China and Korea. Early in July, the Imperial Government Railways brought from the Korean railways some 400 Korean coolies experienced in track work, but only one attempt was made, for the reason that there was a universal protest from all classes of labor in the Moji industrial district, the point where these Korean coolies were landed and worked.

The labor situation in China has been affected little by the war except in the particularly limited localities. The railways of China are located principally north of the Yangste river, and I spent a greater part of my time in this part of China. The northern Chinaman is much more robust than some of the central and southern Chinese. The Shantung man, who is probably the best laborer in China, is usually a well-built upstanding, muscular man, with very little surplus

weight. It is not generally known that the British have recruited up to date about 150,000 Shantung coolies, who have been sent to France, generally by way of the Canadian Pacific Railway.

One interesting situation in connection with the Japanese development in Manchuria is the fact that annually there is a migration of 250,000 of these robust Shantung coolies across the Bay of Chihli. These men usually embark at Weibeihwei and Chefoo to Dairen and Newchang, and the Japanese are thus able to select the best of these men for the operation of the shipyards and shops at Dairen and the Fushun and Penchihu collieries. The Japanese have also been using this class of labor for the railway building and railway reconstruction and their other various enterprises in South Manchuria. The other Chinamen, such as the Chihli, Shansi and Honan, are all well built, upstanding men. The labor in the province of Hupih, where the Han-Yeh-Ping Iron Works are located, are much less robust than the above described men. This is particularly noticeable in the steel plant, where the men prove incapable of withstanding the hard work around the rolling mills satisfactorily, although it is surprising to see the work they do in such items as carrying coal, ore and coke, all of which is done at this plant by hand. The Cantonese Chinese is probably the frailest of the Chinese. This is to be expected, as Canton is practically the same latitude of Havana, Cuba, Haupow being almost exactly the latitude of New Orleans. Therefore, while there is a large quantity of labor in some parts of China, its quality is certainly very inferior, the two last named places being examples of the least capable and the first named the most robust, with probably all varying degrees between them. The labor of the province in which Shanghai is located is fairly robust and the labor along the China coast to Hongkong is fairly robust. The methods of labor on both the Japanese and Chinese railways were very interesting, although I was not as favorably impressed with the capacity of the Japanese track labor as I was with the Chinese. Possibly I was prejudiced in this, but undoubtedly the labor situation in Japan is becoming troublesome, and I was able to notice the results of this in connection with track labor. Notwithstanding the fact that I, of course, made no success of learning to speak the Japanese language, earmarks of labor unrest seemed to me to be noticeable. In addition, while the Japanese are capable workmen, when they so incline, they are, however, inclined to be more troublesome and are not of the natural good nature of the Chinese coolie.

There is one rather interesting fact, however, and that is that neither the Chinese coolie nor the Japanese coolie can be successfully driven. They are both inclined to take their time. The wages on the Chinese railways are rather variable. On the Shanghai-Nanking I was able to get very definite information. Here a section foreman in charge of three gangs over a territory of 15 miles is paid from \$25 to \$30 silver money, or, as it usually termed, "Mex." Foremen of gangs, or, as they are called, "gangsters," are paid from Mex. \$15 to \$20 per month. Gangs are organized with two leading coolies, and these are paid Mex. \$10.50; ordinary coolies are paid Mex. \$8 per month, and each gang is furnished with a cook, who is paid Mex. \$5. Crossing watchmen are paid Mex. \$6.50. These wages are paid to really capable and experienced men, and, as I have seen on a number of occasions, doing real railway sectionmen's

work. The wages on the other railways are comparable to the above for the reason that the Shanghai-Nanking Railway is in a territory where there has been considerable industrial development around Shanghai and Woosung and Soochow. In the workshop at Tongshan the wages paid for common coolie labor is Mex. \$30. This is for ordinary labor around the shops. The shop mechanics are paid wages varying from Mex. \$60 to \$130, the latter applying to the most experienced boilermakers.

One of the most interesting situations is the Japanese development in Southern Manchuria, particularly the Shinko workshops at Darien. There are about 4,150 men in these shops, of which 72 per cent are Chinese. All executive, administrative and technical and such positions as cranesmen, engineers, etc., are filled with Japanese. Chinese labor is depended upon entirely for the doing of all work, including such skilled occupations as molders. The Chinese are particularly good foundry workmen and he is one of the best masons in the world today. Regarding the question of business to be secured, there is no doubt in my mind that there will be a great deal of business done in this part of the world in the next 25 years, but there is one point which I would like to emphasize particularly, and that is that I do not agree with the ideas of some people which now prevail that this business can be secured practically for the asking. Instead of that, the business to be secured will take close attention and there will have to be a thorough study made of the conditions to be met. I made some analysis of the investment assets as shown on the balance sheets, a study of the fixed obligation, and the Chinese railways to-day are profitable and in my opinion will be increasingly so. Furthermore, there is need for a considerable amount of additional railway mileage and if built will prove profitable. I am also of the opinion that the American manufacturers should combine in their efforts for securing this business instead of competing against each other as has been the practice in the past. I was very much impressed with the thorough study which the British are giving post-war trade conditions. In every instance the British houses are carefully studying the matter of holding their own organizations together to be in position to resume business promptly at the termination of the war. In addition, the British government has representatives on the ground carefully studying and reporting on all the fundamental conditions.

New Signaling on Grand Trunk

The Grand Trunk is just completing a section of automatic signals between Shelburne, Me., and Bethel. This stretch covers 22 miles of single track and consists of the A. P. B. signaling. A contract has been awarded to the General Railway Signal Company for the necessary material to signal 16½ miles of single track between Bethel, Me., and West Paris. This work is to be a continuation of the first section and will be installed by railway company forces.

The A. R. E. A. Service Flag

One of the impressive features of yesterday morning's session was the unfurling of the service flag of the American Railway Engineering Association containing the figures "103," to commemorate the part which members of this Association are taking in the service of their country. Aside from this personal service on the part of the 103 members, service pins are on the coat lapels of not a few of the older members who have come to the convention. Secretary Fritch is one of the wearers of such a pin, having a son in the artillery service.

Cuts and Fills

Opportunity Missed

An El Paso man tells of one Westerner's opinion of Chicago. It appears that this man had occasion to visit the city, which he had never seen before. He remained for a week or two longer than he had expected, and, in writing of his experiences to his wife in the West, he said:

"Chicago is a great city, but I do wish I had come here before I was converted."

No Chance to Sue

The following is the official report furnished by a station master of the Shanghai-Nanking railroad, in China, of an accident which occurred October 8:

1. The death named—was smashed by the engine on 3-10-07.
2. Has two sons—and—
3. The death without ticket.
4. The death's fault.
5. The death no relative see.
6. The death is deaf and blind no cannot say what was.

Dangerous Illness

An old negro, riding on the train, fell asleep with his mouth wide open. A mischievous drummer came along and, having a convenient capsule of quinine in his pocket, uncorked it and sifted the bitter dose well into the old negro's mouth at the root of his tongue. Soon the darky awoke and became much disturbed. He called for the conductor, and asked:

"Boss, is dere a doctor on dis here train?"

"I don't know," said the conductor. "Are you sick?"

"Yes, suh, I sho' is sick."

"What is the matter with you?"

"I dunno, suh, but it tastes like I busted my gall."

Oh, Well! I'll Try It Tomorrow

A traveler in Ireland relates the following conversation with an innkeeper:

"At Brodigan's all the clocks are from ten to twenty minutes fast or slow.

"How do you catch trains?" I asked Mr. Brodigan.

"Sure, that's not an every-day matter, and why he foosthering over it? But we do four times out of five, ma'am."

"How do you like it the fifth time when you miss it?"

"Sure, it's no more trouble to miss the wan time than to hurry five times. A clock is an overrated piece of furniture to my mind."

On a Narrow Margin

A committee member, after attending a meeting last night and conversing for some time in the hotel lobby, entered the grill at a late hour. He glanced at the clock, then at the calendar, then at the menu, from which he ordered a frugal repast. Then he waited, nervously.

At the end of ten minutes, he succeeded in catching his waiter's eye.

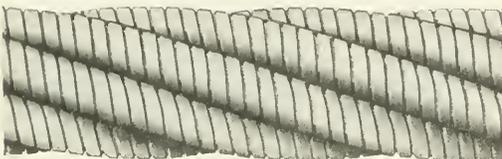
"Look here, how long am I going to have to wait for that grub I ordered?" he inquired.

"Oh, I guess it won't be long, now," yawned the waiter. "In a hurry?"

"In a hurry? Say, I ordered a meal without meat because it is meatless day. And if I have to wait five minutes longer it will be wheatless day, and I won't get a darned thing!"

An Improved Design of Armored Rope

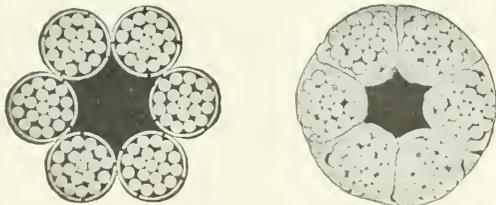
A ROPE FOR USE ON hoisting, haulage, dredging and steam shovel equipment which involves radical and important departures in wire rope construction is being manufactured by the Waterbury Company of New York. The rope is known as armored rope, Gore patent, and is comprised of six strands and either 19, 37 or 61 wires to the strand, as conditions may demand. Its feature of construction is that each strand is covered or wound with flat wires having convex edges which



A Section of Waterbury Armored Rope

form a protection armor, relieving the wires carrying tensile stresses of all abrasive wear and thus retaining the strength of the rope, even after the flat wires are worn completely through. These flat wires are specially drawn and annealed and for that reason they do not project and break off when worn through, but are gradually crowded into the interstices of the rope, thus adding to the wearing surface and hermetically sealing the lubrication within.

By reason of the armor protection at the crowns of the strands and the internal points of wear where the



Cross Sections of the Rope

wires and strands converge, and chafe during flexing movements it is possible to select for the wires in tension those which show a high torsion test. This, together with the internal lubrication, insures flexibility and a long bending life.

It is also claimed for the rope that, because the tensile strength wires are relieved from abrasion, the factor of safety is maintained longer than in rope of other construction. In addition to the added life of the rope itself, it is economical in that the rope wears with use to a smooth, round surface and does not affect the score of the sheaves and drums.

Service Life of Manganese

Frogs and Crossings

SOME VERY INTERESTING DATA relative to the life and the economy derived from the use of solid manganese construction in frogs and crossings have been compiled by the Indianapolis Switch and Frog Company, Springfield, O. During the last 10 years more than \$1,000,000 worth of manganese construction has been installed on over 100 of the leading roads. The service records on these roads indicates that, on the average, the

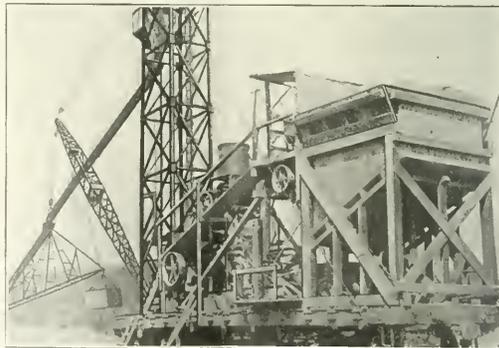
life of manganese frogs and crossings is about 4 times that of Bessemer and open hearth construction. In several instances manganese frogs have shown a life 20 times that of fabricated frogs used in the same location previously, notwithstanding increases in the traffic and the weight of rolling stock since the installation of the manganese.

At the present time the use of manganese construction is particularly advantageous for several reasons. Solid manganese construction is virtually confined to the patterns and integral or unit construction. Fabricated construction requires numerous sections of rail, fillers, bars, plates, bolts, special shapes and forgings which under present conditions are difficult to obtain and require considerable labor. The use of manganese reduces the renewals necessary with other construction.

The Indianapolis Frog & Switch Company's specialties are so designed that the rails, as they come from the mill, join to the manganese portion in self contained easer arms, forming a lap joint protecting the rail ends as well as the manganese from joint pounding.

Improved Concrete Mixing Equipment

CONCRETE MIXER plants mounted on railway flat cars have been in use so long for doing concrete work on railway structures that they possess little that is novel except when some new modification of design is introduced to secure special adaptation to a particular class of work. In the earlier designs, particularly those on track elevation work in Chicago and elsewhere, the problem was essentially simple, as practically all of the forms could be filled with concrete from a mixer car standing on a temporary track at the new grade by the use of a spout placed directly under the mixer outlet. With the introduction of the tower and spouting system of handling concrete, it was not long before steps were taken to apply this system to mixer plants on cars. Towers were added so that the concrete could be elevated to



A Counterweight Chute Suspended From the Tower Boom

a sufficient height to permit the spouting of the concrete at some distance to either side of the track upon which the mixer car was stationed. To permit ready moving of the mixer car, the towers were usually made either of a folding type or facilities were provided for the ready removal of the tower when it was necessary to transport the car to some other point.

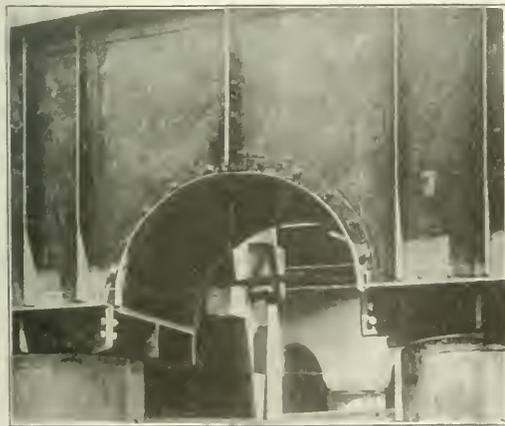
A more recent development is the application of a special counter-weight chute supported from a boom and thereby giving a greater flexibility in distribution. This special chute consists of a structural steel truss of tri-

angular shape, supported from its apex by means of a rope tackle attached to a steel boom suspended from the side of the tower. This triangular truss carries a spout on its top chord extending from the apex down one side of the triangle, the weight of this spout and its contents being balanced by a concrete counter-weight suspended from the opposite end of the truss. The truss can be readily revolved in a horizontal plane about the point of suspension at the apex and as this is also the point where the concrete is received from the spout above, it is readily possible to turn the counter-weight spout in any direction without interfering in any way with the discharge of the concrete.

With concrete work close to the track or under other conditions in which it is more convenient to use the direct spout, the counter-weighted spout can be readily removed and can be as readily re-attached when work demands its use. This equipment is manufactured by the Insley Manufacturing Company, Indianapolis, Ind., and has been applied to concrete mixer equipment on the New York, Chicago & St. Louis, the Delaware, Lackawanna & Western and several other railroads.

Re-Use of Forms Results in Important Economies

IN THE RECONSTRUCTION of the Illinois Central bridges over the track elevation subways within the city of Chicago, important savings both of materials and money are being effected by the use of "Blawforms." Under the construction plan adopted the railroad purchased all forms for use on this work, and the erection of the forms and the placing of concrete has been done by contractors. The furnishing of the forms by the railroad permitted their use by the different contractors

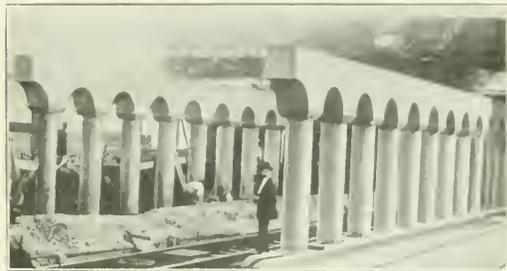


Forms Ready for Filling

engaged in the work, thus making it unnecessary for the individual contractors to invest heavily in equipment that after the completion of their portions of the work would be of no further use to them. It is possible for the railway to secure service from the forms after the completion of this particular project by adopting a similar design in future work. The construction was begun in the spring of 1915 and has been carried on continuously up to the present time. During this period the forms

have been used by three different contractors, and on an average of about 20 times each. In spite of this heavy service the forms are still in good shape, and it is estimated that by the time the work is completed they will have been used 30 times each.

In 1915 the work consisted of the construction of six bridges, each of which contained three rows of columns and cross girders. Forms were furnished for two complete rows, 114 ft. wide. These bridges were built by the John J. O'Heron Company of Chicago. In 1916 Bates & Rogers, contractors, built two bridges, and in 1917 the Gould Construction Company built four bridges.



Completed Rows of Columns and Cross Girders

Each of the contractors utilized the forms furnished by the railroad. As the work progressed northward the width of the bridges was increased, and at Sixty third St. the width is 160 ft. In some of the crossings four rows of columns and cross-girders were built, and on some only three. The contractor had at all times enough forms to set up two rows. The forms are coated with a light form of oil after each use and the work obtained is very satisfactory.

This project is being carried on under the direction of the bridge department of the Illinois Central, C. C. Westfall, bridge engineer. M. D. Thompson, assistant bridge engineer, is in direct charge of the work. The "Blawforms" are manufactured by the Blaw-Knox Company of Pittsburgh, Pa.

The Steel Fence Post as a Labor Saver

TIME, WEATHER and fire continue their unceasing attacks on right of way fence posts, notwithstanding the fact that the American railroads at the present time cannot find enough men to dig the holes necessary to replace the posts that are being destroyed. This is probably the most important reason why steel fence posts which can be driven with a maul in a few minutes' time are being used in large quantities by the railroads in current renewals as well as on new work. Records kept by the Madden Company, Chicago, go to show that under average conditions two men, one driving the posts and the other one holding them, can set about 320 posts, or sufficient for a mile of fence in one day.

The details of this type of posts is shown in the accompanying drawing, and is seen to consist of an 1 1/4-in. by 1 1/2-in. structural steel angle to which a triangular plate is riveted to increase its resistance to overturning. The lower end of the angle is chamfered to facilitate driving. Holes in one leg of the angle, punched two inches center to center, afford a convenient means of fastening any type of fencing by means of staples, which are clinched with a special tool on the inside face of

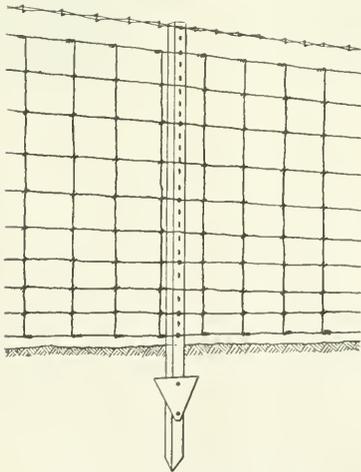
the angle. These posts are considerably lighter than a standard wooden post, a fact which has been of no small advantage in shipping them during the current shortage of cars. This, in combination with their small



Steel Posts in Service 15 Years

cross section, enables a car which will hold 800 ordinary wooden posts to carry 5,200 of the steel posts.

Aside from the ready driving feature the users of these posts draw attention to the fact that grass fires on the right-of-way which destroy so many wooden posts before their natural service life has expired, do no damage to the metal posts. This fact has been found of particular advantage by the track men on those railroads in the west where it is the custom to burn the grass to a



Details of the Post and Fencing

furrow plowed some distance outside of the right-of-way line. Where the steel posts are used there is no longer any need of detailing men to protect the fence posts as the fire burns across the right-of-way line.

The accompanying photograph illustrates the character of service that has been secured from steel posts

along railway lines. The posts shown are on the right-of-way line of the Indiana Harbor Belt near Chicago, and have been in service since 1903. They are still in good condition. They are of practically the same design as those now being made, except that the plate is omitted from the base. These posts were treated with an asphalt paint, whereas the coating now applied is either a standard galvanizing or a rust inhibitive baked enamel.

An Improvement in Concrete Fence Posts

ONE OF THE MOST DIFFICULT problems to solve in concrete fence post construction has been the provision for the necessary additional strength at the ends and corners of the fences. For a long time the prevailing solution was the use of a timber stick for the brace post in connection with a concrete end or corner post that differed from the standard line post only in size. Various obstacles have made it difficult to produce a brace post in concrete possessing the same desirable qualities readily obtained in the standard post.

These difficulties seem to have been solved by the National Concrete Machinery Company, Madison, Wis., in a new design for the combination of an end or corner post with a brace post. A special feature of this combination is the use of castings on each end of the brace post having the form of short pins, which fit into corre-



The Corner Post and End Post Arrangement

sponding holes in the corner or end posts. Through this arrangement a secure connection is formed which is capable of resisting adequately any tension applied to the fencing material.

Another important feature of the design is that both the corner post and the brace post conform to the standard design followed in the line fence posts manufactured by the above company. The reinforcement consists of National woven steel wire as in the line posts, and the posts are cast in a cylindrical sheet steel mold, whereby it is possible to make use of the casting machinery in which the concrete is poured into the end of the mold while it is being jostled or worked rapidly up and down. This feature of the manufacture of these concrete posts has been instrumental in producing concrete of high compressive strength.

The corner post is 5 in. in diameter at the top and 7 in. in diameter at the bottom, and has a total length of 8 ft. The brace post has a uniform diameter of 4 in. and a length of 8 ft.

While the end or corner fence arrangement shown in the photograph is new, the novelty lies in the combination of the end and brace post rather than in the use of features that are entirely new. The end post in combination with another type of brace post has been in use for 8 years on the Cleveland, Cincinnati, Chicago & St. Louis, while the brace post with another type of end casting has been used in rural fencing for about 10 years.

The Trackless Train Saves Time, Men and Money

IN THIS DAY when labor is so scarce and operating costs are so high, railway officers are turning more and more to means of reducing handling costs and of saving time and labor as well. Never has the need of saving men been so apparent. Never have labor and money-saving devices been so much in demand, and of these the electric tractor for hauling is probably one of those most in demand because of the savings which have been effected with its use.

As a tangible example of a tractor's capability, attention is drawn to the Forty-third Street station of the Chicago Junction Railway. In this station approximately 1,800 tons of l. c. l. freight are handled daily. The installation of "The Trackless Train" system was brought about in this case, as in many others, by neces-

floor and working condition were the same, no sharp turns or corners were taken out; in a word, no effort was made to smooth the way for the tractors. Careful deduction and calculations show that even under prevailing labor and wage conditions, the saving effected by use of the tractors amounts to 4 cents per ton. Figuring on a total daily tonnage of 1,800 tons, the daily reduction cost is \$72 and amounts in one year to \$22,536.

The saving was brought about primarily by the fact that the use of the electric tractor reduced each gang of men from five and six to three and four. With the electric tractor in operation it became possible to make up trains of 3 to 12 or 14 loaded trailers. The installation of the tractor did not mean that the old trucking equipment was discarded. The old trucks were adapted



The Tractor Hauling a Train of Loaded Trailers

to the new system by a few simple changes or additions and by the application of ingenious but simple hitches. They track perfectly, even around sharp right angle turns. The cost of the tractor was practically the entire cost of the "Trackless Train" installation, as the converting of the trucks and the addition of the hitches involved but minor expenditures.

The tractors used by the Chicago Junction are four Type Z machines, made by the Mercury Manufacturing Company, Chicago.

A New Form of Track Spike

IN KEEPING ABREAST with the demands placed on it by an ever-increasing traffic and the use of heavier motive power and equipment, the design of the track as a structure has been constantly changed and improved. There is, however, one important unit in the structure which has not been subjected to the radical changes and improvements common to the remaining units. This is the track spike which, with the single exception of the screw spike, has remained practically unchanged in its fundamental design since its early use.

Recently a track spike has been developed and placed on the market by George A. Post of New York, which embodies radical changes both in design and in method of application. As may be seen in the photograph, this is a round, arch-head spike which is applied at an angle of 60-deg. from the horizontal. It is used with tie plates with diagonally disposed, tight-fitting holes, and when applied this combination effects a unit construction of the tie, tie plate and rail, which tends to prevent the creeping, spreading or canting of the rails. The diagonal in-



Rounding a Curve with a Trackless Train

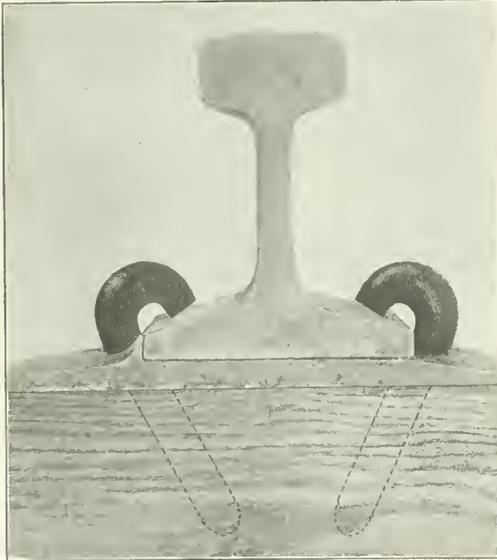
sity. When this freight station was first opened hand trucking was entirely adequate to handle the business, but as the tonnage increased it was soon apparent that the cost of handling was becoming too high and congestion was occurring almost daily. The hand truckers were unable to keep the platforms clear and transfer the freight as fast as it came in. As a result of this condition, after careful consideration, electric trucking was installed with entirely satisfactory results.

In installing the electric tractors, no changes were made to accommodate the new equipment. Operating arrangements were maintained exactly the same as when hand trucks were used. The hauls were the same; the

clination of the spike with reference to the wood fibers in the tie, together with the tight fit in the holes in the tie plate, prevents the spike from being withdrawn from the tie by the lifting action developed by the undulation of the rail under traffic.

Four spikes per tie are used except at rail joints. At joints the spikes are driven outside of the slots in the angle bars. The spikes may be driven either in holes bored in advance or in holes made when the rail is laid.

While the action of the rail under traffic will not loosen the spikes, they may be pulled with an ordinary claw-bar when ties are being renewed. In renewing rail it is not necessary to pull the spikes. Instead they are lifted slightly and given a quarter turn off the flange which permits the old rail to be removed and the new one set in.



The Arch-head Spike

In addition to effecting a saving of labor this feature also conserves the tie as the creating of additional spike holes is avoided.

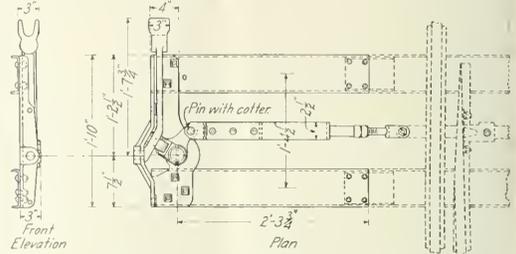
This spike has been tested out on two important eastern roads under conditions ranging from tangent track to a compound curve with a maximum of 6 deg. curvature in a track carrying traffic amounting to more than 100,000 tons per day and have shown highly satisfactory results.

A New Switch Stand

For the U. S. Army

THE UNITED STATES ARMY has adopted a new switch stand for use with portable turnouts built of 25-lb. rail in track of 25 $\frac{3}{4}$ inch gage. In addition to the use by the army this stand is of interest because of the difficulties encountered in working out the design. It was specified that the stand should not be over 3-in. high, that it should throw parallel to the track and that nothing should project below the level of the tie. This meant the exclusion of all existing types of switch stands and the development of a new and original stand.

By referring to the drawings it will be seen that the stand as built meets these specifications fully. In addition the stand has only three moving parts, the throwing lever, the crank lug and the sliding block. It can be disassembled instantly in the field without tools by simply removing the cotter pin. Another important feature of the stand is the absence of bolts, it being a boltless switch stand. The stand can be virtually renewed after becoming worn by hard service by removing the sliding block,



Plan and Front Elevation of the Stand

giving it a quarter turn, and replacing it. This brings two entirely new surfaces into play, and has the same effect as using a new part.

A spring connecting rod is used with the stand, making it automatic. The lever is on "dead center" when in normal position so that latches are not required. The stand can be locked if desired by utilizing the hole in the lever and the one in the upright flange of the base casting which registers when the lever is in either position.

This stand was designed and manufactured to the specifications of S. M. Felton, director general of military railways, by the Bethlehem Steel Company, Bethlehem, Pa.



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An Illustration of the Destruction Wrought by the Germans During Their Retreat on the Western Front

EDITORIAL

Railway Age

EDITORIAL

DAILY EDITION

In spite of the fact that the large attendance in the convention hall when the report of the Committee on

Discussion of Labor Report Restricted

Economics of Railway Labor was presented indicated the widespread interest in this subject, the discussion of the report was very limited and in this way disappointing. Either the larger portion of the membership is not yet awake to the seriousness of the labor situation or the men hesitated to speak because of the conditions existing on the railways at the present time and the fact that the director-general and his staff are studying labor among other problems. The latter is very probably the more correct explanation. By failing to take part in the discussion much information was withheld from the membership at large which would be of great importance in arriving at the correct solution of the problem.

The most gratifying feature of this year's exhibit is the very large number of railway men who are spending

Large Crowds at the Coliseum

a good deal of time in the Coliseum not merely looking at but carefully studying the devices on display. *The Railway Age* doubts if any previous exhibit ever received as much intelligent, practical attention from railway men as this one is receiving. Many railway officers who attend conventions under present conditions naturally and properly feel that they must use their time to better purpose than ever in order to give the railways the very best return for the time they take away from their offices. The exhibit at the Coliseum will be closed tonight at 10 o'clock. It is to be hoped that every railway officer attending the conventions who has not visited the exhibit will yet do so.

The Discussion of the Report on Economics of Railway Labor points to the need of a definite policy concerning

Methods of Recruiting Labor

the recruiting and distribution of available labor under the existing status of the railroads as brought about by Government control and War conditions. Government control if necessary will require certain departures from current practice and many such changes are being made as the administration of the railroads under Government control assumes definite form. The question arises regarding the policy which will be pursued in the hiring of laborers. As pointed out in the discussion, various state and national labor bureaus have indicated a desire to be of assistance in the railway labor field, while in at least one case there has been an expression of a desire on the part of the Government that the railways abandon existing methods of recruiting men in favor of the Government bureaus. While overcoming the exploitation of labor, which is all too common with the operation of private labor agencies, available testimony goes to show that many governmental bureaus for securing labor are subject to serious objections, prominent among which is

a general lack of efficiency, assigned in some cases to an over-abundance of red tape. In view of this, any movement tending to destroy existing means of recruiting labor before insuring the effectiveness of Government bureaus would seem ill advised.

In the report of the Committee on Ballast it was pointed out that while the consensus of opinion of railway men is strongly against ballasting by con-

Some Advantages of the Contract System

tract in normal times, such a plan is considered a necessary evil by many men in times of acute labor shortage. This is significant of the trend towards carrying on maintenance work by contract, which is now being tried out to a greater or less extent on several important roads. In the report 11 reasons are given as arguments against ballasting by contract on operated lines. While most of these reasons may also be advanced against contracting other maintenance work, the advantage of contracting such work as farmers or others living along the line, are equipped to do as well or better than the railroad forces is evident. This work includes fencing, mowing of the right-of way, small jobs of ditching, etc. Again there are many advantages in the plan of contracting small repair work such as renewing the plank in station platforms, replacing broken window panes, repairing broken locks and many such items. Such a plan makes it possible to make these small repairs without delay; does away with the necessity of sending a man from headquarters to do an hour's work or less with the probability that his entire day will be taken up by the trip, and enables the men to be utilized on more important work without interruption, thus making it possible to carry on a greater amount of work than otherwise could be done. With the present absolute necessity of securing the maximum service from their forces, railway men can ill afford to overlook the possibilities of developing the contract plan of doing maintenance work even to the point of including the more important items such as ballasting, or the renewing of ties and rail.

Reports presented by several of the committees this year include glossaries of terms peculiar to the subject in hand. As it is an established custom of the Association that definitions are not subject to discussion on the floor of the convention, it is entirely probable that they do not receive as careful consideration by the association members attending, as do the other portions of committee reports. However, upon acceptance these definitions become a part of the Manual and as such they should conform to the high standards set by this Association for its established rules of practice. This means that the definitions must fulfill the prime and only justifications for their publication—that they convey the accepted meaning of a technical term to one not familiar with it, and eliminate any confusion of meaning resulting from

a current looseness in the use of the term. To comply with these requirements the definition must have literary merit—the diction must be accurate, and the construction sufficiently lucid to convey a word picture while allowing no opportunity for confusion, even to one entirely unfamiliar with the subject. Limitations as to space in the manual require that definitions be given only when the term is not defined in a standard dictionary or when its meaning as applied to a particular branch of engineering differs from the definition found in the dictionary. A perusal of the definitions submitted by the committees this year will convince the reader that some of them have been drawn without adequate consideration of the principles outlined above.

The Analysis of Yard Operation

THE PAST WINTER HAS demonstrated the lack of terminal facilities at many points, particularly in the east. The lines converging at the terminals have been able to deliver more cars than these yards have been able to classify and forward, so that the capacity of entire divisions and even of systems has been limited to that of one or more yards.

Where increased capacity cannot be secured by the construction of an entirely new and independent terminal, it is generally inadvisable, if not absolutely impractical, to enlarge and rebuild a yard under traffic conditions such as those which have existed during recent months for the interference with operation which will necessarily result will decrease the capacity and add still further to the congestion. However, as the Committee on Yards and Terminals pointed out in its report presented yesterday, there are frequently points of local congestion in a terminal which can be relieved by relatively simple changes. Frequently the adoption of as simple an expedient as the moving of a crossover has eliminated interference between opposing movements and resulting serious delays. It may be claimed that all such points of congestion have been eliminated so far as possible in the design of a yard and that there is not, therefore, opportunity for further improvements. However, conditions change rapidly and they have changed particularly during the last year. Such changes frequently lead to revisions in operating methods and give rise to conditions differing materially from those existing when the terminal was laid out. It is for this reason that a detailed analysis of a yard and its operation at intervals is valuable in bringing to light the changes which have taken place and in directing attention to those points where delays occur. There is no better time to make such analyses than the present, both because the need for improvements is great and also because the defects are now most evident.

Control of Tie Renewals

THE REPLIES RECEIVED from 100 railways in answer to questions sent to all the principal roads of this country have brought out the fact that in the majority of cases the responsibility for tie renewals rests on the section foremen. This is in direct contrast with the practice followed on a few roads where tie inspectors are employed or where the roadmasters are required to make detailed inspections and to indicate the ties which are to come out.

Probably an average of 300 ties per mile of track are renewed each year or approximately 2,500 ties per section. With ties costing one dollar each this means that a section foreman is responsible for the expenditure of

from \$2,000 to \$3,000 annually for this one account. Some of the larger roads employ 2,000 or more section foremen, in which cases the foremen collectively authorize an annual expenditure of \$5,000,000 to \$6,000,000.

It is often urged as an objection to the plan of holding the roadmasters responsible for this work that they are already overburdened and if given this duty they will be unable to give it the time necessary to insure good results. This argument is not without merit. It, of course, does not hold true if "tie spotters" or inspectors are employed. Instead the chief objection to the last plan is based on the fact that the "spotter" has no responsibility in the maintenance of track after passing over it.

On the same roads which are leaving this work to the section foremen, with its responsibility of deciding on the expenditure of millions of dollars annually, it is safe to say that the division officers are required to secure the approval of the management for expenditures much smaller than the cost of tie renewals on a single section. The practice presents the opportunity for a foreman to show a low cost of maintenance per mile of track at the expense of safe track or to go to the other extreme and sacrifice economy to appearance. In other words, it introduces the personal element to a great extent. Certainly the amount of money involved is sufficient to warrant the responsibility being concentrated in one with wide experience and good judgment.

Plans for Next Year

WITH THE SUCCESS OF THIS CONVENTION a most natural question arises as to plans for the meeting next year, for surely the convention in 1919 should prove of equal if not greater benefit than the one now in progress. Assuming that a convention should be held, it would seem desirable to give immediate consideration to the program since the effectiveness of the meeting depends upon the work done by the committees and this work should commence as soon as possible.

Obviously some matters presented at the meeting this year have been of more immediate importance than others from the standpoint of the most vital object of the times—the winning of the War. However, owing to an inability to control the discussion under prevailing rules of order, some matters but remotely concerned with the all-important object of the hour were given as much if not more time before the convention than subjects of vital concern. An improvement in this situation as applied to future conventions would seem to demand an arrangement of the work of committees, and the reports to be presented by them, whereby particular emphasis should be given to matters closely allied to current needs. However, in making plans along any such line due consideration must be given to the fact that these are times of rapid changes. The measures of today may not meet the emergencies of tomorrow, so it would seem desirable to give the committees a certain amount of latitude in their instructions in order that they may be enabled to adjust their work and reports to the changing conditions. This would require some supervision, but a general instruction, to consider the matters of most immediate and vital importance, would seem to require but little amplification.

There is no question but that the convention has been justified by the results obtained this year. It can be done again, but the greatest good can be secured only by definitely molding the activities of the association to the changing times, not only as to the work of the committees but as to the discussions at the various sessions. But the duty of the membership does not end here, for as

pointed out by Chairman Lewis of the Committee on Economics of Railway Labor, it is the patriotic obligation of all members to participate in the work by giving conscientious and prompt attention to any circulars sent out by committees. It is only by doing their part in full measure that the association can accomplish the desired end.

Bridge and Building Meeting

About 20 members of the American Wood Preservers' Association, including a number of members of the Executive committee, met in room 1124 of the Congress Hotel at 4:30 yesterday to make plans for the convention next October. At the annual meeting held in Chicago last October, New York was selected as the location for the next convention. Owing to the conditions prevailing in the east it was the sense of those present at yesterday's meeting that the 1918 convention should again be held in Chicago.

Sir Edmund Walker

Sir Edmund Walker, who was a speaker at the dinner of the American Railway Engineering Association last night, is one of the most prominent men in Canada, and is almost equally interested in matters of finance, of education and of art. Besides being president of the Canadian Bank of Commerce, he is chairman of the Board of Governors of the University of Toronto, chairman of the Board of Trustees of the National Gallery of Canada at Ottawa, chairman of the Royal Ontario Museum, and chairman of the Art Museum of Toronto.

Today's Program

The reports scheduled for presentation before the convention today are as follows:

- Roadway.
- Iron and Steel Structures.
- Wooden Bridges and Trestles.
- Masonry.
- Ties.
- Stresses in Railroad Track.
- Rail.
- Signs, Fences and Crossings.
- Track.
- Wood Preservation.

Following the presentation of these reports the officers-elect will be installed and other business transacted.

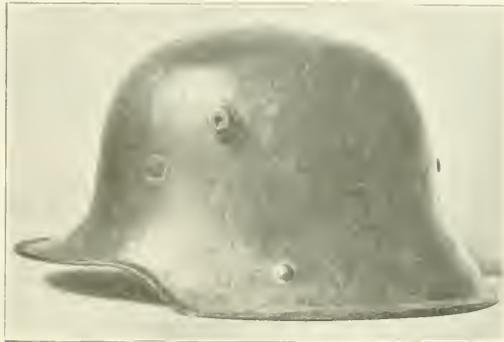
The Necessity of Coal Conservation

A talk was given before the association yesterday morning by O. Monnett, a member of the Coal Conservation Committee, United States Fuel Administration, Illinois section, on the necessity of coal conservation and the precautions to take in the storage of coal. He stated that the United States will demand bituminous coal during 1918 to the extent of 600,000,000 tons and from the best available knowledge and information the production will not be in excess of 550,000,000 tons, the country being confronted with a shortage of 50,000,000 tons, which will have to be made good by more scientific methods of combustion and by conservation in other ways or it will be necessary to shut down some of the less important industries. Bituminous coal can be stored under water for any length of time without deterioration or loss. Where it is necessary to store it in open piles precautions should be taken to prevent spontaneous com-

bustion. Mr. Monnett gave a few of the suggestions gotten up by the Fuel Administration with reference to precautions recommended for minimizing the danger from spontaneous combustion of coal in storage.

A Relic of Cambrai

The photograph shows a German helmet which Fred Poor, president of the P. & M. Company, Chicago, has recently received from Captain Fred A. Preston, aircraft division, Signal Corps, located in France and formerly manager of sales with this company. This helmet was taken from a dead German soldier after the battle



A German Trench Derby

of Cambrai. The condition of the sweat band in the helmet indicates that the German had been running some before being killed. This helmet is considerably heavier than the French helmet, which in turn is heavier than those worn by the American troops. It is of pressed manganese steel construction and weighs approximately three pounds.

Signal Committee Dines

The annual dinner of Committee X of the A. R. E. A. and R. S. A. was held Tuesday evening in the Engineers' Club.

The following members and past members were present:

- J. A. Peabody, signal engineer, C. & N. W., Chicago.
- Frank Rhea, Saltburg, Pa.
- G. E. Ellis, signal engineer, Division of Safety, I. C. C.
- F. P. Patenall, signal engineer, B. & O., Boston, Mass.
- A. M. Bart, chief engineer, master of way, N. P., St. Paul, Minn.
- Mott Sawyer, Supt. C. M. & St. P., Spokane, Wash.
- M. H. Hovey, consulting engineer, Madison, Wis.
- W. H. Elliott, signal engineer, N. Y. C., Albany, N. Y.
- F. L. Dodson, consulting engineer, Gen. Ry. Supt. C. R., New York.
- J. C. Muck, signal-electrical engineer, M. C., Detroit, Mich.
- T. S. Stevens, signal engineer, Santa Fe, Topeka, Kan.
- A. G. Slaver, consulting electrical and signal engineer, Chicago.

Too Mucha da Big Eyed Chick

A bunch of "dagos," working on the track, killed a big hoot owl which they dressed, broiled and served as a delicacy to the noonday meal. About 3 p. m., the boss noticed a cessation of work on the part of the dagos. An investigation found them gazing to the willows and vigorously hollering "Tropico tropico!" The boss proceeded to address them: "Hey there! What 'tells the matter with you 'dagos? Lookin' fur another job? Hey!" One of the Italians replied in a faint voice: "Oh, God! Sicka da bel. Too mucha da big-eyed chick."



Section of Siberian Line Which Japan Will Use if She Intervenes

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American Railway Engineering Association Proceedings

A Report of Wednesday's Sessions Including the Presentation of Six Committee Reports With Discussions

THE SECOND DAY'S SESSION of the American Railway Engineering Association was called to order at 9:30 a. m. by President Sullivan, with the room well filled. Reports were presented during the day by the committees on Electricity, Yards and Terminals, Economics of Railway Labor, Ballast, Economics of Rail-

way Operation and Uniform General Contract Forms. Abstracts of these reports and of the discussions are given below. The report of the Committee on Roadway was postponed until today, while the report of the Track committee, originally scheduled for presentation on Tuesday, will also come up today.

Report on Yards and Terminals



THE PRINCIPLE OF good yard design comprises three fundamental requirements, which are:

- (1) To get the train into the yard and clear the main line.
- (2) To classify the cars in the yard, which includes all intra-yard movement of cars and engines.
- (3) To get the train out on the main track and clear the yard.

With these principles in mind, the following suggestions arise in the form of direct questions:

1. Can you extend your yard lead or construct one adjacent to the main track of sufficient length to hold a maximum train, so that an arriving train can clear the main track quickly before entering the yard and a departing train may clear the yard quickly before going out on the main track? If trains arrive or depart at close intervals, can a second lead track be constructed? These lead tracks are sometimes called receiving or departure tracks.

2. Are your connections between (a) main tracks, (b) lead tracks, (c) drill tracks (or tracks on which switch engines operate), (d) yard tracks, so arranged

that trains may enter and leave the yard with a minimum of interference with switching movement?

3. Are your yards so arranged and have you sufficient running tracks so that you can take a transfer from one end of the yard to the other without interfering with the usual switching? Could the efficiency and capacity of the yard be increased by the enforced holding open of a track (otherwise used for holding cars) as a running track?

4. Are your crossovers so arranged as to give the least interference with switching and the greatest elasticity of movement, or can additional crossovers be put in to secure these results? Where the number of tracks in the classification yard is fixed and where the number of classifications has increased, can connecting crossovers be so located between these classification tracks as to reduce the number of movements for the required classification?

5. If your receiving or departure tracks are too short, can you lengthen one track in each yard in order to take care of the maximum train?

6. Are your caboose tracks so located and have they such connections at each end that cabooses may be handled with the least amount of switching service?

7. Can you take the engine off your train and get it to the roundhouse, and also get it from the roundhouse to an outbound train without materially interfering with switching?

8. Can you facilitate handling road engines by providing a "tie-up," "parking" or "engine storage" track near the engine terminal?

9. Can your yard engines clean fires and take coal, sand and water without delay? Do you change switching crew where engine works, or do you send the engine to "tie-up" track for change?

10. Are the trackmen given an opportunity to repair busy tracks? Are you having yard derailments or delays due to bad tracks, particularly at curves, switches and frogs?

11. Can you quicken the movement of trains through the throats of the yard by putting on switch tenders at these points during the busiest part of the day?

12. Is the present assignment of tracks in the yard for the various operations the proper one?

13. Can you in any case improve the yard movement by reversing the movement of traffic?

14. Can you facilitate switching by making inexpensive changes in grade in the yard at any point? If you are operating a hump, can you change the grades of the hump and facilitate switching?

15. Are you using the cut-list system in hump yards to avoid confusion in classification and to fix responsibility for damage while handling cars?

16. Can you improve switching conditions after dark by installing lights?

17. Are you handling any cars through the yard with more movements than are absolutely necessary?

18. Could you facilitate weighing and lessen interference with other switching by rearrangement of existing connections or by the addition of other connections to the scale track?

19. Are your bad-order and repair tracks so located as to require the least amount of engine service?

20. Can you lessen the cost of icing cars by changing the track layout?

21. Are your car inspectors properly organized, and so located and equipped that they do not delay switching or the departure of trains?

22. Can some terminal delays be avoided by the installation of compressed air lines to charge the brake equipment of trains and avoid the delay of pumping air on the train after an engine is coupled on?

23. Are your outgoing trains delayed "Waiting for Orders?"

24. Is your yard or road service hampered due to lack of proper telephone facilities or other means of communication?

25. Is the time of switching crews wasted by faulty handling of waybills?

Scale Specifications and Rules.

The committee presented specifications for track scales which were practically the same as those submitted a year ago and published in the *Railway Age Gazette* of March 22, 1917, page 583.

The committee also submitted as information the rules adopted by the American Railway Association on Equipment for Testing Track Scales and on the subject of Scale Test Cars. The committee has not as yet made a study of these questions and is, therefore, not in a position to recommend the adoption of these additional rules and specifications by printing them in our Manual.

Conclusions

The committee recommended:

(1) That the Catechism of Yard Design be printed in the Manual.

(2) That the Track Scale Specifications and Rules be adopted and printed in the Manual

(3) That the rules adopted by the American Railway Association on Equipment for Testing Track Scales and on the subject of Scale Test Cars be received as information and printed in the Proceedings.

Suggestions for Next Year's Work.

(1) Make critical examination of the subject matter in the Manual and submit definite recommendations for changes.

(2) Report on the handling of freight in double deck freight houses and the cost of operation. Also report on handling freight by mechanical means.

(3) Continue study of typical situation plans of passenger stations and methods of their operation.

(4) Report on classification yards.

Committee: E. B. Temple (P. R. R.), chairman; B. H. Mann (M. P.), vice chairman; W. G. Arn (I. C.), H. Baldwin (C. C. C. & St. L.), Miles Bronson (G. C. T.), G. H. Burgess (D. & H.), A. E. Clift (I. C.), L. G. Corbus (B. & O.), H. T. Douglas, Jr. (C. & A.), A. C. Everham (U. P.), F. M. Hastings (R. F. & P.), H. W. Hudson (N. Y. Conn.), D. B. Johnston (P. L. W.), F. E. Lamphere (B. & O.), H. A. Lane (B. & O.), A. Montzheimer (E. J. & F.), H. J. Pfeifer (T. R. R. of St. L.), S. S. Roberts (Cons. Engr.), C. H. Spencer (I. C. C.), E. E. R. Trautman, E. P. Weatherly, W. L. Webb (Cons. Engr.), A. J. Wharf (P. & P. V.), J. G. Wishart.

Discussion

H. B. Mann (vice-chairman): The question of the present emergency, as far as terminals is concerned, seemed to be divided into two parts: first, congestion in the yards and terminals, which may be created either by some big error in a certain yard, which is apparent to everyone, and may be corrected by the mere spending of money in large amounts; and second, a collection of little things, such as congestion in certain yards and terminals due to little defects, which have as much of an effect as one big one.

The committee sent out a circular to a number of railroads, and while they received very encouraging replies from a few men, the consensus of opinion seemed to be that the experts that were required were not available. If experts were not available, the committee felt that the association had matter in the Manual that might assist, and if it could be placed in a form that those who were interested could handle it, we still might have the necessary results.

With that end in view, they felt that a catechism was perhaps something that officers not interested in the association, or not having the time to read the Manual, could handle in the best way. The committee then formulated a list of 25 simple questions, taken almost entirely from matter in the Manual, put up in a form that men who do not read the Manual might apply, and apply in many ways. First, through the members of the association on their individual roads; second, railroads, neighbors of those who knew how to handle associations, but had not had that interesting material in their own possession.

That handling could be begun in two ways. First, by the committee of experts that they might send out; second, by sending out the list of questions in each division or with officer interested, and like the passer go or not for that division, and send their replies in to the headquarters of the project, and then the correct headquarters could take the necessary action.

E. B. Kettle (N. Y. C.): I wish to see an explanation of conclusion 2 that this matter, but worked by a cooperative way not only with the Special Committee on Track of the American Railway Association but the Com-

mittee on Iron and Steel Structures of this association; also a committee of the Scale Manufacturers' Association, and there is one correction that the committee would like to have you consider as made without objection. That is with reference to the capacity of scales. Leave out all after the first paragraph. This suggestion has been made after a careful consideration of the specification by a member of the Committee on Iron and Steel Structures of this association.

The President: It is understood that under the heading "Capacity" the vice-chairman suggested that everything after the first paragraph will be omitted. That includes the matter under the second paragraph down to (b) under section 3, paragraph A.

(Mr. Baldwin then read the balance of the heads of the reports, numbers 3 to 11.)

O. E. Selby (C. C. C. & St. L.): I move the adoption of the conclusion and the placing of the specifications in the Manual.

(Motion carried.)

The President: The third conclusion simply recommends that the matter be received as information, which the Board will take cognizance of.

(The committee was dismissed with a vote of thanks.)

The President: We have the following letter from the Regional Director, R. H. Aishton:

"This will acknowledge receipt of your letter of the 30 instant, together with proof of the current report of the Committee on Yards and Terminals relating to 'War Emergency Yard Improvements' and the 'Catechism of Yard Design Operation.'

"I think that your suggestion at this time that a copy of this report be placed in the hands of every operating officer would be of very material advantage in the consideration of the various matters in so far as this particular regional district is concerned, and I will be very glad, indeed, to see that a copy of the report is placed in the hands of each of the regional western railroads, and will, furthermore, suggest similar action to the other regional directors. One of the large problems confronting us is increasing our capacity and the suggestions are directly in line with this policy.

"I would suggest that a sufficient number of copies be printed for distribution, and I will see that they reach the various railroads, together with some comment of your own about the matter."

Report on Economics of Railway Labor



THERE IS NO SUBJECT of more importance to the railways than labor. The increasing cost of living, and the removal from the American field of many thousands of workers from all walks of life for military duty, and of other thousands to war industries, only partially explains the present difficulties of employers. There is an unrest among men; there is a labor atmosphere surcharged with an energy which must be wisely directed to prevent dire calamity.

The committee presented an indexed tabulation of publications each of which treats wholly or in part on some phase or phases of the Economics of Labor. This tabulation gives the name of the author, the title and date of the publication, and the shortest possible description for the guidance of the investigator.

Methods of Securing Labor

The following are the principal methods employed on American Railways for obtaining maintenance of way and construction labor:

(1) Through the Foremen: This is generally applicable in rural districts.

(2) Through Padrones or Interpreters: This is the method generally used in obtaining foreign labor. The laborers are engaged through their representative who, as a rule, either acts as an assistant or intermediary between the foreman and the men and is paid at the rate of an assistant foreman.

(3) Through Labor Agents: These agencies are generally located in the larger cities where surplus labor congregates, the labor agent acting as a sort of middleman between the laborers and the railway. In many cases the railways undertake to obtain all their supply from some representative labor agent. The latter also may represent several railways.

(4) Through Contract Feeding Companies: These companies contract with the railways to feed their labor and, in order to keep the camps full, they will also arrange with the railways to supply the laborers. As a rule, the latter are confined to the floating labor, but not to gangs of foreign labor. The feeding companies usually arrange with labor agents to supply the men for them.

(5) Through Exclusively Operated Railway Labor Agencies: A few roads have provided their own labor agencies in about the same manner as that usually employed by the labor agent, but this has not been developed to any great extent.

(6) Through State and Federal Labor Bureaus: This has been attempted to a greater or less extent of late years, but for various reasons it is seldom that these agencies can supply the class of labor that is required for railway purposes.

(7) Through Representatives of Foreign Governments: In some of the larger cities these men have acted as labor agents for recent arrivals of immigrants from their respective countries in much the same manner as the independent labor agent does. Of late years, this has not been an appreciable factor and since the war it has ceased altogether.

The methods employed by the railways for obtaining labor have, in general, remained the same for many years. They have competed in the past with contractors and manufacturing establishments employing large numbers of common laborers. Labor agents or padrones were formerly the sources of the labor supply, but there has been a steady decline of late years in the classes of men that reach the labor agents. A large part of the better class of unskilled or common foreign labor that formerly went directly to the railways now reaches the mills and factories through channels other than the labor agent, which results, as a rule, in a poorer class of labor only being left available for the railways through these agencies. There has also been a steady decline of all classes of common labor available for railway work, due to better and more remunerative opportunities in other lines of industry. The railways have met this condition in an unorganized and desultory fashion, adhering to original

methods of employment and endeavoring to obtain the additional labor required by various practices such as maintaining a low hourly rate, but adding for extra hours not actually worked in order that the daily wage may be increased without affecting the hourly rate. Also a gradual lessening of supervisory effort on the part of the foreman and others in order to hold the men, has contributed to a greatly decreased efficiency.

The National Immigration law, which became effective May 1, 1917, requires a literacy test and, it is believed, will tend seriously to curtail the supply of common labor; but, with the exception of Mexico, its full effect may not be felt until after the war.

It is believed by the committee that the time has come when there must be a better understanding by the railroads of their labor problems; and more study given to the improvement in methods of securing, organizing and educating unskilled or common labor; also that there must be co-operation among the railroads, looking towards the conservation of the labor supply, especially in the large centers. Committees consisting of a representative from each railway entering the larger labor centers could, to advantage, be formed to study local labor conditions and to keep their respective companies informed of labor conditions generally. These local committees might be made up of persons who are directly concerned with the employment of the greatest number of laborers in the territory tributary to such centers.

In a study of cost for common labor by the sub-committee on labor of the Chicago Zone Railroads (an organization consisting of all the roads entering in Chicago and supporting the Presidents' Conference Committee), the sub-committee has grouped and defined common or unskilled labor as follows:

(a) Native: Consists of laborers who reside in the vicinity, most of whom maintain homes within access of the work. As a rule, this class of labor is the most efficient and no expense, other than the daily wage, is incurred by the employer. The amount of this class of labor available for construction work is usually insufficient.

(b) Foreign: Consists of laborers who come to work in groups usually through a labor agent or one of their own number who acts as a leader. These men usually board themselves. Transportation and free housing are provided by contractors or the railway company.

(c) Hobo Labor: Consists of tramp laborers, nearly all of whom are employed through labor agents; and for whom transportation, housing and feeding facilities are furnished by the contractor or railway company. Laborers in this group differ from those grouped as foreign laborers principally from the fact that they are employed singly and their continuity of service is of such short duration.

It is customary for railroads to provide free transportation for common labor when entering their employ. Special equipment is sometimes necessary, and frequently these trips cover long distances. Foreign labor will generally arrive at the destination without desertion; but in the case of the hobo, there is considerable loss, the amount being proportional to the length of the trip and weather conditions. Cases are reported where special equipment was provided for shipments of over 200 miles and less than 20 per cent. of the men arrived at destination. The average arrivals for all distances is probably about 85 per cent.

There is frequently a further loss of about 15 per cent. caused by the failure of laborers to accept actual service upon their arrival at the work. While this is especially true of the hobo, it applies, to a more or less extent, to all classes of laborers who come to the work

singly. For extra gang and construction work it is customary, where possible, to ship men from the labor center so that they may arrive at the work in the morning or early part of the day in order that the men may be set to work immediately; otherwise, the loss from those not accepting service is increased. A certain percentage may be expected to desert after having obtained supper, lodging and breakfast without having performed any work whatever.

Foreign labor is affected quickly by rumors of slight increases in pay and better working conditions. It is not unusual for an entire force to leave the work on a few hours' notice. The rate of pay is not relatively so important with hobo labor as with other types of laborers.

Studies extending over some years indicate that free transportation and intoxicating liquors are among the important factors in promoting short service, which, in the case of hobo labor, is its greatest drawback. These conditions are aggravated by poor working conditions and surroundings. While longer service is obtained from foreign labor transported free of cost, the practice is open to more or less criticism. By means of this universal free movement, common labor is enabled, often upon a mere whim, to move back and forth without cost to the laborer from one part of the country to the other, causing a great decrease in man-power with resulting disorganization and increased cost of work to the railroads. It is a question whether better results would not be obtained if all roads were to discontinue this practice and charge for transportation on some basis that, while protecting work at a distance from labor centers, would discourage this wandering tendency of much of the common labor.

Unfortunately, it does not rest with the railroads to remove entirely this source of difficulty. A large percentage of free travel is on freight trains, between, in and under cars, which for various reasons, the railroads have apparently been unable to control. Town and city ordinances contribute, to some extent, to this troublesome problem. Better co-operation between the railroads and states would do much to improve this condition.

Unfortunately, the true reasons are not always given and the figures can only be taken as pointing to the probable cause; the desire for ready money is more frequently the reason. Laborers will leave and return to the same job in the course of a few days, the lost time being spent in idleness. Co-operation between railroads and local authorities and better housing and working conditions would greatly ameliorate this condition.

It will be noted in the above statement that the average length of service for the year 1917 is materially increased over that of 1916. This is in part due to greatly improved boarding and housing facilities.

The stopping of immigration caused by the war and the effects which must culminate because of it has, however, completely changed conditions. The conditions brought about by the war now make it imperative that readjustments be worked out which will have for their purpose better conservation of man-power, and more careful selection and continuity of service of the common labor necessary to maintain the railroads.

The committee desires that this be considered a progress report, and that the subject be continued during the coming year.

Feeding and Housing Maintenance of Way and Construction Employees

No one type of camps or method of feeding men can be offered as a standard applicable to all roads or even

to all gangs on one road or on one division of a road. In many ways each camp is a problem in itself, although a successful plan at one point will be applicable to other camps of the same general character. The most important condition governing the character of the housing and of the food provided is the nationality of the men in the gang. The Italian does not desire the same kind of food as the hobo, nor does he want it provided in the same way. Almost every nationality and class of labor employed on track work has its peculiarities and customs which must be respected, if the men are to be retained in the service of the road.

The highly localized labor of a few years ago has now become a thing of the past. The conditions of the last three years have caused almost all classes of men to move more freely from one part of the country to another than ever before, with the result that there is a greater diversity of forces on almost every road than was found a few years ago. This condition makes necessary the closer study of the housing and feeding of these men in order that their wants may be satisfied in a manner approximating that to which they have been accustomed, for unless this is done they will become dissatisfied and go to other work. On many roads the class of men now employed demand widely differing accommodations from those provided a few years ago.

Extent to which housing is necessary depends on a number of conditions other than the nationality of the men employed. Important among these are the availability of local accommodations and the extent to which the gangs are moved from place to place. The practice is quite general over the country to provide houses for section foremen at points where the foremen find difficulty in arranging for them. Although limited originally to such points where they were provided to enable the roads to hold foremen, this practice has spread on some roads until it has become standard to provide such houses. In past years it was unnecessary, except in isolated instances, to provide housing for section forces, as they were recruited locally and lived at home. With the advent of the foreigner into track work it has been necessary to provide lodging for him, as he is unable to secure accommodations in many communities along the line. This has led to the very common provision of bunk houses at section headquarters in which these men can live. Such facilities are provided for about 75 per cent. of the track forces on the Long Island, which employs foreign labor almost exclusively.

The character of the housing provided for section laborers varies widely. On the Seaboard Air Line, where the negro is employed almost exclusively, it is the standard practice to provide four houses for the use of that number of laborers and their families at section headquarters in addition to the house for the foreman, enabling each negro laborer to bring his family with him. On those roads in the Middle West on which both native and foreign laborers are employed in section gangs, housing is commonly provided only for the foreigner, although no difference is made in the wage.

Car bodies removed from the trucks and placed on the ground are most commonly provided as living quarters for these men, although a number of roads have designed and built bunk houses for this purpose. Where it is necessary to provide housing for laborers of this character, the latter practice is much to be preferred. The car body has little to recommend it other than its ready portability and its supposedly low first cost. At section headquarters, where accommodations of this character will be required permanently or for extended periods, a road can well afford to provide more convenient and sanitary arrangements.

The provision of housing accommodations is even more necessary with extra gangs. Even if the work is such that a gang may be located at one point for a considerable period, it is frequently impossible to recruit a sufficient force locally; and it then becomes necessary in most instances to house such gangs in camps.

In addition to these fixed camps it is necessary to house the men in floating gangs who move from one place to another as the work progresses. This is the more common condition, particularly on the railways in the West, where extra gang work is confined very largely to the renewal of rail and ballast and to similar work which progresses from one point to another. The earliest and the most common type of portable camp is the converted box car. In most cases the cars which are in this service are small and of light capacity, and for this reason they have frequently been condemned as unfit for revenue service. From the nature of its construction a car of this character is difficult to maintain in a sanitary manner and, as a result, it has come into quite general disfavor among laborers in recent years. Because of the important advantage of ready portability the railways have been hesitant about giving up cars for the housing of men, but the general prejudice against them because of their unsanitary condition has led a number of roads to revise their standard plans materially to improve conditions during the last three or four years.

One of the most important objections to the old type of car was the number of men crowded into it, bunks being ordinarily provided for 16 men in a 34-ft. car. Probably the most important improvement which a number of roads have made in the design of their cars has been to reduce the number of men housed in each car. Another important consideration in the design of a bunk car is ventilation. Until recently it has been the common practice to place two windows in each end of a car, one on each side. A practice much to be preferred is that of the Missouri Pacific car, whereby a window is placed opposite each upper and lower berth.

In many cases it is not possible to equip a sufficient number of cars from those condemned for revenue service and it then becomes necessary to take other cars from commercial traffic. The car shortage of this year has illustrated the cost of this practice and has given an incentive to the development of substitutes for the box car which still possess the advantage of portability. Thus the Chicago, Milwaukee & St. Paul has designed a sectional building about the size of a car body, which is built of new lumber by company carpenter forces and which can be taken down and loaded on a flat car for movement from place to place. The Chicago & Northwestern has developed a somewhat larger building which can be handled in the same way. The Southern Railway and a number of other roads have equipped some of their gangs with portable steel buildings, several types of which are now on the market. An important advantage of these portable buildings is the readiness with which they may be fumigated and maintained in a sanitary condition.

Other roads have resorted to tents in which to house floating gangs. The Los Angeles & Salt Lake housed a number of gangs in tents equipped with board floors last year. The Buffalo, Rochester & Pittsburgh also used tents for two or three years, although it has recently abandoned them for portable shanties.

Equipment Provided in Camps

The character of the equipment provided in bunk cars and the responsibility for its provision vary greatly on different roads and, in many cases, between different camps on the same road. It is the common practice for

a railroad to provide the bunks in the cars and also stoves. Beyond this point the responsibility varies, the men providing their own bedding in some instances and the contractor doing this on other roads, while on still others all bedding equipment is provided directly by the railways.

Until a few years ago wooden bunks were almost universally employed in cars and in camps, these bunks frequently being installed in the cars by carpenters in the spring and removed at the close of the season when the cars were returned to revenue service. Aside from the expense of equipping the cars with wooden bunks, these bunks have been objectionable because of the great difficulty in keeping them free from vermin and dirt; and they have been unsatisfactory in other ways. This has resulted in a rapidly increasing use of metal bunks of which several types are now available. While wooden bunks are still to be found in many camps and on many roads, they cannot now be considered in accord with the best modern practice and are not to be recommended for a modern camp.

The men are required to provide their own bedding on a number of roads. On other roads bedding is furnished by the boarding contractor in connection with his arrangement for the feeding of the men. Other roads, particularly in the East, provide the bedding themselves.

Other facilities commonly provided by the railways at camps include stoves, washbasins, etc. There is also a distinct tendency in the more modern camps to provide conveniences for the men, such as shower baths, hot and cold running water, sanitary toilets, etc. In addition to these facilities the Baltimore & Ohio has added a steaming room for the steaming of clothing, and stationary tubs for the washing of clothes in some of its more recent camps.

Another development in some of the more modern camps is the provision of a separate room or car for a lounging or clubroom in which the men can spend their spare time. In some instances where camps have been so equipped, daily and illustrated papers are provided and other inexpensive attractions offered to occupy the spare time of the men and keep them more contented in the service.

The Feeding of Employees

The best method of feeding track laborers is a much disputed question and one concerning which there is much controversy at the present time. Without doubt no one method is equally applicable to all nationalities and to the widely varying conditions. At the same time no one phase of the treatment of track labor is more open to criticism at the present time than this, and it is important that the railways give this subject more attention.

With some nationalities, as, for instance, the Italian, it is necessary to allow the men to feed themselves in their own way. While this frequently results in their underfeeding and lessens their efficiency, it appears to be the only arrangement under which the men will work. However, in most cases it is not only possible for a road to feed its men directly, but it is actually necessary for it to do so, as the only practical way in which the men can be fed.

In the South it is the very general practice for a foreman to feed his men and to charge them for board, the company protecting the foreman against loss by deducting the amounts due him from the pay of the men. With this plan it is possible for the men to express their desires regarding the amount and character of their food directly to the foremen and to secure what they want more readily. The most serious objection to the plan

is the difficulty in preventing some foremen from taking advantage of the men through excessive charges and in other ways. While most roads on which this system is in effect provide supervision of the charges for board made by the foremen, it is very difficult to detect and to prevent irregularities, particularly among colored laborers. On the New York Central Lines west of Buffalo it was formerly the universal practice for the foreman of each gang to buy the provisions and collect from the men pro rata for the exact cost of the food, and this practice is still followed with white men. Foreign laborers are now fed by the track supervisor through the foreman at a fixed rate per man which allows the supervisor no profit, while negro gangs are boarded at a fixed price per week, the charge being deducted by the company in all cases.

The practice most commonly followed in the West is to contract the boarding of all gangs to a contractor specializing in this work and to leave all details regarding the purchase and preparation of the food to him, the company deducting the amount for board from the pay of each man and turning it over to the contractor directly. With such an arrangement the railway usually provides the cars or camps and supplies such as stoves and tables, while the contractor furnishes the dishes and cooking utensils and all kitchen help. Generally the contractor who feeds the men in the camps also operates a labor agency with a view to keeping the gangs full. By this method a railway transfers the responsibility for the feeding of its men to an organization specializing in this work and gains the benefit of this specialization. At the same time this arrangement introduces a third party between a railway and its employes whose interests generally do not coincide with those of either of the other two.

This conflict of interest has led to the operation of commissaries and the feeding of men directly by the railways in a number of cases. The New York, New Haven & Hartford, the Delaware, Lackawanna & Western and the Pennsylvania Railroad have adopted this plan, and the latter road reports that camps operated in this manner are much preferred by the men. In general the policy of a road furnishing its own camps is to provide the men with a sufficient amount of proper food and without profit, removing the tendency for the exploitation of the foremen.

Where the boarding of the men is contracted to a commissary company the rate per meal, or more commonly per week, at which the men are to be charged is determined by agreement between the company and the contractor, and the men are advised of this arrangement when hired. The amount due the contractor is then deducted by the company from the wages due each man and is remitted directly to the contractor.

On the Nashville, Chattanooga & St. Louis the company boards its own men in every gang except one or two special organizations employed on construction work. The men are charged for board on the basis of cost which was computed several years ago, this amount being deducted from the daily wage. No deduction is made for rainy days, while gangs are moving, or where men fail to work for any other reason. No readjustment of this charge has been made in recent years on account of the increased cost of supplies.

To compensate a boarding contractor for the increased cost of foodstuffs and at the same time to keep the rates charged the men for board at a reasonably low figure, the Buffalo, Rochester & Pittsburgh now pays the contractor five cents for each meal furnished a laborer actually at work. The Maine Central accomplishes the same

purpose by reimbursing its foremen, who feed their men, for the actual cost of board in excess of 50 cents per day. The New Haven pays part of the cost of board in still another way, charging the men \$4 per week for the first four weeks they are in the service of the company and \$3.50 per week thereafter. This latter rate, which is less than the actual cost to the company, is offered as an inducement to the men to remain in the service. The Southern goes still further with its extra and construction gangs, paying them a fixed wage in addition to board and then paying the contractor for all meals served without making any deductions from the pay of the men. This eliminates all accounting between the company and the men and removes all uncertainty and cause for dispute concerning deductions from the pay checks, a very important consideration in the mind of the negro.

Another method to protect a boarding contractor against the high cost of foodstuffs is to pay him the actual cost of the food and service plus a fixed percentage. This plan was adopted at several camps on the Big Four last year and has also been tried on other roads.

The committee also presented descriptions of a modern camp on the Baltimore & Ohio and of the system adopted by the New York, New Haven & Hartford to feed its men. Abstracts of the laws of the various states governing the housing of men in camps were also included.

Equating Track Sections

The committee reported progress in compiling data based on the reports received from 20 railroads of the distribution of labor on 76 special track sections. Two of these roads have reported discontinuing this report on account of insufficient force and abnormal conditions of labor.

Conclusions

The committee recommends:

1. That the Bibliography be accepted as information and printed in the Proceedings.
2. That the report on Methods of Securing Labor be accepted as information and printed in the Proceedings.
3. That the report on Feeding and Housing of Maintenance of Way and Construction Employees be accepted as information and printed in the Proceedings.

Suggestions for Next Year's Work

1. Study and report on plans for organizations to obtain labor for railways.
2. Continue the study of equating track sections.
3. Study and report on typical plans of boarding-cars and boarding-houses for railway laborers.

Committee: E. R. Lewis (D. S. S. & A.), chairman; C. H. Stein (C. R. R. of N. J.), vice-chairman; W. J. Backes (N. Y. N. H. & H.), R. A. Baldwin (C. N.), J. O. Barlow (S. P.), A. F. Blass (I. C.), W. M. Camp (Railway Review), H. M. Church (B. & O.), W. R. Dawson (N. & W.), R. C. Falconer (Eric), R. H. Ford (C. R. I. & P.), W. R. Hillary (P. L. W.), E. T. Howson (*Railway Age*), C. B. Hoyt (N. Y. C. & St. L.), C. M. James (A. C. L.), W. A. James (C. P.), A. C. Mackenzie (C. P.), Thos. Mancy, J. C. Nelson (S. A. L.), C. A. Paquette (C. C. & St. L.), J. W. Pfau (N. Y. C.), H. R. Safford (G. T.), H. J. Slifer.

Discussion

E. R. Lewis (Chairman): In introducing this report, the committee asks that the members keep in mind the date when this report was written. It was completed in November last year, and the committee realized at that time the impossibility of anticipating the probable changes in the situation, and it was decided in committee at that time that it would be necessary to consider such changes as we were pretty sure would occur on the floor of the convention today.

These changes have come thick and fast. At the present time the railroads are definitely under active government control. It is presumable that the railway employees, including maintenance of way labor, will receive the benefit of employment under some sort of governmental agency, and that the railways will be benefited by the furnishing and the equitable distribution of adequate man power in this crisis. But the labor question is none the less a serious question. It is becoming daily more apparent that the railways must conserve labor in every manner possible.

There are various methods of conserving labor in railways. There is the possibility of improving working conditions and the methods of hiring, distribution, feeding, housing, the grading of wages and the opportunities for advancement. There is also the possibility of the introduction of labor saving devices along these lines. The vast importance of the labor problem to this association and to the world is a matter of common knowledge to us all. The maintenance of way department of the railway may be expressed in relative money terms. There is more money spent for labor in the maintenance of way department of railways than is spent for maintenance of way material. I think it is safe to say that labor amounts to from 53 to 56 per cent of the money spent. You are urged, therefore, to give this committee and the association the benefit of the very fullest discussion and interchange of thought here today. We want results now for the season of 1918. We want it not only for this association, for the railways that we represent, but for the governments of the countries at war. In this period of unrest this is a matter that I think should receive the serious consideration of us all. We are on a war basis. We have had many routine duties and still have, but they are changing from a peace basis—have changed—and we must look at things from a war standpoint. This matter of labor is the most important thing we have to consider, and there are routine duties that we can put off from time to time or delegate to someone else, while we respond to inquiries relating to this matter of getting and keeping matter for the railways, for any labor that we conserve means conservation for all, and further than that, there have been times when the circulars from committees have not received the attention they should receive at the time of a world crisis like this, when our work is important. As you know, the association must depend on the committees, and the committees must depend on the membership for these responses.

Last October, while the committee was formulating its report, matters were brought up in connection with the securing of labor, with a great deal of emphasis, which have not been included in the report, because of rapid change in the situation. It is believed, however, that suggestions along the following lines represent the fast crystallizing thought of the members at large of this association, as well as the members of the committee. These points are as follows:

1. In order to secure a more uniform distribution, especially of unskilled, floating, or unemployed labor, it is recommended that centralized agencies (preferably under the control of the Regional Directors) shall be maintained in all large labor centers throughout the United States. Such agencies should, where possible, co-ordinate with state and municipal agencies. They should contain a division or bureau especially devoted to securing common labor for railways.

2. For the purpose of strengthening centralized agencies, in the event that they shall be established, the railways should call upon them for such additional labor

as cannot be obtained in their local fields before endeavoring to obtain it through other agencies.

3. In order that the railways may meet the demands of transportation with safety and promptitude, it is essential that they shall be efficiently maintained. As an aid in its accomplishment, as well as to permit co-operative effort to be more quickly effected between the railways themselves or through the duly constituted governmental authorities, it is recommended that each railway designate some person familiar, by training and experience with such matters, to study in detail the labor requirements necessary for the proper maintenance of its roadway, also to collect all available data looking toward the utilization of the various kinds of floating and other railway labor which in the past it has been found difficult to hold in continuous employment.

Very often a gang of laborers are disorganized after leaving the service of one railway when with a little preparation they might easily be employed without loss of time and without loss of efficiency to the railways by a second railway and again by a third.

In connection with "bibliography" Mr. Lewis said: After some consideration it was believed that the members of the committee had better compile this bibliography themselves, in order to make sure that nothing might be overlooked, which at the time of compilation existed and should be included.

The report on "Methods of Securing Labor" is presented by the committee as a matter of information.

In connection with the subject, "Feeding and Housing of Maintenance of Way and Construction Employees," the matter presented in this report is offered as information which we would desire to have printed in the Proceedings.

E. F. Wendt (I. C. C.): I wish to inquire what provision is made to insure the sanitary condition in these camps, and to ascertain the medical conditions. Is there any inspection of the camps by trained and experienced medical officers?

E. T. Howson (*Railway Age*): That is covered in the report, but for the sake of saving time that part was not read. Certain roads do have regular periodic inspections. On the Chicago Terminal division of the Rock Island inspection is made by local company physicians each month. The Chicago & Northwestern has a medical officer who gives particular attention to the sanitation of camps, the refrigeration of food supplies, and the character of the water, even to the extent of requiring that water for camps be hauled to these camps from sources of known quality where the water at the location of the camp has not been analyzed and proved. Such inspections, however, are all too limited, in fact, they are not common, but are made on only a few roads.

J. V. Hanna (K. C. Term.): May I ask if the committee knows anything about the work of the Federal employment bureau?

Mr. Lewis: The committee has some information on this subject, and I have also had experience with state agencies. We have been informed that state agencies were ready and willing to organize and could provide labor. I have on several occasions given them direct orders for labor.

F. R. Layng (P. & L. E.): We received a circular from the Federal employment bureau and I went to Pittsburgh to confer with a local government representative there, who is also representative of the Pennsylvania Department of Labor. He told me he was in no position to give us any help in securing common labor. He was giving his attention primarily to the securing of skilled labor for the Government, particularly the ship-building

industry. I then went to Erie at the other end of our line and consulted with the Government agent there with the same result. I think that the bureaus of the Government are really competing with the railroads for labor, and that we cannot look to them for any help as they are at present organized.

On our own road we have established a local agent in Pittsburgh and one in Erie, and we have been moderately successful in securing labor through them. We make no charge for securing a man a job, as the usual employment agent does. We furnish transportation. I think it was the intention that the Regional Director rather expected us to discontinue that practice. My investigation resulted in the conclusion we would not dare do that under present conditions.

W. H. Courtenay (L. & N.): The committee in its able report has not referred to the economic waste of moving labor from one section of the country to the other.

The Louisville & Nashville, which I represent, has lines extending from St. Louis and Cincinnati to the gulf.

In the last two years there has been an enormous quantity of negro labor travel over our lines to industrial establishments and other roads in the North. That militates against the interest of the cotton planter, the saw-mill man, and every other employer in the South. Of course, it is a difficult matter to regulate.

I can appreciate the situation of the roads which do not have a supply of labor living on the lines. They must get it somewhere. The South has suffered greatly from that condition.

As a general proposition there is almost no foreign labor employed on the L. & N. Our two sources of supply are the negroes of the South and the white people living in the mountainous districts which we touch at many points for many miles. It seems to me the best way, looking to the future, is in providing houses for them and endeavoring to locate them with their families. A negro will not work without the negro women about him. The practice on the road which I represent is almost invariably to provide a good house for the section foreman and generally provide at least two double laborers' houses and sometimes more. I think that is a good plan.

Another wise provision in order to obtain labor, which can be done in the South, if not in the North, is to retain the track laborers the year around, or at least retain the majority of them. Formerly it was the custom on our road to work different numbers of men on the track in the winter season than in the summer season, the summer season lasting seven months and the winter season five months.

We have departed from that and authorized our roadmasters to use a given number of men per year. That enables us to use the labor to better advantage. There are a great many men who are attached to a locality and they will not work away from that neighborhood. But in some cases men are content if they can go home once a week or once in two weeks.

Reference has been made to the boarding car, which has been condemned in pretty general terms, but the boarding car is not disliked by the negro. He is a gregarious animal and rather prefers the boarding car. He does not object to sixteen men in a car, while a white man might prefer a little more accommodation.

As to building the camps, such as have been alluded to here, it is a rather expensive project. If a road can get men without doing that, it would hardly seem that we were justified in going to such enormous expense, particularly in a moderate climate.

As to what the roads will do for labor, it is a difficult proposition. We have managed to hold a good many of our men, notwithstanding that the coal mines are paying boys of 16 \$4 to \$4.16 a day to drive a mule in the mine.

Notwithstanding the fact that laborers can get employment at high rates, they frequently prefer working on the railroad, and much depends on the treatment of the men by the foremen. I do not mean the men getting good food, but having the foreman treat the men with reasonable consideration, as a matter of justice. We have had men leave us and go to other roads, and we were surprised to see them come back very often, and the reason they came back was they said they were treated better. If the laborer is given even-handed justice by the foreman he will appreciate it, and much can be done by that sort of treatment.

(The President adjourned the meeting for lunch.)

Afternoon Session

Mr. Lewis: In answer to the remarks made by Mr. Courtenay before lunch, it was not intended by the committee to put forth the recommendation for bunk-houses and to condemn cars for all cases. There are some kinds of labor that are not like the negro labor. Some of them would rather have houses than cars if it were possible. Of course, the sanitary feature is something that we do not want labor to lead in. It never will lead in it. We have to at least give the help that is necessary along that line as near as possible.

Mr. Courtenay mentioned the economic waste of labor in its transportation. That matter has been covered by the committee. In this connection there is an important matter, which is car conservation. Cars are scarce in this country, and in order that cars be available for laborers, they would have to be conserved for that purpose. Probably on account of the scarcity of cars, there will be more bunk-houses needed. There will be many more cases where we will have to use bunk-houses than cars on account of car scarcity. We will be repairing cars that before were not considered necessary.

Edward Gray (C. & O.): I would like to call attention to the fact that the railways are not alone in wanting labor. The important matter is to increase the general supply of labor in the country for all of the really necessary industries, the railroads among them. The measures that we are considering have been considered by the committee, and of course look to the railways getting their own supply. They are competitive in their nature. Every other industry can also serve labor in the same way, offer them the same advantages, offer them an equal measure of justice, offer them superior accommodations.

There is a broader aspect. It is necessary that the supply should be increased, or rather, the total labor supply of this country should be used for the essential things, and gradually taken from the non-essential things. I don't think there is any other way in which labor can be had for the things we want. As it stands now, the least important of any industry in the country competes with the railways, with the shipbuilders. I don't think that any industry can be named so unimportant that it is not left free to compete, possibly with advantages in the matter of securing labor.

The railways have, of course, a fixed price level. Their power to buy is limited, their power of earning is limited. We try to keep prices down by the artificial fixing of prices, on essentials, but in the matter of luxuries and the non-essentials, there is no such fixing of prices. In the matter of employing labor they have a possible advantage. They can give all they want, and the public can buy at any price that they fix. Meanwhile, of course,

we are led to think it is necessary to keep up every kind of activity.

I don't think it is possible to solve the matter without concentration. It is a matter of sacrificing someone, deciding what is less necessary in favor of what is more necessary. Of course, there cannot be an exact definition, but I think all of us with a little consideration could easily choose the things that are of less importance.

P. G. Lang, Jr. (B. & O.): There is one feature in connection with the handling of labor at this time that we experience in Pennsylvania, and that is the influence of liquor on the large overturn among common labor. I simply want to call attention to this as one factor in this problem. Those of you that are in dry territory do not have this problem probably at all. At least, not to the extent that we do. We find that on pay day there is a large percentage of our men who leave us for several days at a time.

The President: That is a subject I would like to hear discussed. If there are some people from dry states I think the association would be interested in hearing what their experience has been.

L. M. Perkins (Nor. Pac.): We have had some experience in the state of Washington on the west end of the Northern Pacific, and our experience is that it is complicated with the large amount of other work. Under the existing conditions, men are able to get work very readily, and they quit just as often as they did before, but the pay check lasts a good deal longer and they stay out longer. We have more idle men lying around.

J. L. Pickles (D. W. & P.): Another aspect of this is the influence of the commercial labor agents. Their interests are diametrically opposite to the interests of the company. The oftener men leave, the oftener they get their fee, and I believe they offer every inducement to these men to quit. The railroads would gain a point if they could get away from the use of the commercial agents.

Mr. Lindsay: I think we will all agree that the latest offspring of the association, the Committee on Economics of Railway Labor, gives promise of being an infant prodigy. I hope that it will continue its work and realize all we expect of it.

Labor Saving Devices

An Ice Cutter Car

E. R. Lewis, of the Duluth, South Shore & Atlantic, described an ice cutter car which he is using to remove solid ice and densely packed snow from track centers. The device consists essentially of a row of teeth of tire steel, bolted to a steel plate set across the track above the rails in front of a small plow, both the teeth and the plate being hung under the middle of the car and being raised and lowered by means of a counter-weighted lever operated by compressed air obtained from the locomotive. The teeth rip the ice loose while the plow throws it outside the rail. The ice cutter can be operated at from 4 to 6 miles per hour in heavy snow and from 2 to 5 miles per hour in solid ice, the total cost of operation being about \$75 per day. It is estimated that it will do the work which would cost \$1,500 per day to do with pick and shovel. This car costs approximately \$1,000.

Discussion

R. C. Ford (C. R. I. & P.): The Rock Island has used the Jordan leveler about the same as Mr. Lewis has described. We cleaned two tracks at a time and took the ridge out between the tracks. All that Mr. Lewis has

stated is equally true as to the Jordan leveler. It has the additional advantage that it of course takes the ridge out and throws the snow out well beyond the two tracks. This winter in our large Burr Oak yards we took and abandoned one track and threw the snow over for five tracks, piled it up and then took a clam shell and loaded the snow out. I don't know how much the saving was there, but it was a simple thing.

Edwin F. Wendt (I. C. C.): I understood Mr. Lewis to say this device cost about \$1,200. Does that cost include the cutter as well as the car, and if so, was it the cost in 1917, or some other year?

Mr. Lewis: No, it does not include the car. This ice-cutter car is not made to do the work of a leveler; in fact, it is not designed to handle soft snow, but in a yard after you have used your leveler and all your other appliances, and you have left snow and ice four or five inches above the top of your rails. I don't think you can get clear of that ice with any plow. I have tried plows many times and never have had any success until I got this tooth arrangement.

Mr. Lindsay: I know many roads in the east would have given considerable for it if they could have had it this winter. They experienced such prolonged cold weather that the ice formed in the yards faster than they could possibly get labor to remove it. Finally in desperation we took a tie 8x12, with a beveled front, put a 6 in. flanged angle iron on the top of it, sharpened the edge and put teeth in every 6 in., put it in front of a wheel like we used to spread cinders, and we pushed it through the ice with good results.

Oxyacetylene Welding of Pipe Lines

G. J. Ray, chief engineer of the Delaware, Lackawanna & Western submitted a description of the economies resulting from the application of oxyacetylene welding to the construction and repair of steam, air and other pipe lines. In this discussion the weakness of screw joints was pointed out and was illustrated with a number of photographs and drawings. It was emphasized that good results are obtained by substituting:

- (1) Welded joints for screwed joints in smaller pipe lines.
- (2) The more general use of improved flanged joints on larger pipes under low pressure, to say nothing of the positive necessity for them in high pressure lines.
- (3) The use of long sweep bends and elbows to take care of expansion instead of the primitive double swing or the complicated patent slip expansion joint.

Discussion

J. V. Hanna (K. C. Ter.): I might say that we get a good deal of service from a device such as was just shown in making repairs. We cut rails. We cut bolt holes and repair frog points. The street railway companies repair frogs by taking a hard metal, hard steel of some sort—possibly they use electric steel and they harden up these worn points right in the track without removing them.

A Weed Grader

G. W. Vaughan, engineer maintenance of way of the New York Central, submitted a description of a weed grader consisting of an attachment for a roadbed spreader to loosen up stone ballast and to destroy vegetation between tracks and on the shoulders. This grader can be operated at the rate of six miles per hour and, on the basis of eight hours per day, will cover 48 miles of track at an approximate cost of \$31. It would require 10 men 6 days to clean one mile of track by hand. At present

labor rates the cost of cleaning 48 miles of track would amount to \$7,200. When in use the grader swings at right angles to the track. It can be fitted over obstructions readily by the mechanism of the spreader.

Discussion

C. E. Lindsay (N. Y. C.): That weed remover was used primarily in stone ballasted track on the western division of the New York Central line in the vicinity of Batavia. It was designed by the superintendent of track, A. M. Clough. I cannot speak of my own knowledge as to the results attained. I have seen some of the track on which the apparatus has been used. It apparently loosens up the weeds and they die by exposure to the sun. Just how efficacious it is in ultimately killing the weed, or whether it acts as a cultivator to promote the growth of weeds, has yet to be determined, but apparently it has considerable merit.

Melting Snow and Ice With Steam

C. A. Paquette, chief engineer of the Cleveland, Cincinnati, Chicago & St. Louis, presented a description of a hose attachment on an engine tender to permit snow and ice to be removed from frogs and switches by steam. A man at the rear of the tender regulates the flow of steam by means of a globe valve. Actual practice has demonstrated that two men can clean a switch in six minutes. The steam is of sufficient pressure to blow the water away from the switch points and prevent its freezing again. It has been found that two men with this equipment will do the work of 8 or 10 men under ordinary methods.

Mr. Lewis: On the subject of the use of steam for cleaning out snow and ice, I might say that we have for a long term of years used steam hose for other purposes in connection with snow and ice, thawing out locomotive water tanks, cleaning the snow and ice off the trucks of cars, and for the running gear of locomotives, and have found it even more successful there at times than for cleaning out switch points, because if the temperature is low enough the use of steam, and the resulting compensation, if you do not have perfect drainage, the water resulting from the use of steam is likely to freeze very quickly. It would not say that it is cold enough in the northern part of this country to freeze the steam into ice before it hits the switch point, but it is pretty nearly cold enough to do it.

Mr. Lindsay: I have used this winter in Albany an electrical device for thawing switches. It has been used very extensively on the New York Central in the electric zone, where power is easily accessible and comparatively cheap, and it has given remarkable results. In my case, I was using it experimentally, to see what it would accomplish in a zone different from the zone around the Grand Central Terminal, and we had two switches equipped with the device, which consists of a resistance coil buried in the space between the ties and the switch rails, to a depth of about three inches below the top of the ballast. When a storm starts the snow accumulates generally over the switch, and after the switch has been in for a time the area of ground is so frozen that you can feel it, and the current is left on until the storm subsides. During the winter we never touch these two switches, although we had an army of men on the others. In that particular experiment the cost of current was \$25 per month per switch.

Mr. Ford: What did the installation cost?

Mr. Lindsay: I could not tell you that offhand. If you will write to Francis Borden, the division engineer of the Grand Central Terminal, he will be able to give you all the information you desire.

A Tractor for Railway Service

C. A. Morse, chief engineer of the Rock Island, spoke on the uses of tractors in railway work. He said in part: The proposition I am to present to you is the result of my spending my life on the granger roads. The result is that I have become somewhat of a farmer. Last fall I was over on the northwestern lines and we found a lot of work was being done that should be done, and we found that we were offering 60 cents an hour for farmers' teams for mowing rights of way, and matters of that kind, and could not get the teams. It also occurred to me that the farmers were substituting tractors for teams, and I wondered where we would be when the farmers got through with the teams and used tractors.

Returning home, I took the matter up to find out what there was in the way of a tractor that might be applicable to railroad work, and I finally got knowledge of a small caterpillar tractor, and I took up the matter with the parties manufacturing it, and I got some estimates and asked authority to purchase one. I figured in using it, to use it in connection with the shoulder ballast, and I hope to show you one before we get through with this meeting which is used a good deal in the northwest on level ballast, by which you can clean about ten miles of shoulder ballast a day and do it at one-tenth of what it would cost to do it by manual labor. Also it can be attached to a mowing machine, by which you can fix up the shoulder of the bank, or repair a ditch, or plow ditches, or use

it as a scraper, or do anything of the kind that you desire.

I finally persuaded the makers of the tractor to take an interest in the matter of constructing tractors for railway work. I got them to ship one of these tractors to the Exhibit, and send their advertising man down here to show some slides and to explain a little in regard to it. My idea was when this was done we could judge for ourselves whether or not it was applicable to railroad work and maintenance work.

After the talk a number of slides were thrown on the screen illustrating the Cleveland tractor.

A Derrick Car

G. W. Vaughan, engineer maintenance of way of the New York Central, submitted a description of a ten-ton derrick car which was first developed on this road in 1910. The car consists of a steel platform approximately 40 ft. long, supported on two 4-wheel standard M. C. B. trucks. A boom and supports, together with engine, coal and water pockets are placed on the platform. The boom consists of 10-in. channels thoroughly braced with channel diaphragms and lacing and is approximately 22 ft. long to the main hoist and 30 ft. long to the auxiliary hoist. The boom is swung with a bull wheel which is equipped with roller bearings. The car is equipped with a 20-h.p. engine capable of a direct pull of 5,000 lb. It has a lifting capacity of 3,000 lb., with the boom at right angles to the car and working 28 ft. from the center line of the track. The car is operated by one man. When unloading rail, three men are required, one to operate the derrick car, one man to haul on the rails and another one to release the hook. From 150 to 400 rails can be unloaded per day.

Report on Economics of Railway Operation



A NEW COMMITTEE ON Economics of Railway Operation was created by the Board of Direction subsequent to the 1917 convention, to which it assigned the following subject: Study the relations between railway operation and the location, construction and maintenance of railways, and report on the possible scope and field of action which should be assigned to the committee on Economics of Railway Operation, and make such progress reports as are possible, in the order of relative importance.

The committee feels that its function should be the consideration of matters coming within the classification of "Transportation" together with such other matters as affect transportation costs, or as are affected by transportation methods. For instance, economics due to water treatment, which affects transportation expense, would involve a consideration of the maintenance and operating costs of water softening plants, etc.: this committee could use maintenance data secured from other committees in such cases in so far as possible. On the other hand, the matter of treating ties is one which does not affect any transportation costs, and should not come within the province of this committee. The subsequent

use of the word "Operation" in this report is on the basis of this interpretation of the committee's duties.

At the initial meeting of the committee it was decided to be the sense of the committee that its scope or field include all matters affecting the operation of a railroad; but that for the present the committee confine its efforts to developing economy of operation of existing physical plants, including such additions as may be necessary for economical operation, but not including changes in alignment or grade reduction; that its efforts may be extended, from time to time, as the necessity or desirability arises; that as an essential preliminary it proposes to make an analysis of operating costs, as conclusions and rules cannot be arrived at without analysis of costs and the effect of capital expenditures.

An extensive Bibliography, prepared by the Library Service Bureau of the United Engineering Society and covering 12 subjects under 8 headings, was presented as an Appendix to this report.

Recommendations for Future Work

The committee recommends that the following topics be assigned for the ensuing year:

1. Collect data on operation costs from rate case investigations and any other available sources, and report on the additional investigations necessary to a complete analysis of operation costs. The committee on Economics of Railway Location should be conferred with by this committee.
2. Effect of variation in the speed of trains on costs of operation and maintenance.

3. Effect of the construction of additional main tracks on costs of operation and maintenance.
4. Economic length of operating districts.
5. Continue work on Bibliography.

Committee: F. W. Green (St. L. S. W.), chairman; V. K. Hendricks (St. L. S. F.), vice-chairman; G. D. Brooke (B. & O.), Ralph Budd (G. N.), Maurice Coburn (P. L. W.), C. E. Denney (N. Y. C. & St. L.), J. M. Egan (I. C.), L. C. Fritch (S. A. L.), U. E. Gillen (G. T.), C. M. Himmelfberger (C. R. R. of N. J.), M. V. Hynes (C. I. & W.), W. J. Jenks (N. & W.), Paul M. LaBach (C. R. I. & P.), Frank Lee (C. P. R.), J. deN. Macomb, Jr. (A. T. & S. F.), Jos. Mullen (C. C. C. & St. L.), R. J. Parker (A. T. & S. F.), Wm. G. Raymond (University of Iowa), H. E. Riggs (University of Michigan), S. S. Roberts, E. F. Robinson (B. R. & P.), L. S. Rose (C. C. C. & St. L.), Mott Sawyer (C. M. & St. P.), E. C. Schmidt (University of Illinois), J. E. Teal (B. & O.), G. S. Waid (S. P.), C. C. Williams (University of Kansas).

Discussion

(In the absence of the chairman, Mr. Breen, and the vice-chairman, Mr. Hendricks, the report was presented by S. S. Roberts, a member of the committee.)

Mr. Roberts: It is the thought of the committee that we should have the Board of Direction outline to it definitely the division between the work of this committee and that on Economics of Railway Location. It appears that the work in many respects overlaps, and we were not quite sure where the division should be drawn. We will be glad, indeed, to have suggestions, either now or in writing, as to what that division should be.

The President: The Chair would like to state as his personal opinion that this is one of the most important committees of our Association. Railways are in the transportation business. The work of this association for the past 19 years has been largely confined to the constructing of the machine by which the work is done. We have just awakened at this time that there may be a question as to how the work shall be done, and I would recommend to the Chairman of the Committee on Outline of Work that no obstacle be put in the way of the work of this committee and its further development.

H. R. Safford (G. T.): I think Mr. Roberts has stated that the Board of Direction should give a little more definite instruction than they have possibly done in the past, but we have been trying to feel our way a little with this committee. My thought is, speaking to the principal point that you made, which relates to transportation, that it is our duty as an association, to try to interest more transportation men to become members, and this is one of the committees with which the transportation men should be most closely related. At the present time I think that one of the greatest fields for this association to consider for committee work has been that related to the economics of railway operation, and in connection with that comes more or less the question of transportation.

Maurice Coburn (P. L. W.): There is one point about this committee and the Committee on Location, and that is the data that the Committee on Location needs for the solution of its problems is the same data this committee needs for the solution of its problems and both need the same information. To avoid wasted effort we will have to work together, and see to it that we do not duplicate effort in the same field.

C. P. Howard: It seems to me that this sub-committee has pointed out one thing which is eminently true, which we should all have known beforehand, and that is that the subject is tremendously vast and could be well divided between two or three committees.

As I understand the question, their idea is that the Committee on Economics of Railway Locations should

take the first division of expense, that is the maintenance of way, and that they will give their effort for the present to the second, which is transportation. I am unable to see how the economics of operation can be very much separated from the economics of location, unless you take the very broad field that this committee is to cover the whole subject and tell the people how to run the railroad. As a practical matter it seems that dividing the work among the two committees is all right, but they are obliged to work along parallel lines.

Mr. Roberts: One of the members of the committee at one of our meetings sized the situation up in this way—he said that heretofore the Committee on Economics of Location has considered which of two or more things was the most economic for one condition of use, and that our field was to consider which of one or more different usages was best for a given line.

Mr. Coburn: Some of us understand it. Before we can solve these problems we must know certain things about operating costs, and the information you need to solve operating problems is the same information the other committee needs to solve their problems of location, and the other committee came to a point where they found they were up against it, but there was a lack of definite, complete information, so that they could correctly solve their problem, and one of the first moves we have proposed is that we will take advantage of the expensive work being done in some rate cases, to see if there is anything in that that will be any help to this committee.

Mr. Roberts: I think the general idea of the committee agrees very closely with one of the former speakers, that the subject is wonderfully wide, and we would like to narrow it down so that we could get a good firm footing on which to make a start.

J. L. Campbell (E. P. & S. W.): It appears to me that there is a field for the work of this committee parallel to, and in correlation with, the work of the Committee on Economics of Railway Location, and that that field should be occupied by this committee. My view of the matter is, the economics of operation is the foundation on which the economics of railway location is to be determined. The problem involved in the economics of railway location is the question of finding the place on which to build the transportation machine, and the proper solution of that problem involves a knowledge of the elements of the economics of railway operation, possibly not a knowledge of all the elements, but certainly requires a good knowledge of many of them, most of the fundamentals.

It appears to me that the work of this committee in many important respects ought to precede the work of the Committee on Economics of Railway Location and that this committee should be valuable in the determination of the economics of railway location, and it will be valuable if it provides this association and this Committee on Economics of Railway Location with such knowledge and information as may not be now available.

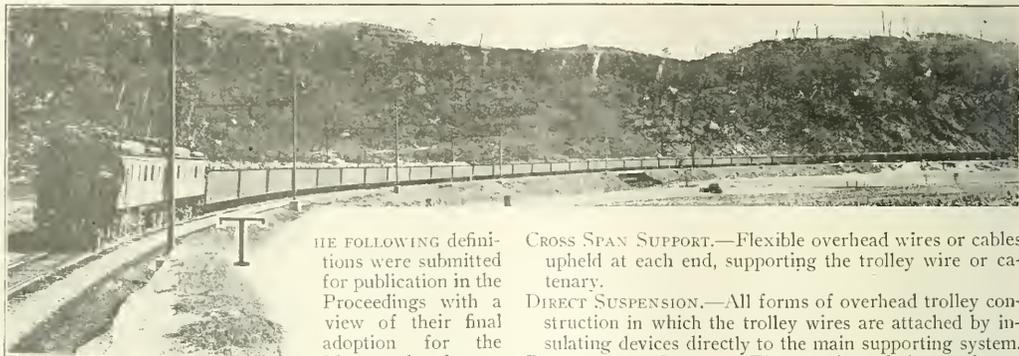
H. Chmurell (N. & W.): I think this committee should take up these various economic questions which have been brought out by the several committees on their respective fields in the first place, and then bear in mind that the cost of a mile is the cost per ton-mile, and that that cost per ton-mile applies to maintenance as well as it does to handling cars over the road. We have recognized that on the Norfolk & Western, and worked out that for 25 or 30 years it runs a possible solution for many questions that come up. In handling the traffic over the line of cars, the larger cars and the larger engines, without increasing the revenues at the same time, form the basis

for our gains. Electrification at certain points makes a large saving. This, however, is limited to points where density of traffic is great enough to warrant it, but I believe as the others have said, that there is a direct work for this committee to do, and they can get information from various roads that will show, irrespective of the increases of labor, that economies are obtained by different railroads.

The President: The Committee on Outline of Work will take careful consideration of the suggestions made by the committee, and I believe that if this committee has some difficulties in starting they will overcome them and make one of the most important committees the association has.

(The committee was dismissed with the thanks of the association.)

Report of Committee on Electricity



THE FOLLOWING definitions were submitted for publication in the Proceedings with a view of their final adoption for the Manual after a

year's trial. These definitions, so far as possible, conform with those adopted by the U. S. Bureau of Standards, printed in the National Electric Safety Code, and those of the American Institute of Electrical Engineers. It is recommended that the definitions be adopted tentatively, with the understanding that they will be reconsidered in the light of suggestions which may be received during the coming year.

BOND.—A metallic means for connecting two rails to permit of passage of electric current.

BONDER.—An employee qualified to install or maintain bonds and their appurtenances.

BRACKET SUPPORT.—An arm supporting the trolley wire or catenary.

BRIDGE SUPPORT.—A rigid overhead structure upheld at each end, supporting the trolley wire or catenary.

CABLE.—Wires bound together, acting as a conductor.

CATENARY SUSPENSION.—All forms of overhead trolley construction in which the trolley wires are attached to one or more supporting cables, which in turn are attached to the main supporting system.

CLEARANCE LINE (EQUIPMENT).—The line beyond which no part of the equipment shall project. Allowance must be made by equipment manufacturers for new equipment for wear on journals and brasses on axle collars, on rails, on wheels, compression of springs, sagging of center of car, constructional variations, end play, broken springs, etc.

CLEARANCE LINE (THIRD RAIL).—Lines beyond which no part of the third rail structure shall project.

CONDUCTOR.—A continuous metallic path for the flow of electricity.

CONTACT CONDUCTOR.—That part of the distribution system other than the traffic rails which is in immediate electrical contact with the circuits of the cars or locomotives.

CONTACT RAIL.—A rigid contact conductor.

CONTACT RAIL (OVERHEAD).—A contact rail above the elevation of the maximum equipment line.

CROSS SPAN SUPPORT.—Flexible overhead wires or cables upheld at each end, supporting the trolley wire or catenary.

DIRECT SUSPENSION.—All forms of overhead trolley construction in which the trolley wires are attached by insulating devices directly to the main supporting system.

DISTRIBUTION SYSTEM.—That portion of the conductor system which carries current of the kind and voltage received by the cars or locomotives.

DUCT LINE.—A structure consisting of one or more pipes laid up in banks in which may be placed wires or cables.

ELECTRICAL SUPERVISOR.—An official of the division staff, qualified to supervise the maintenance of the electrical transmission and working conductors, outside of the power stations and sub-stations.

JUMPER.—A cable used to connect the ends of two contact conductors.

PATROLMEN.—Employees qualified to inspect and make minor repairs to track and third-rail structure, cables and wires, and to use hand signals for the protection of trains.

PULLING CHAMBER.—A chamber smaller than the splicing chamber, and used primarily for pulling cables and wires into ducts.

SPLICING CHAMBER.—A chamber in a duct line where cables are spliced and inspected.

SUB-STATION.—A group of apparatus or machinery which receives current from a transmission system, changes its kind or voltage and delivers it to a distribution system.

THIRD RAIL.—A contact conductor placed at either side of the track, the contact surface of which is a few inches above the level of the top of the track rails.

THIRD RAIL GAGE.—Distance measured parallel to plane of top of both running rails between gage of nearest running rail and inside gage line of third rail.

TRACTION LINEMEN.—Employees qualified to maintain wires and cables and their appurtenances for all railroad voltages.

TRANSMISSION SYSTEM.—That portion of the conductor system carrying current of a kind or voltage different from that received by the cars or locomotives.

TRANSMISSION LINE.—A system of towers or poles and cables or wires carrying current from the source of power to the sub-stations.

TROLLEY WIRE—A flexible contact conductor customarily supported above the cars.

Water Power

The committee is of the opinion that all water power developments, both from the point of view of generation and utilization, are subject to such wide variations, both physical and operative, that every situation is individual to itself; and it is the committee's conviction that now, as never before, there is reason for railroads to investigate anew the financial possibilities to be gained by the development of some of the water powers within their territories, which, under past conditions, may have been considered unprofitable.

The committee reported progress and suggested the following underlying principles as governing a choice between steam and water power developments, or the use of combined water and steam plants.

1. The increased cost of coal, being the largest single factor of cost, outside of fixed charges, in the production of steam generated power, places such higher values upon hitherto undeveloped water powers.

2. Water power on rivers, the average stream flow which can be increased by storage, may now figure attractively against steam generated power in some locations.

3. Water powers on rivers from which continuous flow cannot be obtained may now figure attractively in combination with steam plants against steam development alone.

Proposed National Electrical Safety Code

The preliminary edition of the proposed National Electric Safety Code was issued April 29th, 1915, and submitted for criticism by Dr. E. B. Rosa, Chief Physicist, U. S. Bureau of Standards, Department of Commerce, Washington, D. C. Since that time the code has been the subject of discussion by the officers of the Bureau of Standards and by the representatives of the national engineering societies. The object of the code is to prescribe good electrical practice for all industries, including railroads, and will be recommended by the Bureau of Standards to the various public service commissions and other state legislative bodies for adoption as mandatory law. The second edition of the code was issued November 15th, 1916, for examination, trial and constructive criticism. The most serious defect in the code relates to the requirements for the crossing of foreign wires and cables over railroad company's rights-of-way. The standards used for many years by the railroad companies have been reduced in some important details, as will be shown in the comparison of the A. R. E. A. specifications for overhead transmission line crossings.

General Conclusions in Regard to the Code

1. That the general principles of the code are acceptable and desirable as tending to establish uniform electrical rules in the several states of the Union.

2. That the code is cumbersome and overburdened with cross references and would be made more useful if separated into several pocket-size pamphlets to cover each of the industries.

3. That the requirements of the code pertaining to the crossing of railroad company's rights of way by electric cables and wires are deficient and below the specifications of the American Railway Association, the American Railway Engineering Association and the American Electric Railway Association, and should be revised upwards.

4. That the legality of the code should be established

by the opinion of an authority high in the Federal Government.

Recommendations

1. The committee recommended the tentative adoption and publication in the Proceedings of the Electrical Definitions.

2. Acceptance and publication in the Proceedings, as information, of tabulated statements showing third rail clearances and data relative to overhead clearances on railroads, revised up to November 1, 1917. Continue the subject next year.

3. Acceptance and publication in the Proceedings, as information, of the report on Catenary Construction.

4. Acceptance and publication in the Proceedings, as information, of the report on Electrolytic Effect on Concrete in Salt Water, and a continuation of the general subject of Electrolysis, with the sending of authorized representatives to the American Committee on Electrolysis; and asks for further instructions in the matter of a report on Insulation.

5. Acceptance of the progress reports on Maintenance Organization, Water Power and Electrical Interference, with a continuation of these subjects.

6. That the report on the National Electrical Safety Code be accepted and published in the Proceedings, as information, and that the committee be authorized to send delegates to present a copy of this report to the Director of the U. S. Bureau of Standards, Washington, D. C., and to object to the provisions of the National Electrical Safety Code, which tend to reduce the present requirements of the A. R. E. A. specifications for overhead and underground wire crossings, where the safety of life or property is involved.

7. That the Contract Form on Location of Power Lines and Wires on Railroad Company's Rights of Way be referred to a committee composed of members from the proper standing committees of the American Railway Association and of the American Railway Engineering Association.

Committee: Edwin B. Katte (N. Y. C.), chairman; A. G. Shaver, vice-chairman; A. H. Armstrong, H. M. Bassett (N. Y. C.), Z. M. Briggs (P. L. W.), D. J. Brumley (I. C.), R. D. Coombs, A. O. Cunningham (Wabash), Walt Dennis (Wabash), R. H. Ford (C. R. I. & P.), W. F. Graves, George W. Kittredge (N. Y. C.), C. E. Lindsay (N. Y. C.), W. L. Morse (N. Y. C.), W. S. Murray, J. A. Peabody (C. & N. W.), Frank Rhea, J. R. Savage (L. I.), M. Schreiber, H. U. Wallace.

Discussion

E. B. Katte (chairman): Ten subjects have been assigned by the Board of Direction to the Committee on Electricity, and these subjects have been considered by seven sub-committees. Three of the sub-committees are merely reporting progress, and the others are submitting reports which are briefly as follows:

The revision of the Manual is entirely confined to the suggestion of 28 electrical definitions. Some of them are already contained in the Manual, but are slightly rearranged. Others are proposed definitions, while still a third class are definitions that have been taken from definitions of the Institute of Electrical Engineers. The committee in this connection recommends not the formal adoption at this time of these definitions, but rather that they be tentatively accepted for the year, and that during that period those with suggestions to offer send the revised definitions to the committee, and they will be considered in time for final action the following year.

The Committee on Third Rail and Overhead Clearances submit practically a progress report, with tables showing third rail clearances and overhead clearances.

The Transmission Lines and Overhead and Under-ground Crossings Committee have submitted a report on Item 5, Item 5 being on the proper type of overhead catenary construction, with particular reference to the consideration of providing clear vision for signals, co-operating with the committee on signals and interlocking.

A special subject was assigned during the summer by the secretary to this committee, being a contract form on location of power lines and wires, on railroad companies' right-of-way. The committee was not able to get very far on this, and believes that it is a subject that should be assigned to standing committees of the two associations, and your committee recommends that this be referred to a committee composed of members from the proper standing committees of the American Railway Association and of the American Railway Engineering Association.

The main subject that is in the report is the proposed national electric safety code. The code as a whole has been very favorably received by all of the railroads. It is a very helpful and a very good work. Railroad engineers really only have two objections to make, and these objections have consistently been made ever since the code was first considered. The first is clearances. The code proposes to reduce railroad standard clearances.

The second objection is a structural objection. The code permits lighter structures carrying wires over railroad companies' rights of way, and your committee feels that the code, representing a government document, should not reduce railroad standards. The code is a safety code. Our crossing specifications are distinctly crossing specifications. They do not interfere one with the other.

(Mr. Katte, after reading the matter headed "General Conclusions in Regard to the Code," stated that the code was a voluminous publication and that while it is a very safe guide for electrical construction work, due to the cross references, it was too difficult for the average railroad engineer to use as a specification. Five recommendations were then presented and acted upon by the convention.)

Morton G. Lloyd (U. S. Bureau of Standards): In regard to the comparison which is made in this report between the Joint Specification and rules of the Safety Code, there are a few matters I want to point out only as illustrative that this comparison is not as accurate as we would like to have it. In regard to the provisions for heavy, medium and light loading, our code takes account of the differences in the climatic conditions between the different parts of the country. It provides in territories with medium loading the loading requirements shall be only two-thirds as great as that for heavy loading, and that in the case of light loading it is only to be two-thirds as great as in the medium district. The committee evidently thought we were taking one-third off for the medium and one-third for the light, and stated we had only one-third left.

Another matter is regarding the factors of safety given in this comparison which are quite erroneous. One thing stated is that we only require a factor of safety of one for steel. The Code very distinctly specifies that the stress to be used shall be 27,000 lb. How the committee got a factor of safety of one out of that I am not able to say. The factor of safety for wood poles is stated to be two. That is correct in a sense, and yet very misleading in another sense. The same thing is true of concrete poles.

Another thing to be remembered there is that the Joint Committee specification has not any requirement whatever as to maintenance. We permit them to build

a weaker line, but require them to maintain it at a strength where it will do the work required. That seems to us a much more reasonable requirement and a much safer one for you as well as for the general public.

In view of these matters and these positively erroneous items of comparison, I think it would be very regrettable if that part of this report were passed to final publication as it now stands. As to our strength specifications, I might point out that they also are minimum requirements. What we have done is to draw up a Code of rules which, when finally revised, will be effective as far as possible and we hope will be suitable for the mandatory requirements that may be made as an official order by state commissions or other administrative bodies who have jurisdiction over this kind of construction.

One other thing that is not at all in the joint committee specifications, which we consider very important, is the matter of provision for the safety of the men who are doing the work. In that connection I will say that any code of this kind which is developed with the idea of being eventually made a local standard has got to cover points of that kind. State commissions are deeply concerned with the matter. A specification which does not cover these items is, from their point of view, as well as ours, very defective and unsuitable for the purpose.

Mr. Katte: I don't think there is anything that Mr. Lloyd brought out that has not been considered by your committee, not only at this time but during the past three or four years. Your committee, by representation and by individuals, have been to Washington twice. There is no antagonism on the part of the committee to the Code. The committee is strongly in favor of it. If there is anything in the Code that will strengthen our specifications, we will recommend it to you for adoption. It is the items of the Code that reduce your specifications that we object to. The two principal items are clearances and factors of safety.

The objection to our specification is made by the National Electric Light Association. These men want to cross our railroads with their standard construction. They cannot afford to build their entire line as strong as that line ought to be where it crosses a railroad, no matter whether it is a branch line or a trunk line railroad. The construction should be stronger at railroad crossings than throughout the country.

In the matter of comparison between our specifications and the Code, it is naturally very difficult to compare a precise specification with a very general statement of safety requirements. The Code is not a specification. It is a very general statement of good common practice. We will all follow that Code, but we want to follow the best parts of the Code, not the minima.

The other speaker said that our specifications are not up to date. They are not up to date. The last report was made in 1915, and that revision was merely minor changes. Your committee intends to revise this specification and make it more logical and easily read and interpreted.

Regarding the legality of the Code, there are portions of the Code which are merely constructional which can be enforced legally, there is no question about that. But part 4 is the principal part the lawyers have questioned. They brought out the point that when inspection is made mandatory, that the municipality or United States government appoints the inspectors, as in the case of fire inspection, city police inspection of boilers and electric light installation inspection.

Regarding the structural features of factors of safety, Dr. Lloyd is quite right regarding our contention. It

is our impression that the Bureau of Standards is trying to make the plans between the strong specifications the railroads require for their own structures, and the somewhat lighter construction which the National Electric Light Association permits for their line construction generally. He has proposed a balance between the two.

F. Auryansen (Long Island): I would like first to call your attention to Rule 201 of the Code, which provides that the minimum requirement in the Code may be waived.

To get down to specific examples, this association's specification for structural steel is 18,000 lb. for tension, and corresponding values throughout; whereas the Code increases that figure 50 per cent on the basis of increasing the wind load from 8 lb. to 12 lb. in what is called the heavy loading territory. That is not strictly a 50 per cent increase of both load and stress, because the dead load and the ice load are constant, so that as you increase the stress in the steel you are diminishing your factor of safety.

The Code specifies 700 lb. as the strength of cross arms, pins, etc., in one place, and in another place it says that the entire pulling of the wires shall be provided for. Those are two directly contradictory statements, because the pull in a wire may be very much more than that.

Regarding the minimum requirements, I think there are very few here that would adhere to those. When

we are building a line of this character for ourselves we certainly must take full account of probable growth for a number of years.

The clearance, which may be cut down to 25 ft., according to the Code, is too low. There is the possibility of a cross arm burning, so that instead of a single span you may have two spans combined into one, with a very much larger sag.

The President: I would like to give a little experience that we had in the northwest. In January last we had a rain followed by a cold spell, and for a distance of 35 miles the moment the rain touched any solid matter it turned into ice. All of the telegraph wires were broken in that district. Of course, against a catastrophe of that kind, nobody could have any reasonable factor of safety. The telegraph line that came down weighed seven pounds per running foot. That means it was four or five inches in diameter, and the power wire, being much heavier, would be correspondingly greater with the ice on it.

This subject is not a quarrel by any means between the Bureau of Standards and this committee. Our interest lies in protecting ourselves against construction companies or electric companies that may take advantage of rules that you might promulgate.

(After some further discussion the President stated that the Board would approve the suggestions of the committee, which was excused with the thanks of the association.)

Report of Committee on Ballast



UNDER THE HEADING "Depth of Ballast" in the Supplement to the Manual as published in Bulletin No. 197, Vol. 19, insert the word "proper" after the first word "the," making the paragraph read, "The *proper* depth of ballast under the tie," etc.

Additional Definitions

SKELETONIZING TRACK.—The digging out and removal of all material from over and between the ties down to a level with or below the bottom of the ties.

SHELL BALLAST.—A ballast composed of marine shells of all kinds which are washed into heaps in the shallow water along the Gulf Coast. These shells, for use as ballast, mixed with small per cent of sand, are secured by dredging.

GRANULATED SLAG.—Granulated slag is the product of the blast furnace, formed by having a jet of water injected into the molten slag as it runs from the furnace. This treatment reduces the slag to a granular form.

BLAST FURNACE SLAG.—Slag from blast furnaces, which is poured out as molten slag and allowed to cool. It is then broken up by blasting or otherwise, for use as ballast. This type of slag is of a light gray color, is quite porous and lighter in weight than majority of stone ballast.

OPEN-HEARTH SLAG.—Open-hearth slag is a product of the open-hearth steel furnaces, is very black and dense, and contains a considerable quantity of iron, is quite heavy, and breaks in angular form, and therefore makes excellent ballast.

PRECIOUS METAL SLAG.—A slag from smelters for reducing precious metals; is very similar in appearance and consistency to the open-hearth slag. The precious metal slag is usually black or very dark in color, is very hard and heavy, and, when properly crushed, makes an excellent ballast.

VOLCANIC CINDERS.—Volcanic cinders are the cinders thrown out by volcanic eruptions and deposited in hills and mountains, partially free from lava. In appearance, they are much like "burnt clay" or "gumbo" ballast, but are usually darker in color, and much harder and more durable.

Methods and Cost of Applying Ballast

Mechanical devices used to save labor and expense and to expedite the work fall naturally into sequence from the pit, quarry or ballast pile to the finished track. Cars for transporting ballast should be carefully chosen with regard to the work to be done, whether it is to be on track already laid or for an additional parallel track.

If for raising track, hopper cars should be used with the ballast plow or tie drag. If for parallel tracks, pile dumps are to be preferred, especially when an open-tell Convertible car where the sides swing out and in, will be used with the side plow and including engine, drum and cable, are fairly satisfactory when these cars are not available, which is usually the case where stone ballast is furnished from a private quarry. With open-tell train handling the plow, string, the car is pulled from the locomotive is a poor substitute for the open-tell car. It does not unloading by hand.

The speeder car, sometimes when air-operated, is effective and works well in general use. With this car, ballast is piled on end track with cars which dump alongside the running track from the front cars or unloading by self-acting, can be started out to a grade two miles before the bottom of tie and to the outside shoulder at a

speed of eight miles per hour. When not in use on ballast work the spreader can be used on a grading dump and in wet clay or rock will do the work of 50 men and remain idle most of the time at that.

The only other mechanical tool which seems to require particular mention is the mechanical tamper. This tool has passed the stage where its usefulness under favorable circumstances needs further defense. Around terminals and yards where there is a large amount of frog and switch work, so far as this committee knows, there is no disposition to question the expediency of its use based on its merits alone, entirely apart from any question of scarcity of labor. Opinions differ as to the amount of labor the mechanical tamper will save. It is probably conservative to say that a gang consisting of 1 foreman and 12 men, with 4 pneumatic tampers can do as much work in a day as 20 men with picks or tamping bar, and do it better. Some supervisors set the figure much higher in congested territory.

An outline of a typical four-unit and two-unit gang follows:

Maintenance Gang for Pneumatic Tamper

Four-Machine Outfit	Two-Machine Outfit
Foreman:	Foreman:
1 Compressor runner	1 Compressor runner
2 Hose and utility men	1 Hose and utility man
4 Tampers	2 Tampers
4 Shovel and bar men	2 Shovel and bar men
1 Lookout	

In either case on maintenance work it is assumed that the whole crew working as a unit would renew ties, clean out for tamping and do other preliminary work in advance of the machines. It should be borne in mind, however, that the outfit required with mechanical tampers is complicated and will break down if not properly handled. It is a gas engine and is susceptible to all the potential troubles that go with an automobile, substituting hose troubles for tire troubles. It is an air compressor and requires the same care and is susceptible to the same troubles as any other compressor. The tamping tool is much like a "Jap" Drill and has its own peculiar troubles.

When used at a terminal when the apparatus can receive proper attention from a mechanic, these troubles are not serious. When sent out on a section and left to the tender mercies of the average foreman of an outlying section gang, unless regularly inspected and "tuned up" by someone having the necessary mechanical knowledge not only to put the outfit in shape, but to instruct the foreman in its use, it is liable to be out of order, and consequently out of service a considerable portion of the time.

The carriers were circularized about ballasting by contract and were asked to give the committee their views in regard to the practicability and the desirability of contracting for the application of ballast: (a) On new construction, and (b) on an operated line, first stating whether they had or had not handled ballast work by contract in recent years under either or both of the two classes.

One hundred and seven replies were received in connection with new work. Of this number 18 replied that they had within recent years handled ballast work by contract on new construction, 9 were in favor of continuing such method of procedure, 6 were non-committal, and 3 were opposed. Of the 86 who had not within recent years handled ballast by contract on new work, 13 were

in favor of trying such a method, 36 were non-committal and 37 were opposed.

One hundred and three replies were received in connection with contract ballasting on an operated line. Of the 6 who have within recent years handled ballast by contract on operated lines, 2 were in favor of continuing such practice, 3 were in doubt and one opposed. Of the 87 who have not within recent years handled ballast by contract on an operated line, 8 were in favor of trying such procedure, 32 were non-committal, and 57 were opposed.

On new lines the arguments in favor of contract work as brought out by the replies were two:

1. Flexibility of supply and control over labor owing to freedom in fixing rates of pay.

2. A possible low price owing to some local condition, such as lack of proper equipment on the part of the carrier.

The disadvantages were:

(a) Loss of control over the work.

(b) Less thorough work even under close inspection.

(c) The ultimate cost may be increased.

(d) Dispute over the character and sequence of the work.

(e) Dispute over distribution of ballast.

(f) Dispute over whether or not contractor has fully performed his duty.

On an operated line the same two reasons favorable to ballasting by contract will apply as in the case of a new line.

The same objections are raised and in addition the following are cited:

(g) Some added danger owing to loss of direct control.

(h) Less complete co-ordination between the constructing and operating forces.

(i) Greater interruption to traffic.

(j) Claims for extras on account of interference with the work.

(k) Difficulty of ensuring the maintenance of a surface in the working sector that will prevent surface bending the rail.

Conclusion

The consensus of opinion expressed is strongly against ballasting by contract in normal times and especially so on an operated track. Advocates of ballasting by contract do so largely as an emergency measure because of the greater flexibility of a contractor's organization in changing the rates of pay and so securing labor in time of stress. The matter is best summed up in the language of one of the men listed as favorable to this method. He says:

"My experience on this and other railroads is that contract ballasting * * * is to a large extent a necessary evil."

Comparative Merit of Different Stones

and Gravel and Other Material for

Ballast. Physical Tests of Ballast

Under date of July 24, 1917, approximately 30 carriers were requested to list the various ballasts used of each kind in the order of their effectiveness and the answers of sixteen are tabulated in an appendix to the report. At the meeting in March, 1917, the Association approved the recommendation of the Ballast committee on the order of effectiveness of the various kinds of ballast and the committee has endeavored to obtain from the data in the

appendix the order of effectiveness of the various classes of each kind of ballast as follows:

CONCLUSIONS.

- (1) Stone
 - (a) Trap rock
 - (b) Limestone
 - (c) Sandstone.
- (2) Washed Gravel.
- (3) Broken Slag (not granulated)
 - (a) Precious metal slag.
 - (b) Open-hearth slag.
 - (c) Blast-furnace slag.
- (4) Pit Run Gravel.
 - (a) River or stream gravel.
 - (b) Hill gravel (not cementing).
 - (c) Hill gravel cementing
- (5) Cherts.
 - (a) Cherts from zinc ore, which is coarse.
 - (b) Cherts from lead ore, which is fine
- (6) Burnt Clay or Gumbo.
- (7) Cinders.
 - (a) Hard coal cinders.
 - (b) Volcanic cinders.
 - (c) Soft coal cinders.

The committee obtained from the Library Service Bureau of the United Engineering Society, New York, a list of publications on "Ballast and Ballasting." This

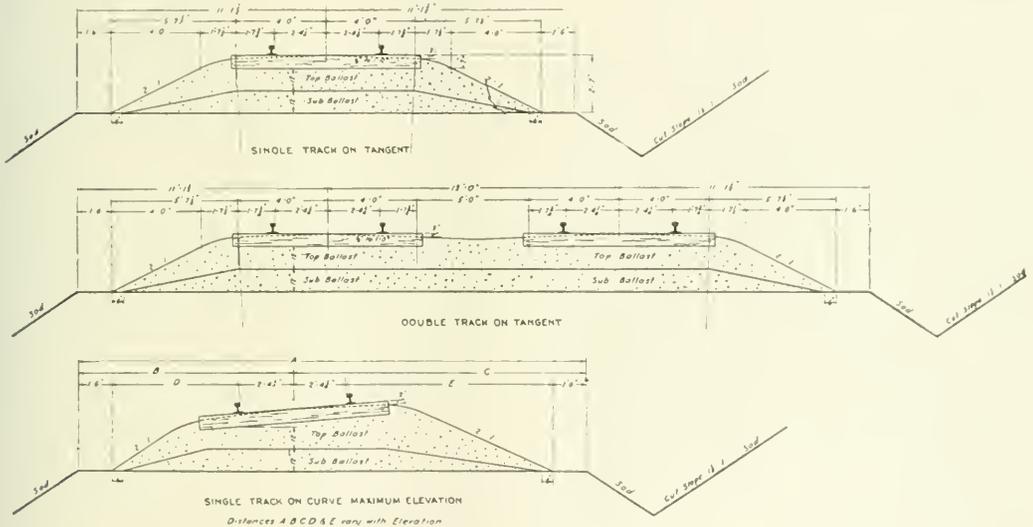
section shown be adopted for "Class A track with 24 in. of ballast."

Conclusions

The committee recommended:

1. That the changes in the Manual be approved.
2. That the additional definitions be approved and published in the Manual.
3. That the phraseology in regard to "Physical Tests of Ballast," be approved for the Manual.
4. That the ballast sections be approved and published in the Manual.

Committee: H. E. Hale, chairman; J. M. Meade (A. T. & S. F.), vice-chairman; C. W. Baldrige (A. T. & S. F.), J. S. Bassett (M. P.), W. J. Bergen (N. Y. C. & St. L.), H. E. Boardman (N. Y. C.), C. J. Coon (N. Y. C.), T. W. F. Johnson (C. G. W.), G. H. Harris (M. C.), F. A. Jones (M. P.), J. S. McBride (C. & E. I.), William McNab (G. T.), F. J. Parrish (C. H. & D.), S. B. Rice (R. F. & P.), H. L. Ripley (N. Y. N. H. & H.), H. E. Stansbury (E. P. & S. W.), Paul Sterling (N. Y. N. H. & H.), F. J. Stimson (P. L. W.), D. W. Thayer



Recommended Sections for Stone Ballast on Class A

is not a complete bibliography, but it is a continuation of a search made on the same subject in the library of the American Society of Civil Engineers on October 10, 1906.

Ballast Sections, With Particular Reference to Sub and Top Ballast

The committee made a composite drawing of the ballast sections of 10 principal roads. Through this composite drawing was drawn in red the outlines of the Class A track sections recommended by the committee for 24 in. of ballast to indicate to the members of the Association how the proposed new section compares with other sections now in use. The committee feels that the Class A section should have 24 in. of ballast under the tie as compared with 12 in. shown in the 1915 Manual, page 55. To agree on all the points at one time is rather difficult and, therefore, the committee divided the section into its parts in the following diagram for the purpose of reaching a conclusion on each part separately.

The committee recommended that the ballast cross-

(I. C.), W. Trapnell (C. & C.), D. L. Sommerville (N. Y. C.), W. K. Walker (Wab.), R. C. White (M. P.), W. D. Williams (Cin. Nor.).

Discussion

H. E. Hale (chairman): The first part that is of interest will be found under the head of Miscellaneous. The committee was fortunate to obtain a copy of the Pennsylvania Railroad's specifications for stone ballast. The most interesting part of those specifications is the inclusion of physical tests for stone ballast. This is the first case of the physical test being included in a specification that the Ballast committee has found.

The committee was assured the question of proper depth of ballast of various kinds to secure uniform distribution of loads to the roadway. No conclusion could be reached by the committee, on account of the fact that the committee on Stresses in Track had not completed its report. We must wait until that committee has the report completed.

Under the heading of Methods and Cost of Apply-

ing Ballast is given a proposed typical gang for ballasting. Your committee feels that more economy can be gained by proper organization of ballast gangs than any other subject that has been given to the Ballast committee. We have been able this year to include several different organizations used by different railroads, and have presented them simply as information, with the hope that we will get from other carriers additional gangs or organizations, so that we can in the coming year give you a definite recommendation. That given is rather tentative. The conclusions are simply to carry this question over until next year.

The next subject given to the committee was the use and limitation of mechanical tools. We have just given you moving pictures of one of the principal mechanical tools, and our conclusions are in the report which we propose be printed in the Manual.

(It was moved and carried that they be put in the Manual.)

Mr. Hale: In regard to the mechanical tamper, our conclusions are given in the third paragraph. I would like to move that that be put in the Manual.

(Motion carried.)

Mr. Hale: We have received from time to time some rather interesting data on the cost of the mechanical tamper. Some of it has been printed in this report and previous reports. It was quite discouraging, and the committee felt it was due to the method of keeping the record. However, they felt that the members of the association would like to have some data on cost, and we did not try to summarize it or average it, but simply reported it to you as received by us.

The next subject given us was "Ballasting by Contract." We had quite a difference of opinion on the committee, and the conclusions of the majority of the committee are printed in the report.

(Mr. Hale read the first two paragraphs.) I would like to move that those be put in the Manual.

(Motion carried.)

Mr. Hale: The next subject assigned to the committee was on Comparative Merit of Different Stones and Gravel and other Material for Ballast. The effectiveness of different kinds of ballast was approved last year by the association, and the committee would recommend that this be included in the Manual as written.

(Motion carried.)

Mr. Hale: In regard to the subject of physical tests of ballasts, there is one recommendation for the Manual.

(Mr. Hale read the first paragraph.)

The committee would like to have that in the Manual, because that bulletin has a great many tests carefully tabulated, and anybody that is studying the tests of stone ballast will get some good information, not only in the eastern part of the country, but from all parts of the country.

I move that that be put in the Manual.

(Motion carried.)

Mr. Hale: The last subject assigned to the Ballast committee was Ballast Section, with particular reference to sub and top ballast. Your committee has had this subject up for several years, and each year they have recommended some section and it has not been approved. The Ballast committee now comes back with the same section recommended to you. The committee itself was not able to agree until we divided the section into three parts. When this was done there was very little differ-

ence of opinion when we realized it was necessary to have 24 in. of ballast under the ties.

Mr. Ford: As I understand the recommendation of the committee, they are seeking to have adopted here a standard ballast section for Class A traffic. I haven't any particular fault to find with this section for some railroad, but I do think it is unfortunate for this association to go on record as committing itself to any particular ballast section.

Mr. Lindsay: In support of Mr. Ford I would like to call attention to what the committee says: "The Ballast committee is not in a position to recommend any addition or changes in the matter in the Manual under the heading of 'proper depth of ballast.' The committee therefore recommends that this subject be reassigned for the coming year's work." And yet in the picture they show a definite depth ballast.

Mr. Hale: That is quite true, and the committee feels that both those statements are correct. The one is the question of the proper depth of ballast for uniform distribution of loads, and on that subject we have no information, or really we have quite a good deal of information, but not what we consider sufficient to make a definite recommendation. In this section the committee recommend the ballast cross section as shown be adopted as Class A track with 24-in. ballast. We specify 24 in. of ballast. We have quite a number of roads with a great deal more than 24 in. In fact, 24 in. is quite common on our trunk lines, and yet the association has shown no section for over 12 in., and instead of being objectionable in valuation work, we were confronted at one time with the question that everything under 12 in. would not be considered ballast, because this association only showed 12 in. of ballast in their cross section. It appears to your committee that the committee is very lax in not recommending a 24-in. section.

H. R. Safford (G. T.): It has been, I think, nearly 14 or 15 years since the 12-in. ballast section in the Manual was adopted. I have no hesitation in supporting the 24-in. section, because I believe that if we will only take cognizance of the increase in locomotives and cars in that length of time we will find that 24 in. is just about necessary. I hope that this motion will prevail.

The President: They are not asking the approval of the 24 in. They are simply asking for approval where you do use 24 in.

Mr. Ford: I am not objecting to any question of 12 in. or 24 in. or any other depth, but I do object to the specific dimensions that are shown as being the outline for the standard ballast section when 24 in. of ballast is being used. I want to make it clear there is no question of 24 in. at all, or any other depth that I object to.

Mr. Hale: If that is the case, we have quite a number of ballast sections in the Manual, and if it is against recommending a specific section, then, as I understand it, Mr. Ford, you would recommend that those sections now in the Manual be taken out.

Mr. Ford: I don't believe that the recommendation of the committee should be agreed to, for publication in the Manual.

Mr. Pickles: I think the form of the section is all right. Why not make it apply to ballast available, so it would answer in any depth of ballast?

Mr. Hale: That is the idea, that we have to get more than 12 in. under certain conditions. We know that 24 in. is used. What we would like to do is to put up a section that, if 24 in. is necessary, this is the proposed section, not recommend definitely 24 in., because we could not pass it. We know that the association would not approve it. If the wording which the committee has recom-

mended is not satisfactory to the association, we would be glad to change that; in fact, we would change anything at all in this section the association desires. But the committee strongly recommend that some section be shown in the Manual with 24 in. It is possible that a

railroad will want 18 in. and they could very easily split the difference between the 12 in. recommended and the 24 in. recommended.

(Mr. Hale's motion prevailed unanimously and the committee was dismissed with thanks.)

Report on Uniform General Contract Forms



THE PREPARATION of a form of agreement for industry tracks has recently become a matter of interest and attention before a number of different railway associations. This committee learned that it has been the subject of consideration by a committee of the Railway Development Association, composed of representatives of industrial departments of railroads, for quite an extended period. It has also recently been under consideration by other associations, including the General Managers' Association of New

York, and by the presidents and executives of the railroads centering in Chicago.

Members of this committee present at its first meeting of the current season in New York City felt that an effort should be made to secure joint action between the Railway Development Association and our Association relative to the preparation of a standard form of agreement for industry track. Arrangements were therefore made for joint meetings of committees of the two associations. Three such meetings have been held and the form herewith submitted has been agreed upon by the two committees for recommendation to their respective associations.

Members of the Association will note, in the form of agreement submitted, that no specific provisions relative to the bargain to be made between the railroad and the shipper as to division of expense, or ownership of track, have been incorporated in the proposed form of agreement. These are left open, for insertion at the option of each railroad, following the lines of the general policy which it may adopt relative to these matters.

A recommendation as to the general policy to be adopted by the railroads is appended to the agreement. The tendency at the present time is undoubtedly toward requiring the shipper to bear all the expense of the construction and maintenance of the industry track beyond the clearance line, while retaining in the railroad the ownership of that portion of the track located upon its right-of-way. This general policy has already been adopted in many parts of the country, while in others the railroad companies have not yet been able to entirely agree upon it. Its uniform adoption, however, in so far as practicable, is recommended for the whole country by members of the two committees acting as a joint committee.

Industry Track Agreement

This agreement, made this . . . day of . . . in the year . . . by and between . . . party of the first part, hereinafter called the railroad company, and . . .

party of the second part, hereinafter called the shipper:

Witnesseth:

WHEREAS, The shipper desires industry track facilities, hereinafter called sidetrack, for the more economical and convenient conduct of ^{his} business, at or near . . . Station, County of . . . State of . . . described as follows:

(Here describe length and exact location of track.)

in accordance with plans dated . . . (Note—If desired insert "identified by the signature of . . ." hereto attached and hereby made a part hereof; and

WHEREAS, The operation of cars and engines over said sidetrack at other than the regularly established station facilities of the railroad company involves the risk of damage to or destruction of property and injury to or death of persons;

Now, therefore, in consideration (Note—If necessary insert one (\$1) dollar, etc.) of the above premises, the covenants and agreements herein contained to be kept and performed by the parties hereto, and of the payments hereinafter to be made, it is mutually agreed that the said sidetrack shall be constructed and maintained, and the railroad company hereby agrees to operate the same, under the following terms and conditions:

Right-of-Way

1. The shipper shall furnish at ^{his} own expense all necessary right-of-way outside of the right-of-way of the railroad company, required for the proper construction and operation of said sidetrack, said right-of-way to be satisfactory to the . . . of the railroad company.

The cost and expense of procuring or complying with any ordinance, order, permit or consent whatsoever required by municipal, state or other lawfully constituted authorities for the construction, operation, maintenance and use of said sidetrack shall be borne by the shipper.

During the continuance of this agreement the railroad company shall have the right at all times to enter upon the property of the shipper, for the purpose of constructing, maintaining and operating said sidetrack.

Construction

2. The actual cost of constructing said sidetrack, including roadbed, trestles, bridges, and all other appliances in connection therewith, shall be borne as follows:

(Herein insert details covering terms and conditions as to furnishing labor and material and division of expense as agreed upon.)

(NOTE—If desired insert "The shipper shall also assume the expense of recording this agreement.")

Maintenance

3. The sidetrack shall be maintained and renewed to the satisfaction of the . . . of the

railroad company; the work shall be performed and the cost thereof borne as follows:

(Herein insert details.)

Ownership

4. The title and ownership of said sidetrack shall be vested as follows:

(Herein insert details.)

Use

5. The railroad company shall have the right to use, without cost, the whole or any part of said sidetrack for general railroad purposes, provided such use shall not unreasonably interfere with the use thereof by the shipper.

The shipper agrees that he will not permit or authorize the use of said sidetrack by or for the benefit of any other person, firm or corporation not one of the parties hereto, nor assign this contract or any rights thereunder, without the written consent of the railroad company.

Changes or Enlargement

6. If any change, rearrangement, extension or enlargement of said sidetrack or its structures shall at any time be required by reason of any change in the railroad company's track or tracks, or because of any changes in the operating practice of the railroad, or for any other cause, all expense resulting therefrom shall be borne by the shipper, unless otherwise mutually agreed by the parties hereto.

Clearances

7. The shipper shall not erect nor permit to be erected any building or structure, nor permit any material to be placed above top of rail within..... (.....) feet of the nearest rail of said sidetrack on straight track, or within..... (.....) feet on curve, nor permit anything to be placed above said sidetrack lower than a height of..... (.....) feet above the top of rail.

Accidents

8. The shipper agrees to exercise the greatest care in the use of said sidetrack to prevent cars or other obstructions from getting upon or too close to main or other tracks and generally to use such means and care as will avoid accidents of every kind.

Liability

9. The shipper hereby agrees to indemnify, protect, and save harmless the railroad company for loss of, damage to, or destruction of ^{his} property, or the property of any other person or persons upon the premises of the shipper by ^{its} request or consent, whether by fire or otherwise, or of death or injury to any person or persons (except where it can be shown that such death or injury to person or persons was due solely to negligence on the part of employees of the railroad company) arising out of the construction, maintenance, use or operation of said sidetrack.

Discontinuance

10. The shipper shall assume and bear any and all loss or damage sustained by ^{him} in consequence of any temporary or permanent elimination of said sidetrack, due to the relocation or change in the grade of the track or tracks of the railroad company by virtue of any municipal action or otherwise, or in event the disposition of the property of the railroad company or its future

use or development shall make it impracticable in the judgment of the.....of the railroad company to continue the connection, and the shipper hereby waives any and all claims therefor.

Cancellation, Termination and Removal

11. It is expressly understood and agreed that if for the space of.....consecutive months said plant be not operated, unless prevented by a strike or strikes, or if the title to said plant become vested in or the operation thereof be transferred to some party other than the shipper, or if any other party operating said plant refuses to adopt this agreement and to agree in writing to be bound thereby, or if the shipper fails to keep and perform any of the covenants, agreements, terms, or condition, hereinbefore set forth to be by ^{him} kept and performed, then the railroad company reserves the right to terminate this agreement upon.....days' written notice to the shipper.

Upon termination of this agreement the railroad company shall have the right to enter upon the property of the shipper and take up and remove any or all the material owned by the railroad company as aforesaid, and shall not be liable to account in any way to anyone for any monies paid or expended on account of any of the track or tracks covered by this agreement, nor for any damages resulting from the removal of the track or tracks owned by the railroad company as aforesaid.

Until terminated as hereinbefore provided, this agreement shall inure to the benefit of and be binding upon the parties hereto, their heirs, executors, administrators, successors and assigns.

In witness whereof, the parties hereto have executed this agreement in.....the day and year first above written.

.....Railroad Company

By.....

Witness for Railroad Company

.....

(Shipper).....

By.....

Witness for Shipper

.....

Recommended Basis for Division of Cost

of Construction and Maintenance, and

Ownership of Industry Tracks

After leaving the right-of-way of the railroad company, all responsibilities of the company as a common carrier cease and in going beyond the right-of-way, the railroad company becomes the agent of the shipper in the operation of said sidetrack, thereby contributing to the economical operation and efficiency of its plant. This fundamental principle should, therefore, be considered in determining the basis for dividing the cost of construction and maintenance, and the ownership of such industry track.

An industrial sidetrack is essentially a plant facility and furnishes the shipper with service elsewhere than at the regular station of the railroad company. It is, therefore, recommended, as a matter of equity, in constructing such track, that the following terms as to division of expense and the ownership of property, should govern:

1. The railroad company may pay for and shall maintain that portion of the sidetrack from the switch point to the clearance point.

2. The shipper shall pay for and maintain that portion of the sidetrack beyond the clearance point, including roadbed, trestles, bridges and all other appurtenances.

3. That portion of the sidetrack upon the right-of-way of the railroad company shall be and remain the property of the railroad company.

4. That portion of the sidetrack beyond the right-of-way of the railroad company shall be and remain the property of the shipper.

Form of Agreement for Interlocking Plant

Your committee considered this form of agreement at three of its meetings, and also discussed it with a sub-committee of the Signal and Interlocking Committee of the Association. The Form of Agreement for Interlocking Plant herewith submitted is the result of action taken at these various meetings.

Members of the association will note that in the submitted form of agreement no attempt has been made to specify a basis upon which the expense for construction, maintenance and operation should be divided, because that portion of the agreement is part of the consideration which must be determined in each case by negotiation between the companies interested; and because conditions vary so widely in different parts of the country that no specific basis for apportioning the expense has been considered feasible. This portion of the agreement is therefore left open to be negotiated and written into the agreement in each case.

The articles covering Liability and Arbitration are incorporated in the submitted form, in order to complete the same. The committee recognizes the fact, as will doubtless also members of the Association, that these two articles are peculiarly the province of the legal officers of the railroads, and that they will therefore probably be modified in many cases, to meet local conditions, et cetera.

Agreement for Interlocking Plant

This agreement, made this day of, 19.., by and between....., hereinafter called the..... company, and....., hereinafter called the..... company.

Witnesseth that:

WHEREAS (Note—Include brief description of conditions, including the location of existing or proposed grade crossing; an enumeration of all existing agreements, if any; the names of the companies between which agreements were made, their dates, purpose, et cetera).

WHEREAS, The parties hereto mutually desire to construct, maintain, renew and operate an interlocking plant at said crossing, the location of said crossing being shown, and the said interlocking plant to be arranged as shown on the blue print marked "Exhibit A," dated....., identified by the signatures of the..... of the..... company, and of the..... of the..... company, hereto attached, and hereby made a part of this agreement.

Now therefore, in consideration of the premises and of the mutual conditions and agreements hereinafter set forth, the parties hereto do covenant and agree as follows:

Definition

1. The term interlocking plant, herein contained, shall be held and taken to include any and all houses, towers, power plants, machinery, appliances and appurtenances required for the operation of the same.

Construction

2. The..... company agrees to construct an interlocking plant, as shown on said "Exhibit A," and

in accordance with specification which have been approved by the..... of the parties hereto, and identified by their signatures.

The cost of removing any existing safety appliances or devices shall be divided in like manner as the maintenance and renewal expense of said appliances or devices has heretofore been divided.

The..... company agrees to begin the construction of said interlocking plant within..... days after the execution of this agreement, and to carry the same forward to a prompt completion.

(Note—Insert penalty clause if desired.)

Apportionment of Cost

3. (a) The cost of constructing, maintaining and renewing said interlocking plant, as shown on said "Exhibit A," shall be borne by the parties hereto as follows:

Each party hereto shall participate in the ownership of said interlocking plant in the ratio which the payments made by it for construction of said interlocking plant, including extensions and changes chargeable to capital account, bear to the total cost of construction thereof.

The expense of maintaining and renewing said interlocking plant shall include taxes, assessments and insurance; all losses by fire, flood or other damage caused by the elements; also any change made necessary by an act, law or ordinance, of a lawfully constituted public authority.

(b) The cost of operating said interlocking plant, including power, heat, light, and supplies, shall be borne by the parties hereto as follows:

Spare Space

4. Spare levers, machine spaces, and building space, may be provided for its exclusive use upon request of either of the parties hereto, at the sole cost and expense of such party; provided, further, that the other party to this agreement may hereafter acquire the right to the exclusive use of the same by either paying the original cost, or by providing an equal amount of space of the kind used when the same shall be required, at the election of the party which originally provided the spare space.

Extensions and Changes

5. Either party shall have the right to make extensions or changes in said interlocking plant, provided that they shall not materially impair the efficiency of the same. All such extensions or changes, arising from changes made in any existing track or tracks, or made to cover any future track or tracks or connections, which either party hereto may have the right to construct, or which may be required by reason of any changes made in the standard appliances of either party, or which may be ordered by a lawfully constituted public authority, shall be made by the..... company, and the cost of such extensions or changes shall be borne by the party hereto for whose benefit said extensions or changes are made, and the amount chargeable to each party for maintenance, renewal and operation in such case shall be determined as follows:

Control of Plant

6. MAINTENANCE—(a) The maintenance and renewal of said interlocking plant shall be under the sole charge and control of the..... company, and it shall employ competent persons to maintain and renew the same, and such parties from time to time so em-

ployed shall be removed for good and sufficient reason upon request in writing of a general managing officer of the company.

Each of the parties hereto, through its authorized employees and representatives, shall have the right at all times to inspect said interlocking plant, as well as the accounts covering the construction, maintenance, renewal and operation of the same; and in the event that the company shall notify the company in writing of renewals and repairs that may be necessary for the safe and proper operation of said interlocking plant, and if the company neglects for a period of thirty days to make said necessary renewals and repairs, then the company shall have the right to make such renewals and repairs, and the company shall, upon presentation of proper bills, and within the time provided in Section Ten hereof, pay its proportion of the amount so expended.

(b) Each of the parties hereto shall, at its own expense, keep all switches and derails in its own tracks free from ice, snow, dirt or other obstructions which may interfere in any way with the proper working of said interlocking plant; and in case either party fails to do so, the other party may enter upon the premises of the party at fault and remove such ice, snow, dirt or other obstructions; in which event, the party at fault shall reimburse the party doing such work, as provided in Section Ten hereof, for all expense thereby incurred.

OPERATION.—(c) The operation of said interlocking plant shall be under the sole charge and control of the company, and it shall employ competent persons to operate the same, and such persons from time to time so employed shall be removed for good and sufficient reasons upon request in writing of a general managing officer of the company.

It is further mutually understood that either party may use the operators at said interlocking plant in its telegraph or telephone service, provided said party shall give the other party at least ten days' prior written notice of the same; but in the event that additional expense is so incurred, either on account of increased wages of operators over levermen, or on account of additional employees required, the party using the operators in its service shall bear the additional expense. If for any reason it becomes necessary to temporarily take the said interlocking plant out of service, the control of the flagmen required to protect said grade crossing shall also be in the company, and the expense of said flagmen shall be considered, for the purpose of apportionment, as an expense of operating said interlocking plant.

Material and Labor Supplied by Parties

7. Each of the parties hereto shall, without cost to the other, furnish and install its own derails, switch points, switch rods, special switch and derail ties and timbers, all track insulations, poles, cross-arms, pins and insulators, and will maintain and renew them from time to time thereafter; likewise, without cost to the other party, do all the track work and grading along its own tracks necessary to prepare the same for the installation of said interlocking plant, and also provide and maintain proper drainage; likewise, bear the cost and expense of raising and adjusting pipe carrier and mechanism foundations, or the renewal of detector bars, clips or any other appliances required or made necessary by the resurfacing, rebalasting or rail renewal of its tracks within the limits of said interlocking plant; likewise, furnish and install at its own expense any signal bridges,

or other special signal supports, which may be required to support signals governing the movement of trains on its tracks.

Either party shall have the right to carry its automatic block signaling through the limits of the interlocking plant at its own expense. Where signals perform the function of both block and interlocking signals, the party hereto whose train movements are controlled by said block signals shall maintain the same at its expense.

Precedence

8. In the use of said interlocking plant passenger, mail and express trains shall have precedence over freight trains and light engines; and freight trains shall have precedence over light engines. The trains and engines of the company shall have precedence over the trains and engines of like class of the company.

Wage Rates

9. The wages of employees connected with maintenance, renewal and operation of said interlocking plant shall be the same as the standard wages paid by the company for similar service to its other employees in the same territory.

Payment of Bills

10. All payments hereunder shall be made within thirty days after rendition of proper bills.

The company shall render bills covering the cost of constructing said interlocking plant, such expense to be billed in one statement unless otherwise agreed upon by the parties hereto.

Bills covering the operation, maintenance and renewal of said interlocking plant shall be rendered monthly; and those covering insurance, taxes and assessments, annually.

Such of said bills as are based upon payroll cost of labor and stock prices of material shall include a fair arbitrary charge to cover supervision, inspection, handling, transportation, accounting and similar undistributed items of expense. Such fair arbitrary charge shall be in accordance with the recommendations of the General Managers' Association of in effect from time to time, or in the absence of any such recommendations, shall be agreed to by the parties, or determined by arbitration as hereinafter provided.

Should dispute arise as to the correctness of any items included in bills rendered under this agreement, the party against which such bills are rendered shall pay all items concerning which there is no dispute, and the other items shall be paid promptly when the correctness thereof has been ascertained by arbitration or otherwise.

Liability

11. Each party hereto assumes for itself the responsibility and risk of using and operating its own trains and engines over the space covered by the said interlocking system, and also responsibility for the negligent acts and omissions or the alleged negligent acts or omissions of its own officers, agents, servants and employees engaged in connection therewith; and in performance of any of its separate duties under this contract; and will pay to the other party and to third persons all damages which may arise and for which it may be liable from such negligence and in such operation.

The party having special charge of the management and operation of said interlocking system shall not be liable to the other party for the negligent acts or omissions, or the alleged negligent acts or omissions of any person employed in the operation, maintenance or repair of said interlocking mechanism, but all persons so

employed shall, as respects any injury caused by such negligence, be regarded and treated as the agents or servants of each party hereto, and each of said parties hereby assumes the responsibility for all damages resulting from the negligence of such agents or servants in the operation of its own engines, cars and trains, and those of its tenants, lessees and licensees, at the said crossings, and shall indemnify and save the other party harmless therefrom. Any expense caused or growing out of the injury or any workman or employee engaged upon the construction of said interlocking plant shall be held and considered to be a construction expense, and shall be divided as herein in Section 3 provided.

Arbitration

12. In case of any differences or dispute arising under this agreement or concerning the subject-matter thereof, the parties hereto agree to submit such difference or dispute to three arbitrators, one of whom shall be appointed by the company, and another by the company, and each party shall give to the other party written notice of appointment of its arbitrator, together with his name and address. The two arbitrators so chosen shall select a third arbitrator. If either party shall fail to choose an arbitrator as herein provided, the arbitrator selected by the other party hereto, at the expiration of days after the date of its said written notice, shall select a second arbitrator, and the two arbitrators so chosen shall select a third arbitrator. If within days after the appointment of a second arbitrator, as herein provided, the two so chosen shall have failed to select a third arbitrator, either party hereto may apply to any judge of the District Court of the United States for the district which shall then include....., or who shall thereupon appoint the third arbitrator. The three arbitrators so chosen in any manner as herein provided, or a majority of them, shall hear and decide said difference or dispute, and their decision, or that of a majority of them, shall be final and binding on the parties hereto.

The expense of an arbitration under the terms hereof shall be borne by the parties hereto in the proportions fixed by the arbitrators.

Cancellation of Conflicting Agreements

13. It is mutually understood and agreed that any and all agreements existing between the parties hereto or their predecessors, so far as they conflict, or are inconsistent with the terms and conditions of this agreement, are hereby annulled, but in all other respects they shall continue in full force and effect.

Duration and Succession

14. This agreement shall take effect on the:..... days of, 19.., and shall continue in force during the existence and operation of the interlocking plant, or until discontinued by the mutual agreement of the parties hereto.

The provisions of this agreement shall be binding upon and inure to the benefit of the parties hereto, their successors, lessees and assigns.

In witness whereof, the parties hereto have caused this agreement to be executed in duplicate, by their respective officers, thereunto duly authorized, the day and year first above written.

.....Company,
Secretary. By.....
.....Company,
Secretary. By.....

Committee: E. H. Lee (C. & W. T.), Chairman; C. A. Williams, vice-chairman; C. Frank Allen, S. D. Braxton (Little Kanawha), O. P. Chamberlain (C. & J. W.), John P. Congdon, Thos. Earle, W. D. Fancette (S. A. L.), G. F. Gifford, J. C. Irwin (B. & A.), R. G. Kenly (M. & St. L.), A. S. Kent (C. I. & I.), C. I. Parker (N. Y. C.)

Discussion

E. H. Lee (Chairman). The preliminary statement as to the scope of the committee's work for the association will not be read. We suggest no revisions for the Manual this year. Briefly stated, we prepared a form and submitted it to the association last year. For reasons internal to the committee itself, the form was not recommended for introduction into the Manual, and during the current year we found this same question of a uniform contract form of agreement for industry tracks was a subject before several other associations and railroad bodies, and it therefore seemed desirable to coordinate our efforts, so far as possible, with these other bodies, and after several joint meetings with representatives of the association which is principally interested in this particular agreement, we offered to this association this agreement for its approval and for introduction into the Manual.

I will just briefly run over Appendix A, and name the various headings, so if any objections are made or suggestions offered we can consider them.

(Mr. Lee then read the sub-divisions of Appendix A, and there was no discussion on them.)

(Mr. Lee then read Appendix B, "recommendations," and said):

I wish to call attention to the fact that nothing in the side-track agreement is intended to exclude or prevent any carrier from inserting: (1) any routing clause, (2) any clause for the continued use of the right of way to other established industries beyond, or being served through, said track (under clause No. 5) by payment of a per cent on fair valuation of land used; mutually valued or arbitrated if not agreed upon.

I move the adoption of the agreement for industry track and its incorporation in the Manual. (Approved.)

Mr. Lee then read the matter headed, "Report on form of Agreement of Interlocking Plant," and then read the headings in the agreement in Appendix C.

The President: Is there anything in this contract as to what company shall operate the plant?

Mr. Lee: That is left to negotiation between the parties.

H. R. Safford (G. T.): As I read the agreement, it is predicated on a situation where two parties are jointly involved, and where the relation of the two is not that of junior on one side and senior on the other, and I have no criticism to offer to the agreement as to that feature, but this agreement would not apply and would not protect the senior company in the case of a crossing where one company was responsible for all of the expenditures. In that case the junior company should take at least all of the liabilities in connection with the operation and maintenance of that crossing. Has the committee given any consideration to the fact that there must be a change in the form of the contract to cover that condition?

Mr. Lee: The committee considered that phase of the subject thoroughly, as one or more members of the committee had identical conditions in the territory served.

I wish to move the adoption of the uniform contract form for interlocking plants and its incorporation in the Manual.

(The motion was duly put and carried, and the committee adjourned with the thanks of the association.)

WINDY CITY ECHO

(COUNT THE LETTERS)

13TH ENGINEERS, (RY) U. S.

Vol. 1. No 1.

FEBRUARY 13, 1918

PRICE 2½ Washers

THE COLONEL'S MESSAGE

The members of this regiment, having grown accustomed to the more or less novel conditions which surround the work upon which they are engaged and to the equally novel if not always comfortable conditions under which they must live, it is natural that they should turn their attention to devising ways and means of recreation and amusement to while away the hours when not on duty. It is in that spirit and largely with that object in mind that the Windy City Echo makes its first appearance. Unlike commercial newspapers it does not aspire to a large number of subscribers and advertisers but to a large number of contributors and its success or failure will be measured in part by the extent to which this aim is realized.

It is in no sense an official organ. On the contrary it is the work of the soldiers of the Regiment acting through representatives chosen from each company and only such restrictions will surround its publication as are required by the censorship regulations and for the maintenance of military discipline.

The Echo has before it a great field of usefulness. Besides its success as an entertainer and as a medium for the exchange of ideas, which seems to be assured, it can do much to stimulate Regimental Spirit and to initiate and foster various other forms of recreation and amusement.

That it will seize these opportunities and thus become a powerful instrument for good in shaping the destiny of the Regiment is the earnest wish of the Regimental Commander.

C. W. KUTZ.

OBITUARY

Prudent R. Van Rissinghem, Company B, was fatally injured by being thrown from his train at S----- on December 27th, 1917. He was born in Nevele, Belgium, and enlisted from East Moline, Illinois, where he was employed on the Chicago, Rock Island & Pacific Railroad. He was a good soldier and a good friend, and the first man of the regiment to lose his life on active service. He was buried with military honors at F----- the day following his death. The services were conducted jointly by Lt. Cutler, Chaplain, and a French priest from the hospital.

Jesse C. Main, Company D, died at Ameri-

can Base Hospital No. 15 on December 16th, 1917, from a complication of diseases resulting from typhoid and pneumonia. He was removed to the Base very shortly after being taken sick, and during his five weeks there was in daily communication with friends from this regiment convalescing there. He was 27 years old and enlisted from Stillman Valley, Ill. and had worked for the Chicago, Milwaukee & St. Paul Railroad. He was buried at the Base, and a dozen men from the regiment, were able to attend the funeral service. He was a very cheerful, willing worker and was widely known in the regiment.

BUCK UP

Buck up boy, it ain't so bad

Dog-gone, it might be worse,
A soldier's alive until he's dead

So why climb into the hearse.

Of course you're takin' a gambler's chance,

But it's a hundred to one you'll win,
So just buck up it ain't so bad,
Accept it all with a grin.

You wanta go back? Well so do I

And it's that that'll make you fight,
But you can't give in to the inner man
And expect to do things right.

Why cuss it kid, think of the guy

Who ain't seen home in years,
If you've gotta feel bad, feel bad for him,
He hasn't got time for tears.

So forget about the lonely streak,

Remember the part you play,
You're over here to do your bit
And until then you've gotta stay.

You're thinkin' about the folks back home?

Well they're thinkin' about you too,
They're mighty proud you're over here
So why the devil feel blue?

So just buck up, do your share,

And don't wear a smile,
It's the things we here to fight hard for
That makes our lives worth while.

Why it's all a part of Life's big game,

Loneliness, love and joy,
But it's things like that, that make the man,
Be a man, Buck Up, my boy!

TED SULLIVAN

Med. Dept.

APPRECIATION

The 13th wishes to thank each and every one of the friends back home who were instrumental in making our Christmas more enjoyable by sending over here Christmas boxes and various other forms of presents:

A large proportion of the Christmas boxes received by the men were grouped in Chicago and shipped in large boxes, which secured very prompt handling and insured their arrival with minimum of loss and breakage. Every man in the regiment appreciated the amount of trouble it was to do all the work in connection with notifying their relatives and getting the packages together. On behalf of the men we take this opportunity of expressing their hearty thanks to Mrs. W. C. Langfitt, Mrs. R. D. Black, Mrs. N. L. Howard, Mrs. C. A. Holmes, Mrs. F. E. Sloup, Mrs. E. H. Shaughnessy, and Mrs. V. H. Hagelbarger.

In addition to this the employees of the following railroads, which are represented by a company in this regiment, are tendered the grateful acknowledgment for work they have done for the men:

Illinois Central
Chicago, Rock Island & Pacific
Chicago Great Western
Chicago, Milwaukee and St. Paul
Chicago & Northwestern
Atchison, Topeka & Santa Fe.

Another of our benefactors was Vice President E. A. Howard of the Chicago Burlington & Quincy Railroad, who provided cigars for every man in the regiment.

In spite of the fact that the men from the Chicago, Burlington & Quincy are scattered among different regiments, the employees of that railroad got together a fund of more than \$300.00 which will go far toward providing the little extras which help so much in padding up the regular ration allowance.

Officer of the day: « I saw you lying in the gutter last night. »

Joe Burnes: « Yes sir, two Master Engineers were holding me down. »

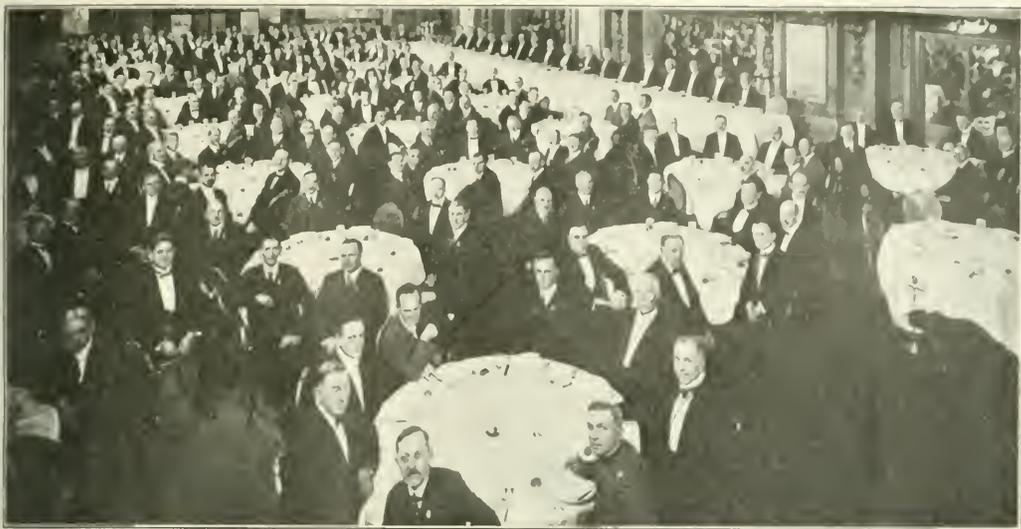
O. of D.: « Who were they? »

J.B.: « Haig and Haig. »

°°

Have you noticed that all the French girls have the Arc de Triomphe in their eye?

A copy of the first paper published by the 13th Engineers (Railway) regiment, which is now operating railways "somewhere in France." Among the officers of this regiment are a number of members of the American Railway Engineering Association, including Charles L. Whiting, major, Second Battalion (formerly division superintendent, C. M. & St. P.); W. G. Arn, captain adjutant (formerly assistant engineer, maintenance of way, I. C.); C. E. Carson, captain adjutant (formerly superintendent, F. D. D. M. & S.); and T. W. Fatherson, captain engineer (formerly engineer maintenance of way, C. G. W.)



Banquet of American Railway Engineering Association

Annual Dinner of the Engineering Association

Abstracts of Addresses at the "War-Fare" Dinner Held in the Gold Room of the Congress Hotel Last Evening

THE NINETEENTH ANNUAL DINNER of the American Railway Engineering Association was held in the Gold Room of the Congress Hotel last evening with President John G. Sullivan presiding as toastmaster. The speakers included Sir Edmund Walker, president of the Canadian Bank of Commerce, who spoke on "Canada's Part in the War"; Edward R. Kelsey, governor of the International Association of Rotary Clubs, whose topic was "Good Fellowship," and Rev. Stephen K. Mahon, the title of whose address was "Unsolved Problems."

The program was highly patriotic in character. All of the speakers laid emphasis on the necessity of taking all possible measures to back up our troops at the front.

Two tables were occupied by Santa Fe men, while the Rock Island men filled three tables. The Cornell University alumni also occupied a table as in previous years.

Canada's Part in the War

Sir Edmund Walker spoke in part as follows:

In speaking to an audience consisting, as this gathering does, of men who deal with facts scientifically the message must be free of camouflage and boasting while retaining the courage to give praise where due. Canada is much misunderstood by Americans, but it is to Americans like George Louis Beer and Clarence W. Alvord that the British owe their knowledge of the colonial system of Great Britain.

The early Canadians were French, clinging to their own systems, United Empire loyalists determined to build on Great Britain's mistakes, the Scotch and the Irish who love fighting and the English who would not readily lose touch with the old land. These are the people who won successive victories in parliamentary struggles

and brought to the British dominions beyond the seas autonomy so complete that only a silken thread is left.

How would such a people act when Great Britain was in trouble? Tribal feeling is the strongest instinct in man. So we did not hesitate. Great Britain had pledged her honor for Belgium and by the end of July, 1914, men from all parts of Canada were either offering military regiments or volunteering to raise them. Step by step there were raised about 400,000 men and then we resorted to conscription to carry out our pledge of 500,000 men. To make this army effective we soon realized that we alone must clothe, feed and arm our men.

The manufactures in Canada are not highly developed. Our problem was to secure machinery, plan factories and train men and eventually women. The Munitions Board had to guarantee deliveries of raw materials, build factories and increase the output generally. The articles grew from shrapnel shells to aeroplanes and ships. Now Canada is producing these articles in 550 factories. On these plants the sum of \$13,500,000 has been expended for the account of the Imperial Government. The Board has contracted for a large number of high power aeroplane engines and there are now under contract in Canada 112 steel and wooden ships with 405,000 tons capacity, aggregating in value over \$90,000,000. The cost of the war to Canada at the end of 1917 had totaled \$70,000,000. In our last loan we asked for \$150,000,000 from our people. We received subscriptions for \$417,000,000.

We in Canada are not war weary. It is burned into us that if the war is lost it will be by the civilian people at home. Our civilian soldiers made in a few months have

first fight at St. Elói through the battle of Ypres and many other fights which will be associated with the name of Canada forever.

Between 20,000 and 30,000 English women are now in France serving as nurses and searchers, etc. Canadian women are serving everywhere. In Canada they are the bulwark of every charity and are filling men's places in every walk of life.

Despite submarines the number of vessels coming and going in all United Kingdom ports was greater in December, 1917, than in February, 1917, when submarine war really began. The British Navy alone has made this possible. Great Britain has carried safely across the sea 13,000,000 soldiers and has only lost 9 transports and 9,000 men. She has also convoyed safely 2,000,000 horses, 25,000,000 tons of war supplies and 53,000,000 tons of coal and oil.

With the entry of the United States into the War our boys are fighting together. If we can but make democracy workable, we can together make the world worth while, which it certainly is not just now.

Dr. Mahon's Address

Dr. Mahon spoke in part as follows:

Unsolved Problems, we have had them. We have always had them. Some have been easy to solve. Some have caused the midnight oil to burn. Solution has come when there was a willingness to accept the facts no matter how unpleasant, and to deal honestly, vigorously, and persistently with them. The Pilgrims solved the Indian problem with shotguns, and it was not General Sherman, but General Miles Standish, who first said, "The only good Indians are the dead ones."

The American ideal is essentially an ideal of democracy. In the three great tidal waves of immigration, the first was for religious liberty; the second for political liberty, and the third for economic liberty. America, with all her mistakes, has kept clearly in the conscience of her body politic those ideals of justice, liberty, equality and righteousness which are dearer than life itself. She has always desired peace. Her wars have always been wars in which principles were involved. If sometimes the nation has seen "through a glass darkly" the progress has nevertheless been up and not down. The policy has been that of good will, generosity and co-operation. The standard nationally has been "of the people, by the people and for the people," and not "of the people, by the rascals, for the rich."

Over against the American ideal of democracy with its reverence for law and reverence for the rights of others is the Roman ideal, modernized as we see it today in Germany where the big word is that of "Verboten"—forbidden. It is found everywhere throughout the nation; it is the rule of fear. The leaders of Germany are out for a modern Roman Empire; they believe in it. They have prepared for it; at all stages they have been game for the colossal risks involved. The object is power; the state has no morals. Like the monster in Mrs. Shelley's "Frankenstein," there is the body, the brute, the mind with its cunning, but it has no soul, no sense of justice, no sense of obligation—a monster who victimizes.

It is said that when the German army entered Louvain, the priests and preachers prayed, the nuns wept, the young girls besought brutal men for mercy; but all to no avail. You cannot argue with a drunken man, nor preach to a lion, or persuade a brigand. America, standing in the presence of treaties violated, all the finer instincts of our civilization desecrated, its liberties denied—what must she ask herself? What have I to gain by war? What would I lose? Would it be the popular

move, the expedient thing? Would it be profitable?

Lincoln said, "A house divided against itself cannot stand; we cannot exist half-slave and half-free." We accepted that doctrine for our nation, a war was waged, and justice was established. Now we say, we cannot exist half-autocracy and half-democracy, and in using these terms I mean them in no platitudinous way. But interpreted by our text we cannot exist with one half seeking to have Lordship over the faith of the people while the other half is seeking to be helpers of their joys.

Which shall conquer? Germany says, "We shall win"; Bernstorff says, "America is too far away"; Von Hindenburg says, "America has come in too late." No one knows what a night will bring forth, changing the destinies of centuries. In such a situation, we must do more than simply stand and wait.

The Great Adventure

Study the great characters of history. Where did they come from? The Joan of Arc, the Washingtons, the Lincolns, the Lafayettes—they are those who, in response to the common experiences of their day, gave themselves to the bettering of those conditions. This is the challenge of today—injustice, hate, greed, ambition, autocracy trampling the rights of humanity under foot; there leaps up in the soul resentment, we see red, we feel a passion to correct wrong; we must respond to the challenge or the soul shrivels. When some of the white stars of our service flags are being splashed with red and some being turned to gold, there is no place for the profiteer and the greedy. Each must sacrifice. Every man is in the war. It is the glory of America that she answers the call of the oppressed.

Christianity is the single solid hope of world peace—so far from Christianity having failed, this is a war for Christian principles. The rule of Christ only can usher in the rule of peace. Therefore, we must not only win the war, we must win the world. The great issue in the world today is the Kingdom of God. Underlying the material are the ultimate spiritual issues. Col. House, on his return from Europe, said to President Wilson, "There can be no permanent peace until the churches christianize international relationships."

Good Fellowship

The last speaker was Edward R. Kelsey, governor of the International Association of Rotary Clubs. He outlined some of the things to be gained by "good fellowship" in an organization such as the American Railway Engineering Association. He expressed, by example, what real friendship means. However, to secure the maximum good a man must do his part, the "I-don't-like-that-man" spirit will not do. How much sunshine have you spread in his path? Optimism is another attribute now so essential. Acquire the "I-can-do-it" habit. The success of the Liberty Loan campaigns illustrate what can be done, and what must be done again with the help of these characteristics.

Meeting of Committee V—R. S. A.

Committee V of the Railway Signal Association on Maintenance and Operation, L. R. Mann, chairman, held a meeting yesterday in Room 344 at the Auditorium Hotel. Rules were drafted for the instruction of mechanical men and maintainers for use at mechanical interlocking plants. These are to be printed in card form for placing in towers. Similar rules are also to be formulated for electro-mechanical electric and electro-pneumatic plants.

A. R. E. A. Election of Officers

An announcement of the results of the balloting for officers for the ensuing year was made at the close of yesterday's session. The officers are as follows:

President, C. A. Morse, chief engineer, Chicago, Rock Island & Pacific, Chicago.

First Vice-President, Earl Stimson, engineer maintenance of way, Baltimore & Ohio, Baltimore, Md.

Second Vice-President, H. R. Safford, chief engineer, Grand Trunk Railway System, Montreal, Canada.

Secretary, F. H. Fritch.

Treasurer, George H. Bremner, district engineer Bureau of Valuation, Interstate Commerce Commission, Chicago.

Directors, J. L. Campbell, engineer maintenance of way, El Paso & Southwestern, El Paso, Texas; E. A. Frnk, principal assistant engineer, Seaboard Air Line,

Chicago Engineers' Club will be announced tomorrow, although as first vice president of this organization he has been performing the duties of the president for the last eight months owing to the absence of the regularly elected president in Russia. He is chairman of a sub-committee on water waste of the Chicago Association of Commerce. He is also a member of a special committee on public affairs of the Western Society of Engineers, Chicago, and is the member of the nominating committee of the American Society of Civil Engineers from the eighth district. He is equally active in the work of the American Railway Association, being chairman of the sub-committee on engineering, which has been considering clearance legislation among other problems and being a member of the maintenance committee of that same organization.

Mr. Morse is an enthusiast in any work which he undertakes, in his railway work as well as in his asso-



Earl Stimson,
First Vice-President Elect

C. A. Morse,
President Elect

H. R. Safford,
Second Vice-President Elect

Norfolk, Va., and E. H. Lee, vice-president and chief engineer, Chicago & Western Indiana, Chicago.

Nominating Committee, J. E. Crawford, chief engineer, Norfolk & Western, Roanoke, Va.; H. T. Douglas, Jr., chief engineer, Chicago & Alton, Chicago; J. V. Hanna, chief engineer, Kansas City Terminal Railway, Kansas City, Mo.; J. B. Jenkins, formerly valuation engineer, Baltimore & Ohio, now in military service; J. E. Willoughby, chief engineer, Atlantic Coast Line, Wilmington, N. C.

President Charles A. Morse

Charles Adelbert Morse, whose election as president of the American Railway Engineering Association was announced yesterday, is an enthusiastic believer in the value of engineering organizations. Although he came to Chicago only four years ago and is carrying the responsibilities of the position of chief engineer of the Rock Island Lines, a system of over 8,000 miles, he has found time to take active part in the work of a number of important engineering organizations and has made his influence felt strongly in them. In addition to assuming the presidency of the American Railway Engineering Association today, his election as president to the

association activities, his success can be contributed largely to the enthusiasm which he instills in those with whom he comes in contact. With this enthusiasm is combined an aggressiveness and a disregard for restrictive precedents which enable him to cut any obstructive red tape to secure the desired results. Under his leadership the American Railway Engineering Association should make important progress during the next year, a period in which many problems will be presented, the proper solution of which is essential to the continued welfare of the organization.

Charles A. Morse was born at Bangor, Me., on January 1, 1859, and was educated at the University of Maine. After completing his education, he immediately came west and began railway work as a chairman with the Chicago, Burlington & Quincy. After spending four years with that company he became division engineer on the Mexican Central, where he remained for a year and a half before returning to the Burlington. He entered the service of the Atchafalaya, Topeka & Santa Fe as a transition in January, 1889, and remained continuously in the employ of that road for almost 27 years, during which time he passed through all the grades to that of

chief engineer of the system. He was division engineer and resident engineer at Fort Madison, Iowa and Pueblo, Colo., until July, 1901, after which he was assistant to the chief engineer at Topeka for seven months and then principal assistant engineer at La Junta, Colo., for 13 months. From March 1, 1903, to July 1, he was engineer of the eastern grand division at Topeka, after which he was acting chief engineer of the Atchison, Topeka & Santa Fe until July 8, 1904, on which date he was appointed assistant chief engineer. On September 1, 1905, he was appointed chief engineer of the Coast Lines, with headquarters at Los Angeles, Cal., and one year later he was appointed chief engineer of the lines east of Albuquerque, N. M., with headquarters at Topeka, Kan. In November, 1909, he was appointed chief engineer of the Santa Fe System, which position he held until March, 1913, when he became chief engineer of the Chicago, Rock Island & Pacific at Chicago.

A. R. E. A. Registration

- Auryansen, F., Bridge Eng., L. I. R. R., Jamaica, N. Y.
 Baldwin, Hadley, Asst. Ch. Eng., C. C. C. & St. L. Ry., Cincinnati, O.
 Barnhart, E. H., Asst. Eng., B. & O. R. R., Baltimore, Md.
 Beall, L. L., Ch. Eng., A. B. & O. R. R., Atlanta, Ga.
 Bell, Gilbert J., Eng., West. Dist., A. T. & S. F. Ry., Newton, Kan.
 Bergen, W. J., Asst. to Ch. Eng., N. Y. C. & St. L. Ry., Cleveland, O.
 Berry, J. B., Cons. Eng., Chicago, Ill.
 Blass, A. F., Eng. M. W., I. C. R. R., Chicago, Ill.
 Bouton, W. S., Eng. B. and B., B. & O. R. R., Baltimore, Md.
 Boyd, G. E., Div. Eng., D. L. & W. R. R., Buffalo, N. Y.
 Boykin, R. H., Div. Eng., Erie R. R., Susquehanna, Pa.
 Brown, H. W., Asst. Div. Eng., Pa. Lines, Cleveland, O.
 Butterworth, A. S., Asst. Eng., M. P. R. R., St. Louis, Mo.
 Cadarette, Nelson, Asst. Eng., D. S. S. & A. Ry., Duluth, Minn.
 Cassil, H. A., Eng. M. of W., P. M. R. R., Detroit, Mich.
 Chandler, Charles, Asst. Bridge Eng., I. C. R. R., Chicago, Ill.
 Charles, R. S., Layne-Bowler Co., Memphis, Tenn.
 Coburn, Maurice, Prin. Asst. Eng., Pa. Lines West, St. Louis, Mo.
 Cook, R. A. (in Military Service).
 Cronican, W. P., Asst. Eng., I. C. R. R., Chicago, Ill.
 Crugar, E. L., Dist. Eng., I. C. R. R., New Orleans, La.
 Cunningham, A. O., Ch. Eng., Wabash Ry., St. Louis, Mo.
 Dakin, A. H., Jr., Cons. Eng., 370 St. Nicholas Ave., New York.
 Davis, C. S., St. Eng., Detroit & Pa. R. R., Detroit, Mich.
 DeMore, G. A., Div. Eng., N. Y. N. H. & H. R. R., Hartford, Conn.
 Dennis, Walt, Prin. Asst. Eng., Wabash R. R., St. Louis, Mo.
 Donahey, J. A., Gen. Supt. and Ch. Eng., A. C. & Y. Ry., Akron, Ohio.
 Doupe, J. L., Ch. Sur., C. P. R., Winnipeg, Canada.
 Dyke, R. L., Div. Eng., N. Y. S. & W. R. R., Elmira, N. Y.
 Evans, John, Div. Eng., M. C. R. R., Detroit, Mich.
 Faulkner, L. E., Ch. Eng., Miss. Cent. Ry., Hattiesburg, Miss.
 Finley, W. H., Ch. Eng., C. & N. W. Ry., Chicago, Ill.
 Fisher, S. B., Care M. K. & T. Ry., Parsons, Kan.
 Ford, R. H., Eng., Tr. Elev., C. R. I. & P. Ry., Chicago, Ill.
 Gebert, S. C., Val. Dept., C. H. & D. Ry., Cincinnati, O.
 Glass, J. J., Ch. Draftsman, C. G. W. R. R., Chicago, Ill.
 Grant, E. W., Asst. Eng. Val., Santa Fe Ry., Topeka, Kan.
 Hawthorne, F. M., Asst. Div. Eng., Pa. Lines, Louisville, Ky.
 Heritage, C. S., Bridge Eng., C. C. S. Ry., Kansas City, Mo.
 Hill, G. D., Asst. Eng., Val. Dept., N. Y. C. R. R., Cleveland, O.
 Howard, R. H., Ch. Eng. M. W., Wabash Ry., St. Louis, Mo.
 Hoyt, C. B., Supt. Tr. Maint. and Const., N. Y. C. & St. L. R. R., Cleveland, O.
 Johnson, E. A., Supt. B. & B., Maine Cent. R. R., Bangor, Me.
 Johnson, Noah, Eng. M. of W., Wabash R. R., Peru, Ind.
 Johnston, D. B., Div. Eng., Pa. Lines, Louisville, Ky.
 Johnston, T. S., Care L. E. Myers Co., Chicago, Ill.
 Katte, E. B., Ch. Eng. Elec. Trac., N. Y. C. R. R., New York.
 Kegler, W. C., Eng. M. W., C. C. C. & St. L. Ry., Galion, O.
 Khuen, Richard, Gen. Man. Erect., Am. Bridge Co., Pittsburgh, Pa.
 Knight, H., Supt. M. W., Erie R. R., New York City.
 Larsson, C. G. E., Asst. Ch. Eng., Am. Bridge Co., New York.
 Latham, R. L., Ch. Eng., H. & B. Ry., Hamilton, Ont., Canada.
 Lloyd, H. A., Spl. Agt., Erie R. R., Jersey City, N. J.
 Maischaider, A. F., Eng. M. of W., Big Four Ry., Mattoon, Ill.
 Martin, E. L., Eng. M. W., M. K. & T. Ry., Dallas, Tex.
 McComb, R. J., Supt. Tracks, W. & L. E. R. R., Brewster, O.
 Miesse, C. H., Jamestown, N. Y.
 Mills, A. L., Receiver, Ft. S. & W. R. R., Ft. Smith, Ark.
 Montfort, R., Cons. Eng., L. & N. R. R., Louisville, Ky.
 Neubert, John V., Eng. Track, N. Y. C. R. R., New York.
 Newhouse, C. E., Asst. Div. Eng., B. & O. S. W. R. R., Seymour, Ind.
 Passel, H. S., Ch. Eng., C. I. & W. R. R., Indianapolis, Ind.
 Pearce, R. M., Res. Eng., P. & L. E. R. R., Pittsburgh, Pa.
 Petersen, W. H., Eng. M. W., C. R. I. & P. Ry., Des Moines, Ia.
 Pfafflin, E. H., Ch. Eng., C. T. H. & S. E. Ry., Chicago, Ill.
 Puder, F. R., Asst. Eng., C. T. H. & S. E. Ry., Chicago, Ill.
 Purdon, C. D., Ch. Eng., St. L. S. W. Ry., St. Louis, Mo.
 Ramage, J. C., Supt. of Tests, Sou. Ry., Alexandria, Va.
 Ray, W. M., Asst. Eng., B. & O. R. R., Cleveland, O.
 Reichmann, Albert, Div. Eng., Am. Bridge Co., Chicago, Ill.
 Rettinghouse, Herman, Ch. Eng., C. St. P. M. & O. Ry., St. Paul, Minn.
 Rhodes, E. M., Asst. Eng., B. & O. R. R., Baltimore, Md.
 Ringer, Frank, Ch. Eng., M. K. & T. Ry., Dallas, Tex.
 Robinson, J. S., Div. Eng., C. & N. W. Ry., Chicago, Ill.
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of the plate come to bearing on the fishing surfaces of the rails, only at the middle where the two rails join, and with the inside face of the fish plate at some distance from the web of the rail as in the ordinary angle bar. At the ends of the bar, however, the fishing surfaces are not in contact, so the bolting up of the joint has the effect of bending the splice bars until their inside surfaces come in contact with the web of the rail. Under this construction and with sufficient allowance in the bolt holes for expansion and for the bending of the rails under traffic, the joint bars may serve to hold the rails in coincidence at the joint without being themselves subjected to bending stresses by the load.

Some of the claims made for this joint are that it eliminates rail breakages in the joints and breakage of the



The Roach Joint in Track

An Improved Design of the Roach Rail Joint

MOST OF THE RAIL joints now in use are designed on the principle of connecting the rail ends by members intended to continue the stiffness of the rail across the joints. A rail joint must also act as an expansion joint for the rail, and provide for the necessary slipping of one or both rails within the clasp of the joint members as the rails change in length, with variations in temperature. Because of these two conflicting requirements, the primary office of the rail joint—to make the separate rails act as continuous members by the joints—

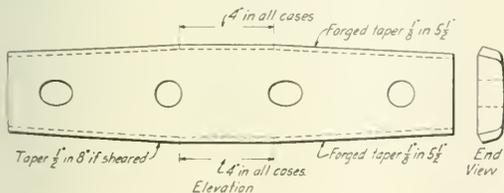
joint itself; that stresses in the bolts are reduced, that the joint has only half as much metal as the lightest form of any other type of joint; that it is the simplest joint and therefore the easiest to apply; that it can be applied at the heels of switches and frogs with the same ease as on other joints and without change of design; that the spacing of ties is unnecessary, that the bases of rails can be spiked opposite the Roach bars the same as at any other part of the rails, and that standard tie plates can be used throughout. The bars may also be removed and replaced without having to draw the spikes. Joints of this type have been in use on several southwestern railroads for several months.

The Clarification of Boiler Waters

ONE OF THE ADVANTAGES of the large riser pipe type of water tank arises from the opportunity it affords for sedimentation and disposal of matter held in suspension in the water. The water may be naturally muddy as when coming from a stream like the Missouri river, or it may contain precipitated solids through the use of soda ash or some other reagent to accomplish a partial water treatment where for any reason it has not been thought desirable to install a complete water softening plant.

The manner in which the base of the large riser pipe acts as a settling basin or sludge sump is shown in the sectional illustration. The outlet and inlet pipe extend up into the riser pipe for a distance of 10 ft. or more so that there is a considerable portion of the riser pipe below the tops of the inlet and outlet pipes which can serve for the accumulation of the suspended matter. A specially arranged wash-out valve is provided at the bottom which is easily operated from the outside by a lever while the tank is in service.

In accordance with this idea, a large number of the tanks furnished by the Chicago Bridge & Iron Company for the Chicago, Burlington and Quincy have been equipped and are operated as treating tanks. The soda-ash is sprayed over the top of the inlet pipe as the water is pumped into the tank, the sediment being precipitated



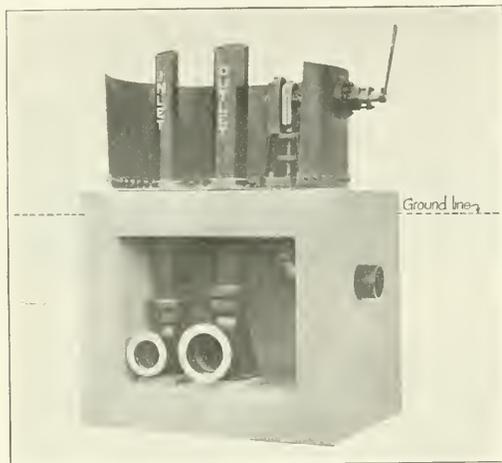
Details of a Joint Bar

has been difficult to accomplish. This is one reason why a different solution of the joint problem has been submitted in the form of the new Roach Joint, manufactured by the Reinforced Rail Joint Company, St. Louis, Mo.

The principal function of this joint is to keep the trends of adjoining rails co-incident at the point of juncture while leaving the rails free to bend independently under load. As seen in the accompanying photograph, this joint is essentially a pair of fish plates, although presenting a marked difference from the old-fashioned fish plates in that the fishing surfaces are on convex curves, that is, the splice bar is deeper at the midpoint than at the ends. Because of this, the fishing surfaces

to the bottom of the large riser pipe. All of the tanks which have been furnished to this railroad in the past few years have been equipped for water treatment so that the process may be installed at any time without the delay or expense incident to putting the tank out of service. The Wabash has also applied this method of water treatment to a number of tanks furnished by the same company.

As many water stations are located where water is pumped from mud-bearing streams, the large riser pipe is more generally used for the collection and discharge



Sectional View of the Riser Pipe Base, Showing Arrangement

of mud than for soda-ash treatment. The matter held in suspension soon settles in the bottom of the large riser where it may be discharged through the washout valve. The Illinois Central tanks at Dyersburg and Obion, Tenn., are both supplied from muddy streams so that it is necessary during certain seasons of the year to sludge the sediment out through the washout valve every few days. The problem of securing cleaner and purer water for locomotive service is of particular importance at this time and the method of securing these results by means of this type of tank is of interest, as the results are obtained with practically no labor expense.

A New and Economical Coal Handling System

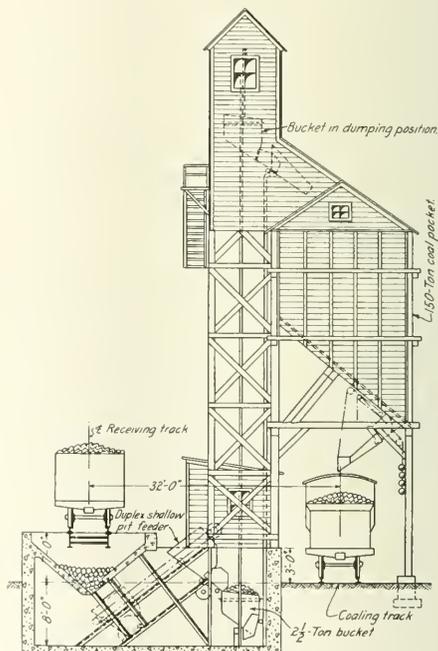
THE BUCKET PITS 24 to 25 ft. deep required with the counterbalanced or balanced bucket-type coal handling plants are occasionally a source of trouble and expense where wet excavation, rock or quicksand are encountered. Because of this, the Roberts & Schaefer Company, Chicago, perfected a duplex shallow pit loader which eliminates the deep pit while still retaining the advantages of the large bucket, and during the past two years installations involving this type of pit have been made at Paintsville, Ky.; East Ely, Nev.; Las Vegas, N. M.; South Chicago; South Brownsville, Pa., and Chicago.

In this new design the coal is received in a 20-ft. long track hopper in the regular manner. Directly in front of the aperture of the hopper is an undercut gate made

of ½-in. steel plate operating on rollers. This gate, in its opening and closing feature, is actuated by the ascent and descent of the duplex feeder, which has a capacity of 2½ tons. This feeder is a large structural steel box, which rolls on flanged rollers on a heavy angle-iron track carried on the structural steel supporting frame in the bucket pit. The loader is direct connected by gears to the hoist which elevates the bucket; the gears being so timed that the loader makes its trip upward as the bucket descends, the ratio being about five to one.

On the front of the measuring receptacle is an apron equipped with a roller which likewise travels on a guide, which prevents its opening except when discharging the load into the bucket. The apron folds over a pair of pulleys in discharging coal into the elevating bucket. With this design noise is eliminated and the operation of machinery in pit is silent.

The duplex shallow pit loader permits the installation



A Cross Section of the Plant

of a 12-ft. pit by elevating the receiving track 2 ft. above the coaling track. It also permits coaling on a track which is located 32 ft. from the receiving track, as shown in the plan.

"Never Again"

He found his own front porch with wonderful accuracy, navigated the steps with precision, and discovered the keyhole by instinct. Once in the dimly lighted hall, there was an ominous silence followed by a tremendous crash.

"Why, what has happened, George?" came a voice from above.

"It's all right, Mary, but I'll—I'll learn those goldfish to snap at me!"

EDITORIAL

Railway Age

Is the Railway Supply Industry Awake, or "Asleep at the Switch"?

THE RAILWAY BUSINESS ASSOCIATION originally was organized chiefly as an agency of conciliation. Its purpose was to help bring about better relations between the railways and the public, and between the railway supply companies and the railways. It has done this.

Conditions in both the railway and the railway supply fields have been greatly changed by the adoption of government control of railways. The railways and railway officers have been deprived of many means which they formerly employed to defend themselves before the court of public opinion. No railway officer at present feels free to discuss frankly the relations between the railways, on the one side, and the government and the public, on the other side. Most railway advertising and publicity work have been discontinued; and that which is continued is under government control.

As for the railway supply companies, they suddenly find themselves in a position where they must not merely do what they can to secure fair treatment for the railways from the government, but where they must adopt measures to insure fair treatment for themselves from the government.

For the railway supply companies not promptly to recognize the greatness of the changes in their own situation which government control has wrought, and act accordingly, would be very stupid, and might prove absolutely fatal for many of them. The time has come when they must organize to fight every wrong tendency of the government in dealing with the railways, and to fight to protect every right and every legitimate interest of the railway supply industry.

The term "railway supply industry," as here used, is a very broad one. We include in it every class of concern which directly or indirectly produces equipment, material or supplies of any kind for railways. The number of concerns which come within this description is very large, the amount of their invested capital runs into billions of dollars, the number of their employees runs into millions. Thus broadly considered, the railway supply industry is one of the largest, and by organizing on sound lines and acting courageously and energetically, it can make itself one of the most influential industries, if not the most influential, in the United States.

Every concern and individual in any way engaged in the railway supply business is invited to be represented at the meeting under the auspices of the Railway Business Association at the Hotel LaSalle in Chicago on April 8. The purpose of the meeting is to so reorganize this association as greatly to broaden its activities and make it a potent force in the determination of the country's future railway policy

and for the protection and promotion of the welfare of those who furnish necessities to railways.

Unless the railway supply interests of the country are "asleep at the switch," the meeting will be largely attended and will result in the formation of an organization at once inclusive enough, many-sided enough, flexible enough, and strong enough to play a very important part in the affairs of this country.

America must awaken to and stamp out the insidious German propaganda which is striving to cut down production, restrict transportation, and place other stumbling blocks in the way of our hearty and successful participation in the fight against autocracy and Prussianism. We must recognize the great danger in this propaganda which is specially devised to suit local conditions and national characteristics. It laid the great giant Russia prostrate, defeated Italy's splendid army, controls the commerce of Spain and is largely responsible for our Mexican troubles. It is hard at work in many places and in many ways in this country and every loyal citizen must do his duty in fighting it—this is just as important and just as necessary as actual fighting in the trenches on the other side. The stirring appeal on the opposite page is addressed by the Conference Committee on National Preparedness to the American workmen. The term "workmen," must be construed in its broader sense to include all workers, whether manual or brain—and this includes every railroad employee from the apprentice boy or beginner to the president and the chairman of the board. The Conference Committee on National Preparedness has offices in the Metropolitan Life Building, New York City, and is prepared to furnish posters or leaflets in large quantities, containing the message, "What Doth It Profit a Man?"

What Doth it Profit a Man?

The only item of railway revenues that showed a decrease for the calendar year 1917, as compared with 1916, was the item of revenue from the mail traffic, according to the recent summary of railway returns published by the Interstate Commerce Commission. The earnings of the railways

for carrying the mails amounted to \$58,681,549 in 1917—a reduction of \$2,546,216 from those of 1916. This is a reduction of 4.4 per cent per mile of road. For the same year freight revenues per mile of road increased 36 per cent, passenger revenues increased 16.4 per cent and express revenues increased 18.1 per cent. In the face of these figures it would be extremely unlikely that the mail traffic had not increased also and while no statistics of the amount of mail carried are available we have the authority of a recent statement issued by Postmaster General Earlson that the first class mail increased during the year by 25 per cent while the parcel post increased approximately 40 per cent. The statement was issued in January for the purpose of transferring the blame for delays in the mail from the

post office department to the railroads whose pay for their service in carrying the mails had been reduced.

If the present railway mail pay rates and the present methods of the department of handling the railway mails are continued, and the question whether they are to be continued is being investigated by the Interstate Commerce Commission, a still greater reduction in the payments to the railroads will be shown for the present year, because the new methods had not been in full effect for all of last year. However, the slight saving to the public will hardly be appreciated by those who have reason to depend to any considerable extent upon the speed or regularity of the mails because the methods by which the saving is being effected do not tend to improve the service in either of these respects. The reduction in mail pay for last year has been principally at the expense of the railways. If continued it will hereafter be at the expense of the United States government because the less the post office department pays for its transportation service the less the railroad administration will have with which to pay its expenses.

The annual report of the Pennsylvania, which traverses the territory where the greatest increase in the mail has occurred, shows that compared with 1915 the passenger revenues had increased 37.1 per cent and express revenues increased 49.2 per cent but mail revenues decreased although there was an extraordinary increase in the quantity of mail carried. How this reduction in the compensation of the railroads for carrying the mail has been accomplished, under the space system which has been substituted for the weight system of payment, has been explained several times in these columns.

What Does Standardization of Locomotives Mean?

WITH THE WORK of the Government's Committee on Standard Locomotives drawing to a close, it is well to review what standard locomotives will mean to the railways of this country. It is assumed that the committee plans to recommend light (about 55,000 lb. axle load) and heavy (about 60,000 lb. axle load) classes of Mikado, Mountain, Pacific, Santa Fe, Mallet and Switcher types of locomotives.

By restricting future orders to the above twelve designs our railways will have locomotives which in many cases will be too light for the service in which they are placed and in some cases too heavy for the particular needs of the roads. This means a decrease in operating efficiency—it will cost more to operate the locomotives, more trains will have to be run, more locomotives will have to be built, or if, for instance, the Santa Fe type is to be used for purposes in which the heaviest Mikados are now being used, the locomotives will cost more and be more expensive to maintain. The heavy investments many roads have made in strengthening bridges and in improving the track for wheel loads above 60,000 lb. will not be giving the anticipated return. Advantage cannot be taken of large clearance limits on some roads, particularly those in the West. In fact, the increase in cost of train operation due to locomotives of a compromise design will more than offset the saving in first cost.

The maintenance of these standard locomotives, which will be "new" locomotives to all the roads, must be given serious consideration. The repair facilities of the railroads are overtaxed as it is. What will be the conditions when these standard locomotives are placed in operation? New drawings, templates, jigs, patterns and the many conveniences the roads have developed for repairing locomotives standard to their lines will have to be made for the new

locomotives and all at a time when every ounce of energy is required to repair and maintain the existing locomotives. With the 400 or more locomotives that are now being operated on foreign lines there is an excellent opportunity of finding out what confusion a new locomotive creates when it comes in for repairs. It has been stated by one who has handled such locomotives that they are out of service 30 per cent more time than the home road locomotives.

With the increase in operating expenses and the increase in maintenance costs, will the money saved by contracting for standard locomotives be worth while? Will the country have any more motive power—not locomotives, but motive power—by adopting standard locomotives rather than having the builders construct locomotives of existing designs, which meet the particular operating conditions and which the roads are organized to maintain? Is it wise to burden further the railways' already overtaxed facilities? There can be but one answer, particularly at this time, when the nation is at war.

Australia as a Future Market

THERE WILL BE many countries looking towards the American railway supply field to help fill their urgent and belated demands after the war, but there will be few markets that will offer the opportunities open to us in Australia and New Zealand. These countries in normal times import great quantities of railway materials each year, principally from England and the United States, and our machine tool exports there have been especially large. Since the shipping situation became so acute, however, the demands have not been met and Australia and New Zealand today are in urgent need of railway materials for both maintenance and contemplated improvements. The Australians are already familiar with many American railway products and keenly appreciate their excellence, as has been evidenced by the continued sales, particularly of such things as signal material and machine tools. The opportunity for American railway supply manufacturers, in short, is there. Are these manufacturers doing their share now to lay their plans to make the most of this opportunity?

It is this question that makes especially interesting and timely the report issued this week by the Bureau of Foreign and Domestic Commerce on American markets for railway equipment, materials and supplies in Australia and New Zealand. Frank Rhea, a man with extended experience in both the railway and the railway supply field, has just returned to this country after a trip covering about one year, during the course of which he investigated, as commercial agent for the Bureau, the markets for railway equipment in Australia and New Zealand, and in China, Japan, Korea and Manchuria. His report on Australia and New Zealand, published as Special Agents Series No. 156, is to be followed later by a similar report on the other countries which he visited.

In the abstract of Mr. Rhea's conclusions published on another page it will be seen that he speaks very conservatively of the trade opportunities in railway supplies in Australia. It is this fact and the standing which Mr. Rhea has in the field which give the report no small share of its value. Mr. Rhea has not exaggerated, but the opportunities for trade that he found stand out in the report as sharp and clear as crystal, showing Australia and New Zealand to be among the best markets that the American railway business man could hope to enter after the demands of war have given way to those of peace.

Mr. Rhea emphasizes the vast possibilities that lie before the American manufacturer of car and locomotive specialties and parts, the builder of machine tools, the maker of

signal apparatus and accessories and the manufacturer of maintenance of way material and track tools. The Australians, he says, will prefer to build their own cars and locomotives because labor is so well organized that this work in most cases will not be allowed to go out of the country. They will not be able, however, to supply the parts and specialties efficiently; but, on the other hand, the fact that so much work will be done in company shops will stimulate as it has in the past the steady and continued sale of American machine tools which have already proved their excellence in Australia and have furnished a large proportion of our total exports to that continent.

The suggestions that Mr. Rhea presents on "application" or commercial engineering are not to be confined to Australia and New Zealand. They are world-wide. They are of particular importance at this time, however, because they emphasize the necessity of getting at this export proposition now. England, France and Canada have been in this war longer than we, and although their every energy is being bent to win the war, they nevertheless are already laying their plans for after-the-war business. American industry—the railway supply industry included—must do the same.

The Rate Decision

TOO LATE to be of any particular advantage to the railroads, except possibly as a vindication of their judgment, the Interstate Commerce Commission has rendered a decision allowing the eastern roads most of the remainder of the general advance in freight rates which they asked about a year ago and which was granted in part last June. The present effect of the advance will be to make it that much easier for the railroad administration to make the railroads earn enough to pay its guarantees to the companies for the use of their properties and the expenses of operation.

Whether the effect on railroad credit, if it had been ungrudgingly and promptly allowed at the time the railroads urged its necessity, would have been sufficient to have made it unnecessary for the government later to take over the railroads in order to stabilize the credit structure of the country, is, of course, now problematical. As the commission has not seen fit to accompany its formal orders with any opinion as to its reasons, it may also be considered problematical whether the same decision would have been rendered had the railroads remained under private management.

In its decision of June 30, 1917, the commission declared that the record had not disclosed the existence of a situation requiring "so heroic a remedy" as the 15 per cent advance asked by the railroads, although it was only five months later that it addressed a special report to Congress recommending two alternative plans which many would consider even more heroic.

The commission also indicated in its report to Congress on December 1, after the railroads had renewed their petition for higher rates, that it thought that no advance in rates would be sufficient to relieve the situation confronting the carriers and the country. Probably, in view of the fact that railroad financing at that time had come into competition with government financing, the commission was right in that statement. It was then too late to repair the damage which had been done in earlier years by a governmental policy of railroad regulation which had discouraged the adequate development of the transportation system by making investment in railroad securities unattractive and uncertain.

Railroads have been asking higher rates with indifferent success for several years. Their original petition last year was made on March 22, before this country was at war.

They hoped then for an increase which would stimulate their credit. By the time they made their supplemental application, which the commission has now passed upon, they were chiefly engaged in a struggle to keep up with mounting expenses.

Now that the inadequacy of railroad facilities has become painfully evident there are occasional criticisms because the railroads did not invest more out of what surpluses some of them had, or use what credit they had left, in adding to their plant. Such criticisms overlook the fact that the new money invested for several years had been allowed little or no additional return and that in most cases new capital would cost more than there was any likelihood that it would be allowed to earn.

Whether the commission considers the latest decision, handed down the day after the railroad control bill was passed, as an act of heroism or one of martyrdom is not disclosed, because the commission confines its expression on the subject to a series of formal orders vacating its previous suspensions. Perhaps we shall never know whether the commission was guided by a conviction that Mr. McAdoo would need the money or whether it had reached a belated conclusion that the railroads had needed it. Possibly there is some significance in the fact that the decision was rendered only a few days after the publication of the revenues and expenses of the railroads for the calendar year 1917, whereas when its former decision was issued it had only a forecast.

During the hearings in the 15 per cent case and since that time it has been frequently stated that the railroads, in urging the need for higher rates, were unduly alarmed because of the extremely unfavorable showing for the month of February and that the results for the year would not bear out the prediction they made at that time of the effect of increasing expenses. The commission itself took that view to a considerable extent and before deciding the case had its own statisticians prepare careful estimates for the whole year based on the actual results for the first four months. It predicted that the operating revenues for the year 1917 would be in excess of those for any preceding calendar year and gave estimates for both the operating revenues and the operating income per mile of road, saying that its estimate as to operating income was entitled to less confidence than that of operating revenues and might be reduced somewhat by anticipated increased costs, if realized.

Its estimates, compared with the actual results as given in its recent summary, are as follows:

Per cent of 1916	United States	Eastern District	Southern District	Western District
Average operating revenues (as estimated)	\$17,104	\$20,443	\$11,668	\$8,567
Average operating revenues (as reported)	17,438	20,481	11,712	8,661
Average operating income (as estimated)	4,334	5,801	3,125	2,891
Average operating income (as reported)	4,185	6,027	3,071	2,905

This comparison shows that the commission's estimate of the expected increase in revenues was considerably exceeded not only for the roads as a whole but for these in all three districts. For the roads as a whole the revenues were \$378 greater per mile of road than the estimate and for the eastern, southern and western districts they were \$1,056, \$581 and \$19, respectively, greater than the estimate. On the other hand, the anticipated increase in expenses were more than realized and as a result the operating income of the roads as a whole was \$149 less than the estimate in spite of an increase in revenues \$378 greater than the estimate, so that the increase in expenses must have been \$527 per mile greater than the estimate. In the case of the eastern roads the operating income per mile was \$470 per mile greater than the estimate, or less than half of the increase in revenues. Applying this to the mileage of the eastern roads, 59,157 gives a total increase as compared with the estimate of \$27,805,790. It was estimated that the increase

in rates which the commission allowed at that time amounted to about \$97,000,000 a year and as the higher rates were actually in effect for a little over three months the increased operating income as compared with the commission's estimate is about equal to the amount of the rate increase for the period during which the rates were in effect. In other words, it took an increase of \$586 a mile in revenues, resulting from a greater increase of traffic than was expected, to make the operating income as high as the commission estimated it would be, if the higher rates allowed be left out of consideration, as they were in making the estimate, and the expenses were, therefore, \$586 per mile more than the first four months indicated they would be.

For the southern and western roads, in spite of the increased revenues, the operating income per mile was \$189 less than the estimate, and for the western roads it was \$418 less than what the commission thought it would be when it declined their request for a general advance.

If we disregard the influence which Mr. McAdoo's wishes may or may not have had on the commission's latest decision, these comparisons would indicate that it is merely another example of hind sight that is more acute than foresight.

Revolutionizing Railroad Organizations

IN HIS MESSAGE TO CONGRESS announcing the adoption of government control of the railroads, President Wilson said, "Nothing will be altered or disturbed which it is not necessary to disturb." It would appear that the director general of railroads gives the word "necessary" a very broad definition. Mr. McAdoo is proving a bold innovator. Radical changes are being made in the organizations of the railroads.

When Mr. McAdoo was appointed he had the choice of constituting himself, in fact, whether nominally or not, the head of the Railroads' War Board and using the organization it had built up, or of setting it aside and creating a new organization. He did the latter. He has made and still is making great changes in the personnel of the railroad organizations. The Railroads' War Board consisted of five men whom the railway presidents of the country themselves selected. Mr. McAdoo has created a council of his own which does not include any of these men. The railroads, under the Railroads' War Board, divided the country into seven districts in each of which there was a committee of railway executives charged with the duty of handling matters primarily concerning their districts. Mr. McAdoo has divided the country into three regions and appointed three regional directors, only one of whom was chairman of one of the former railway district committees. The Railroads' War Board created several committees to handle various branches of its work. Mr. McAdoo has created various offices and committees which have superseded the more important sub-committees of the War Board.

The railway men Mr. McAdoo has appointed on his immediate staff, and his regional directors, are among the ablest in the country. When he has called upon them to help him they have promptly and loyally responded. Probably they are as well equipped to fill the new positions he has created as any men he could have selected. But since the railroads, under private control, did not work out the present organization, or create the various positions in it and determine their functions, the responsibility of railway officers for general results under the new system necessarily will be secondary, while that of government control, and of Mr. McAdoo, as the official exercising the authority of government, will be primary. Doubtless nobody recognizes this more clearly than himself.

However good the personnel of an organization, the re-

sults it gets always depend very largely on the form of the organization and on the duties assigned and the opportunities for efficient work afforded to its members. In an editorial in its issue for January 18 (page 148) the *Railway Age* expressed the opinion that one of the greatest dangers to the success of government control was the danger that it would lead to excessive centralization. There seemed reason then to hope that excessive centralization would be avoided. Almost every step Mr. McAdoo has taken, however, has been toward centralization. An increase of centralization under governmental control probably was inevitable, but he seems to be carrying it farther than is necessary. Instead of dividing the country into a considerable number of regions for railroad purposes he has divided it into only three. In the eastern district there are 60,000 miles of railway; in the southern, 51,000 miles, and in the western, 144,000 miles. In each of them there are more miles of railway than in any other entire country. The mileage in the western district is almost three times as great as in any other country. Mr. McAdoo in his instructions to the regional directors said, "Broadly speaking, I wish to give you power to direct railroad operations in your territory so as to handle traffic with the least congestion, the highest efficiency and the greatest expedition. As far as is consistent with these objects you will, of course, keep down operating expenses. I have put responsibility upon you for the entire operating situation."

"Railroad operations" consist in moving traffic, in maintaining equipment, in maintaining way and structures, and in making improvements and enlargements of facilities. The responsibility for "the entire operating situation" of 50,000 to 145,000 miles of railroad is an enormous thing. No railway officers, under private control, ever had responsibility for operation of so much mileage. One of the fundamental principles of organization is that authority should go with responsibility and be commensurate with it. To enable them to bear their great responsibility the regional directors should have great authority, so they can give authority to and hold responsible the executives of the lines in their charge. What is actually being done? The budgets of the individual lines for improvements and maintenance are required to be submitted to the Railroad Administration in Washington. Committees in Washington are determining what kind of locomotives and cars shall be bought for all the railways, and all locomotives, cars and rails are to be bought in Washington. Changes in passenger train service must be submitted to Washington. All wage questions are being submitted to the Railroad Wage Commission in Washington, and Mr. McAdoo said in his instructions to the regional directors that "at least at the outset and until the matter shall take more definite shape" all important labor problems are to be submitted to him.

Examples of this tendency toward centralization might be multiplied. It would appear that initiative regarding most important and some unimportant matters is being taken from the managers of the individual lines, and that even the regional directors are not being given authority commensurate with their responsibility as it has been defined by Mr. McAdoo. Under this system all the brains of the railroad business are not being, and cannot be, fully utilized. Railroad presidents who have been accustomed to planning years ahead regarding the development and operation of the properties in their charge are being obliged to postpone action on many matters of immediate importance until they can get authority and instructions from Washington. The situation is due in part to the fact that Congress took ten weeks to act on the question of the basis of the compensation to be paid to the companies, a matter the British Parliament settled in 48 hours. But in the centralization of organization which is going on Congress has had no part.

The *Railway Age* said in the editorial already quoted

from (issue of January 18) "The central authority can and should indicate the *general* principles on which the railways are to be managed. It can and should indicate the general methods by which these principles are to be carried out;" but when the controlling authority begins to try to do more than this "centralized control will slow down everything instead of speeding up everything, and the increases of efficiency gained by eliminating competition will become small compared with the losses of efficiency caused by impairing the initiative and lessening the sense of keenness and responsibility on the part of the units." The tendency regarding which apprehension was then expressed, has plainly manifested itself, and its effects are beginning to appear. At least so it seems to us. Perhaps we are wrong. Perhaps after Mr. McAdoo feels he is in complete control of the situation he will begin to decentralize as much as is compatible with unified operation. While no signs of any intention to do so are now visible, Mr. McAdoo has shown more than once that he is no rigid doctrinaire, and, therefore, conclusions drawn regarding his policy after he has been in office only 10 weeks may, of course, be shown by further development of his policy, to have been based on inadequate evidence.

Step by step the size of individual railroad systems has increased. Every stage of this development has presented problems of organization and administration of great difficulty. Many of the biggest and finest brains on our railroads have struggled with the problem of so balancing centralization and decentralization on systems of five to ten thousand miles as to get the best results. In many cases, where large systems have not been successfully managed, the failure has been due to centralization which has deprived the officers of divisions and grand divisions of the initiative and authority they needed. How much more important must be the effects of centralization on a system of 260,000 miles. To operate the railways efficiently under present conditions will require not only the greatest exertion and loyalty, but the best *thought* and *judgment*, of all their strong men. Great centralization would prove incompatible with the utilization of the best thought and judgment of the most of them.

Mr. McAdoo is an able man and a very hard worker, as are all of his principal lieutenants. Perhaps they can get the desired results with the organization he is forming and the methods he is using. But he is making changes which do not seem consistent with the President's assurance that nothing would be disturbed which it was not necessary to disturb; and it does seem to us that he is seriously handicapping himself, his immediate lieutenants and the managers of the individual lines by a tendency to carry centralization too far.

New Books

7th Year Association of Corporation Schools. Proceedings of Fifth Annual Convention, 893 pages, 6 in. by 9 in. Bound in cloth. Published by The National Association of Corporation Schools, F. C. Henderschot, secretary, Irving place and 15th street, New York City. Price, \$10.

The functions of the association are (1) to develop the efficiency of the individual employee, (2) to increase efficiency in industry, and (3) to influence courses of established educational institutions more favorably toward industry. Among the subjects which were reported upon and discussed at the fifth annual convention were: Administration and supervision of corporation educational work; corporation continuation schools; educational methods; employment plans; special training schools; trade apprenticeship schools; unskilled labor; and vocational guidance.

Letters to the Editor

The Depreciation of Railroad Property

KANSAS CITY, Mo.

TO THE EDITOR:

A contribution by Julius Kruttschnitt appeared in your issue of December 21, 1917, in criticism of my article on Depreciation, printed two weeks earlier. It would be unfortunate for the cause of the transportation industry if the views there expressed were permitted longer to remain unchallenged.

My distinguished critic affirms that, repairs being adequate and renewals proportionate to the average life of materials, an element of property less than a service-producing unit, exemplified by a series of ten ties, suffers no depreciation by reason of exhaustion. He thereby implies that no value attaches to an element, as such, in dissociation from the organism which it goes to compose; that a non-existent value undergoes no change; and that, while the capacity for usefulness remains perpetually unimpaired, a serviceable unit is incapable of depreciation from inherent causes.

Thus far we are in complete agreement, as abundantly appears, even from a superficial reading of my memorandum. The theory which asserts a 50 per cent mean of depreciation in the ties of a seasoned track when fully maintained, was introduced, not with approbation, but for the purpose of demonstrating the absurd consequences of its adoption. Controversy, therefore, centres upon questions of method.

Rejecting the scientific evidence available, he prefers to rest his case upon the unsupported claim that in the aggregate no deterioration of matter has occurred or is destined to occur. This is supposed to be manifest from responses to the interrogatories following:

Question 1. What kind of ties are used in construction and repairs by the ———— R. R. Answer: Ties whose lives range from zero to as much as 20 years, but which under our traffic and climatic conditions will last on the average 10 years.

Question 2. What kind of ties will be found in the track of the ———— R. R., which makes renewals currently as the necessity therefor becomes apparent? Answer: Ties whose lives range from zero to 20 years, but which under our traffic and climatic conditions last on the average 10 years.

Mr. Kruttschnitt concludes:

As the answers are identical, the average life of ties as found at any time in a properly maintained track is the average life of the class of ties used.

The answer to Question 1 is erroneous. It is not true that ties with a life of zero are employed in the construction or maintenance of any railroad. The foreman of a track gang or a section force who is so irresponsible as habitually to lay ties requiring immediate removal, would invite discipline. The inaccuracy affects the number of terms and the sum of the series, if not the mean coefficient or average life, and violates the conditions hypothesized. Comparison is therefore instituted at a time, not coincident with the date of construction, but remote from it by a term not less than the life of the least durable tie. So much being evident the affirmed identity of response is probably incorrect; but even though established, it would afford insufficient proof to sustain a disclaimer of exhaustion.

It is more probable that the duration of service in a series of 10 ties will vary from 5 to 15 years, upon the assumed average of 10 years, with an aggregate of 100 years. Theoretically no renewals will be necessary until the end of the fifth year. At that time exhaustion will amount to

50 service years (10×5), equal to 50 per cent of the initial sum. During the succeeding 10 years all ties in the series will be renewed, and 100 years of useful life (10×10) will have been added. But in that term 100 years of serviceable existence (10×10) will have expired. Depletion is then equal to 50 per cent, as at the close of the fifth year. Replacement has now become regular, and thenceforth that condition may be expected to remain virtually unaltered. It is manifestly untrue that the expectancy of life in a stated group, collectively regarded, is so great at any time subsequent as when the original installation was made.

The defect in argument is indifferently concealed behind a fanciful distinction between the product obtained by multiplying the number of ties constituting a series into a quantity representing the average life, upon the one hand, and the sum of the several lives whence the average is derived, upon the other; that is to say, between multiplication and continued addition.

The reasoning is sufficiently maintained, if limited in its application to a term following the point where renewals become rhythmic, a matter concerning which there is no dispute. But it fails to dispose of the change in physical condition which takes place in the interval between the date of construction and the time when the seasoning process is complete. It is upon the occurrence of this change that issue is joined.

A conclusion is sound or unsound according as the basis upon which it relies for support is valid or invalid. The ground of explanation excludes the matter to be explained, and the proposition topples to its fall or awaits an efficacious demonstration.

Physical deterioration is a condition which can neither be disguised nor evaded. It is profitable to admit its existence and show that, upon the presumption of effective maintenance, the inference of depreciation consequent upon it is fallaciously deduced; rather than attempt the establishment of one fact by disproving another. Because too much is undertaken nothing is accomplished, and at the same time discredit is cast upon meritorious argument advanced in support of the same conclusion.

Value is not directly related to physical magnitude or duration, unless upon the condition that economic quality is imputed and remains constant. It follows thence that there is no point of correlation between a change in value and any extension or intension of matter, in space or time. Fallacy is insistently perpetrated in the nugatory, though subtle and elusive, attempt at the identification of things that differ; namely, the extent of material substance and the quantum of value.

Argument in refutation commits its sponsor to the elimination of economic quality, involves the abrogation of economic science through its absorption into mathematics, and leads to a purely quantitative theory of value. In its final consequence, he is excluded from the field of economics and restricted in his approach towards value, appreciation or depreciation, to speculation upon concrete quantity. Whenever he crosses that boundary, he is involved in self-contradiction.

Quality in a railroad consists in the capacity for and performance of an efficient service, in consideration of a net reward, present or prospective. Within the limitations above stated, matter expired and to expire is in the nature of excess plant which, although a necessary element of investment, and as such conditionally entitled to reimbursement, is seldom reimbursed currently, and which the devices of perverse ingenuity would expose to uncompensated sacrifice. Moreover, there is always left a remainder fully capable of discharging the office required of it. A state of undiminished or productive efficiency is perpetually maintained.

Value exists solely by virtue of the net force of demand;

that is, demand affected by supply. Railroad property is divorced from all demands other than that for transportation service. Value consequent upon such other demands is in suspense, has no actual existence, and is distinctively hypothetical. Such are actual investment, to which the prevailing concept of depreciation stands imperfectly related, and cost of reproduction.

If the foregoing were not true, it would follow that the premature renewal of ties would occasion an enhancement of value, sufficient in extent to neutralize the depreciation alleged to have accrued; but, so far from that being the case, such course would involve a flagrant dissipation of assets, in the form both of labor and materials, causing no appreciation, and removing no depreciation, but actually producing an augmentation of it. A consideration of unexpired useful life implies instrumentality, imports function, and introduces economic quality. Resort to the monetary unit involves a like consequence.

Once scientific principle is surrendered, control becomes arbitrary, and the carrying trade is exposed helpless to the intrigues of its adversaries.

G. C. HAND,

Vice-President Kansas City Southern.

Who Wastes the Fuel?

TO THE EDITOR:

Referring to the letters from Messrs. Anderson and Coss (*Railway Age*, March 1, 1918,) criticising my article on fuel waste (*Railway Age*, February 8, 1918,) I would state that there was no intention on my part to pick out any individual or class as being particularly responsible for this waste; the article was written with the idea of demonstrating that it was unjust to place all of the responsibility on the engine crew, which is usually done.

I also wished to start something that would be of value in fuel saving, and to get others thinking of their responsibility for this waste.

That there are other things outside of engine service that need correction has been strongly in evidence this winter, especially the lack of proper terminal facilities. Articles such as those by Messrs. Anderson and Coss will help bring out other factors that need correction, and betterments may result.

Nothing will save fuel or accomplish results like co-operation on the part of all concerned, and I think if we could all get around a big round table, both officials and men (and forget all about departments or position), to talk over conditions and troubles in a friendly manner and a co-operative spirit, and then go out and use the Golden Rule a little more, we would see a wonderful improvement in the results obtained.

For the benefit of the gentlemen who were pleased to criticise my article, I would state that the reason I singled out train dispatchers as wasting more coal than anyone else, was that their opportunities for saving or wasting fuel were so much larger per unit than other employees, that I thought it best to make it strong, in order to bring it home to them. If I have done them any injustice or unduly hurt their feelings, I hereby extend to them my apologies. I would, however, call their attention to the fact that enginemen have been and are receiving even stronger criticism constantly, with no more reason for it.

Quite a lot of other shots were made. Was this the only one that hit the mark? I hope not!

MASTER MECHANIC.

FRANCE TO RAISE PASSENGER FARES.—Passenger rates on the seven trunk railroads of France are to be raised 25 per cent, according to a cable despatch dated March 17 to the *New York Sun*.

American Railway Supplies in Australia

Frank Rhea of the Bureau of Foreign and Domestic
Commerce Returns with Encouraging Reports



On the Recently Electrified Lines at Melbourne, Victoria.

THE RAILWAY SUPPLY MANUFACTURER who has become interested in export trade will find that in Australia and New Zealand he will have one of his biggest and most permanent markets. The several state-owned railways of Australia and New Zealand with their 22,000 miles of railway, import in normal times a large part of their annual requirements in materials and supplies. A steady business combined with an immediate "after the war" demand to make up for the supplies impossible to obtain now because of the lack of shipping, are what lie before the American manufacturer who is going to be wide awake enough to realize his possibilities in this extensive market. The Australians are ready and waiting to buy in the American market car and locomotive specialties and parts, machine tools, signal and signal supply material and maintenance supplies and track tools.

These are the conclusions that follow a reading of the report on American markets for railway materials, equipment and supplies in Australia and New Zealand by Frank Rhea, commercial agent for the Bureau of Foreign and Domestic Commerce, who has recently returned to this country after an extensive trip in Australia and the Far East. Mr. Rhea's investigations have made him an optimist on the opportunities for American railway supply manufacturers in Australia and New Zealand. Although he does not believe that there is a market for finished cars and locomotives in Australia, in view of the desire of Australian labor to build its own railway equipment, he has been particularly impressed by the very fact that the Australians want to build their own cars and locomotives, for to him it means that there is for American manufacturers an important market in Australia for car and locomotive specialties and parts. American built machinery has constituted one of the leading imports into Australia from America for several years. The tendency of the Australians to build their own equipment, the recognized excellence of American machine tools in Australia and the skill with which they are sold there, Mr. Rhea believes, will guarantee a continuance of this extensive business. He emphasizes the necessity, however, of what he terms "application engineering" and draws attention to the fact that the most successful firms are those which have been represented by keen men who have seen to it that the machines sold were the ones best fitted for the work that they were to be called upon to do, and by men who have followed the progress of the work done by these machine tools and assured themselves that they were giving entire satisfaction.

Mr. Rhea spent about one year in the Far East. He left

Vancouver in October, 1916, and spent about four months in Australia and one in New Zealand. He visited all the headquarters of the state and Commonwealth railways and made extensive trips over the various lines. After leaving Australia he spent some time in the Philippine Islands and then went on to China, Japan, Korea and Manchuria in which countries he spent some seven months. His investigations will be issued in two separate reports, the one on Australia with which this article deals, and one on markets in China, Japan, etc., which will be issued later.

Mr. Rhea is well qualified to speak on railway matters, for he has had an extensive experience in both railway and railway supply work. He graduated from the University of Pittsburgh with the degree of civil engineer in 1892. He was first engaged in railway work in the maintenance department of the Norfolk & Western. He later went into the employ of the Union Switch & Signal Company and spent one and one-quarter years as an apprentice on electrical and mechanical work. He then returned to railway service and spent one year as general foreman of signals at the Pennsylvania's Broad-street station. He later spent 12 1/2 years in the service of the Pennsylvania Lines West, 5 1/2 years as chief signal inspector in charge of signal construction and reconstruction work, and 7 years as engineer maintenance of way at Zanesville, Ohio, and Loganport, Ohio, being at the latter place in charge of some important reconstruction and double track work. It was at about this time, too, that Mr. Rhea assisted in the preparation of the Rudd-Rhea report relative to unifying the signal practice of the Pennsylvania system which attracted considerable attention. Mr. Rhea then left railway work to enter the railway supply business and spent some five years as commercial engineer with the General Electric Company on all kinds of electrical equipment for railway work. For the three years following, and immediately preceding his trip to the Far East, he was district engineer of the western district of the division of valuation of the Interstate Commerce Commission.

Mr. Rhea's Conclusions

Mr. Rhea's report has been issued in the Bureau of Foreign and Domestic Commerce as Special Agents Series No. 156. It bears the title "Railway Material, Equipment and Supplies in Australia and New Zealand," and covers 164 pages with illustrations. The report covers the Australian and New Zealand railway situation in great detail, both in general and in relation to the special states. Lack of space prevents the inclusion of all the salient features brought out.

but suppliers will no doubt be greatly interested in Mr. Rhea's conclusions and suggestions.

In instances where it is believed that American concerns have a chance to obtain future business, attention will be called to that fact, and there will also be a definite indication of the cases in which no such opportunity exists. As an example one may cite the erection of rolling stock either in the railway department's own shops or by Australian manufacturers, with the restriction of the work in some instances to the particular state (as in Victoria and New South Wales). If the railway development of Australia proceeds gradually for the next few years it is probable that little rolling stock will be purchased outside the Commonwealth, but it is likely that, in order to get the benefit of improve-

warranted in giving them little consideration in forecasting what will occur when conditions again become normal. As regards some requirements, the Australian railways are compelled to obtain their present supplies in the United States or do without, and there are really a good many things which they are doing without or of which they are very much reducing their consumption.

During the war and the period of adjustment after its termination, there seems little doubt that American concerns can obtain business if they offer reasonable prices and delivery and if ocean transportation can be secured. What will happen after the end of the war and the period of adjustment it is impossible to forecast, other than to assume that in the course of time matters will again become normal and the development of Australia will resume the tendencies of the past. In this event there will doubtless develop considerable competition for the business of all classes, and apparently much will depend on capable application engineering. Aside from some special lines, such as electrical equipment and lubrication, it would seem that the business in the past has been handled with very little special engineering knowledge on the part of the selling concerns in Australia.

This situation has been well illustrated by the small sales recently of a concern that formerly did considerable business, but that now seems to pay very little attention to the application of the products sold. On the other hand, one notes the very substantial increase in the business of another firm that is making excellent applications in the sales it is handling. The manager of the first concern stated that its policy is to furnish what the customer asks for without giving any particular consideration to its application and that, since the firm handles a first-class line of machine tools, it is the customer's loss if the best application is not had; whereas the other concern not only goes over the application with the customer, studying the best machine available for the purpose before the selection is made, but in addition follows up the performance after installation. The adoption of such a policy, carried out by seasoned and experienced engineers, will, in the writer's opinion, be a necessary arrangement in the future. In brief, it is believed that future business will be largely obtained by competent application or commercial engineering. The adoption of such a policy for certain lines will secure paying business, and, unless it is adopted where it does not now prevail, new business will not be obtained and that which is now being done will be lost in the future when the situation becomes normal after the close of the war.

The Question of Representation

The question of representation should be divided into two parts, first as to whether American concerns doing business in Australia will handle the business with their own representatives, negotiating directly with the purchaser, or through agent or indent concerns and, second, what kind of representative should handle the business directly with the customer, whatever arrangement prevails in the first instance.

The answer to the first depends on circumstances to a very great extent, but when the amount of business warrants there are usually good reasons for the parent concern to have a representative in Australia, although a considerable amount of business may be done through agent concerns. For the average American concern the amount of business will only warrant its being handled by agent or indent concerns, but in many instances it seems that the business will justify the sending of special representatives to Australia, as hereafter suggested.

In Australia as in all other parts of the world, there are active, indifferent, and poor agents now in the field, and much depends on the capability of such representatives. In



The Government Railway Systems of Australia

The Port Augusta-Kalbarrie Railway, the Trans-Continental, has been completed since this map, taken from the Official Year Book, was made.

ments, very considerable quantities of accessory parts will be brought from overseas. In the case of New Zealand it would appear that, if all the necessary railway equipment is built in the Dominion, it will be done at the sacrifice of labor that could be more profitably employed in other ways.

Past, Present, and Future Business

In forecasting future business it seems wise to consider the business done in the past and the methods employed in obtaining it. A very considerable amount of railway business has been done in the past, although statistics as to the actual value are difficult (in fact practically impossible) to identify and segregate. At one time a great deal of rail went to Australia, and the supply of mineral oils and lubricants has always come very largely from the United States. A varying amount of accessory rolling-stock parts and shop machinery has come from America, and the electrical equipment has come very largely from this country or from American concerns with British branches.

Past business has been obtained mostly in one of the three following ways: First, by concerns with direct representatives in Australia; second, by agent concerns in Australia; third, by the medium of indent orders, in which instances the purchasers either knew just what they wanted or were able to give the indent agent definite information or specifications so that the desired articles could be obtained.

The present war conditions, involving high prices, long delivery, United States export regulations, and almost prohibitive ocean freight rates, are so unusual that one seems

some instances it is probable that agencies were taken as filling-in lines and to fall back on when the regular supply was not available.

With the conviction of the desirability and the probable necessity of application or commercial engineering as the best means of obtaining and holding railway business in Australia, and also the advisability of sending seasoned men who will naturally command good salaries, the question arises how this can be arranged and made workable without costing more than would be warranted. It is the writer's opinion, based on investigation and discussion with several men experienced in handling Australian business, that one high-grade man could frequently represent several



One of the Latest Type of Freight Locomotives in Use in New South Wales

firms whose products can be grouped—for example, an experienced mechanical-branch man could represent all branches of shop machinery, another man could represent all lines of locomotive and car appliances, or one man could represent both permanent way and works materials and track appliances. Also, with the conditions existing in Australia, there appears to be no reason why a man of the proper adaptability could not work with several concerns in Australia (even when these concerns are handling competing lines), if such a man is sent out at the expense of the American concerns. This, of course, would require men of good common sense but not necessarily men of any unusual ability. Since there are a number of associations among the manufacturers of railway materials, equipment and supplies for furthering the interests of these manufacturers with the American railways, it would seem desirable that these same associations should get together for the advancement of their foreign business. For instance, such associations as the Railway Business Association, the National Railway Appliance Association, the Electric Railway Manufacturers Association, or even a community of the associations might get together and arrange for experienced application engineers to visit Australia—doing so as actual representatives to obtain business for the interested concerns and working with such representatives as these concerns may have in Australia or arranging for additional agents. There are also a number of concerns organized for the handling of foreign business (particularly some of those recently organized) that might arrange for the representation of complete lines as above suggested, and then follow up by sending out special application engineers.

In considering such an extensive field as railway materials, equipment, and supplies, a division into groups seems advisable. The following grouping is based on what one

experienced engineering salesman might reasonably be expected to be familiar with, and is also somewhat along the lines of that made by some of the larger concerns handling railway business in America.

Contracting

In the writer's opinion, with the present arrangement of handling all public works and the prevailing labor conditions, Australia is not an attractive field for American contracting concerns to enter into and follow the present American practices of pushing the work to a conclusion in the shortest possible time by the use of labor-saving machinery, particularly expensive outfits worked with day and night shifts. There is no doubt that, to develop fully the material resources of Australia, the situation warrants such treatment, but organized labor objects to such procedure and public opinion supports this position, or at least permits this condition to exist. It would seem, however, that if some of the large projects contemplated, such as the unification of the railway gages, are undertaken, some concessions will have to be made.

Roadway Machines

Steam shovels and other similar equipment are little used in Australian railway construction. While this class of equipment could no doubt be used to very considerable advantage, particularly in some of the grade and alignment revision work being undertaken in several of the states, it is very doubtful whether such methods will be adopted so long as the present labor conditions continue. The New Zealand railways are much better equipped in this respect and may increase this equipment if further extensive grade and alignment revisions now under contemplation are undertaken.

Bridges

Bridges are not frequent, and those that do occur are usually small, with few foundation difficulties. In addition, there is a decided tendency for the railway departments to do their own fabricating and erection. This is



Sydney (N. S. W.) Express Leaving Wallangarra on the Queensland Border

encouraged by the much higher tariffs on fabricated materials than on plain materials. Also the New Zealand Railways are the only system that has adopted a set of standard designs and is prepared to buy bridges exact as detail as used. In the future the New Zealand Railways expect to buy their bridges in quantity.

Bridge paints, on account of the large proportion of dry weather last much longer in Australia than the average in America. This does not apply to New Zealand, where on

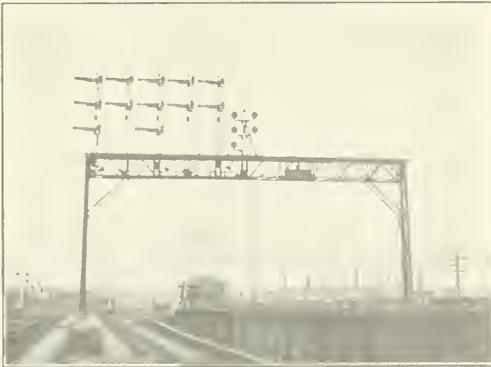
account of the amount of wet and warm weather the life of bridge paint is probably shorter than in America.

Building Materials

The principal market for building materials is for galvanized or substitute roofing material which will not require sheeting, and such substitutes for wood as beaver board. The supply of Australian hardwoods will take care of the needs for building wood, except soft wood required for drawers, shelving, and similar uses where it has to be worked and for which pine will probably continue to be imported from America. Just how far it is economical to go in Australia in the use of protected materials as a substitute for galvanized iron is dependent to a very large extent on the location. Where not subject to special deteriorating influences, galvanized iron apparently has a longer life in Australia and New Zealand than is the average in America, and its use is very much more extensive in all parts of Australasia than in America; in fact, this is the case everywhere in the Far East.

Coaling Stations

The handling of locomotive coal is done to a very large extent by the use of coaling trestles or man-powered handling outfits or, in some instances, with small locomotive cranes, the latter being particularly the case in New Zealand. Thus far very few really up-to-date coal and ash handling plants have been installed in Australia. At many points it seems probable that these will be installed in the future, but in a number of instances an impression seemed to prevail that the present arrangements were much more reliable than the more modern devices; therefore it is difficult to predict what the future improvements will be along



Former Method of Route Signaling on Victorian Railways

this line, although it would appear almost a necessity to make improvements in some cases to take care of the business as it grows.

Water-Treatment Plants

Considerable up-to-date water-treatment apparatus has been installed in a number of the states and, with the water conditions existing in a large part of Western Australia, South Australia, and the western sections of Queensland and New South Wales, further installations will no doubt be made. In some instances neutralizing compounds are practicable, and an American company is introducing its products, which, in view of some of the results obtained in the United States and Canada, should make a decided success in some parts of Australia.

Grain Elevators

The question of grain elevators was covered at some length in connection with the New South Wales Railways. In the writer's opinion, there is no doubt of the desirability of adopting arrangements to handle grains (particularly wheat) in bulk in all of the Australian states, but the project of a wholesale conversion according to the plans now out for tenders for the erection of elevators seems of doubtful practicability. It is advised, therefore, that American concerns go over this situation very carefully before contracting for erection complete, which would probably include the financing of the project for the government of the state in which the work is done. These remarks, of course, do not apply to the furnishing of the machinery and materials for some one else to erect and finance.

Wharf and Pier Equipment

The use of wharf and pier machinery has been, to a considerable extent, influenced by the labor situation, the wharf



Present Method of Speed Signaling on Victorian Railways

workers being one of the most powerful unions in Australia and New Zealand. At present, however, a necessity exists for speeding up the movement of shipping. The wharves in New Zealand are much better equipped in this respect than those in Australia. To a certain extent this is probably due to the authority exercised by the various harbor boards in New Zealand, who have power to borrow money for improvements and collect wharfage charges in a more comprehensive way than is the case in Australia.

Fencing Materials—Ties

Practically all railway lines have to be fenced by the department in all the Australian states and New Zealand. The present practice is to use a rather heavy, smooth, straight wire with frequent anchor posts equipped with expensive slack adjusters. In some instances intervening strands of barbed wire are used, but in no case did the writer see any of the special spiraled wire that is commonly used for right-of-way fences on most American railways. On inquiry, not a single case was found where attention had been called to this wire by the sellers of fencing materials, and none of the sellers seem to know of the product. Consequently there appears to be a very good opportunity for the general introduction of American fencing materials. These remarks also apply to the use of steel fence posts, especially for the drier parts of Australia, where the ravages of the white ants are most serious.

In general, Australia has sufficient timber in sight to take care of present needs, including those of South Australia and New Zealand, both of which have to draw on outside

supplies. The ravages of the white ants, the favorable weather conditions, and the light traffic would appear to make certain parts of Australia, particularly the northern lines of South Australia, a good place for the use of steel ties if they can be delivered there at a reasonable price. The engineering branch of the South Australian railways has already looked into the use of steel ties and is satisfied with respect to their practicability. Up to the present time, however, it has been found more economical to use jarrah sleepers from Western Australia, costing something over \$1 each.

Rails

It is presumed that the two steel plants now in operation in Australia will be able to take care of the normal rail requirements, but in such case the entire production would apparently be required for this purpose and other lines would not be produced. Such a condition seems very unlikely. During the present very difficult period as regards the obtaining of materials, it is safe to say that the normal rail renewals are not being made, although with the lighter wheel loads and lighter traffic it is probable that the same relative wear does not occur as takes place on the American railways, even when allowances are made for the greater amount of curvature and the steeper grades. New Zealand, having no steel plants, gets all its supplies from abroad, and it is not probable, for the present at least, that New Zealand will depend to any great extent on Australia, although this may possibly be the case when a scarcity of shipping prevails.

Frogs and Switches (Points and Crossings)

The present practice is for all the state railway departments of Australia and the New Zealand railways to manufacture in their own shops, or to have manufactured by concerns in their respective states, all their requirements in frogs, switches, crossings, switch stands, derails, and guard rails, and there seems little doubt that this practice, for the present at least, will be continued. It would appear, however, that they might advantageously employ the special types of light-weight guard rails now coming into general use in America, that they would at least be warranted in installing hardened-faced frogs and switches in some particular situations, and that these could be produced by importing the hardened parts and completing the work in the railway shops. A few of the lifting type of derails, especially the "Hayes" design, have been used, but these are very infrequent as compared to the total in service. Many are of the complete switch type, which are more expensive to install and maintain than the most costly designs of the lifting type.

Rail Fastenings

As a general practice, the angle bars are bought with the rail. All the Australian state railways follow the same course with the manufacture or purchase of their supply of dog spikes and track bolts as with their frogs and switches. The supply in New Zealand is usually purchased abroad, particularly fang bolts and screw spikes. At present no guard rail clamps are used, and few tie plates, except in some cases around turnouts. It would seem that both of these, particularly the guard-rail clamps, could be adopted with much advantage, and the track men to whom the writer explained the use of guard rail clamps were very much interested in their application. The use of rail anchors is becoming very extensive, and most of those used thus far are of the Vaughn design, furnished by the Railway Track Supply Co., of London. One point that applies to the maintenance of all the patented rail anchors, when employed on Australian railways, is the necessity of inspection to prevent the ballast from loosening the rail anchor as the result of

the very much fuller ballast section used, because of the sleepers being only 5 in. in thickness.

Roadway and Track Tools

The writer assumed at first that it would not be worth while to follow up the subject of roadway and track tools, but after some inspection and inquiry it was found that there was not the difference in the design and equipment of tools that might naturally be expected, and that in a considerable number of instances the American track tool would be very well received by the Australian "ganger," as he is called. A very considerable use of American hand tools by all classes of railway mechanics was also noted.

Signals

Materials and supplies for mechanical interlockings, lock and block, and staff or tablet, will probably be bought as in the past, particularly as all these requirements are fully standardized; but in the materials and supplies that enter into power interlocking, automatic signals, electric parts for the control of lock and block and staff or tablet, and all kinds of electrical accessory parts, considerable business has been and will continue to be done. This is one of the lines of business that requires a very considerable amount of application engineering.

The signal situation is a good example of the inclination on the part of some of the Australian state railway departments to manufacture their own requirements. In some instances the signal branch has a considerable manufacturing plant and manufactures not only the well-established parts but the more difficult electrical parts as well—this in some instances with apparent disregard of any existing patent restrictions or objections to the adoption bodily of designs that are trade assets as a result of years of experience. The writer has yet to find an American railway that has made a success of this policy, although it has been tried in several instances and at times seemed desirable on account of the apparently high prices demanded by the manufacturers. It is not probable that the Australian railways will succeed any better, although they may in the meanwhile acquire a supply of poor (and in some cases possibly unsafe) electrical railway-signal apparatus. These remarks regarding patents also apply in connection with several other situations, particularly as regards patented locomotive and car devices.

As already stated, there seems to be a very substantial field for the installation of selective telephone apparatus for the "central control" of train movements, supplementing the signal equipment or rather coordinating with the signal systems. The fact should be appreciated that this is not an introduction of the American method of train running, which is in bad repute with Australian railway officials.

Both of the two largest American railway signaling companies have representatives in Australia, who are doing excellent work in promoting the sale of American electrical railway signaling devices and also signal crossing apparatus.

Rolling Stock

It is the general policy for the railway department of each state to erect its own equipment in its own shops or to purchase in Australia or, in some cases, in the United States. It is probable that no great amount of complete equipment will be purchased abroad. South Australia and Western Australia will probably go to the other Australian states for locomotives, and New Zealand and Tasmania may go abroad. Purchases have been made in the past, and now being made under the present modified conditions, and probably will be made in the future, of much material and equipment in the form of slabs for engine frames, boiler plates and flues, axles, tires, wheel centers, air hose, injectors, lubricators, cranes and similar parts, notwithstanding

ing the decided tendency to manufacture these parts as well as to erect the rolling stock. The American railways have found as a result of long experience that while they may be able to erect their own rolling stock to advantage they seldom succeed in manufacturing the specialties as well or as cheaply as the concerns that devote all their attention to such lines, with a specially trained staff. There will probably be in Australia a growing realization of this truth; therefore it seems warranted to conclude that a considerable amount of this business will continue to go to the concerns producing special lines unless inferior products are to be used. It seems probable that in the course of time improvements will be made in the adoption of automatic car couplers, particularly for the handling of coal to expedite its classification, and that air train signals will be adopted.

In connection with any materials or equipment going to New Zealand it may be noted that the North American hardwoods experience the same short life in New Zealand as in the tropics, and therefore care should be exercised not to use such woods but, instead, suitable woods that will resist the deteriorating influences of this climate. These same remarks apply to agricultural implements, which are often condemned on account of the failure to use woods that will stand the New Zealand climate. It is also well, in furnishing locomotives, to consider the matter of very robust frames and bearings, on account of the excessive wear occasioned by the sharp curves and steep grades on most of the lines. This applies especially to New Zealand and Tasmania.

Machinery for Shops

Among the imports from the United States during the last few years, machinery constitutes the largest item, and in the writer's opinion this will continue to be the case, particularly if there is a continuance of the present policy by which the railway departments manufacture and erect their own rolling stock and similar requirements. It is believed that in this line competent application engineering will be necessary in Australia and New Zealand to develop and hold the business for American products, though as a rule the railway officials are inclined to admit the superiority of most of the American machine tools.

Oil Storage and Handling

In general, very little modern apparatus for oil storage and handling has been installed, and that which has been employed is nearly all of special design, usually manufactured by the department, and generally quite expensive. An American company now has a representative in Australia and in time should build up a large line of business with its excellent equipment, especially if it follows the methods of application engineering that have characterized much of its work in the United States.

Electrical Equipment

The line of business connected with power houses and substations is well looked after by American concerns now in the field, which have always obtained a considerable portion of the business either directly or through British branches.

The same remarks apply to electrical car equipment.

As regards overhead-contact materials, substantially the same remarks apply, although some of the American concerns manufacturing certain specialties might obtain additional business from Australian and New Zealand tramways.

Mention might also be made of the electrification of the Melbourne Suburban Railways and the Sydney metropolitan scheme and also the probable electrification of the Perth suburban lines. For this last-named project Mertz & McLellan are the consulting engineers.

Fuel and Lubricants

For the present and for a long time to come all fuel for Australian and New Zealand railways will be furnished locally or from other Australian states.

At present a very large part of all the lubricants, and also a large part of the mineral oils, used by the Australian and New Zealand transportation systems, are furnished by American concerns.

Financial and Corporate Offices Not to be Charged to Operating Expenses

THE EXPENSES OF RAILROAD OFFICES, including salaries of officers, devoted to financial and corporate affairs as distinguished from operation, may not be charged to operating expenses after April 1, except as expressly authorized by the Railroad Administration, according to Circular No. 10, issued on March 18, by Director General McAdoo. Although no official explanation has been made, it is understood that the order applies to such officers as chairmen of boards of directors and of executive committees and in some cases to vice-presidents, as well as to stock transfer and bond registering offices and other offices maintained in New York and elsewhere which are considered not necessary for the purposes of the Railroad Administration in its control of the roads, but properly chargeable to the corporations.

On February 23 Mr. McAdoo addressed a circular to the roads asking for detailed information regarding the expense of financial offices in New York and elsewhere and the circular is the result.

Circular No. 10 is as follows:

"The question has been raised as to whether the Government ought to pay any part of the expense of the New York offices (including salaries of officers at New York) of railroad companies, except to the extent that such expenses are on account of operating offices properly located at New York; and, on the same principle, as to whether the Government is under any obligation to pay the expenses of offices of any of the companies in any locality, devoted to financial and corporate matters as distinguished from matters pertaining to the physical operation of the railroad properties.

"Even if it should be decided that the necessary expenses for some of the purposes for which such New York offices, and to some extent similar offices at other places, should be chargeable against the government, it seems very clear that in many instances the expenses currently so charged are greatly in excess of what is necessary to accomplish the purposes which, according to a reasonable construction, would be chargeable against the government.

"Under the circumstances it is desired that each carrier claiming that any such expense should be chargeable against the government shall present a statement showing the amount of this expense and what amount, if any, it is claimed should fairly be charged to the government, and the reasons why the carrier believes such expense is so chargeable. And on and after April 1, 1918, the said expense shall cease to be charged against operating income, except in so far as the same shall be expressly authorized after the facts shall have been considered as provided herein."

In cases where the same man is both chairman of the board or of the executive committee and president, or where other officers devote their time both to financial and operating matters, it is expected that application will be made to the Railroad Administration as provided in the circular and it is understood that in such cases the portion of the expense or the salary considered chargeable to corporate affairs will be segregated, to be paid by the company out of its guarantee.

Railroad Control Bill Passed by the House

Passed in Form Reported by Conferees After Elimination
of Restriction on State Taxation

WASHINGTON, D. C.

THE RAILROAD CONTROL BILL, which was passed by the Senate on March 13 after the conferees had struck out the provision intended to prevent states from increasing their taxation of railroad property, was passed by the House on March 14 by a vote of 303 to 26.

The conference report was passed with comparatively little debate in the House, although several representatives took occasion to express their objection to the broad powers granted to the President in Section 10, which provides that carriers while under federal control shall be subject to all laws and liabilities as common carriers "except in so far as may be inconsistent with the provisions of this act or any other act applicable to such federal control or with any order of the President." Chairman Sims of the Committee on Interstate and Foreign Commerce defended this section and Representative Esch, one of the conferees, declared that if the words are properly interpreted they do not give the President the broad and unlimited power to repeal or suspend any statute of the United States or any state that so many had objected to.

Mr. Esch also pointed out that the language of the conference report adopted no longer includes the term "standard return" but provides for "just compensation, not exceeding a sum equivalent as nearly as may be" to the average annual operating income.

The compromise as to the rate-making power seemed to be generally satisfactory to the House.

Those who voted against the bill were Representatives Bankhead, Burnett, Church, Dowell, Good, Green of Iowa, Haugen, Helm, Huddleston, Johnson of Washington, Kearns, Knutson, McLaughlin of Michigan, McLemore, Mason, Ramseyer, Reavis, Reed, Steenerson, Sweet, Thomas, Townner, Williams, Wingo, Wood of Indiana, and Woods of Iowa.

Three Congressmen voted "present" and 96 did not vote.

The passage of the bill in the Senate on March 13, as reported in last week's issue, was attended with a rather lively controversy over the provision inserted by the conferees in Section 15, providing that no state or subdivision thereof should assess taxes on railroad property during the period of federal control in excess of the ratio which the taxes derived from railroad property bore to the total taxes of such state or subdivision for the year previous to federal control. The objection to this was that it unduly restricted the taxing powers of the states, whereas both the Senate and House bills as originally passed had contained a provision that nothing in the act should be construed to amend, repeal, impair or affect the existing laws or powers of the states in relation to taxation. The House bill, however, had added a further provision which made it necessary for the conferees to adopt a compromise and the compromise proposed aroused the objection of Senators who wished all the rights of states to be preserved. Other Senators advocated the compromise on the ground that it was necessary to protect the federal government against the power of a state to increase taxation in such a way as to impose a burden on the federal government, which is now responsible for the expenses of the railroads, including taxes.

After considerable discussion the vice president, sustained a point of order against this provision of the conference report as being new matter not contained in either of the original bills and the ruling of the chair was sustained by a vote of 51 to 23. The conference report was then re-com-

mitted to the conference committee which held a hurried meeting and reported back, striking out the provision objected to in time to secure the passage of the bill in the Senate on the same day.

The final vote was 47 to 8, those who voted against the bill being Senators Borah, Cummins, Gore, Gronna, Johnson of California, Kenyon, Norris and Townsend. Forty Senators did not vote. When the bill was originally passed in the Senate no roll call was taken. Several Senators who were opposed to the bill took occasion to express their arguments against it before the final passage. Senator Townsend of Michigan objected on the ground that the representative of the Director General who had written most of the bill had included in it many provisions which he did not consider necessary for war purposes, such as the provision that state and federal laws could be set aside by the President's order and the provision allowing the President to initiate rates. "I do not believe that any new law is necessary," he said, "in order to give the President ample power to do everything that is necessary to be done for the railroads for facilitating the prosecution of the war or growing out of the war emergency."

Senator Lewis of Illinois declared that while he was in favor of government ownership it would have been an exhibition of bad faith for the government to use the war emergency for the purpose of taking over the roads permanently and that the question of government ownership should be settled on its merits. He also took occasion to say that if he had his way he would repeal the act creating the Interstate Commerce Commission, giving the President power to make rates and to create bodies representing the government to be located in various parts of the country so that shippers could be heard without coming to Washington.

Senator Johnson of California reiterated his objection that the bill is "unfair and unjust to the people and so outrageously generous to the railroad companies that its enactment into law is shameful and iniquitous."

Senator Cummins also made a speech against the bill objecting to the compensation as too liberal and against giving the President power to initiate rates. He predicted that within six months there would be a stupendous advance in freight rates and that the commission would improve them.

Senator Jones of Washington declared that although he thought the bill was unfair and unjust to the people it was necessary for the conduct of the war and that he would vote for it.

The text of the conference report was published in full in last week's issue. As passed only the provision in Section 15 was eliminated, but the conference report as it is ultimately stated last week.

Rate-Making Under Government Control

Shippers are (and are expected to be) free from any interference to initiate rates and to be controlled by the Railroad Administration when the bill becomes a law. While it is understood that the Director General does not care to concern himself to any considerable extent with matters pertaining to rates, and that his last resort is to use a roll call, it will be understood that he is vitally interested in the power to increase rates sufficiently to cover all expenses and the guarantee to the railroads as well as in the power to make any important change in rates that he considers desirable without the necessity for first securing the approval of the

interstate and state commissions. Under the new law he can act first and put a rate into effect and the federal commission can overrule him later if it wants to, but nothing is said that would give a state commission any authority to interfere in any way with any rates he should initiate in the same way that he initiated the increased demurrage rates and put them into effect for both state and interstate traffic. Even before the passage of the law the President's proclamation assumed, and Mr. McAdoo has been acting on the assumption, that he had the power to change rates, and while he has gone through the form of requesting the approval of the commission, the commission in every case has authorized the filing of the tariffs. On the day that the law was expected to be signed the Railroad Administration announced an excess fare on the Pennsylvania's parlor car train between New York and Washington, although the commission a short time ago denied the railroad permission to impose such a charge. On the following day the commission announced its approval of the tariff.

What is concerning shippers is the question as to the extent to which the Railroad Administration intends to initiate rates without hearings or notice to the shippers. Under the amendment to the fifteenth section of the law passed last August railroads have had to secure the commission's approval before even filing a tariff and the tariff when filed, of course, might be suspended. Now, apparently the administration can put a rate into effect practically without notice, and there has been much complaint upon the part of shippers that this power is lodged in a man whose principal advisors are railroad men.

The case of the proposed "spotting charge" is an example of the reason for this attitude as expressed by shippers who have recently been in Washington. The proposal to charge \$2 a car for placing on an industrial siding and \$1 a car for spotting at a particular point on the siding was drawn up in the Traffic Division. It is understood that it had not yet been referred to Mr. McAdoo when the shippers of the country heard about it and began to protest vigorously. How far the proposal had gone and what were the chances of its being put into effect are still matters of uncertainty, but it appears that a member of Mr. McAdoo's staff thought it would be well to find out what the state commissions thought about it and that the news was very rapidly disseminated among them and through them to the shippers, by way of C. E. Elmquist, the Washington representative of the state commissions. Even before the proposed plan had traveled from the traffic department on the tenth floor of the Interstate Commerce Commission building to Mr. McAdoo's office on the ninth floor a flood of telegrams had come to Mr. McAdoo from all points of the compass. Telegrams also went to the senators and representatives on Capitol Hill, arriving there about the time that the conferees were trying to adjust the differences between the Senate and the House bills as to the final rate-making authority. This was also about the time that a committee representing the National Industrial Traffic League, including G. M. Freer, H. C. Barlow, W. H. Chander, R. D. Sangster and C. E. Childe, arrived in Washington in an effort to rescue the commission's final authority over rates which was then trembling in the balance. While it is understood that the results of the shippers' visit to the capitol was not entirely satisfactory to them it is believed that the storm aroused over the spotting charges may have added to the difficulty which prevented the conferees from accepting the proposed compromise which Senator Smith had brought from the White House, which would have required the commission to make rates high enough to pay all expenses, instead of merely requiring it to take them into consideration.

The following petition regarding the rate-making powers was presented to the conferees on behalf of the National Industrial Traffic League:

Protest of National Industrial Traffic League

"Your petitioner, the National Industrial Traffic League, an organization comprising in its membership the principal commercial organizations and industrial and commercial concerns located throughout the United States, and representing, substantially speaking, 300,000 shippers, addresses your honorable committee in respect to the railroad bill, now in conference. Your petitioner is particularly concerned respecting section 10 of the Senate bill and section 11 of the House bill, that portion of the same which refers to the making and prescribing of rates, fares, classifications, rules and regulations of the carriers while under federal control.

"No one appreciates more fully than the members of this organization the fact that the country is at war and further that many old ways of doing things must bend, to the end that supreme effort of the nation to win the war shall not be embarrassed; but we are convinced this bending can be done in an orderly form and manner, as now provided by law, and all the necessary and desired results be obtained. "The railroads of the country are in the hands of the government for the period of the war and for some fixed period following the close of the war.

"We understand, in general terms, the purpose of taking over the roads was principally twofold, viz., to co-ordinate their activities to the great aim of winning the war and the further purpose of fairly conserving their financial status through the period of great borrowing by the government. In these laudable efforts we are all in accord. In the bringing of these aims to a successful conclusion it may be necessary for the government to deal with the rates, fares, rules, regulations, etc., of the carriers, and it is to this phase of the pending bills that we address ourselves.

"We take it for granted the welfare of the commerce and industry of the country is second only to the one great purpose of winning the war. Our contention is that as the railroad bills now read, the welfare of the commerce and industry of the country may be unnecessarily placed in jeopardy.

"The government is in possession of the roads; it exercises its control through the agency of the Director-General, who has surrounded himself with a cabinet of principals and assistants drawn almost exclusively from the railroad service. None of these gentlemen has had, substantially speaking, any training on the commercial or industrial side of the question, outside of the railroad point of view. These men are undoubtedly of ability and capacity in their particular line of training, yet we may say with propriety their training has given them in many respects an entirely different point of view from that held by many gentlemen trained in commerce and industry. We take it to be a fair assumption that the Director-General will be guided in great measure in his conduct of the railroads by the counsel and advice of those he has called about him. Our point is this: In the very nature of things, can these gentlemen always have as clearly in mind the interests of the public as those of the carriers?

"Permit us to illustrate what we have particularly in mind. The demurrage rules were the outcome of eight years' negotiations between shippers and carriers under the guidance of the Interstate Commerce Commission. They had been changed from time to time by mutual agreement. So far as the shippers were advised, this method of handling the question was mutually satisfactory to the shipping public and to the carriers. In January of this year there appeared, without notice to the shipping public, a new set of rules differing materially from those long in effect. After a fruitless personal appeal to the Director-General, a written protest was filed in behalf of the shippers by your petitioner. It was pointed out that the new rules would not accomplish the desired results. The final outcome was that the representatives of your petitioner were

requested to return to Washington for conference with representatives of the carriers and the Interstate Commerce Commission. In this conference we proceeded in the manner long followed; the rules were again revised by mutual agreement and at the request of the Director-General went into effect in place of those previously promulgated by him.

"It is our desire to avoid and prevent a repetition of such instances. For more than thirty years the Interstate Commerce Commission, created under the authority of Congress, has had the full confidence of the shipping public; nowhere can be found a more useful and patriotic arm of the government. To that body may safely be left the determination of all questions affecting rates, fares, rules, etc.

"It is contended by some that the ultimate control of rate-making is a necessary part of the war power of the President. Your petitioner cannot conceive of any condition arising out of the war in which the President could be hampered or embarrassed in his control and operation of the carriers by reason of the rate-making power remaining in the jurisdiction of the Interstate Commerce Commission. Under the stress of war it may be desirable to change existing rates, fares, charges and regulations affecting shippers; but the successful operation of the railroads for war purposes would not be affected by the amount of the rates charged. As a matter of justice and public policy the commerce of the country should pay an adequate charge for transportation. If changes in rates become necessary, the burden should be equitably distributed by a tribunal well versed in all phases of the subject, so as to disturb the commerce and well-being of the country as little as possible. The rate adjustments of the United States are delicately balanced and related; any disturbance thereof should be had only after a full investigation by a disinterested body.

"For more than thirty years Congress has authorized the Interstate Commerce Commission to execute and enforce a well-considered and well-rounded form of regulation of carriers. That body may well be said to be the only body qualified by long years of experience and training fully and adequately to consider and determine all questions within the jurisdiction of the act to regulate commerce. The control of rate-making is a legislative function vested in Congress and delegated by Congress to the Interstate Commerce Commission as a branch of the legislative department of the government. We earnestly insist that the power and jurisdiction be left unimpaired, to be exercised in accordance with the act to regulate commerce as amended.

"It is our firm conviction that this can safely be done and all necessary and desirable results be obtained. By so doing this legislative function will be retained where you have placed it, viz., in the agency of the Congress created for the purpose and qualified by experience.

"We are persuaded that even the necessities of war do not justify or make necessary the destruction of all that has been accomplished during the past 30 years of regulation of the carriers by the Interstate Commerce Commission.

"As a war measure Congress authorizes the President to make regulations as to the imports which should be permitted, but does not authorize him to fix the customs duties; it permits the Postmaster-General to operate the postal system, but does not authorize him to fix rates of postage. There certainly is no greater necessity to authorize the President to fix the rates of transportation over the railroads which you permit him to operate as a war measure.

"Wherefore, your petitioner earnestly prays that the paragraphs in the two bills dealing with rate regulation and control shall be so amended as to leave to the Interstate Commerce Commission the determination of all questions arising in respect thereof as now embodied in the act to regulate commerce and its amendments."

Since the first protests were received, the Director General has received a considerable number of communications from

other shippers urging him to impose the proposed charge for service on industrial sidings. Apparently these have come from the shippers who use the public team tracks.

Express Companies

No decision has yet been reached on the question as to whether the express companies are to be taken over by the government, but the impression is being gained that they will not be. It is understood that the four principal express companies, the Wells Fargo, the Adams, the American and the United States, have asked to be taken over on terms similar to those applied to the railroads on the ground that their business is so closely intertwined with that of the railroads and because their financial position has been steadily growing worse. It is understood that the influence of the post office department has been against taking over the express business because the Postmaster General has always taken the position that the post office department could handle the business through the parcel post and that if it were taken under the wing of the Railroad Administration, two departments of the government would be competing against each other.

The Railroad Administration has endeavored to sound the opinion of the state railroad commissions on the subject through their representative at Washington, Charles E. Elmquist, and he has asked the commissions for an expression of their views in reply to a circular letter. Among the questions he asked were as to whether the four companies or all of them should be taken over as a war measure, what compensation should be allowed if they are taken over, and whether they should be returned to private ownership after the war.

The director-general is now authorized to proceed with the negotiations with the railroads regarding their compensation and with plans for expenditures for equipment and improvements as well as for financing the roads. It is understood that work has been under way for some time on the preparation of contracts to be made with the roads and that the Interstate Commerce Commission is about ready to certify the amount of the average net operating income for three years which is made the basis of compensation except in special cases. A plan of accounting will be devised by Director Prouty of the division of public service and accounting. Conferences regarding the form of contract are being held between Judge Payne, general counsel of the Railroad Administration and the Law Committee of the Railway Executives Advisory Committee.

Improvements may be paid for in part out of the revolving fund consisting of the \$500,000,000 appropriation and the surplus earnings above the guarantee when the railroads are not able to finance them. Aid may be extended to the roads in refunding maturing obligations and financial assistance may also be given the roads in the form of loans by the War Finance Corporation if the bill providing for it now pending before Congress is passed. In hearings on that bill Director-General McAdoo stated that one of its purposes was to aid some of the railroads in meeting their requirements and that that was one of the reasons why the appropriation asked was only \$500,000,000. That sum he said would not be sufficient to take care of the roads even for this year.

BRITISH RAILWAY ROLL OF HONOR.—The Brighton Railway of England has issued the sixth edition of its Roll of Honor containing the names of its staff who have died in active service. The figures are up to the end of the year 1917 and show that the total number of men enlisted from the Brighton Railway up to that date was 4,814 which represents 29.6 per cent of the staff, 388 have died in active service which is 7.02 per cent of the men enlisted.

Planting Trees As Protection Against Drifting Snow

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE has undertaken an active program of tree planting as a means of protecting its tracks from drifting snow. It is planned to plant these trees along 100 miles of right of way each year and although this work was first undertaken as late as 1914, trees have already been planted along 250 miles of right of way and 70 miles additional line is ready for planting this spring. Up to the present time these trees have all been planted along the lines in North Dakota but



Original Condition of Many of the Cuts

it is planned to extend this work into Wisconsin this year.

In undertaking this work it was first necessary to develop a method of planting the trees economically. For this purpose a machine has been devised which will plant 8,000 trees a day with three men, or as many trees as 80 men could set in a day by hand. These trees are also said to be planted more satisfactorily, while they are all set at a uniform depth.

Careful consideration was given to the selection of the type of tree to plant, bearing in mind the kinds of soil which would be encountered along the cuts to be protected.



The Tree Planter in Action

Several kinds of willows were tried and the laurel-leaved willow was finally selected as the hardiest. It is planted in the outer row and also in some of the rows nearest the track. The Buffalo berry, carragana, buckthorn and artemisia are also used to some extent in the outside row, the purpose being to provide a low growing spreading tree or shrub with no big openings through which the wind can pass readily. Green ash or cottonwood is planted in the second row and green ash or box elder in the third row with the remaining five rows in willows. Eight rows of

trees are planted on the north and west sides of cuts and six rows on the south and east sides. These will be cut back periodically one row at a time as the trees develop.

The original right of way was 50 ft. wide in most instances, but this was soon found to be too narrow for effective tree planting so that 75 ft. additional is being purchased on the north and west sides of the cuts and 50 ft. on the opposite sides. The trees are set three and four feet apart in rows placed 8 ft. apart.

Most of the trees, which have been placed up to the present time, have been purchased from nurseries, although a nursery has been started by the company and trees are now being raised there. They are taken to the point of planting in refrigerator cars, as it has been found possible in this way to keep them dormant until as late as July.

While this work has not been carried on a sufficient length of time for the trees to become full grown and to demonstrate the entire success of the plan, the cost of plant-



A View of the Tree Protection

ing and caring for these trees compares very favorably with that of snow fences. The first cost is about 25 per cent of that for snow fences, while the maintenance expense will be very small after the first three or four years. This work has been handled under the supervision of T. A. Hovestad, agricultural commissioner of the Soo Line.

FREE PASSES TO ENGLISH RAILWAY DIRECTORS.—The president of the British Board of Trade was recently asked whether, seeing that all the railways of the country were now under government control, he would give orders that the privilege hitherto enjoyed by the 500 or more railway directors of the United Kingdom of unrestricted traveling over all the railway systems first-class, without payment of fares, should now be withdrawn, and thus ease the prevailing congestion as regarded seating accommodation as well as adding to the railway revenue. To this, Sir Albert Stanley replied that he had no reason to suppose that the issue of free passes to railway directors results in any abuse of traveling facilities, and it did not seem to him that a departure from the existing practice would lead to the result which the member desired to attain.

C. B. Seger

CHARLES BRUNSON SEGER has been elected temporary chairman of the executive committee of the Union Pacific, succeeding Judge Robert S. Lovett. Judge Lovett resigned from the Union Pacific to give his entire services to the United States government and it would appear, therefore, that, although Mr. Seger at present has the word temporary prefixed to his title, this actually will have little, if any, significance.

Superficially, at least, there is a contrast between Judge Lovett and his successor. Judge Lovett was diplomatic, kindly, sympathetic, but none the less keen. Mr. Seger is keen, uncompromising, downright, clear thinking to an unusual degree. In other words, the contrast between Judge Lovett and Mr. Seger is entirely as to methods.

It may be presumed that Mr. Seger has the confidence and backing of Kuhn, Loeb & Co. In the matter of choosing a head for the Union Pacific system, it is pretty safe to say that the bankers have had the ruling voice.

Mr. Seger has been vice-president and controller of the Union Pacific since the Union and Southern Pacific were separated in 1915. As an accounting officer he stands unquestionably at the very head of his profession. His grasp of detail and his memory for figures are remarkable. He is naturally intolerant of slipshod or petty theories. His organization of the accounting system of the companies which go to make up the Union Pacific has been the admiration of accounting officers and railroad executives both here and in England.

Mr. Seger's entire railroad career has been in the accounting department but, notwithstanding this, it is the opinion of operating officers who have worked with him that he could make a superlatively good general manager or, so far as that is concerned, fill any operating position; and, although he might not be capable of acting as superintendent of motive power or chief engineer of construction, to know intimately what a good mechanical officer or engineering officer ought to accomplish under a given set of conditions. As vice-president and controller, in practice if not in theory, the presidents of the Union Pacific companies conferred with or reported to—as you have a mind to call it—Mr. Seger. Much of Mr. Seger's time and thought were given to operating statistics.

Probably there is no other accounting officer in the history of American railroads who has had as clear an insight into the limitations of the use of operating statistics as a guide to operating efficiency or who has worked more persistently and more successfully to so collate these statistics as to reflect actual conditions. Accounting officers are apt sometimes to make something of a sacred mystery of their profession. To Mr. Seger, a mystery, like an unweighted average, was an anathema. Mr. Seger was fearless in his opposition to theorists and to those who held views contrary to his own. He opposed vigorously and without subtleties the

Interstate Commerce Commissioner's desire to separate all operating expenses between freight and passenger. It could not be done accurately and, therefore, it was a falsehood to attempt to do so, was the substance of his argument.

It is very interesting to note an apparent tendency in Kuhn, Loeb & Co.'s policy toward the roads that they control. When they reorganized the Wabash, W. H. Williams, vice-president of the Delaware & Hudson and an accounting officer, was made chairman of the board. Now we have an accounting officer made chairman of the executive committee of the Union Pacific.

Charles Brunson Seger was born August 29, 1867, at New Orleans, La. He went to common school and began railroad work as an office boy on Morgan's Louisiana & Texas Railroad & Steamship Company, which is part of the Southern Pacific. He had become a clerk before 1887 and in that year was given the title of steamship auditor. In 1889 he was made traveling auditor and two years later was appointed chief clerk to the general auditor.

In November, 1893, Mr. Seger was made auditor and secretary of the Galveston, Harrisburg & San Antonio, the Texas & New Orleans, and the Direct Navigation Company. On January 18, 1900, he was made also auditor and secretary of the Galveston, Houston & Northern.

On November 1, 1904, Mr. Seger was appointed auditor of the Southern Pacific-Pacific system, with office at San Francisco, Cal. In January, 1910, he was made general auditor of the Union Pacific and Southern Pacific systems—the Harriman system; and in 1911 was made deputy comptroller of the Harriman lines. When the courts ordered the dissolution of the Harriman system and the separation of the Union and Southern Pacific, William Mahl, who had been controller of the Southern Pacific under Collis P. Huntington and later under F. H. Harriman, controller of the Harriman lines, resigned and C. B. Seger became controller of the Union Pacific and

A. D. MacDonald of the Southern Pacific.



C. B. Seger

AMERICAN ENGINEERS ROBBED IN CHINA. Press despatches from Peking dated March 8, report that two American engineers have been robbed and captured by bandits near Yeh-Sien, in the Province of Ho-Nan. A Chinese assistant also was taken prisoner. The party was on its way to inspect and survey the site of a proposed railway between Chow Kai-kow and Siang Yangfu. They were carrying a large sum of money with which to pay survey parties. An escort of 20 soldiers resisted the bandits until their ammunition was exhausted, when the party surrendered. Two of the Chinese escaped and reported the outrage. Officials of the American International Corporation which is associated with the Siems-Carex Railway & Canal Company in railway building in China, announced that they intended calling the attention of the State Department at Washington to the bandit outrage near Yeh Sien, and would ask protection for their employees now in that section.

Approximate Cost of Stopping a Train

By R. E. W.

FREQUENTLY THE QUESTION of cost incidental to stopping a train comes up in court actions and commission hearings, and heretofore the answer has been an estimate based upon general railroad experience and without any supporting data. If, however, such an estimate is not accurate enough for the purpose, some way of actually figuring the cost must be chosen and the following method will be found to give good results.

Since energy is the capacity for performing work, we may divide the energy dissipated in stopping a train from a given speed, by the work required to move the same train a mile at the speed from which the stop was made, and this quotient will represent the distance the train would have traveled due to its stored up energy. It is evident then, that this quotient, which may be called the equivalent miles run, multiplied by the cost of coal, repairs and wages per train-mile, will give the total cost of the stop. Train resistance figures which enter into the computation are based on a wide range of experiments and the respective costs mentioned above are taken from railway company statistics. These must be average values, because the cost of stopping a train even from the same speed, is not always the same due to varying brake action, slipping of drivers, etc.

To express the energy relations algebraically, let,

- S = total energy in the train due to its speed.
- R = work required to move the train a mile at the given speed.
- F = distance the train could travel due to S.

Then from the preceding paragraph:

$$\text{Equivalent miles} = F = \frac{S}{R} \tag{1}$$

To find the value of S consider the general equation

$$E = \frac{1}{2} M V^2 \tag{2}$$

Where: E = energy in foot pounds.
M = weight in pounds divided by G (acceleration due to gravity).
V = velocity in feet per second.

Expressing the weight W, in tons and the velocity V, in miles per hour, equation (2) becomes

$$E = \frac{1}{2} \frac{W \times 2,000}{32.2} \times \left(\frac{V \times 5,280}{3,600} \right)^2 = 66.8 W V^2 \tag{3}$$

Adding about 5 per cent for energy of rotation, the total energy in the train becomes:

$$S = 70 W V^2 \tag{4}$$

$$R = 5,280 \times \text{total train resistance at the given speed in pounds} \tag{5}$$

$$\text{Therefore: } F = \frac{70 W V^2}{5,280 \times \text{total train resistance}} \tag{6}$$

To apply this method to a particular case, consider an eight-car passenger train of the following description, running at 30 m.p.h.

Total weight of Pacific type engine.....	120 tons
Weight on driving wheels.....	75 tons
Weight of tender (¾ load).....	63 tons
Weight of eight coaches at 110,000 lb.....	440 tons
Total car resistance at 6.0 lb. per ton*.....	2,640 lb.
Tender and engine truck resistance at 6.0 lb. per ton*.....	648 lb.
Engine friction and head air resistance.....	2,090 lb.
Cost of coal per car mile†.....	2.63 cents
Cost of engine repairs per mile.....	9.49 cents
Cost of car repairs per mile per car.....	1.75 cents

Substituting in equation (6):

$$F = \frac{S}{R} = \frac{70 (120 + 63 + 440) \times 30^2}{5,280 \times (2,640 + 648 + 2,090)} = 1.38 \text{ miles.}$$

The cost of coal and repairs for the above distance is as follows:

Cost of coal = 1.38 × 2.63 × 8 =	29.0
Cost of engine repairs = 1.38 × 9.49 × 1 =	13.1
Cost of car repairs = 1.38 × 1.75 × 8 =	19.3

Cost chargeable to stop = 61.4 cents

This does not include the cost of time lost by the crew

which may be figured by applying 1.38 miles to the rate of pay per mile in case the crew gets overtime.

Also there are other items such as track repairs, lubrication, depreciation and taxes, a proportion of which is properly chargeable to these stops, but the amount is small and can properly be neglected.

For the sake of comparison, the above method is applied to a 50-car freight train of the following description running at 30 m.p.h.:

Total weight of Mikado type engine.....	130 tons
Weight on driving wheels.....	100 tons
Weight of tender (¾ load).....	63 tons
Weight of 50 loaded freight cars at 75 tons.....	3,750 tons
Total freight car resistance at 4.4 lb. per ton*.....	16,500 lb.
Tender and engine truck resistance at 4.4 lb. per ton*.....	409 lb.
Engine friction and head air resistance.....	2,715 lb.
Cost of coal per freight car mile†.....	40 cents
Cost of freight car repairs per car mile.....	.87 cents
Cost of engine repairs per mile.....	9.49 cents

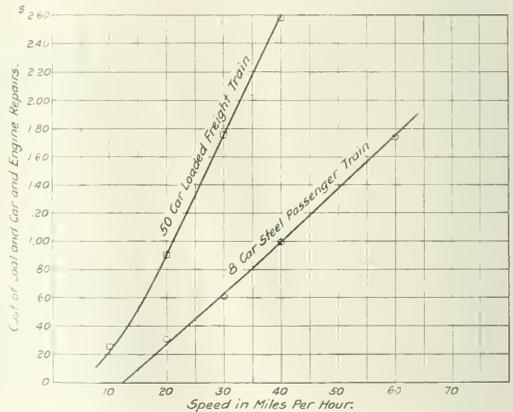
Substituting in equation (6):

$$F = \frac{S}{R} = \frac{70 \times (130 + 63 + 3,750) \times 30^2}{5,280 \times (16,500 + 409 + 2,715)} = 2.40 \text{ miles}$$

Cost of coal = 2.40 × .40 × 50 =	48.0 cents
Cost of car repairs = 2.40 × .87 × 50 =	104.5 cents
Cost of engine repairs = 2.40 × 9.49 × 1 =	22.8 cents

Total cost of labor charges as stated before. = 175.3 cents exclusive

The relative costs of stopping the above passenger and



Approximate Cost of Stopping Freight and Passenger Trains from Different Speeds

freight trains from a speed of 30 m.p.h., is shown in the following table:

Total cost of coal.....	Passenger 29.0 cents	Freight 48.0 cents
Cost of car repairs.....	19.3 cents	104.5 cents
Cost of engine repairs.....	13.1 cents	22.8 cents
Total.....	61.4 cents	175.3 cents

It will be observed that the cost of coal and especially the cost of freight car repairs, is what makes the charge so much higher in the case of the freight train. The same thing is shown graphically by plotting the two curves illustrated, which were obtained by plotting speeds against costs, as obtained by the above method.

In case exceptions are taken to this method due to the fact that the costs of repairs are usually based on the actual mileage, which does not include the constructive or equivalent miles due to stops, it must be remembered that the relative mileage is small and the only effect would be to slightly reduce the cost of the stop.

*All car resistances were taken from data obtained by Professor E. C. Schmidt for the University of Illinois. Engine truck and tender resistance is assumed to be equal to car resistance.

†Engine friction and head air resistance were taken from the Locomotive Handbook, published by the American Locomotive Company. All other data are taken from railway company statistics.

New Reading Coal Pier Has Interesting Features

The Installation of a Modern Car Unloading Machine Doubles Capacity of Port Reading Terminal

TO PROVIDE INCREASED FACILITIES for handling the rapidly increasing tidewater shipments of coal at its Port Reading (N. J.) coal terminal the Philadelphia & Reading has recently completed and placed in operation a modern car dumping plant to supplement the old facilities at this point. The new facilities include a pier, a car dumper, a thawing plant and additional yard tracks. While the project involved an outlay of approximately \$1,000,000, the expenditure is justified by the increased capacity of the plant and the reduction effected in operating expenses. By operating two shifts a day, the new car dumper has a capacity equal to that of the old plant. A force of

terminal for the handling of coal. The line is single track, with passing sidings holding 75 to 100 cars at intervals of about three miles to permit of flexible operation. The inbound or loaded coal trains average about 50 cars each and the outbound or empty trains 60 to 70 cars.

Prior to the completion of these improvements, the coal handling facilities at this terminal consisted of three high-type gravity trestles with a combined capacity for handling approximately 7,000,000 tons of coal per annum and a coal storage yard having a capacity for 2,800 cars. The trestles handle both bituminous and anthracite coal in the approximate proportions of 60 per cent bituminous and 40



General View of the Terminal

175 men is employed to handle the maximum capacity of 600,000 tons a month over the three trestles comprising the old plant, as compared with 12 operators required to handle the same amount of coal over the car dumper.

The Port Reading Coal Terminal

The Port Reading coal terminal, which provides the facilities for the trans-shipment to vessels of coal transported over the lines of the Philadelphia & Reading and its connection, was first placed in operation in 1892. It is located about 17 miles below New York City on the Arthur Kill, which separates Staten Island from the New Jersey mainland and at the terminal of the Port Reading Railroad, a subsidiary of the Reading system.

This railroad is 19 miles long and extends from Manville, on the New York division of the Reading, to the terminal. It is operated for freight only, its principal function being to provide the connection from the Reading main line to the

per cent anthracite. The bituminous coal comes from Ohio, Pennsylvania and West Virginia and the anthracite mainly from Pennsylvania.

While by far the greater amount of the coal handled in Port Reading is destined for New York and vicinity, a considerable amount is also handled for export, coastwise and bunker purposes. Twelve locomotives are employed in the regular shifting force, working 24 hours per day. The engine crews and car riders work in eight-hour shifts. A fleet of four tugs is maintained to handle the vessels for New York City, a flotilla consisting of from 25 to 30 boats. The loading is done as far as possible during the day, and the loaded boats are moved out on the low tide at night. The empties at New York are picked up during the day, assembled at a stake boat in the lower harbor and are returned to the terminal at night for the next morning's performance.

The new facilities consist of a timber pier 900 ft. long

by 78 ft. wide and an electrically-operated car dumping machine, a sub-station for generating the power used to operate the dumper, a boiler house built of concrete and brick, a thawing house of fire-proof construction with a capacity for 44 cars and additional yard facilities. The new track facilities provide storage for 1,200 cars, making a total storage capacity in the entire plant of 4,000 cars. The car dumper is capable of handling one car of 100-ton capacity per minute and it is expected that an average of 30 cars per hour over the dumper will be maintained. Working day and night shifts at this hourly capacity the car dumper will handle an amount of coal equal to that handled over the three gravity trestles. The dumper will be utilized chiefly for unloading bituminous coal and the smaller sizes of anthracite. As the trestles will be maintained in service to supplement the dumper, this installation doubles the coal-handling capacity of the terminal.

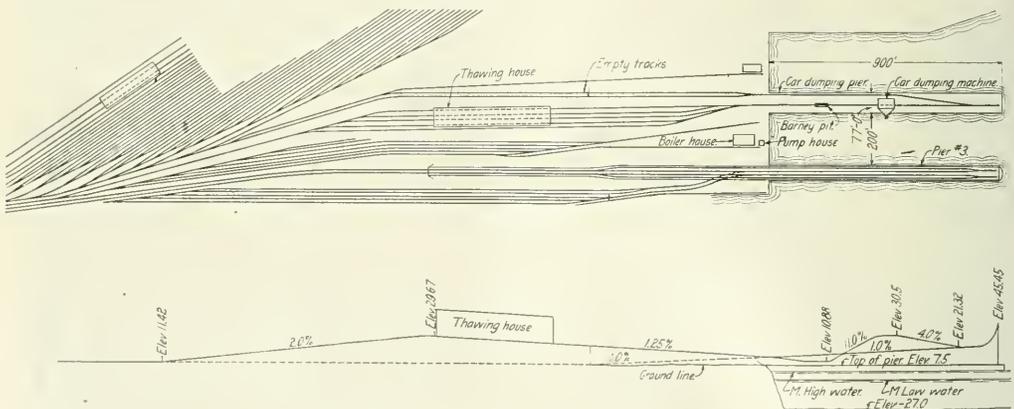
The site upon which the new facilities are now located was originally a salt marsh which was under water at high tide. This marsh was filled in with sand pumped from the sound by an hydraulic dredge to an elevation of 10 ft. above mean low water. The dredge also made the fill upon which the thawing house is located and for the empty and loaded car tracks serving the machine. The fill at the thaw-

with the bottoms of the cars. The air heating apparatus is located in the center of the house on the second floor and consists of steam engines, fans, steam coils, and recording thermometers by which the temperature in any of the four stalls is ascertained and recorded. Steam is supplied to the thawing house through asbestos covered pipes leading from the boiler house, and the condensation from the steam coils is returned to the boilers both because of the saving in heat and the difficulty of securing good boiler water in this locality.

The efficiency of the plant is increased by using the same air over and over instead of securing a new supply from the outside atmosphere. This is done by drawing the air from the top of the stalls through the steam coils and forcing it through ducts which have outlets between the rails, thus bringing the hot air in contact with the bottoms of the cars. The severe weather during the winter at Port Reading makes it necessary to use the thawing plant about three months in the year.

Other Facilities

The pier is a timber structure 75 ft. wide and 900 ft. long. The central portion is of low water construction and comprises the foundation for the unloading machine. This



Plan of the Track Layout and Coal Pier

ing house has an elevation of about 30 ft. above mean low water at its summit, and in making these fills 588,764 cu. yd. of material were moved. This part of the work was done in 60 days, the dredge maintaining an average of 9,800 cu. yd. of material moved per day.

The Thawing Plant Is an Important Feature

The thawing house, which is one of the most interesting and important units of the layout, is located between the storage yard and the dumper. It is 440 ft. long and 70 ft. wide and has four stalls, each capable of holding 11 cars. It is of fire-proof construction, with a frame work of light steel channels to which triangular wire mesh was welded electrically on each side and covered with gunite, forming two solid walls about 1½ in. thick with an air space between them. This type of construction is particularly adapted to this kind of a structure inasmuch as the air space between the walls reduces the radiation of heat to a great extent. The house rests on a concrete foundation which in turn is supported on timber piles driven into the sand fill.

The thawing of coal is done by forcing air, heated to a temperature of 250 deg. F., into any one or all of the four stalls or tunnels of the house and bringing it into contact

foundation contains 880 timber piles which are cut off at low water, clamped, capped and covered with an 8-in. deck. This deck supports the concrete machine foundation as well as the concrete face wall of this portion of the pier which encloses the entire machine foundation. The space between the various units of the concrete foundation is earth filled. The remainder of the pier is of high water construction, the piles being cut off 10 ft. above mean low water, clamped, capped and covered with a 3-in. deck. All of the piles and timber used in the construction of the pier are creosoted except the top clamps, caps and 3 in. decking in the high water construction.

The boiler house which supplies steam to the thawing house and the sub-station for the operation of the car dumping machine, is located midway between the thawing house and the dumping machine. The house is built of brick and concrete with its boilers arranged in three batteries of two boilers each, having a total capacity of 1,200 h.p. The boiler house is equipped with elevating and conveying machinery which delivers the fuel into a suspended bunker from which it is fed to the boilers by gravity.

The sub-station is located under the dumper and is fitted with 250 h.p. direct connected electric generators which are

used on alternate days. The generators supply the power for the entire operation of the dumper with the exception of the haulage car, which is steam operated. The exhaust steam from the sub-station is utilized in preheating the boiler water to about 210 deg. F. before it reaches the boilers.

Another important feature of the plant is the electric boat hauling machine which moves the loaded boats away from the unloader, the empties into place and warps the boats being loaded up and down the pier for trimming so as to bring the proper hatch under the chute. This machine



The Thawing House

consists of a drum located under the car dumper and sheaves anchored to the pier in both directions from the drum over which cables are operated.

The Operation of the Car Dumper

As may be seen in the map, the layout is simple and convenient of operation. The approach to the thawing house is on a 2 per cent compensated grade which permits the locomotives in use at the terminals to push eleven 100-ton capacity cars into the thawing house, or all that one stall of the house will accommodate. The tracks through the house and down to the car haulers pit were built on a 1.25



The Unloader in Operation

per cent descending grade. Sufficient room is provided in front of the thawing house to store 11 cars on each of the four tracks through the house. When the house is filled with cars and the first stall thawed these cars are run out of the house by gravity and 11 more cars are put in. In severe weather about two to four hours is required to properly thaw a car.

A fifth track provided south of the house permits the operation of the dumper without the necessity of the cars passing through the house. Like the other four tracks, this track is on a 1.25 per cent descending grade in the direc-

tion of the dumper. The thawed cars and those brought in by way of the No. 5 track run down one by one from the storage tracks in front of the thawing house to the haulage pit, from which point they are taken up the heavy track trestle over an 11 per cent grade to the cradle of the dumper by a steam-operated car haulage machine. At the machine the car is clamped in place elevated and turned over, dumping the coal into a pan conveyor. From the pan the coal runs through a telescopic chute into the hold of the boat, and by always keeping the chute full the breakage is reduced to a minimum. The oncoming loaded car pushes the empty car from the cradle. It then runs down a 4 per cent grade to a switch back at the end of the pier and returns on the light track trestle down a 1 per cent grade to the light car storage yard.

The plant was designed and built under the direction of Samuel T. Wagner, chief engineer of the Philadelphia & Reading, and F. Jasperson, engineer in charge of construction. The construction work on the pier, foundations and boiler house was done by railroad forces under the supervision of Mr. Jasperson. The thawing house was built un-



The Unloader and the Loaded and Empty Cars

der contract with the Surety Engineering Company of New York, and the McMyler Interstate Company furnished and erected the dumping machine. The operation of the plant is under the direction of William Brown, shipping and freight agent at Port Reading, and its maintenance is in charge of I. A. Seiders, superintendent of the motive power and rolling equipment department of the Reading.

DOCK CONSTRUCTION IN FRANCE.—Several thousand men are employed in construction work at the various American depots in France says a Paris correspondent in the New York Times. A total of 125 miles of tracks has been laid to the depots, and \$15,000,000 has been expended. The docks under construction at one port will cost millions of dollars.

AMERICAN ENGINEERS BUILD WAREHOUSES IN FRANCE.—Remarkable progress has been made, by the American engineers in constructing tracks and building warehouses and ordnance depots, despite the difficulties of transferring all the materials from America. A cable dispatch to the New York Times dated March 12, says that the advance regulating station has 19 warehouses completed, with a capacity of 5,000 tons each, to supply an army of 1,000,000 men. The number of warehouses will be increased to 59 by July. All this work, including the construction of the ordnance depot, 50 miles of railroad tracks, and barracks for several thousand men, has been completed since October.

Rate Advances Allowed on Eastern Railroads

THE INTERSTATE COMMERCE COMMISSION in a series of orders handed down on March 15 allowed most of the increases in rates asked by the railroads in Official Classification territory at the hearings held before the commission during November in the supplemental 15 per cent case and the other cases considered in connection therewith, which in general cover the commodity rates which were not increased by the commission's decision of June 27, 1917. That decision allowed increases in class rates and on a few specific commodities, estimated to amount to approximately \$97,000,000 a year, and the latest decision allows, with some exceptions, the remaining increases originally asked which it was estimated by the railroads at the time of the hearing would add approximately \$58,000,000 more.

No opinion accompanies the latest decision, which is merely a series of orders vacating the suspension of the proposed tariffs with a statement of the exceptions and a set of rules governing the relationship and adjustment of the rates involved in the 15 per cent case.

In general the advances allowed are on a 15 per cent basis, but the increase on anthracite coal is a maximum of 15 cents a ton, the increase on cement is 1 cent per 100 lb., and on lumber and forest products 1 cent per 100 lb.

As to anthracite coal, the commission vacated and set aside its order of July 30, 1915, docket No. 4914, in the matter of rates, practices, rules and regulations governing the transportation of anthracite coal and the modifying orders entered on September 1, November 22 and December 30, 1915, and February 24, March 9 and March 23, 1916, thereby allowing the advances to go into effect. In Investigation and Suspension docket No. 111, in which proposed increases were suspended until April 29, 1918, the commission vacated as of March 25, 1917, its order suspending the operation of schedules in tariffs of the Norfolk & Western, and ordered that the commodity rates on anthracite coal, in so far as increased by 15 cents per long ton or less, as stated in the schedules, be approved, provided that such rates between points in Official Classification territory shall not be increased by more than 15 cents per long ton, and that where a through rate between two such points is made by combination appropriate provision is made in the schedules that the aggregate increase of the factors applicable in such a combination shall not exceed 15 cents per long ton. The proposed schedules will be held under suspension until cancelled by new schedules filed in conformity with these conclusions. The orders in the anthracite investigation, 35 I. C. C. 220, will be vacated and set aside.

In the eastern livestock-fresh meat case, I. & S. docket No. 1124, in which the proposed increases were suspended until July 13, 1918, the orders are vacated as of March 25 and the proceeding discontinued.

In the eastern commodity case, I. & S. docket No. 1125, in which proposed increases were suspended until June 30, 1918, the carriers are required to cancel the schedules on or before April 25, 1918, in so far as they proposed increased rates on condensed milk and canned vegetables from Wisconsin and Illinois points, and increased rates on lumber, mine props and mine timbers in carloads, and furnace castings in less than carloads, and an increase in the minimum carload weight on woodenware from Escanaba, Mich., to eastern points. With this exception, the orders are vacated as of March 25 and the proceedings discontinued.

In the case involving commodities between trunk line and western points, I. & S. docket No. 1131, in which the increases were suspended until July 13, the orders are vacated as of March 25 and the proceeding discontinued.

In the Central Freight Association territory petroleum

case, I. & S. docket No. 1134, in which the increases were suspended until July 18, the orders are vacated as of March 25 and the proceeding discontinued.

In the eastern grain case, I. & S. docket No. 1142, in which increases were suspended until July 29, 1918, the orders are set aside as of March 25 and the proceeding discontinued.

The supplementary 15 per cent case, No. 57 ex parte, involves increases in commodity rates within Official Classification territory, and increases in class and commodity rates between Official Classification territory and other territories. The commission ordered that commodity rates on brick clay and articles grouped therewith in present tariffs from Canton, O., to points in Central Freight Association territory and Illinois, and on the Mississippi river, may be increased by 15 per cent and rates from other points in western Pennsylvania, West Virginia, central, southern and eastern Ohio and the Ashland, Ky., group, may be made on the established differentials over or under the Canton rates so increased.

It is further ordered:

That commodity rates on cement may be increased by 1 cent per 100 lb.

That commodity rates on lumber and forest products may be increased by 1 cent per 100 lb.

That commodity rates, other than on ice, bituminous coal, coke, and iron ore, which are not otherwise covered by this order or by the foregoing orders, and which have not been increased since June 27, 1917, may be increased by 15 per cent, observing established rate groupings, relationships, and differentials in manner provided in paragraphs designated I to XIII of this order.

That joint rates, whether class or commodity, between Official Classification territory on the one hand, and southeastern territory, the southwest, and points on or east of the Missouri river on the other, may be increased by amounts not exceeding the increases in rates now and heretofore allowed to the carriers in Official Classification territory under this proceeding and the C. F. A. Class Scale Case, 45 I. C. C., 254. If these increases involve a change in the relationship under the long-and-short-haul rule between intermediate points and more distant points outside of official classification territory relief from the fourth section of the act must first be secured on regular application.

That in establishing rates increased by 15 per cent, the existing groupings and relationships as hereinafter specified may be preserved, even though by so doing some rates are increased slightly more than 15 per cent.

That in establishing the increases, rates from Chicago to New York and Montreal, and from New York to Chicago, may be increased 15 per cent, and such increased rates may be scaled to or from percentage points or groups upon the established percentage groupings and percentages; that rates via the established all-rail differential lines may be made the same differentials under the standard all-rail rates as now exist; and that the established groupings of points of origin or of points of destination under common rates may be preserved; even though so doing results in increasing some rates slightly more than 15 per cent.

The commission also prescribed in detail the percentage relationship of rates and the differential and arbitrary adjustment of rates, authorized but not specifically designated above, in cents per hundred pounds. Specific commodity rates which were on June 27, 1917, the same as the class rates, or established percentages of class rates, from and to the same points, may be increased the same amounts or percentages as such class rates have been increased. Rates per ton may be increased on the basis per hundred pounds, using 2,000 lb. as the ton.

Rates authorized in the foregoing orders may be established upon notice to the commission and to the general pub-

lic by not less than five days' filing and posting of tariffs and schedules under suspension in the foregoing proceedings may be supplemented or cancelled on one day's notice, but where rates are held by any unexpired order of the commission other than those in the anthracite investigation, there must be appropriate application in each case for modification of the order.

In the case involving commodity rates in Official Classification territory, Fifteenth section order No. 176, a large number of applications for approval for filing of certain increased rates are denied without prejudice to applicants' right to renew any of them as to which the authority sought is not granted in whole or in part or denied in the above orders.

Handling Locomotives at Railway Terminals*

An Increase in Locomotive Miles Can Be Accomplished
By Better Enginehouse Facilities

By Frank C. Pickard

Master Mechanic, Delaware, Lackawanna & Western, Buffalo, N. Y.

WE ARE ENGAGED in the business of transporting necessities from where they are produced to where they are needed and the connecting link between these two places is the railroad, its motive power, vehicles of conveyance, tracks, etc. This country needs locomotives as it does ammunition and big guns. The locomotive must be kept as nearly 100 per cent efficient as possible and must be detained at the terminals as little as necessary. The fol-

tween the different classes of power. The chart shown in Fig. 2 is for an organization where such division is desired.

It is desirable to have an inspection pit, so located that the locomotive may be placed on it immediately after it has been washed. This pit should be long enough to take the entire locomotive and tender and it should be equipped with sufficient lighting facilities to enable the inspector properly to do his work.

A first-class turntable of ample length and sufficiently strong so that it will not spring under the heaviest loads is very necessary for handling locomotives at a large enginehouse. One essential matter that is many times overlooked is the alinement of the tracks across the table. It is highly desirable to have the turntable line up with the fixed tracks on both ends.

An enginehouse is not complete unless it is equipped with a tool room that contains suitable and enough tools properly

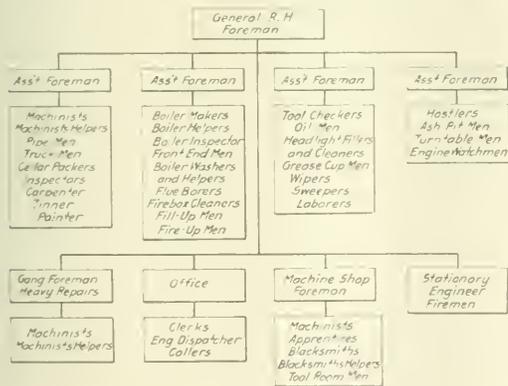


Fig. 1

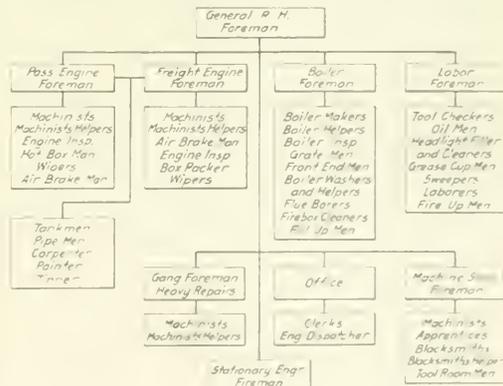


Fig. 2

lowing are a few suggestions that will help to accomplish these results.

A water-type ashpit served by a gantry crane should be provided at the terminals. With such equipment one man can handle the cinders from 125 locomotives in 24 hours. The labor for cleaning fires can be handled to the best advantage on a piece work basis.

After the fire of a locomotive has been cleaned or dumped, the machinery of the locomotive and the running gear of the tender should be carefully cleaned so that it may be inspected properly. The larger types of locomotives can be thoroughly cleaned in from seven to ten minutes by washing them with a combination of fuel oil and water sprayed through a nozzle by compressed air.

Each enginehouse must have a well defined organization. The chart shown in Fig. 1 gives the plan of an organization for a terminal handling approximately 100 locomotives every 24 hours, where it is not desired to specialize be-

and promptly to handle the work. Each enginehouse of any considerable size should be equipped with portable tools, such as boring bars, valve facing machines, crank pins, truing machines, portable tool boxes, portable benches, small trucks, wagons, etc.

Water cranes should be located on the tracks leading to and from the enginehouse. With these properly located, no time will be lost in moving locomotives back and forth to give them water. Every enginehouse should have a sufficient steam pressure to provide a blower system of adequate

* Abstract of a paper presented before the COMMERCE ROUTING COMMISSION.

capacity. A hot water washout plant of sufficient capacity to take care of all locomotives to be washed is important. By its use a large amount of boiler maintenance is eliminated, for when cold water is used the expansion and contraction of the boiler due to the quick change of temperature will cause trouble. The hot water system also saves fuel and time in preparing the locomotive for service. Electric and autogenous welding outfits are essential in every enginehouse, as by their use much time in repairing the engine can be saved.

Each enginehouse should have suitable pits for removing engine truck wheels, tender wheels and drivers. Every locomotive terminal should be provided with adequate means for handling the locomotive fuel. The coal dock should be located so that it will cover locomotives as they approach the enginehouse. A suitable record should be kept to show the terminal detention of locomotives which is chargeable to both the mechanical and transportation departments separately.

Check up the enginehouses at night and in the morning and finish the day's work with as few locomotives held as possible. Everything should be done to keep them in service. It may be that a tender from one locomotive can be transferred to another and thus a locomotive gained, or if two engines of the same class are held, many times one may be released by replacing defective material of one with its duplicate on the other. Everything must be done to produce more locomotive-miles.

Discussion

As a stimulus to the discussion of the subject, the author added to the paper a list of twelve questions. The majority of those who spoke favored cleaning locomotive fires on a piece work basis rather than on a day wage. Some roads pay 35 cents per engine for this work. The Lackawanna pays 35 cents for locomotives having 65 sq. ft. of grate surface and under, and 45 cents for locomotives having more than 65 sq. ft. of grate area. The washing of engines, as described by the author in his paper, was considered good practice and it was deemed inadvisable to use this system when the temperature got below 10 above zero, as it was difficult to keep the water from freezing on the locomotive. For this work the Lackawanna pays 39 cents per locomotive. The majority of the members favored the use of inspection pits. Mr. McIlvaine, superintendent motive power of the Northern division of the Pennsylvania, stating that the use of inspection pits was practically universal on the Pennsylvania. The majority of the members found that more supervision was necessary under present labor conditions. None of those who spoke found it necessary to use women in enginehouse work except as clerks. Most of the members stated that the locomotives were coaled on going into the roundhouse. The plan of organization shown in Fig. 1 was preferred.

W. H. Flynn, superintendent of motive power of the Michigan Central, discussed the paper at length saying, in part, as follows:

Mr. Pickard's mention of the necessity of a well equipped tool room is a pertinent point, but I would go further and recommend that every large roundhouse, and possibly some of the smaller ones, be provided with a small but well equipped machine shop, even though the general repair or "back shop" were not very far away. Motor driven tramp or portable lathes will also be found to be of great value, and as the current can be obtained from an ordinary lighting circuit, the use of such machines is very flexible.

The fundamental principles of a good engine terminal are plenty of room inside as well as out; necessary equipment inside for doing work; good heat and ventilation; plenty of light, both day and night; a good turntable; good coal, water and clinking facilities, and last but not least, a good organization with system. The best designed and

equipped terminal will not produce results if the organization is weak or the system poor. I am convinced that by careful selection and thorough training, good roundhouse foremen with future possibilities can be developed.

Turning engines promptly is most necessary, but in so doing the maintenance must not be overlooked. It is in doing the necessary work that system is so essential, for without a well defined plan of taking care of boiler work, wedges, rods, packing, tires and wheels, turning engines out rapidly goes for naught, if they fail between terminals. I am a firm believer in doing the necessary work at the proper time, even if it retards the despatching of the engine, which it sometimes will, but engines cared for properly will pull cars, which is what the country needs so urgently today. There have been times when we could figure on slack periods to catch up with work, but such a policy would be disastrous in the present crisis.

Well laid out, well equipped, properly managed engine terminals are mighty big factors in the successful operation of every railroad. It is a live and vital subject today.

A resolution of co-operation to Director General McAdoo was adopted by the club members.

Hearing on Kansas City Southern Valuation

TESTIMONY REGARDING the "other values and elements of value" in the Kansas City Southern system, which, according to the tentative report of the Bureau of Valuation of the Interstate Commerce Commission, were not found to exist, was presented at a hearing before the Interstate Commerce Commission at Washington beginning on March 14. Samuel Untermeyer, representing the road, and C. A. Prouty, director of the Bureau of Valuation, stated that the company and the bureau have practically completed the testimony as to the physical valuation and have reached a stipulation on an agreed statement of facts to be signed probably this week; but the director stated that no basis had been found for the determination of the intangible values in such a way that they could be stated in dollars and cents. He contended that it could not be done without reference to the purpose for which the valuation was made and that it would be proper for the commission to report to Congress on the physical property with a statement that the other values had not been determined.

Mr. Untermeyer urged that the earning capacity of the road depended more upon the intangible elements than on the physical property and while he was prepared to introduce testimony he filed a motion that it be deferred until after the commission has completed the physical valuation of the other five roads in the territory. After considerable argument, during which Director Prouty and P. J. Farrell, chief counsel for the commission, stated that the finding of the bureau was not meant as a declaration that there were no intangible values, but as a statement that they were not found, the commission took the motion under advisement and directed that the testimony be introduced.

Mark Wymond, a civil engineer of Chicago, who has had a broad experience and is the author of a book on valuation and rates, was introduced as the first witness and amid considerable wrangling as to whether or not he was going to make an argument and as to the relevance of his testimony he read a statement explaining his opinion, after an investigation of the property, that its total value was \$76,500,000. In reaching this conclusion he had assumed the value of the physical property, on the basis of the stipulation, as \$50,000,000.

L. E. Loree, chairman of the Kansas City Southern, explained in detail the reasons for his judgment that the road was worth \$80,000,000. He based this largely on the earn-

ing capacity and declared that the intangible value was the difference between the total value and the value of the physical property, without attaching a definite figure to any of the elements which he said he had used as an aid to his judgment. He said he had not taken into consideration the average market value of the securities, because, while such an average for a long swing might be valuable, market values of securities during the last 10 years have not reflected the earning capacity of the roads, but have been influenced by a general list-rust and apprehension. Mr. Loree was cross-examined by J. E. Benton, solicitor for the Bureau of Valuation, whose purpose apparently was to show that while the existence of intangible values could be shown it would be impossible to establish a definite figure for each item or to apportion the values to the states. Mr. Loree admitted that some arbitrary basis would have to be used.

Mr. Loree stated incidentally that a number of locomotives that stood on the company's books at \$12,000 each and which had been valued by the bureau at \$6,000, had been sold for \$30,000 and the proceeds used to buy new Mallets. Also tank cars of a book value of \$1,100 valued at \$500 had been sold for \$2,200.

W. S. Kinnear, consulting engineer, testified that his investigations, based largely on the earning capacity of the road, the increment in the increase in net income and the margin of safety as compared with other roads in the territory, showed that the total valuation of the property was \$77,000,000, and that the difference between this total value and the value of the physical property represented the intangible values. He did not attach specific values to the various items and admitted that the total intangible valuation could not be apportioned among the states except on an arbitrary basis. He suggested, however, that this could fairly be done on the basis of the apportionment of the physical property, but under cross-examination admitted that this would not accurately reflect the elements of intangible value in each state.

Train Accidents in January¹

THE FOLLOWING is a list of the most notable train accidents that occurred on the railways of the United States in the month of January, 1918:

Collisions

Date	Road	Place	Kind of Accident	Kind of Train	Killed	Injured
5	P. & Reading	Skillman	re	P & P	3	4
13	M. & Texas	Granger	re	P & P	7	11
20	Erie	Lackawaxen	re	P & P	7	7
20	Penn.	Iroquois	xc	P & P	0	5
21	Ches. & Ohio	Russell, Ky.	hc	P & F	2	2
23	M. & Texas	San Antonio	xc	P & F	1	4
23	Atlantic	Taylor	xc	P & F	1	5
24	Del., L. & W.	Nay Aug, Pa.	re	F & T	6	5
26	Chicago B. & O.	Wyola, Mont.	xc	P & F	4	4
30	Norfolk & W.	Railford	hc	P & F	2	4
31	N. P. and C. N.	Sedro Woolley	xc	P & P	2	19

Derailments

Date	Road	Place	Cause of Derailment	Kind of Train	Killed	Injured
9	Norfolk & W.	Cleveland	exc. obs.	P	1	0
14	Houston & T.	Hammond, Tex.	exc. obs.	P	1	1
14	Maine	Bonus	runaway	P	1	1
15	Union Pa.	Libolt, Kan.	b. rail	P	1	2
18	Norfolk & W.	Groesbeck	ms.	P	0	0
19	Penn.	Amo, Ind.	d. switch	P	0	0
1	Louisville & N.	Newcastle	d. switch	P	0	1
2	Rutland	Middlebury	boiler	P	0	6
17	C. C. & S.	Marion	d. track	P	0	2
17	Penn.	Philadelphia	d. turnout	P	1	1
23	N. & S.	McCarty	exc. sld.	P	1	1
24	Louisville & N.	Conway, Ky.	d. track	P	0	3
9	New York Central	Middleville	exc. obs.	P	0	3
9	Illinois Central	Granger, Ill.	exc. obs.	P	0	4
30	Pennsylvania	Bradenville	exc. obs.	P	0	5

¹ Abbreviations and symbols used in Accident List

Rear—R; Front—F; Buffer collision—xc; Over—O; Collision—by
 derailing—D; Derailment—df; Unforeseen obstruction—un; Un-
 lanced—dl; Open leading switch—ms; Misplaced switch—ac;
 hst.; Accidental cause—acc; Malicious obstruction of track—
 boiler; Failure of locomotive on road—fire; Cars burned white run-
 ning—P or Pass. Passenger train—F or Ft. Freight train (includ-
 ing empty freight cars)—ms, etc.—Asterisk, Wreck wholly or partly
 destroyed by fire—1424. One or more passengers killed.

The trains in collision at Skillman, N. J., on the 5th were eastbound passenger, a local standing at the station being run into at the rear by a following express. The rear car of the local train was wrecked, but it was empty and all of the personal injuries reported on either train were classed as slight. The cause of the collision is given by an officer of the road as the failure of a Hall automatic block signal, which permitted the train to proceed when it ought to have indicated stop, and the coincident failure of the flagman of the leading train to go back a proper distance.

The trains in collision at Granger, Tex., on the 10th, about 2 a. m., were the first and second sections of the Katy flier. One sleeping car in the leading train was telescoped for two thirds its length; and three passengers were killed and 11 injured. The first section was standing at a coal chute and the collision was due to the high speed of the second section, which approached not under control. The rule covering situations of this kind, in effect for a number of years, was reissued in a circular by the chief operating officer about two months ago (November 19) saying: "When more than one section of a passenger train, all but the first section must approach and pass all water tanks and coal chutes, and all stations that are regular or flag stops for such trains, completely under control, so that under no circumstances whatever shall it be possible for it to strike the preceding section."

The trains in collision near Lackawaxen, Pa., on the 20th were eastbound passenger. The dining car at the rear of the leading train was wrecked and two passengers and one employee were injured. The collision was due to disregard of a block signal.

The trains involved in the collision at Iroquois, Pa., on the 20th were westbound first class train No. 59; a light engine and an eastbound passenger (No. 6). No. 59 ran into the light engine and forced it between the block station and the eastbound train which was making a reverse movement. The trains were moving at moderate speed. Four trainmen and one mail clerk were injured. The cause of the collision was the disregard of a signal by train No. 59.

The trains in collision at Russell, Ky., on the night of the 21st were eastbound passenger No. 4, and a switching engine in the yard. One engine man, one fireman and one other employee were killed and three other trainmen were injured.

The trains in collision on the Missouri, Kansas & Texas near San Antonio, Tex., on the 23rd were a southbound passenger, nine hours behind time, and a train consisting of a switching engine and a steam shovel, moving from a side track to the main line. The passenger engine and the steam shovel were damaged and the combustible portions of the shovel took fire; the flames, however, being extinguished by the city firemen. One employee was killed and two passengers and two engine men were injured. The switching train was on the main track without right and without flag protection.

The trains in collision at Larboro, N. C., on the 23rd were a southbound passenger, and a locomotive standing on a side track. The train ran over a misplaced switch and collided with the standing engine. The engine man of the passenger train was killed and two other trainmen were slightly injured.

The trains in collision at Nay Aug, Pa., on the 24th were eastbound freight. The leading train, with a pushing engine at the rear, was at a standstill and was run into by a following freight, wrecking the caboose and five cars and badly damaging two locomotives. Two trainmen were injured.

The trains in collision near Wyola, Montana, on the 26th were an eastbound passenger and the rear end of preceding freight. The head end had been cut off to double and the rear cars, which were not properly secured by sufficient brakes, ran down the hill and into the head of the

passenger train. The engine and first three cars of the passenger train were derailed, also six cars of the freight train, the freight cars catching fire and being partly destroyed. Four passengers were killed and four slightly injured.

The trains in collision near Radford, Va., on the night of the 30th were an eastbound passenger and a westbound freight. Two enginemen, one fireman, and one brakeman were killed and three other trainmen were injured. Responsibility for the collision is charged against an operator, for failure in manual block-signal working, and to neglect on the part of the conductor of the freight, who overlooked the passenger train.

The trains in collision at Sedro Woolley, Wash., on the night of the 31st were a southbound freight of the Northern Pacific and an eastbound passenger of the Great Northern. The freight ran into the passenger train at the crossing of the two roads. The freight engine struck the rear car of the passenger train, and pushed it about 100 ft. to the station building. The car broke through the station office and was itself completely wrecked. Five passengers were killed and 15 passengers and three trainmen were injured.

The train derailed near Cleveland, Va., on the 9th was a westbound freight. The engineman was killed and two trainmen were slightly injured. The cause of the derailment was not determined.

The train derailed on the Houston & Texas Central at Hammond, Tex., on the morning of January 14, about 3 o'clock, was northbound passenger No. 17. One steel coach was crushed by running violently against a locomotive on the side track. Seventeen passengers were killed and twelve were injured. The derailment was due to a loose switch which had been deranged by a brakebeam which fell from a car in a freight train. This accident was reported in the *Railway Age* of January 18.

The train derailed at Bemis, N. H., on the 14th was an eastbound freight. The train became uncontrollable on a steep descending grade at Crawford, and ran at high speed to Bemis where the engine and 30 freight cars were ditched and wrecked. The engineman was killed and the fireman and one brakeman were injured.

The train derailed near Beloit, Kan., on the 15th was a westbound passenger. The engine was not thrown off the rails, but the two passenger coaches were overturned and fell down a bank into Plum Creek. Three passengers were killed and 23 passengers and three employees were injured.

The train derailed at Groseclose, Va., on the 18th was a westbound express. The engine and 7 cars ran off the track. The cause of the derailment was an unfastened switch.

The train derailed on the Pennsylvania Lines West of Pittsburgh, at Amo, Ind., on the 11th, was an eastbound freight. In the train were eleven cars of gasoline, which took fire, and the contents of the whole was consumed, together with a small dwelling house. The cause of the derailment was a cylinder head of the locomotive, which was knocked out, fell to the ground, and then struck a switch stand so as to loosen the lever and allow the switch point to open slightly. The third car in the train was the first one to be disturbed by the loose switch point; and the rest of the train ran along the side track and into a string of standing cars.

The train derailed at New Castle, Ala., on the night of the 21st was northbound passenger No. 4. The train ran through a damaged switch and the engine and two baggage cars were ditched. The engineman, fireman and one other employee were injured.

The train derailed near Middlebury, Vt., on the morning of the 22nd was a southbound passenger. The locomotive was wrecked by the explosion of its boiler, and the fireman was killed. The engineman was fatally injured.

The train derailed near Marion, Ohio, on the 23rd was

westbound passenger No. 5. Three passenger cars were overturned and 29 passengers were injured. The cause of the derailment was obscure but was believed to be spreading of rails.

The trains involved in the accident on the Pennsylvania Railroad at Girard avenue, Philadelphia, Pa., on the 23rd, were eastbound passenger No. 22, the Manhattan Limited, and eastbound passenger No. 230. A mail car in No. 22 was derailed by the failure of a journal, and it was thrown to one side so as to foul the track on which the other train was traveling, both trains moving eastward. The mail car was badly damaged and of the several clerks in it, one was killed and eight injured. Four passengers were slightly injured.

The train derailed on the Nashville, Chattanooga & St. Louis near McCarty, Tenn., on the 23rd was a northbound local passenger. Two cars were overturned. The fireman, two passengers, one mail clerk, and one other employee were injured, all of the injuries being reported as slight. The cause of the derailment was excessive speed on a curve of 5 deg. 47 min., with super-elevation of 6 inches.

The train derailed at Conway, Ky., on the 24th was northbound passenger No. 34. The train, four hours behind time, was drawn by two engines; the second engine was overturned and one baggage car was wrecked. One engineman, one fireman and an express messenger were injured. The cause of the derailment was not determined, but it is believed to have been due to a defect in the track.

The train derailed at Middleville, N. Y., on the night of the 29th was a southbound passenger. One coach was overturned and fell down a bank. Nine passengers were injured.

The train derailed at Granger, Ill., on the 29th was an eastbound express passenger, drawn by two locomotives. Both of the engines remained on the track, but ten of the eleven steel cars in the train fell down a bank. Three passengers were killed and fourteen were injured. The cause of the derailment was not determined. The track where the derailment took place was relaid in December with new 90-pound rail on new zinc-treated ties fully ballasted, and rails fully spiked. Track was in good condition and where the cars ran off was straight, on a descending grade 26 feet per mile on a slight fill. An officer of the road writes that "the engines and cars were in first-class condition and, so far as could be determined, did not contribute to the accident. The fact remains, however, that the rails were forced out of position by some unknown cause at or prior to time this train arrived."

The derailment reported at Bradenville, Pa., on the 30th occurred on a short branch of the Pennsylvania Railroad. The train consisted of a snowplow and flanger, two locomotives and a caboose. One engine was overturned in a drift and two members of a gang of shovelers on the tracks were killed. Three others were injured.

ELECTRIC CAR ACCIDENTS.—Serious accidents to trolley cars were reported in January from Eliot, Me., Thompsonville, Conn., and Louisville, Ky. Of the three, the last-named was the only one attended by fatal results. In this, a rear collision on a bridge, on the 14th, three persons were killed and 20 or more injured. The accident occurred in a blinding snowstorm, a very unusual occurrence in that latitude.

CANADA.—Of the four notable train accidents reported in Canadian newspapers in January one only was fatal. This was a rear collision on the Canadian Pacific at Dorval, near Montreal, on the 4th. The leading train, just entering a side track, was loaded with soldiers, seven of whom were killed and 20 or more injured.

IMPORTS INTO BOMBAY, INDIA, of railway supplies and equipment were valued at \$7,861,433 in 1915 and \$2,961,085 in 1916.



Four Improved Types of Electric Locomotives

Recent Developments Which Have Been Brought About
By Demands of Traffic and Profile

RECENT ELECTRIC LOCOMOTIVES were described and illustrated at the fourteenth annual electrical meeting of the New York Railroad Club, March 14, 1918. The New York, New Haven & Hartford's new 180-ton passenger locomotive was described by E. R. Hill, of Gibbs & Hill, consulting engineers. The Chicago, Milwaukee & St.

company were described by A. H. Armstrong of the latter company. E. B. Katte, chief engineer of electric traction, New York Central, described the new electric passenger locomotives for that road. The meeting was of particular interest because the papers read showed how the manufacturers were meeting the conditions imposed upon them by the demands of traffic, profile and limits of load on bridges in different parts of the country.

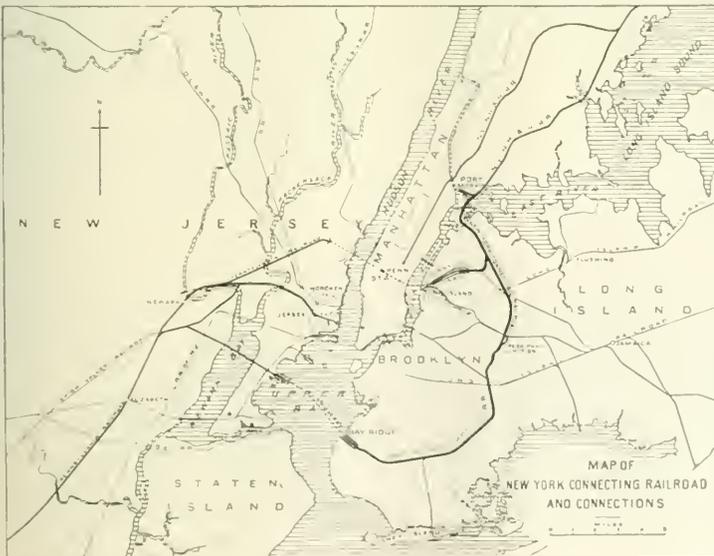


Fig. 1—Map of New York Connecting Railroad

Paul's new quill geared locomotives under construction by the Westinghouse Electric & Manufacturing Company were described by F. H. Shepard of the latter company. The new Chicago, Milwaukee & St. Paul bi-polar passenger locomotives under construction by the General Electric Com-

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180-Ton Locomotive for the New Haven

The following information is taken from Mr. Hill's paper. The new electric locomotives for the New York, New Haven & Hartford are of the Baldwin-Westinghouse type designed to operate on the New York Connecting Railroad (Fig. 1). The profile of this is shown in Fig. 2. The Hell Gate bridge, erected at a cost of \$4,000,000, is shown in the illustration at the top of the page. The total cost of line, including the Bay Ridge improvement of the Long Island Railroad, was \$40,000,000.

Express trains operated between the Grand Central station and New Haven average 11 steel cars and weigh about 770 tons. Maximum trains of this character are of 12 steel Pullman cars and weigh from 850 to 900 tons. To handle these over the New York Connecting it was found necessary to provide heavier locomotives than are now in use on the New Haven, or double head the present locomotives, as is frequently done on the heavier trains.

Another condition limiting the New Haven operation is the restriction imposed by the New York Central as to total weight and axle loading of locomotives using the draw-

bridges and viaducts on their lines into the Grand Central station. The New York Central's conditions limit loads on four driving axle locomotives to 47,500 lb. per axle and of locomotives with six driving axles to 41,000 lb. per axle. There are limitations also as to total weight of locomotives and the extent to which double heading is permitted.

The new 180-ton locomotives now on order represent the

lower part of Fig. 3 is a duplicate of the present type of locomotive in all essential respects, the main differences being that there are three pairs of drivers on each truck instead of two, and pony axles are used at both ends of each truck instead of at the outer ends only. In all principal respects the details of the locomotives are identical with the 34 freight and heavy passenger straight single phase locomotives built in 1911 for use in freight service. The principal data regarding the three types of passenger locomotives of the road are given in Tables 1 and 2.

The motors are connected in groups of three permanently

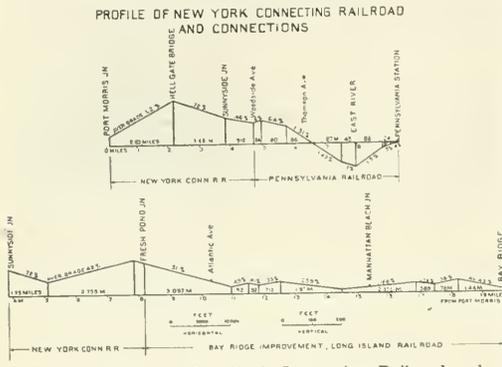


Fig. 2. Profile of New York Connecting Railroad and Connections

maximum in weight and capacity of the A. C. D. C. type that will not exceed the New York Central's structural limitations. This, however, does not quite meet the maximum desired performance for through express trains on the New York Connecting Railroad grades. The new locomotives will handle 12-car trains on the Pennsylvania direct current terminal grade and eastbound on the New York Connecting Railroad 0.2 per cent grade, but will only handle 11-car trains on the westbound 1.2 per cent New York Connecting

in series and the speed characteristics are substantially the same as those of the original gearless locomotives; the control is to be arranged for multiple unit doubleheading of these two types. They are geared for a higher speed than the present geared type locomotives and cannot be operated in multiple unit with them.

The motors are grouped in pairs and connected by means of bearings and single reduction gearing to a quill which surrounds the axle with ample radial and end clearance to prevent it coming in contact with the axle when in normal running condition. The motors, gearing and quill, are sup-

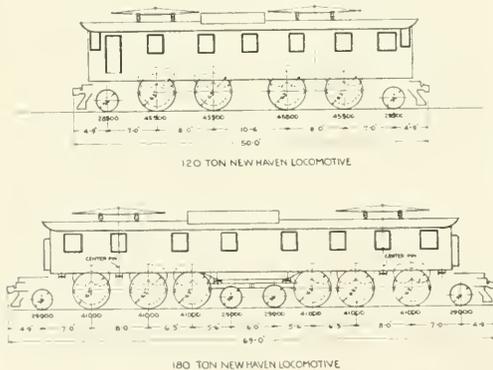


Fig. 3. Old and New Types of New Haven Locomotives

Railroad grade. This latter grade is two miles long and it is proposed to employ electric pushers for assisting westbound trains of over 11 cars up the grade; an alternative to this is to double head the engine with one of the old gearless types of locomotives.

Prior to this the latest and largest type of locomotives on the New Haven road was the 2-4-4-2 locomotives of the 073 075 series shown at the top of Fig. 3, having four driving axles and two pony axles in two trucks, each driving axle being equipped with a pair of single reduction geared motors with quill drive. The new locomotive shown on the

Principal Service Data—		70	60	42	35	8	43.7	37.6	620	900	850	770
Maximum safe speed, m. p. h.	Balanced Speed with 770-Ton Average Train	70	60	42	35	8	43.7	37.6	620 tons	900 tons	850 tons	770 tons
On level	On 4 per cent New Haven grade	70	60	42	35	8	43.7	37.6	9 cars	13.3 cars	12 cars	11 cars
On 2.7 per cent Connecting Railroad grade	On 1.2 per cent Connecting Railroad grade											
Schedule of Express Trains New York—New Haven	Without stops						43.7 m. p. h.	37.6 m. p. h.				
With four intermediate stops	Grand Central Station Service—East and West											
Maximum local train	Maximum local train doubleheaded with gearless engine	420 tons	—	6 cars								
Maximum express train	Maximum express train	620 tons	—	9 cars								
Maximum local train	Maximum local train	900 tons	—	13.3 cars								
Maximum local train	Maximum local train	850 tons	—	12 cars								
Maximum local train	Maximum local train	770 tons	—	11 cars								

ported from the truck frame independent of the axle and wheels, the motors being directly above the center line of the axle. With this arrangement the weight of the motors, gearing and quill, is carried on springs and the only dead weight coming directly on the track is that of the driving wheels and axle. The center of gravity is high and good riding qualities and tracking conditions are secured.

The only connection between the motors and the driving wheels is through a group of six helical springs in each driving wheel, center connected at one end to the spokes of the wheel and at the other end to the disk at the end of the

quill. This arrangement is in use on all of the geared passenger, freight and switching locomotives of the New Haven and has given excellent satisfaction. The motors are also identical with those used on certain of the passenger, and on all of the geared freight locomotives, the total of such motors being over 400. By adopting this same type of motor, suspension and drive duplication and uniformity of parts is secured and savings in shop maintenance and operation is thereby effected.

The truck center pin is located between the first and second driving axles, thus making the truck unsymmetrical fore and aft of the center pin; this will tend to prevent oscillation or nosing of the trucks.

The drawbar pull between trucks is transmitted through a radial bar coupling and not through the cab. The weight of the cab is borne on each truck by six spring mounted pads. The truck frames are of the integral cast steel type, the entire frame and crossies being cast in one piece. The saving in weight by the use of this type of truck frame is estimated to be 3,200 lb. per locomotive. This feature is important not only because it is desirable to minimize the dead weight of the locomotives in general, but also because of the weight limitations of the bridge structures over which these engines are to operate and the guarantee which the manufacturers were required to give was that the total weight should not exceed 181 tons.

The motors and transformers are ventilated by two motor-driven blowers mounted in the cab. For train heating purposes the locomotives will be equipped with flash type, kerosene fired boilers capable of evaporating 4,200 lb. of water per hour. Tanks having a capacity for 1,440 gal. of water and 370 gal. of oil will be provided as part of the heating equipment of each locomotive.

These locomotives illustrate in a general way the adaptability of electric traction in meeting the constantly increasing requirements of railroad service. In this case, without modifying the general type or any of the mechanical or electrical details and without exceeding existing weight limitations on bridge structures, a locomotive 50 per cent larger than the present has been produced simply by the addition of a driving axle and a pair of motors to each truck with adaptation of mechanical and electrical details for the mounting and control of the additional parts.

Baldwin-Westinghouse Passenger Locomotive for St. Paul

The map, Fig. 4, shows the electrified section of the Chicago, Milwaukee & St. Paul. The profile for this section of

118 tons, and the heating equipment, including water, 27 tons.

The locomotive consists of two running gears, with the Pacific type wheel arrangement, coupled back to back, supporting a single cab, with the control auxiliaries and heating apparatus. The drive wheels are 68 in. in diameter, the driving wheel base is 16 ft. 9 in., the wheel base for



Fig. 4. Map of Electrified Sections of the Chicago Milwaukee & St. Paul

each truck is 36 ft. 2 in., the total wheel base is 77 ft. and the total length of the locomotive between knuckles is 88 ft. 7 in. A large portion of the cab is occupied by the heating equipment, which includes boiler, water and oil tanks. The rheostats are placed near the top of the cab close to the controlling switches, the locomotive may be operated from either end and each end has its complement of meters, air brake valve, master control, sanders, etc. The controller has nine running positions corresponding to one-third, two-

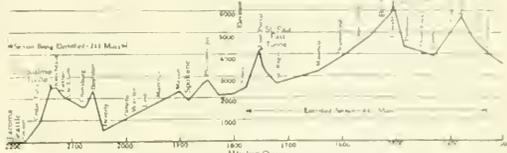


Fig. 5. Profile of Electrified Sections of the Chicago, Milwaukee & St. Paul

thirds and full speed positions, with two speed control positions on each. This gives economical operation over a wide range of speed. Regeneration from maximum speed down to a minimum of about 10 miles per hour is provided for the purpose of holding the train on down grade or for making slow-downs.

The continuous capacity of the locomotives is 2,000 horse-

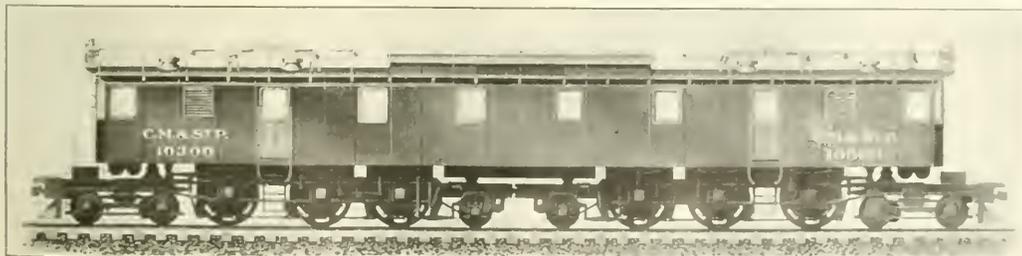


Fig. 6 Baldwin-Westinghouse Electric Locomotive for the Chicago, Milwaukee & St. Paul

line is shown in Fig. 5. The following information is taken from the paper read by Mr. Shepard.

This new locomotive, Fig. 6, ten of which are now under construction, was designed for passenger service. The weight of the locomotive complete is 260 tons, of which the electrical equipment weighs 121 tons, the mechanical parts

power, corresponding to a tractive effort of 44,000 lb. at 24.5 miles an hour. The maximum starting tractive effort will be 110,000 lb.

The motor equipment consists of six twin motors with quill drives, two of which are mounted above each driving axle. Each armature carries a single pony and the two

drive a single solid gear mounted upon the quill shaft and held in position by quill bearings. This allows a movement of the axle within the quill shaft of $1\frac{3}{4}$ in. from normal position.

The locomotive is provided with the well-known electro-pneumatic control. Power from the line is obtained from the 3,000-volt trolley. A motor-generator set delivering current at approximately 80 volts supplies current for train lighting and for a storage battery. The blowers, air compressors, light and control are all operated at 80 volts and their operation, due to the presence of the battery, is independent of the line power. In addition to the motor-generator set and battery there is a third source of low voltage supply, which is utilized for the operation of the auxiliaries and for the excitation of the fields of the main motors for regeneration whenever the train has acquired requisite speed. This source of power is from the axle driven excitators, of which there are two on the locomotive, each being mounted on the inside axles of the 4-wheel trucks. These axle driven generators are about the size of an ordinary street car motor and furnish current at low voltage for the excitation of the main motor field when regenerating. At other times they furnish current for the operation of the blowers and air compressors, independent of the battery. A locomotive is at all times independent of line power for the supply of air to the brakes.

It is natural to question the reason for this type of locomotive, presenting as it does certain mechanical complications as compared to other types. It was understood that

structure, but unfortunately, the yield of the rails due to wheel loads is not uniform, varying greatly, depending upon the track joints, special work, condition of ballast and sub-grades. These general conditions are exaggerated by the extreme weather conditions experienced in this country.

Much importance has been placed upon such questions as center of gravity, wheel arrangement, size of wheels and equalization on steam locomotives, especially for passenger service. The steam locomotive, of necessity, consists of a large mass including boiler and cylinders carried on the locomotive frame, the driving wheels being loosely and flexibly connected thereto. Space limitations require a relatively high center of gravity. It is a curious coincidence that these limitations in the design of steam locomotives automatically secure action which inherently is easy upon the road bed, because of the flexibility of the heavy parts of the locomotive and the fact that the individual axles are relatively free from restraint due to directly imposed weight. In the electric locomotives described these advantageous features are all retained.

St. Paul Gearless Locomotives

The gearless locomotives now under construction in the General Electric shops for the Chicago, Milwaukee & St. Paul will also operate over the line shown in Figs. 4 and 5. Following are extracts from the paper read by Mr. Armstrong:

The excellent operating results obtained during the past ten years with gearless locomotives on the New York Central's

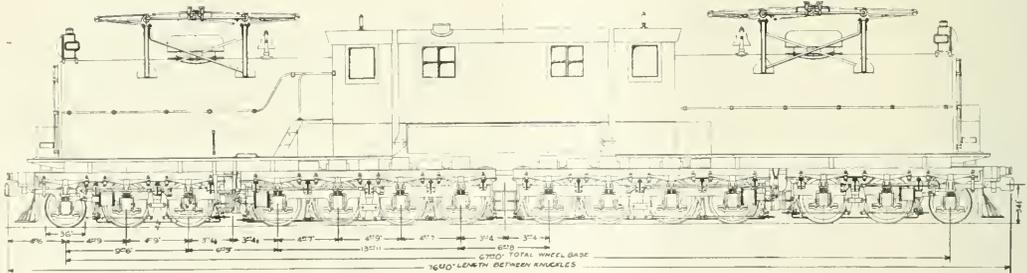


Fig. 7. Gearless Electric Locomotive Built by the General Electric Company for the Chicago, Milwaukee & St. Paul

the weight on the driving axles, both as to amount and disposition, in the present locomotive would not be accepted for additional locomotives for passenger service. This required the departure from the design of locomotives at present in passenger service. It could have been accomplished by the use of more driving wheels with smaller and lighter motors or by the use of very large motors with side rods. Service conditions require a minimum of six driving axles with a weight of 55,000 lb. on each. This can reasonably and economically be met by twin motors with quill drive, and this construction possesses advantages as follow: (1) The limitation of voltage across any commutator to 750 volts, thereby obtaining stable commutation for both motoring and regenerating. (2) The greater accessibility, the lesser restriction in design and the greater freedom from injury to motors due to their position above the axle and remote from the road bed. (3) The mounting of the motors rigidly upon the locomotive frame, thereby securing great flexibility between the road bed and the motor weight. (4) A center of gravity which is $43\frac{1}{2}$ in. above the rail. (5) The use of a minimum number of gears and the removal of main gears. (6) A desirable wheel arrangement, with distribution and equalization.

The American railroad track is a cushioned, yielding

tracks have attracted increasing attention to this form of construction. The locomotives for the Chicago, Milwaukee & St. Paul are equipped with 14 axles, 12 of which are drivers and two are guiding axles. The armatures are mounted directly upon the axles and, with the wheels, constitute the only dead or non-springborne weight of the locomotive. This weight is approximately 9,500 lb. as compared with 17,000 lb. dead weight on the driving axles of the present geared locomotives now operating on the St. Paul. The two fields are carried upon the truck springs and there is full freedom for vertical play of the armature between them. The construction of the motors throughout is practically identical with that employed upon the New York Central's gearless locomotives, but the capacity of the locomotive is much increased and the wheel arrangements somewhat different. The general physical characteristics of the locomotives now under construction are given in Table 3.

With twelve motors per locomotive available for different control combinations, there is a possibility of securing a wide range of speed to meet the varying conditions of passenger train operation. Motors are connected three in series, or 1,000 volts per commutator for full-speed operation, but the control also permits a connection of four, six and twelve motors in series for fractional speed operation. Provision

mountain service will result in a marked improvement in the method of handling both passenger and freight trains on this most difficult class of railroad service.

Gearless Locomotive for New York Central

The section of road on which the new locomotives for the New York Central will operate is shown in Fig. 8. This section of track follows the Hudson river for the greater part of the distance from Harmon to the Grand Central Terminal and no steep grade has to be contended with. One of the new locomotives designed for service on this road is shown in Fig. 9. In describing the locomotive, Mr. Katte stated:

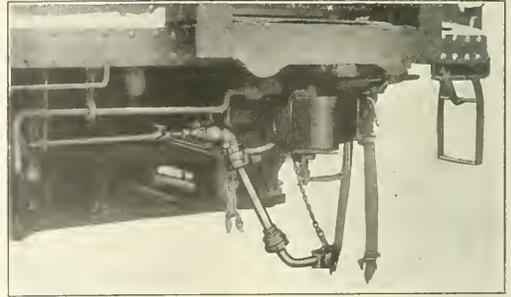
"During the past year we have received on the New York Central nine new passenger locomotives known as class T-2B. The tenth locomotive will be delivered next month. These locomotives are very similar to the earlier class T locomotives, in fact, when we asked the operating department if it desired to suggest any changes its representative held up his hands and exclaimed, 'For goodness sake, don't make any changes, you will spoil them.' As a matter of fact, there were 30 or 40 minor modifications and improvements made.

"These locomotives are driven by eight motors of the bipolar type, one on each axle. The total weight of the locomotive is 134 tons and the drawbar pull at 25 per cent adhesion is 66,000 lbs. The load is about equally divided on all wheels. The motors are known as G. E.-91-A and have a one hour blown rating of 325 hp., or a total of 2,600 hp. for the locomotive. The capacity of the locomotive is the hauling of a 1,200-ton train at 60 miles per hour. The maximum speed of the locomotive with lighter trains is 75 miles per hour.

"As a typical example of regular service a class T locomotive hauls train No. 71, weighing 1,035 tons, between the

All-Metal Steam Heat Connection

WITH A VIEW TO PROVIDING a connection for the steam lines for passenger cars that would reduce the trouble and expense incident to the use of rubber hose, the Barco Manufacturing Company, Chicago, has developed a connection in which no rubber is used. This



Passenger Car Equipped with Barco Steam Heat Connection

device has recently been placed upon the market after it had been in use for four years.

The Barco car steam heat connection is made up of two Barco joints of a special type and two sections of extra heavy steel pipe. Any standard steam-heat coupler head can be used on it. A locking clamp secures the upper flexible joint to the train line end valve, making it impossible for the con-

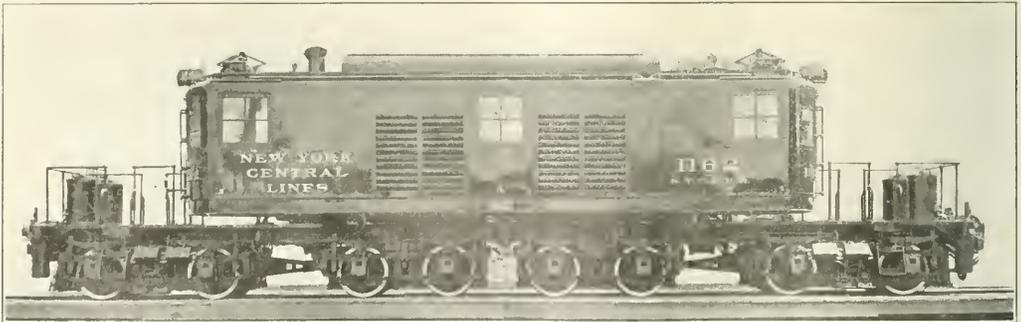


Fig. 9. Latest Type of New York Central Electric Locomotive

Grand Central Terminal and Harmon, a distance of 32 miles, making one stop, in 54 minutes running time. The average maximum speed is 57 miles per hour, and the current consumption has been shown to be equivalent to 21.9 watt hours per ton mile.

"The cost of inspecting, maintaining and repairing our electric locomotives has averaged 3½ cents per mile during the past year. The locomotives are inspected after traversing an average of 5,000 miles, which is equivalent to 33 days, between inspections. As a measure of reliability I can say that class T locomotives average 32,000 miles per locomotive detention."

THE CANAL CONTROL COMMITTEE OF ENGLAND has issued a handbook on canals, giving information relating to the controlled canals, lists of the towns served by them and names and addresses of public carriers.

nection to fall to the track. If desired lagging can be applied to the connection, but in most of the installations this has not been done. It is desirable to have a flexible bracket at the end of the train line of a type similar to that shown in the illustration.

No special tools are required to apply or remove these connectors. They will couple to cars equipped with rubber hose as well as to those having the Barco connection. The joints are more flexible than rubber hose, which makes them easier to couple. They will stand the full boiler pressure of the locomotive without leaking or bursting. The steel pipe gives a larger opening for the passage of the steam than rubber hose and eliminates the trouble due to the rubber lining becoming loose and stopping the pipe or catching in the valves. The all-metal connections remain serviceable for a long time and they also do away with frequent renewals.

The New Zone System of Coal Distribution

Railroad and Fuel Administrations Have Worked Out a Plan for Avoiding Cross Hauling of Coal

THE UNITED STATES FUEL ADMINISTRATION in co-operation with the Director General of Railroads announces a zone system to govern the distribution of bituminous coal during the coal year beginning April 1, 1918.

Heretofore coal has been distributed practically without regard to the distance between the mine and the consumer. Under the zone system coal will be distributed to consuming territory under restrictions that will avoid as far as possible waste of transportation facilities, but nevertheless consistent with the maintenance of the greatest possible production and a proper coal supply to all coal users. Every effort has been made however to preserve long established trade relations.

A statement describing the system issued by the Fuel Administrator says:

"In view of the necessities and of the serious danger of coal shortage the United States Fuel Administration and the United States Railroad Administration have devoted several months to the study of what can be done to remove the causes which have hampered the enlargement of coal production. It has been found that a factor which has largely diminished the number of cars available for loading in the mines and the number of locomotives available to haul coal is that in a substantial sense the country has been engaged in 'carrying coals to Newcastle'; cars and locomotives have been occupied for many unnecessary days in hauling coal hundreds of unnecessary miles in order to deliver it at places much more accessible to other coal fields, whence coal could be obtained with far less tax upon the transportation energies of the country.

"The Fuel and Railroad Administrations have therefore been confronted with the responsibility of deciding whether they shall knowingly be parties to this waste of transportation, which, if not so wasted, could be used so as to make practicable the production of more coal sorely needed to carry on the war. It is clear that in the interest of the nation there should be a different policy for the future. The coal zoning plan is the result of this decision.

"After prolonged conferences with coal producers, jobbers and consumers, and with the traffic and operating officials of the railroads, zones have been established so that coal supply shall be normally derived from mines relatively near, thus preventing these abnormal and wasteful transportation movements, insuring more equal distribution of cars to the mines and more steady employment of mine labor.

"The patriotic co-operation of the many interests and individuals who may be affected by this cutting out of unnecessary transportation is confidently hoped for. When a consumer finds that he no longer has the opportunity to get his coal from a distant mine according to his custom, it is hoped that he will realize that his using another sort of coal is an essential part of the scheme of conservation in the interest of the national defense. When a coal producer finds that he no longer has a market to which in the past, regardless of the unnecessarily long haul, he has sent his coal, it is hoped he too will realize that the resulting adjustment of his business is in the national interest; that there will be more cars and locomotives and transportation energy to transport more coal from his mines to the markets he can reach within his zone; that his business in consequence should be increased rather than diminished.

"The situation with which the Fuel and Railroad Administrations have thus had to grapple is one of infinite complexity, and no first effort to remove the waste can be perfect, or can fully meet all the constantly changing conditions. Real-

izing these limitations, the plan as established provides for elasticity through a system of special permits issued by the Fuel Administration when and as necessary.

Effect of Zone System

The general effect of the zone system is to restrict eastern coal to eastern markets and fill the vacancy in the central and western states with nearby coal produced in those states.

In addition to the saving in transportation the system will provide for the possible retention of something like 5,000,000 tons of coal for the eastern states which heretofore has gone west all-rail. This tonnage can be readily utilized in the east. As an indication of the saving to be effected by the system, it will eliminate the movement of more than 2,000,000 tons of Pocahontas coal to Chicago and other western points over a haul of about 660 miles. Chicago can obtain this tonnage of coal, and under this system must obtain it, from southern Illinois mines with an average haul of 112 miles. Allowing for the differences in quality in the two coals, it is estimated that there will be thus saved 11,400,000 car miles or, very conservatively figured, 285,000 car days. This will permit 14 additional round trips of 20 days each from West Virginia mines to zone destinations, permitting an additional production of at least 700,000 tons of Pocahontas coal.

Similar comparisons show that on the movement of 550,000 tons annually from Kanawha districts to Wisconsin points there can be saved about 2,500,000 car miles with a consequent increased production of some 300,000 tons. On the movement from southeastern Kentucky to Chicago the saving will be about 800,000 car miles and 50,000 tons production. The elimination of the Indiana to Iowa movement will save 1,600,000 car miles and permit 100,000 tons additional production. These are only a few of the instances of transportation saving to be effected by the system.

The bituminous coal, the movement of which is regulated by the zone system, is about 300,000,000 tons, or 60 per cent of the total production. Based on this production, there will be saved on the round trip from and to the mines almost 160,000,000 car miles. This will permit the same cars to make almost 500,000 additional trips from the mines, equivalent to an increase of 5 per cent in the production. The increase in total production in 1917 over 1916 resulting from all efforts was about 8 per cent.

A large part of the coal which the system will prevent from moving west out of the eastern producing districts will be available for use in New England insofar as it can be transported there. Production in the district supplying New England via all rail routes can be increased somewhat—but there is difficulty in moving by all-rail routes the amount of coal needed and the capacity of the rail gateways to New England has been nearly reached. Improvements now being made will increase the capacity of the Poughkeepsie bridge route, but it is said to be impossible to escape the conclusion that provision must be made for a much larger movement by water in 1918 than in 1917 or New England and its people and industries will suffer.

This situation will be made the subject of a separate study by a committee representing the Shipping Board, the Railroad Administration, the Fuel Administration, coal operators in the territory involved, the railroads involved in the movement of this coal and consumers in the territory affected.

The restrictions imposed upon the movement of coal by

the zone system will make necessary some readjustment in fuel practices in various communities affected by these restrictions.

Special Permits

Under regulations of the fuel administrator, coal of particular quality or characteristics for a special purpose, such as by-products, gas, blacksmith and metallurgical coal, will be permitted to move by permit beyond the limits imposed by the zone system.

The zone system affects all bituminous coal except:

Coal for railroad fuel for which special arrangements will be made by the Fuel Administrator and the Director General of Railroads.

Coal for movement on inland waterways which is in no way restricted by the system.

Coal delivered to Canada which is subject to regulations of the Fuel Administrator.

Heretofore, many of the mines in many of the producing districts throughout the country have been unable to keep up their production in the summer months because of the decreased demand for their product. Under the zone system these producing districts have been allotted consuming territory which will demand a large increase in production. Thus, coal which has long been available, but not used, will be added to the aggregate supply for the country as a whole. The early buying of next winter's supply of coal by consumers throughout the country is considered imperative by both the Fuel Administrator and the Director General of Railroads.

Ample production capacity has been assigned to each of the consuming zones outlined in the system, but these producing fields must be kept working as nearly as possible at their maximum capacity if the system is to be a success.

The method of enforcement of the zoning system is that the Fuel Administration will prohibit distribution beyond the limits of the zone and the Railroad Administration will supplement these prohibitions by railroad embargoes. When permits shall be issued by the Fuel Administration to admit of distribution beyond the zone limits, such permits will operate as exemptions from the embargoes, and the embargoes will so provide.

The zone system was worked out by a joint committee appointed by the railroad and fuel administration in January, consisting of Howard Elliott, of the New York, New Haven & Hartford; A. G. Gutheim, assistant manager of the car service section of the Railroad Administration; G. N. Snider, traffic manager of the Fuel Administration; S. A. Taylor, a mining engineer, and C. E. Leshner, of the Bureau of Mines.

Such a plant was repeatedly recommended by the Railroads' War Board last year for the purpose of eliminating cross-hauling and on December 19 it recommended to the Fuel Administration a carefully worked out plan prepared under its direction by F. S. Peabody, chairman of the committee on Coal Production of the Council of National Defense.

Limitations Imposed by Zone System

The zone system will impose the following limitations upon the movement of bituminous coal.

All producing districts in Missouri, Arkansas, Kansas, Oklahoma and Iowa will be restricted in their shipments of coal to the following markets:

The states of Nebraska, Kansas, Oklahoma, Missouri and Arkansas, that portion of the state of Iowa on and west of a line via the C. R. I. & P. from Glenville, Minnesota to Mason City, Iowa, thence via the C. M. & St. P. to Nora Junction, thence via the C. R. I. & P. through Waterloo to Cedar Rapids, thence via the C. M. & St. P. to Ottumwa, thence via the C. R. I. & P. to Keokuk; that portion of the state of Texas east of the Pecos river; that portion of the

state of Louisiana on and west of the Mississippi river (both sides).

Lake Michigan and Lake Superior coal docks will be restricted in their shipments of coal to the following markets:

The states of North Dakota, South Dakota and Minnesota; that portion of the states of Iowa and Wisconsin on and north of a line from Milwaukee, Wis., via the C. M. & St. P. through Milton Junction to Madison, Wis.; thence via the C. & N. W. to Woodman, Wis.; thence via the C. M. & St. P. through McGregor, Mason City and Rock Valley, Iowa, to Sioux City, Iowa; and the upper peninsula of Michigan.

All producing districts in Illinois are restricted in their markets to the following:

From April 1 to September 30 to the states of:

Wisconsin, Minnesota and South Dakota.—On and south and east of a line via the G. B. & W. from Kewaunee, Wis., to Amherst Junction; thence via the M. St. P. & S. S. M. through Abbottsford and Chippewa Falls to Minneapolis, Minn.; thence via the C. M. & St. P. through Benton Junction, Ortonville and Aberdeen, S. D., to the Missouri river; thence by said river to Sioux City, Iowa.

Iowa and Missouri.—On and east of a line from Sioux City via the C. M. & St. P. through Manilla and Adell to Des Moines; thence via the C. B. & Q. to Albia; thence via the Wabash to Moravia; thence via the C. M. & St. P. to Chillicothe, Mo.; thence via the Wabash to Moberly; thence via the M. K. & T. to North Jefferson City; thence via the western boundary of Cole, Miller and Pulaski counties, Mo.; to the St. L. S. F.; thence via the St. L. S. F. through Neosho to the Missouri-Oklahoma state line.

Arkansas.—On and north of a line via the C. R. I. & P. from Memphis, Tenn., through Little Rock and Mansfield, Ark.; also, points on the St. L. I. M. & S. and St. L. S. W. south of said line of the C. R. I. & P.

Louisiana.—Points on the St. L. I. M. & S. and St. L. S. W. *Tennessee and Kentucky.*—On and west of a line via the I. C. from Memphis, Tenn., through Fulton and Clinton, Ky., to Cairo, Ill.

Illinois.

Indiana and Michigan.—On and west of a line via the C. & E. I. from Evansville, Ind., through Otter Creek Junction and Brazil to Wheatfield; thence via the New York Central to South Bend; thence via the M. C. to Niles, Mich., thence via the Cleveland, Cincinnati, Chicago & St. Louis, to Benton Harbor.

All producing districts in Illinois are restricted in their shipments of coal to the following markets. *from October 1 to March 31—*

States of:

Wisconsin.—On and south of a line via the C. M. & St. P. from Milwaukee, Wis., through Watertown, Madison and Woodman to Prairie du Chien.

That Part of Iowa and Missouri.—on and south of the C. M. & St. P. (I. & D. Div.) from North McGregor to Sioux City and on and east of a line from Sioux City via the C. M. & St. P. through Manilla and Adell to Des Moines; thence via the C. B. & Q. to Albia; thence via the Wabash to Moravia; thence via the C. M. & St. P. to Chillicothe, Mo.; thence via the Wabash to Moberly; thence via the M. K. & T. to North Jefferson City; thence via the western boundary of Cole, Miller and Pulaski counties, Mo.; to the St. L. S.; thence via the St. L. S. F. through Neosho to the Missouri-Oklahoma state line.

Arkansas.—On and north of a line via the C. R. I. & P. from Memphis, Tenn., through Little Rock and Mansfield, Ark.; also, points on the St. L. I. M. & S. and St. L. S. W. south of said line of the C. R. I. & P.

Louisiana.—Points on the St. L. I. M. & S. and St. L. S. W. *Tennessee and Kentucky.*—On and west of a line via the

J. C. from Memphis, Tenn., through Fulton and Clinton, Ky., to Cairo, Ill.

Illinois.

Indiana and Michigan.—On and west of a line via the C. & E. I. from Evansville, Ind., through Otter Creek Junction and Brazil to Wheatfield; thence via the New York Central Lines to South Bend; thence via the M. C. to Niles, Mich.; thence via the C. C. C. & St. L. to Benton Harbor.

All producing districts in Indiana will be restricted in their shipments of coal to the following markets:

Those portions of the states of Illinois, Kentucky, Wisconsin and Michigan on and within the following boundary lines:

On the East.—From Joppa, Ill., via the Ohio river (both banks) to Madison, Ind.; thence via the P. C. C. & St. L. to North Vernon; thence via the C. C. C. & St. L. to Rushville; thence via the P. C. C. & St. L. through Richmond to Indiana-Ohio State line, thence north to Michigan State line; thence via the N. V. C. through Jackson, Mich., to Lansing; thence via the P. M. to Howard City; thence via the G. R. & I. to Mackinaw City, Mich.

On the West.—From Joppa, via the C. & E. I. to Arthur; thence via the Vandalia to Peoria; thence via the C. & N. W. through Nelson, Sycamore and Belvidere, Ill., to Beloit, Wis.; thence via the C. M. & St. P. through Elkhorn and Waukesha to Milwaukee, Wis.

Producing districts in western Kentucky on the Illinois Central, Louisville & Nashville and L. H. & St. L. railways will be restricted in their shipments of coal to the following markets: States of—

Kentucky and Tennessee.—On and west of a line via the L. & N. from Louisville, Ky., through Bowling Green, Ky., Nashville, Tenn. (including branches to Glasgow, Ky., Scottsville, Ky., and Hartsville, Tenn.); Columbia and Baugh, Tenn., to the Tennessee-Alabama state line.

Mississippi.

Arkansas.—On and south of the line of the C. R. I. & P. from Memphis, Tenn., through Little Rock and Mansfield, Arkansas.

Louisiana.

Texas.—On and east of the line of the H. E. & W. T. from Logansport, La., to Houston; thence via the G. H. & H. to Galveston.

Illinois and Wisconsin.—On and east and south of a line via the I. C. from Cairo, Ill., through Centralia, Clinton and Freeport to Madison, Wis.; thence via the C. M. & St. P. through Watertown to Milwaukee, Wis.

Indiana.—On and west of a line via the C. & E. I. from Evansville, through Otter Creek Junction and Brazil to Wheatfield; thence via the N. Y. C. to South Bend; thence via the M. C. to Indiana-Michigan state line.

The producing districts in Virginia on the L. & N., all producing districts in eastern Kentucky on the L. & N. and the C. N. O. & T. P. and short line connections, Tennessee mines on the Cumberland Valley division of the L. & N. and on the Middleborough R. R. are restricted in their shipments of coal to the following markets: States of—

Kentucky.—On and east of a line via the L. & N. from Louisville to Lebanon Junction and east of the main line and branches to Glasgow and Scottsville, Ky., of the L. & N. from Lebanon Junction through Bowling Green, Ky., to Nashville, Tenn.

Indiana and Ohio.—On and within the following boundaries:

On the West.—from Louisville via the C. I. & L. to Michigan City, Ind.

On the East.—from Cincinnati to Toledo, Ohio, via the C. C. C. & St. L. through Springfield, Bellefontaine and Newark, Ohio.

Michigan.—Lower Peninsula

All producing districts in Tennessee, Georgia, Kentucky

mines on the L. & N. main line and branches connecting at and south of Corbin and on the C. N. O. & T. P. south of Somerset; all Black Mountain and Stonega districts in Lee, Wise and Western Russell counties of Virginia will be restricted in their shipments of coal to the following markets:

The states of North Carolina, South Carolina, Georgia, that portion of Tennessee on and east of a line via the L. & N. from Mitchellville to Collinwood through Nashville, Columbia and Iron City, that portion of Alabama north of the Tennessee river; that portion of Virginia on and south of the N. & W. from Norton through Roanoke and Petersburg to Norfolk, including branches connecting at Petersburg; that portion of Florida east of the Appalachian river.

All producing districts in Alabama will be restricted in their shipments of coal to the following markets:

The states of Louisiana, Mississippi, Alabama, Georgia and Florida; that portion of the state of Texas on and east of a line via the H. E. & W. T. from Logansport, La., to Houston; thence via the G. H. & H. to Galveston; that portion of the state of Arkansas on and south of the line of the C. R. I. & P. from Memphis, Tenn., through Little Rock and Mansfield, Ark.; that portion of the state of Tennessee lying west of the Tennessee river and on and south of the line of the N. C. & St. L. from Memphis, through Jackson and Perryville.

All producing districts in Ohio will be restricted in their shipments of coal to the following markets:

Those portions of the states of Ohio, Indiana and Michigan on and within the following boundary lines:

On the East.—from Ironton, Ohio, via the Ohio river to East Liverpool; thence via the Y. & O. to Washingtonville; thence via the Erie through Niles to Cleveland.

On the South and West.—from Ironton, Ohio, via the Ohio River to Cincinnati, thence via the P. C. C. & St. L. through Hamilton, Ohio, to Richmond, Indiana; thence via the G. R. & I. to Mackinaw City, Mich.

In the West Virginia high volatile fields, mines on the Kanawha & Michigan and the Kanawha and West Virginia and on the C. & C. west of Dundon will be restricted in their shipments of coal to the following markets:

Those portions of the states of West Virginia, Ohio and Indiana on and within the following boundary lines:

On the East.—from Charleston, W. Va., via the K. & M., Z. & W. and T. & O. C. through Zanesville to Bucyrus; thence via the Pennsylvania Lines west to Sandusky, Ohio.

On the West.—from Charleston, W. Va., via the K. & M. to Athens, Ohio; thence via the B. & O. through Chillicothe and Washington Court House to Dayton; thence via the P. C. C. & St. L. to Richmond, Indiana; thence via the line of the G. R. & I. north.

Michigan.—Lower Peninsula.

In the high volatile fields of West Virginia and Kentucky, mines in West Virginia and Kentucky, in the Thacker-Kenova and Kanawha districts on the N. & W. and the C. & O. and Kentucky mines in the eastern Kentucky districts on the C. & O. and the S. V. & E. will be restricted in their shipments of coal to the following markets:

The lower peninsula of Michigan

Those portions of the states of Ohio and Indiana on and within the following boundary lines:

On the East.—from Kenova, W. Va., via the N. & W. to Sciotoville, Ohio; thence via the C. & O. Northern to Waverly; thence via the N. & W. to Columbus; thence via the H. V. to Marion; thence via the Pennsylvania Lines west to Sandusky, Ohio.

On the West.—from Cincinnati via the C. C. C. & St. L. to Indianapolis; thence via the C. I. & I. to Michigan City, Indiana.

Kentucky, West Virginia and Virginia.—Points on the main line of the C. & O. westbound and including Cincinnati and eastbound on all lines of the C. & O. and N.

& W. to and including tidewater. From Big Sandy district of northeastern Kentucky on the C. & O. and Sandy Valley & Elkhorn coal may also move to Kentucky points on the line of the C. & O., Ashland to Louisville, Kentucky, inclusive.

In the low volatile fields of West Virginia, mines in the Pocahontas, Tug river and New river districts on the N. & W., the C. & O. and the Virginia and Clinch Valley districts in Tazewell and Eastern Russell counties along the N. & W., will be restricted in their shipments of coal to the following markets:

District of Columbia, North Carolina and Virginia, including tidewater terminals.

Kentucky and Ohio—Points on the direct lines of the C. & O. and N. & W., westbound to and including Cincinnati, Ohio and Columbus, Ohio.

West Virginia—Points on the direct lines of the C. & O., N. & W. and Virginian eastbound.

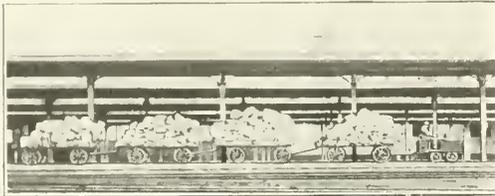
South Carolina—On and east and north of a line via the Southern from Charlotte, N. C., through Chester, S. C., to Columbia; thence via the S. A. L. to Denmark; thence via the Southern to Charleston.

Lake Erie Ports for lake transshipment only.

All mines in Northern West Virginia, Pennsylvania and Maryland on the B. & O., Western Maryland, and the Coal & Coke east of Dundon, as well as all of the mines north of these lines will be allowed to ship eastbound to all points in the states of West Virginia, Maryland, District of Columbia, Delaware, Pennsylvania, New Jersey, New York and the New England states reached by customary eastbound routes, including coal for transshipment to vessels at tidewater. They will not be allowed to ship westbound except to all Lake Erie ports for lake transshipment only, with the further exception that Pennsylvania producing districts will be allowed to ship as far west in Ohio as the line of the P. & W. V., and the W. & L. E. through Wellington to Lorain and the Pan Handle, West Virginia, producing district on and east of the line of the B. & O., C. L. & W. Branch. Bridgeport to Lorain, Ohio.

Electric Trucks in Station Service

TO REDUCE THE TIME required in handling baggage, mail and express matter at the Union Terminal, Dallas, Tex., three electric trucks developed by the Orenstein-Arthur Koppel Company, Koppel, Pa., have been installed. These are tractor trucks following the general lines of the standard trucks manufactured by this company, ex-



Handling Four Loaded Trucks with the Tractor

cept for several modifications designed to facilitate their application to this special service.

The Dallas Union Terminal station, which was described in the *Railway Age Gazette* of November 17, 1916, is of the through type, with 10 station and three stub tracks. The station building is located opposite the middle of the station tracks with the baggage room on the track level, while the express companies are provided with a building near one

end of the station tracks. The platforms are 15 ft. wide and extend about 750 ft. each way from the axis of the station. Trains entering the station are stopped with the forward ends near the ends of the platforms, so that mail and baggage cars are worked without interference with the passengers who have access to the platforms by means of an overhead passageway leading from the station building. The baggage, mail and express trucks are moved to and from the platforms over plank roadways crossing the tracks at the ends of the platforms. This arrangement involves a long haul which formerly required the efforts of two or more men for fully 10 minutes to bring a single baggage truck from the station to a train. It was the expense of this system and the frequent delays to trains resulting from it



Two-Seated Tractor Used at Dallas

that led to the introduction of the three electric tractors. One of these tractors now hauls four trucks over the same distance in about one third the time formerly required for one.

The trucks are equipped with batteries having sufficient storage capacity to operate for 18 hours. They are charged during a period of six hours when no trains are coming in. The busy periods extend for three hours in the early morning, and in the evening, but more or less work is done also during the 10 or 12 hours intervening. There is a seat on each end of the car and the direction of the tractor may be reversed by the operator changing his position from one seat to the other. Consequently it is not necessary to turn the truck on the platform.

The operator sitting on either of these seats controls the speed by an upright bar with a U-shaped handle at the top, and controls the steering by another similar handle. There are two pedals on the platform which can be used sitting in either direction. There is likewise an electric foot push brake in the center of the platform. The truck is steered by pushing the second handle forward or backward.

PROPOSED RAILWAY FOR BRITISH GULANA.—The British Guiana press publishes brief details of a scheme, as prepared by the Director of Public Works of that colony, for a railway extending from Huntley, on the Georgetown-Rosignol Railway, in a general southwesterly direction toward the interior. The line will be of meter gage. It is proposed to lay down a third rail from Georgetown to Rosignol, thus providing the meter gage along the existing line while leaving its present standard gage undisturbed. This would enable trains from the hinterland to divide into two sections at Huntley, one going to Georgetown and the other to Rosignol, with a consequent saving of the transfer of freight and passengers and a considerable economy of time.

Paint Spraying System

THE AERON SYSTEM of applying paint in the form of a spray by means of compressed air, developed by the De Vries Manufacturing Company, Toledo, Ohio, is used extensively in the industrial field and has wide possibilities in the railroad field. It is now used by some roads for painting equipment and buildings and is a great time

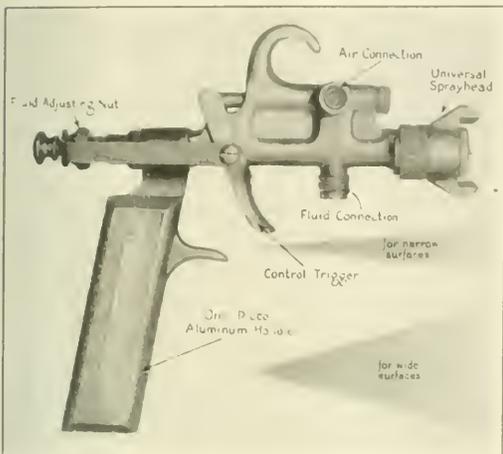


Fig. 1—Paint Spraying Nozzle

and labor saver. The system is so designed that it may be operated without materially wasting paint.

The nozzle is in the form of a pistol with the control trigger always under the operator's finger and within 4 in.



Fig. 2—A Difficult Painting Job Made Easy

of the spray head. This allows the paint to be applied exactly where it is needed and reduces to a minimum any loss in paint. An adjustable nozzle is provided which governs the width of the spray. All kinds of varnishes, enam-

els, lacquers and oil paints may be used with the Aeron system, which is easy to install and operate and does a uniformly high grade of work. It may be used to good advantage in the painting of car bodies, trucks, stencils, locomotives, car interiors and exteriors.

Among the advantages of paint spraying as compared with the old hand brush method, may be mentioned the following: Greater speed, less paint used, less wasted, rough and inaccessible surfaces covered more uniformly and the possibility of cleaner and better working conditions. A portable painting equipment has been developed which consists of a suitable air compressor, belt driven from a small gasoline engine and mounted on a portable truck. A paint tank and regulating head, together with an air receiver are also mounted on the truck. Suitable hoses and connections are provided for use with the nozzle. Where compressed air is available the air compressor and gas engine are unnecessary.

The really vital part of the Aeron equipment is the nozzle which is shown in Fig. 1 with the connections and attachments plainly indicated. The flow of air and paint is under-



Fig. 3—Paint Sprayer Used for Stenciling

the instantaneous control of the operator by means of the trigger and the universal spray head produces a flat spray which may be adjusted horizontally or vertically, or for wide or narrow surfaces. Wide surfaces may be covered with rapidity and uniformity.

In operation, the paint tank regulating head inlet is connected by 1/2-in. air hose to the compressor air system. One or more nozzles are then connected by 3/8 in. air hose and 1/2-in. fluid hose to the regulating head outlet. The paint is put into the tank through a filler plug hole. With the regulator shown in Fig. 2 and the fluid adjusting nut on the nozzle, the air pressure is controlled to meet varying conditions of size of nozzle, viscosity of paint, height of nozzle above tank, etc. Special extension nozzles are provided for use in unusually difficult places.

Painting car trucks is a slow, troublesome job by the old paint brush method and Fig. 2 shows how the work may be done by use of the Aeron system. Fig. 3 illustrates the stenciling of a car body. The system is flexible and may be easily adapted to the varying conditions that have to be met in railway practice.

General News Department

The coaling plant of the Chesapeake & Ohio, at Maysville, Ky., was destroyed by fire on March 17, together with a large quantity of coal. Estimated loss over \$55,000.

The Philadelphia Bourse has adopted resolutions asking congress to act promptly on the bill now before it, Senate Bill No. 3530, calling for discontinuance of the valuation of the railroads of the country.

At Glasgow, Ky., March 14, a fire, of unknown origin, destroyed the freight house of the Louisville & Nashville, together with other buildings and seven loaded freight cars; estimated total loss \$300,000.

Two important new subways in New York city, in Lexington avenue northward from the Grand Central Terminal, and in Seventh avenue, past the Pennsylvania station, now substantially completed, are likely to lie unused until about July 1, because of difficulty in getting materials for the electrical equipment of the power houses.

The regional and central purchasing committees of the railroad administration held a conference in Washington Wednesday for a general discussion. The committees on standardization of cars and locomotives have practically completed their specifications for Director General McAdoo's approval. The regional directors went over the plans Monday and Tuesday.

The New England Railroad Club, at its annual meeting in Boston, March 12, elected F. A. Kyer, purchasing agent of the Boston & Albany, as president of the club for the ensuing year. W. J. Backes, engineer of maintenance of way of the New York, New Haven & Hartford, was chosen vice-president.

The right of the Texas Railroad Commission to prescribe freight rates is to be tested in court, the Missouri, Kansas & Texas, and other roads, having entered a suit at Austin on March 15, asking for an injunction against the commission on the ground that, while the railroads are under the control of the federal government, the state commission has no rate-making authority.

In a fire in the Southern Pacific terminal at Lordsburg, N. M., on the 14th of March, a roundhouse, six locomotives, a number of freight cars and a large amount of stores, including fuel oil, were destroyed, the total loss being estimated at several hundred thousand dollars. The fire spread to and destroyed a number of dwellings in that part of the town occupied by Mexicans.

The proposed tunnel for automobiles beneath the Hudson river, between Jersey City, N. J., and New York city, is now definitely recommended by the New York State Bridge and Tunnel Commission, which has sent a report to the governor saying that the work of construction ought to be begun at once. This recommendation is based on the original designs of Jacobs & Davies, prepared in 1913, with certain modifications made recently, at the request of the commission, by Gen. George W. Goethals. The cost is estimated at \$12,000,000 and the time of construction three years.

A garden at every section-house is one of the food-producing measures which the Southern Pacific hopes to put into effect this season. Agents, section foremen and trackmen, from Portland to El Paso and San Francisco to Ogden, are being instructed to convert to vegetable gardens all suitable ground available. In addition, the company is endeavoring to lease all cultivable land which it owns (not used by employees) and a good deal of the right-of-way land adapted to truck gardening or agriculture, is being leased. Vegetable gardens were made last year by hundreds of employees with great success.

Congestion of freight at the north Atlantic ports continues about the same as it has been for the past three weeks. Great progress has been made, since the advent of mild weather, in

moving delayed shipments, but large quantities of food, machinery and other things for Europe have been shipped from western points since March 1, and these take the place of the delayed shipments which have been moved. At the six principal ports about 8,000 carloads are still held, in cars; and over 20,000 carloads of freight are lying in storehouses and on piers or on the ground. At the beginning of this week the number of eastbound loaded cars above normal in "eastern" territory was 40,294.

Thirty-fifth Engineers in France

Word received from Capt. William R. Pearson, of Company C, 35th Engineers (Railways), indicates that that regiment is now in service in France. Capt. Pearson was formerly assistant valuation engineer of the Nashville, Chattanooga & St. Louis. The 35th Engineers was stationed at Camp Grant, Rockford, Ill., previous to its departure for Europe.

Universal Interline Billing

Director General McAdoo has issued an order establishing universal interline billing of freight between all railroads subject to Government control. This order also contemplates a simplification of divisions, so that much of the accounting work connected with the making of these divisions will be avoided.

The order goes into effect May 1, and is in the form recommended by the Accounting Officers' Association. A subsequent order will be issued for simplified bases for apportioning inter-road freight revenues.

Car Shortage Increased

The net shortage of freight cars on March 1, according to reports compiled by the American Railway Association, amounted to 138,102, as compared with 98,044 on February 1, 89,995 on January 1 and 117,132 on December 1. The bulletins giving these figures are not being issued in the form they were before the government assumed control of the railroads but the figures are still being compiled in comparative form. On January 1 there were surpluses amounting to 20,337 and a total shortage of 110,332. On February 1 the surplus was 24,297 and the total shortage was 122,341. On March 1 the surplus was 21,890 and the shortage 159,992, making the excess of unfilled orders 138,102.

Locomotive Consulting Board

Frank McManamy, manager of the Locomotive Section of the United States Railway Administration, has appointed the following railroad officers as a consulting board to consider matters relative to the maintenance of locomotives, the distribution of locomotives to various shops for repairs, shop production and practices, and other matters of a similar character: H. T. Bentley, superintendent of motive power, Chicago & North Western; C. E. Chambers, superintendent of motive power, Central of New Jersey; C. E. Fuller, superintendent of motive power, Union Pacific; J. Hainen, assistant to the vice-president, Southern; D. R. MacBain, superintendent of motive power, New York Central Lines West; John Purcell, assistant to the vice-president, Atchison, Topeka & Santa Fe.

Indianapolis Improvement to Be Finished

Director General McAdoo, on the recommendation of Commissioner Harlan, of the Interstate Commerce Commission, has ordered that the work of track elevation at Indianapolis, Ind., be continued until completed. In a report to the director general, Commissioner Harlan recommended that the work be permitted to go on in a modified form. The partial completion has left streets in the business district of the city in a condition dangerous to pedestrians, a menace to health and

costly to traffic. Between \$7,000,000 and \$8,000,000 has been expended already in this elevation work. Practically 75 per cent of the steel necessary is on the ground. The cost of completing the work will be approximately \$6,000,000, to be borne equally by 14 different railroads.

General Inventories Called For

Director General McAdoo has issued a general order calling on all carriers subject to federal control to commence, prior to May 1, taking an inventory of materials and supplies by actual count, measurement, weight, etc., and immediately upon completion thereof to adjust the inventory, by additions and deductions, to December 31, 1917. But any carrier that has taken an inventory in the form indicated within 90 days prior to December 31, 1917, or subsequent to the latter date, is not required to take an additional inventory, but is directed to adjust the inventory previously taken to December 31, 1917.

The inventory is to be preserved in the files of the carrier and is presumably required for the purpose of keeping an accurate record of the property taken over by the government.

Railway Exempts Soldiers from Land Payment

B. A. McAllister, land commissioner of the Southern Pacific, San Francisco, Cal., announces that soldiers and sailors who have been buying Southern Pacific lands on the installment plan are exempted from payments until nine months after the termination of the war, or of their service with the army or navy. All that will be required of a purchaser is that he apply to the company within ninety days after he is released from service and the date will be fixed, within nine months, when the first of his payments will fall due, the others to follow a year apart in their original sequence. No interest will be charged him in the meanwhile. In making this arrangement the Southern Pacific has anticipated the so-called Soldiers' and Sailors' Civil Rights or Moratorium Bill, as it has had this rule in effect since May 10, 1917.

Extensive Floods

Press despatches of Thursday, March 14, reported disastrous floods at Hornell, Corning and other places in New York state; at Dover, N. H.; Charleston, W. Va., and in southern Michigan. Derailments because of flood conditions occurred at Knoxville, Pa., on the Buffalo & Susquehanna; near Corning, N. Y., on the Erie; at Lindley, N. Y., on the New York Central, and near Nunda Junction, N. Y., on the Pennsylvania Railroad. In the last named accident three trainmen were killed. At Dover, N. H., a wooden bridge of the Boston & Maine, 400 ft. long, was carried off its foundations. In lower Michigan, railroad traffic had to be suspended in many places.

Recuperation Camp for Soldiers

Guy Adams, manager of mail traffic of the Union Pacific has given a part of his Double Header ranch as a camp for convalescent soldiers and sailors who were previously in railroad service. For the purpose of administering this project the Railroad Men's Mountain Home Association has been incorporated, and to this the land, about 40 acres, has been leased. The Double Header ranch is situated in Turkey Creek Canyon, 16 miles above Morrison, Colorado. The ranch comprises 160 acres and is covered with pine, spruce and cottonwood timber. The property has seven of the best springs in the state at the foot of Double Header mountain after which the ranch was named.

Mr. Adams' plan to finance the project is to give every railroad employee in the country from president to section hand a chance to contribute to its support. No fixed amount will be asked for but all contributions large or small will be welcome. The First National Bank of Denver will act as treasurer of the association and custodian of the funds, and all gifts should be sent to this bank. None of the trustees will receive remuneration for services, and the association will be a non-profit-making association. It is hoped to be able to take care of 100 railroad men by July 1, and 1,000 men on January 1, 1919.

Bad Results of Government Control

From lakes and seashore resorts, from Hawaii and the White Mountains comes a wail over the government abolition of the "literary bureaus" of the railroads. No more of the multichrome folders, with crystal mountains, emerald lakes, and golden landscapes! No more alluring photographs mounted over a still more alluring text! An actual holiday is often a prosaic affair. But what joy compares with ruffling over piles of resort advertisements, each dealing with a perfect paradise? Where is there a style like that of the railroads' literary agents? Often they are weak in grammar but like Ruskin they are not afraid of wild adjectives and word-pictures. One can only hope that the folders on hand will last out this season, and that the war will end in time to renew a glowing succession.—*New York Evening Post*.

A Very Unusual Train Accident

This over-worked title was used in the newspaper last Friday, March 15, with entire appropriateness—to denote the derailing and wrecking of steel sleeping cars by a boulder, weighing about three hundred tons, which fell from a ledge at the side of the roadway just at the moment when these cars were passing, and after the engine and first three cars of the train had cleared the spot.

This accident happened to westbound express train No. 19, of the Pennsylvania Railroad, near Elizabethtown, Pa., 17 miles east of Harrisburg, at 1 a. m. on March 15. The boulder measured 24 ft. long, 12 ft. wide and 8 ft. thick and it fell from near the top of a cut about 70 ft. deep. It first struck the third car in the train and this and the two following cars were knocked off the rails and wrecked. The rock had to be blasted to clear the track.

Two passengers were killed and 24 passengers and 2 trainmen were injured.

Union Pacific Roster of Employees in Military Service

In a recent circular sent to heads of all departments, E. E. Galvin, president of the Union Pacific and the Oregon Short Line, asks that the following information be secured concerning each employee of the System who has answered the call of his country: (1) The name of the man in service; (2) the character of his employment on the Union Pacific and length of service; (3) his rank; (4) the branch of service to which he has been assigned; (5) his regiment; (6) his company or corps (or ship, if he is in the navy); (7) place of encampment; (8) name and address of parents or nearest relative. This information will be kept up to date and whenever a Union Pacific man meets with a mishap abroad assistance will be rendered him or to members of his family, should such assistance be needed. Ballard, Dunn, special representative of the president of the Union Pacific, will have general supervision of the preparation of these rosters. Each district terminal, main shop and such other points as may be necessary will secure information concerning the men formerly employed who are now under arms and will forward duplicate rosters from time to time to the company's headquarters at Omaha.

Daylight Saving Bill Passed

The daylight saving bill, by which standard time throughout the United States will be advanced one hour at 2 a. m. on the last Sunday in March, which this year comes on March 31, and be set back one hour on the last Sunday in October, was passed by the lower House of Congress on March 15, after having been passed by the Senate last year, and on the following day the Senate concurred in the House amendment, changing to seven months instead of five the period in which the abnormal time shall be used. The law provides that the Interstate Commerce Commission shall define the limits of five zones of standard time "having regard for the convenience of commerce and the existing junction points and division points of common carriers," and that the standard time of each zone shall govern the train movements of all common carriers. In other words the railroads' standard times, Eastern, Central, Mountain and Pacific, and also Alaska time, one hour slower than Pacific time, will now be United States Government standards. This law, giving

statutory authority to our standard times will be in effect, not only during the seven months in which clocks are run ahead of time, but also throughout the whole year.

Trade Paper Advertisers to Co-operate in Third Liberty Loan

One of the features of the Third Liberty Loan, or at least as far as the trade and technical papers are concerned, will be a plan whereby advertisers will devote their space for one or more issues to Liberty Loan advertising, the papers themselves, in most cases, supplying the copy, art work and cuts. The idea originated with a committee of the New York Business Publishers' Association and has received the sanction of Secretary McAdoo in the following letter to Guy Emerson, director of publicity for the Liberty Loan Committee for the Second Reserve District:

Washington, D. C.

I have your letter of the 5th of March with regard to the liberal advertising space which members of the Business Publications' Association will devote in business papers to the Third Liberty Loan. Will you kindly convey to the association the secretary's sincere thanks for their patriotic action? The business papers co-operated most effectively in the first and second campaigns and the secretary deeply appreciates their promise of loyal support for the third issue.

(Signed) G. R. Cooksey, Asst. to the Secretary.

Railroad Administration to Have Early Statistical Reports

Director General McAdoo has perfected arrangements for obtaining statistics of railroad operations for his own use and for the information of the public so that information will be available more promptly than heretofore.

Some 15 to 20 of the principal carriers will be required to send by telegraph a statement of weekly earnings. These will be available about the fifth or sixth day after the close of the period which they cover and are expected to fairly indicate the trend of earnings for the entire country.

About the twentieth of the following month all Class 1 roads will report earnings and expenses for the previous month. Joint facility rents, car rents, etc. and tax accruals, exclusive of war tax, will be included.

All Class 1 carriers will be required to make promptly the monthly reports of operating results now required by the Interstate Commerce Commission, and the data will be published about the tenth or fifteenth of the second month. The bulletin of the commission has been modified in certain respects so that the earnings for the month and the period can be examined upon the basis of the three years' average which is used in fixing the compensation of the carriers.

All of this information will be placed at the service of the public as soon as compiled at Washington and will, it is believed afford earlier and more reliable information of this sort than has ever been available in the past.

Canadian Society of Civil Engineers

The first general professional meeting of the Canadian Society of Civil Engineers to be held in Toronto March 26 and 27 will be devoted to a discussion of the present fuel and power situation and there will be several papers of particular interest to railway men.

The headquarters for the convention will be located at, and the meetings will be held in the theatre lecture room of the Physics building, Toronto University.

Among the papers of interest to railway men will be the following:

Transportation from the Fuel Viewpoint, by W. N. Neal, general secretary of the Canadian Railway Association for National Defence, Montreal, Que.

An Illustrated Address on "The Erection of the Quebec Bridge," by Geo. F. Porter, engineer of construction, St. Lawrence Bridge Company, Montreal, Que.

Railway Electrification, by John Murphy, Chief Electrical Engineer, Department of Railways and Canals, Ottawa, Ont.

Traffic News

In St. John, New Brunswick, it is reported that the Canadian Pacific is considering a proposal from the United States government to send two hundred thousand tons of export freight, monthly, through that port during the coming summer.

The chairman of the Texas Railroad Commission has notified R. H. Aisbton, regional director, that Texas farmers expect to ship north, within the next six weeks, about 400 carloads of spinach, this being the estimated crop from 5,000 acres. Most of this spinach is to be sent by express.

Passengers to and from stations on the Long Island road now constitute nearly three-fourths of the total number using the station of the Pennsylvania Railroad at Seventh avenue, New York city. The total number of passengers serving the station in the year 1917 was 18,148,605, of whom 13,224,258 were Long Island passengers and 4,924,347 were those of the Pennsylvania Railroad.

The Food Administration has appointed three regional traffic managers to co-ordinate the work of the Food Administration and the Railroad Administration by facilitating the movement of foodstuffs, reducing delays in loading, unloading and returning cars, etc. The men appointed are: Charles Barham, general freight agent of the Nashville, Chattanooga & St. Louis, at Atlanta, Ga.; J. H. Cherry, assistant general freight agent of the Illinois Central, at Chicago, and Nat Duke, assistant freight traffic manager of the Delaware, Lackawanna & Western at New York.

The car service section of the Railroad Administration has issued a circular to all railroads, stating that Col. J. S. Fair, of the Quartermaster Corps, in charge of the remount division of the National Army, has requested that arrangements be perfected whereby cars will be promptly furnished for the shipment of animals from points of assembling by contractors to various central points for inspection by the purchasing officers of the army. If for any reason the necessary cars are not available or cannot be furnished without delay the facts must be promptly reported to the car service section.

The Senate Committee on Interstate Commerce has begun holding hearings at Washington on a bill introduced by Senator Poindexter, of the State of Washington, proposing an amendment to the fourth section of the interstate commerce act calculated to impose an absolute prohibition against charging higher rates for short hauls than for long. Former Senator J. L. Bristow, chairman of the Kansas Public Utilities Commission, and J. F. Shaughnessy, of the Nevada Railroad Commission, testified before the committee on March 13, declaring that the present law imposes a hardship on shippers and asked that discretion in the matter be taken out of the hands of the Interstate Commerce Commission.

The Advisory Committee on Waterways recently appointed by Director General McAdoo has submitted a preliminary report recommending the increased use of a number of canals to transport coal during the summer. The membership of the committee has been increased by the appointment of Calvin Tomkins, former dock commissioner, New York, and M. J. Sanders, of New Orleans, manager of the Leyland Steamship lines.

Congressional Limited Restored

Director General McAdoo has decided that in reducing the passenger train service between New York and Washington shortly after the first of the year he cut too deep. After an investigation of the increasing travel he has ordered the restoration of the Pennsylvania's Congressional Limited, effective on March 17, as a train of 10 parlor cars leaving Washington at 4 p. m. and arriving at New York at 9:15 p. m., and leaving New York at 3:07 p. m. and arriving at Washington at 8:45 p. m. There is an extra fare of \$1.50 between New York and Washington and of \$1.25 between New York and

Baltimore. Formerly there were no extra rates of this train other than the regular Pullman charge for seats.

Anti-Loss and Damage League

This organization, the purpose of which is indicated by its title, has taken for its special mission the campaign for the adoption of proper containers for freight; that is to say, for the abolition of flimsy pasteboard boxes and such like things, and the substitution of wooden or metal boxes of sufficient strength for the uses to which they are put. The managing director is J. H. Leonard, 1133 Broadway, New York City, and the other directors are L. O. Hedden New York; H. C. Vost, New York; John Meigs, Philadelphia, W. J. Kelly, New York; H. C. Gniereand, New York; J. C. Barker, Richmond; F. B. Haile, Washington, Chas. C. Kain, Chicago; E. F. Brooks, Buffalo; J. C. Post, St. Louis; and L. S. Heald, Baltimore.

Increase in Live Stock Movement

Director General McAdoo has received the following report of the comparative receipts of live stock at various stock yards for the month of February, showing a substantial increase over the same period of last year:

	CARS.		
	1918.	1917.	Increase.
Chicago	26,083	20,841	5,242
Kansas City	10,136	10,401	1,035
Omaha	11,142	10,120	1,016
East St. Louis	8,542	7,221	1,321
St. Joseph, Mo.	6,137	4,500	1,637
Denver, Colorado	1,909	1,892	17
Sioux City, Iowa	5,088	5,293	5
South St. Paul	4,067	3,814	253
Total	73,174	61,388	11,626

Store-Door Delivery in New York City

The committee of commissioners which is investigating the subject of freight delivery in New York city, and which is to make a report to Director-General McAdoo, held a conference with mercantile interests, trucking men and railroad officers in New York city, on Tuesday of this week, and the result is a "report of progress"; but when the proposed plan will be ready for presentation to Mr. McAdoo is not stated. Commissioner James S. Harlan, of the Interstate Commerce Commission, chairman of this committee, says that on account of the vital importance of New York city as a freight terminal for goods which are being sent to Europe, or are otherwise necessary in the prosecution of the war, a radical change in the present practices must be made, and he feels assured already of the co-operation of the railroads and the team owners.

The New York and Connecticut Freight Line

This is the name of a corporation, with headquarters, at 38 Park Row, New York City, which announces that, beginning April 1, it will run five-ton automobile trucks, with five-ton trailers, daily, between New York City and New Haven, Conn., a distance of about 75 miles. It is proposed to run a regular through and interurban auto truck service doing business at New Rochelle, Mamaroneck, Port Chester, Greenwich, Stamford, South Norwalk and Bridgeport. Freight will be taken from the door of the shipper and delivered at the door of the consignee, on the same day. Including the store-door delivery and the elimination of handlings, the new concern hopes to do as well as the express companies, in the way of efficiency, and to make rates "virtually on a par with freight rates" when the cartage at both ends is considered, and the uncertainty of present freight conditions is taken into account. The general manager of the company is W. G. L'Hommedieu, and the New Haven office is at 185 Church street.

A tariff printed on the back of the company's card, showing rates on lots of one ton or over and not more than five tons, names 50 cents per 100 lb. as the through rate between New York and New Haven and 30 cents per 100 lb. for the shortest distances. On lots weighing over five tons special rates will be made.

Union Ticket Office at Atlanta

Director General McAdoo has authorized C. H. Markham, Regional Director, Southern District, to consolidate the city ticket offices in Atlanta, Ga., into one union office at 74 and 80 Peachtree street. The lines now maintaining separate offices in Atlanta are the Nashville, Chattanooga & St. Louis, the Louisville & Nashville, the Atlanta and West Point, the Southern, the Georgia Railroad, the Central of Georgia, the Seaboard Air Line and the Atlanta, Birmingham & Atlantic.

This change will result in a substantial saving in rentals and will also add to the convenience of passengers as the new office is centrally located and will be well manned by efficient and experienced men. The consolidation will take effect on April 1 or as soon thereafter as possible.

Investigations as to the possibility of consolidating the ticket offices in New York, Chicago, St. Louis and other cities are under way.

The Canadian Railroad Rate Advance

The Canadian Government has approved the order of the railway commissioners authorizing a general increase of 15 per cent in both passenger and freight rates throughout the Dominion of Canada. This matter had been under consideration for more than two months because of an appeal from western Canada against the proposed increase. The Order in Council which is now issued stipulates that the increased rates shall terminate one year after the close of the war and that the Canadian Pacific, the only large road which is now prosperous, shall pay to the government, as a war tax, all income above what was received in the year 1917. This special tax must in no case be less than \$7,000,000 a year unless the total net revenue of the company from all sources should be insufficient to pay normal dividends of 10 per cent

Appeal to Canadian Shippers

From Canadian Railway Association Bulletin

The average freight car, carrying your goods, Mr. Canadian Shipper, goes only half-filled. You may perhaps be loading a little better than that average. You may think it is "nobody's funeral but your own," since you pay the railways the legal rate and should be allowed to waste space if you like.

But the fact is that all Canada is vitally concerned. The waste of car space is not your "funeral," but the country's "funeral." There are fewer freight cars in Canada than are needed every day. Munitions shipments, shipments of most essential materials, such as food, coal, raw materials, are being held up for lack of cars. If you would see to it that your shipping department filled its cars to full capacity or weight-carrying capacity, you would be helping to double the freight-car equipment of Canada at a time when cars are almost priceless. Please have a personal interview with the men who handle your shipping. They will remind you, of course, of the convenience of loading "one order to a car." They may say there is additional labor cost for jacking a car beyond a certain point. They may indicate that your shipping department would thus have to be altered, or that your customer's convenience would not be as suitably met. Possibly not. But since your prosperity depends upon the prosperity of the whole country and our successful conduct of the war, you will surely see the importance of making your shipment of maximum service in minimum time.

By an appeal for heavier loading the Director of Overseas Transport has succeeded in making 1,000 cars out of the work of 1,200 which had previously been considered full cars. One implement concern in Canada found that by a skilful packing of parts and the building of a rough "deck" in each car it was able to save 12 cars on a shipment of 800 wagons, 22 cars on a shipment of 3,000 rolling ploughs, 52 cars on 120 binders.

A flour shipper tells us he could not afford to load cars to full capacity because of the high labor cost in doing so. On investigation it was found that he had been trying to load each row of bags to the top of the car while the loaders were still working from ordinary floor level. Naturally the job was heavy and awkward. When his shippers were shown the simple little trick of laying the bags in "steps" running down from the ends of the car to the door the difficulty was solved.

Commission and Court News

Personnel of Commissions

Oscar S. Straus, chairman of the New York State Public Service Commission, first district, has been reappointed for a term of five years.

Winthrop M. Daniels was elected on March 16 as chairman of the Interstate Commerce Commission for the ensuing year, succeeding Henry C. Hall, in conformity with the commission's practice of rotating its members in the chairmanship in accordance with seniority. Mr. Daniels has been a member of the Interstate Commerce Commission since early in 1914. He was appointed by President Wilson in January, but the appointment was not confirmed by the Senate for several weeks because of some opposition on account of the position he had taken in a valuation case while he was a member of the Board of Public Utilities of New Jersey. He was born at Dayton, Ohio, on September 30, 1867, and was graduated from Princeton in 1888. For nearly 20 years he was Professor of Political Economy at Princeton University, of which President Woodrow Wilson was then president. When Mr. Wilson became governor of New Jersey, in 1911, he appointed Professor Daniels to membership on the Board of Public Utilities, which position he held until his appointment to the Interstate Commerce Commission. While a member of the faculty of the university he wrote several text books which have been used in many colleges, including "The Elements of Public Finance." He also lectured on public finance and on railway economics and has been an editorial writer on the New York Evening Post. He was reappointed a member of the Interstate Commerce Commission on the expiration of his term a little over a year ago and the confirmation was again delayed in the Senate by the opposition of Senator Cummins. He is regarded as one of the ablest members of the Interstate Commerce Commission and displays a keen interest in the economic questions which arise in connection with the regulation of railroads.



W. M. Daniels

Court News

Recovery of Illegal Taxes

The federal district court for the Eastern District of Pennsylvania holds that in a suit against the United States to recover internal taxes alleged to have been erroneously or illegally collected, the suit is "brought" within the meaning of the statutory provision (limiting the time for bringing suit to two years after the cause of action accrued) when the summons subsequently served is issued.—Mill Creek & Minehill N. & R. v. United States, 246 Fed., 1013. Decided November 22, 1917.

Injuries to Employee Engaged in Repairs

A helper to the boiler maker was sent into the water tank of an engine tender, brought to the shop for repairs, to fasten the inside brace rods. Before finishing his work he started to leave the tank through the manhole, and for that purpose stood on a brace rod which was loose at the end, though this fact had not been discovered by him. It yielded to the pressure, and he fell

to the floor. In an action for his resulting injuries the Iowa Supreme Court holds that the railroad was not negligent, as the place of work was not inherently dangerous, but was only dangerous because the brace rod was loose, which could be discovered only from observation on the inside. It was for the very purpose of discovering and repairing the brace rod that he was in the tank, and some observation on his part was a part of the work of repairs delegated to him.—Rihack v. C. St. P., M. & O. (Iowa), 166 N. W., 292. Decided February 9, 1918.

Boarding Train from Unsafe Place

In an action for injuries to the plaintiff while preparing to board the defendant's train, when struck by the running board or step board, the Massachusetts Supreme Judicial Court holds that the act of a railroad in tolerating a practice on the part of the public to take trains from a certain unsafe space beside the track was not an inducement or invitation from the railroad to an intending passenger to use such space, and one using it was not a passenger. To one not a passenger, because seeking to board a train at an improper place, and therefore a trespasser, or at most a licensee, the railroad merely owed the duty to refrain from wilfully, recklessly and wantonly exposing him to injury. The evidence was held to show that the place to which the public, in entering and leaving trains, was invited was the space made level for such purpose between the station and the nearer rail of the track; not the manifestly narrow, inappropriate and dangerous space between the ends of the sleepers and a riprap wall to protect the station and tracks from the action of the advancing sea, which the plaintiff used.—Doherty v. N. Y., N. H. & H. (Mass.), 118 N. E., 281. Decided January 4, 1918.

"Switching Service" or "Line Haul"

In an action to compel a railroad to accept for services in hauling freight a less sum than its published tariff rate for long distance haul on the theory that the services were switching services, the Iowa Supreme Court holds that services rendered by intersecting railroads in transporting gravel from the plaintiff's gravel pit within a city to a point where the plaintiff was building a bridge within the city were not "switching services," independent of a "line haul," so that one railroad was entitled to the tariff rate fixed for line haul services per car of gravel, and not merely to a switching rate. And the fact, if it were a fact, that the railroad had violated the state statute against unjust discrimination by charging certain other shippers a less rate for line haul services than it demanded of the plaintiff for such services could not justify the court in compelling the railroad, by decree or judgment, to violate, in the plaintiff's case, the statute prohibiting it from charging or receiving more or less than the published tariff rate. Cummings Sand & Gravel Co. v. Minneapolis & St. L. (Iowa), 166 N. W., 354. Decided February 13, 1918.

Construction of Tariffs

Tariff Circular 18A of the Interstate Commerce Commission, March 31, 1911, provides that a tariff shall contain an alphabetical index of the points from and to which it applies, and, further, that "this is not to be understood as prohibiting the incorporation in a tariff of a rule for the affirmative and definite application of the rates or fares named in that tariff to or from points not indexed, and which are distinctly intermediate on the same line with points that are indexed." A certain tariff had a clause of this kind, and the Circuit Court of Appeals, Eighth Circuit, holds that this provision must be construed in connection with the circular under which it was issued, and that it had no application to points which were indexed, and to or from which specific rates were named. In such a tariff the word "intermediate" refers to stations between those named.

The company concerned was the C. M. & St. P., and the action against it was for alleged excessive charges. Its tariffs, so far as material, were substantially as follows:

		Rates in cents per 100 pounds		
From	To	Flax seed	Wheat	barley and oats
Cogswell, N. D.	Duluth	14	14	14
Brampton, N. D.	Duluth	14	14	14
Newark, S. D.	Duluth	19½	15	15

*Cogswell is the station farthest from Duluth.

The question was whether the quoted provision in the tariff is applicable to the rates from Newark to Duluth, and thus whether its rates are fixed the same as from Brampton, notwithstanding the rates specifically fixed from Newark in the table. The court answered the question in the negative and affirmed a judgment for the railroad.—*National Elevator Co. v. C. M. & St. P.*, 246 Fed., 588. Decided October 9, 1917.

Ejection from Station—What Constitutes a Passenger

In an action for wrongful ejection from a station, it appeared that about 10:30 or 10:45 a. m. on December 24, 1916, the plaintiff was in the defendant's station at Sedalia, Mo., and bought a ticket to Dresden; that the next train to Dresden was to depart at 6 p. m. of that day; that shortly after the purchase of that ticket one of the defendant's employees, with great force and violence, ejected him from the station. The station was crowded at the time. The plaintiff testified that he knew there would not be a train for Dresden until that evening, but he said on account of its being cold outdoors he thought he would buy a ticket so that if the watchman came around and asked him why he was sitting in the waiting room he would have something to show for it. The Kansas City Court of Appeals sustained the railroad's contention that the plaintiff on his own testimony was not a passenger. The court said in part: "In order for the relation of passenger and carrier to exist in cases of this kind it is necessary that the intending passenger come to the station, and within the implied care of the carrier, a reasonable time before the departure of the train by which he is to travel. The right to enter and remain at a railroad station extends only so far as is reasonably necessary to secure to the traveler the full and perfect exercise of his right to be carried upon the cars, and what is a reasonable time will depend upon the circumstances of each particular case; one's right to remain at a railroad station depends on his intent to take a train expected soon to leave. *Kidwell v. Chesapeake & Ohio*, 71 W. Va., 664, 77 S. E., 285, 43 L. R. A. (N. S.), 909. From plaintiff's evidence above it is seen that he intended to use the station for a period of more than seven hours, until his train should arrive, as a convenient and warm place to spend the day. Under these circumstances plaintiff was not a passenger at the time he was ejected from the station." Judgment for \$50 actual and \$50 punitive damages was reversed and the cause remanded.—*Thomas v. Bush* (Mo.), 200 S. W., 501. Decided January 28, 1918.

United States Supreme Court

Title to Sections in Spokane Indian Reservation

Suit was brought in ejectment by the Northern Pacific to recover possession of eighty acres of land in the Spokane Indian Reservation, (the title to 64,000 acres depending on the decision). The stipulated facts were substantially as follows: By the act of Congress of July 2, 1864, the railroad was granted, to aid in the construction of its line, 20 alternate sections of land per mile on each side of the line in any territory, and 10 in any state. In October, 1880, the company filed its plat locating its line opposite the land in controversy. Meanwhile, in 1877, a representative of the Commissioner of Indian Affairs had made an agreement with the Spokane Tribe of Indians setting aside certain land in Washington Territory, of which that in question forms part, for the use of the tribe. The report of the representative was sent to the Senate in 1878, but the Executive Order of the President, formally setting aside and reserving the territory described in the agreement, was not signed until January 18, 1881. The Supreme Court of the United States holds that the Secretary of the Interior and the Commissioner of Indian Affairs approved the action of their representative "not later, certainly, than the sending of the secretary's report to the Senate on January 23, 1878, which was almost three years prior to the filing of the railway company's plat, and that the Executive Order of the President on January 18, 1881, simply continued and gave formal sanction to what had been done before." The Spokane Indian Reservation having thus been lawfully created prior to the filing of the plat of the plaintiff's line on October 4, 1880, judgment for the defendant was affirmed.—*Northern Pacific v. Wismer*. Decided, March 4, 1918.

Equipment and Supplies

Railway supplymen will be particularly interested this week in the editorial on page 691 entitled:

Is the Railway Supply Industry Awake or "Asleep at the Switch?"

and in the article on page 697;

American Railway Supplies in Australia.

Locomotives

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, is in the market for 3 second-hand standard gage switching locomotives weighing 45 tons or more.

Freight Cars

THE BIRMINGHAM SOUTHERN is reported as having issued an inquiry for 20 70-ton flat cars.

THE GUANTANAMO & WESTERN has ordered 25 40-ton steel frame box cars from the American Car & Foundry Company.

FELS & Co.—The item in the *Railway Age* of March 8, to the effect that this company was in the market for a number of 8,000 and 10,000 gal. tank cars, has been denied.

Iron and Steel

THE CHICAGO, BURLINGTON & QUINCY has ordered 4 100 ft. and 1 90 ft. through turntables, totaling 365 tons.

Signaling

THE ESSEN TERMINAL has ordered from the Union Switch & Signal Company material for mechanical interlocking at Ojibway, Ont.; two machines, Saxby & Farmer, 8 levers each.

THE PENNSYLVANIA LINES WEST OF PITTSBURGH have ordered from the Union Switch & Signal Company materials for an interlocking plant at Boone, Ind.; 35 working levers.

THE CANADIAN PACIFIC has ordered from the Union Switch & Signal Company material for a mechanical interlocking, 18 working levers, at Komoka, Ont., to replace an old machine.

THE JACKSONVILLE TERMINAL COMPANY, Jacksonville, Fla., has ordered from the Union Switch & Signal Company the material for two electro-mechanical interlockings, Towers 1 and 2.

THE PENNSYLVANIA has ordered from the Union Switch & Signal Company material for a mechanical interlocking at Port age, Pa., 24 levers; an electro-pneumatic interlocking, 11 levers, at Paoli, Pa.; two electro-mechanical machines at the same place, and for extensive additions at Mettlen, N. J.; Harrisburg, Pa., and Denholm, Pa.

FIRE LOSS IN U. S. IN 1917.—Losses by fire throughout the United States in 1917 amounted to \$230,000,000, making it the worst year for fires in the history of the country, with the exception of 1906 when the San Francisco earthquake and subsequent conflagration occurred. Announcement of this figure was made to the New Jersey State Council on Fire Loss as a communication from the Council of General Firemen.

U. S. TRADE WITH GREAT BRITAIN.—The amount of trade between the United States and Great Britain in 1917 was \$447,000,000 last year, according to a compilation made up by the National City Bank of New York. This figure compares with \$196,000,000 in 1913, the year preceding the war. The more important of the manufactures exported to Great Britain in 1917 included approximately \$6,000,000 worth of railway supplies, including rails, iron and locomotives.

Supply Trade News

The **Gulick-Henderson Company, Inc.**, announces the removal of its New York offices to the Herald Square building, 141-145 West 36th street, in order to provide larger and more suitable quarters.

J. M. Woodruff, who has been representing the Warren Brothers Company in the South for the past five years, is now connected with the Standard Asphalt & Refining Company, Chicago.

Frank J. Hurley, who for a number of years was a representative connected with the New York office of the Independent Pneumatic Tool Company, died in East Orange, N. J., March 10, at the age of 29 years.

The **Galena Signal Oil Company** is to establish a large manufacturing and distributing plant at Houston, Tex., having bought the refinery and pipe lines of J. S. Cullinan for a consideration said to approximate \$10,000,000.

E. E. Adams, consulting engineer, and **F. W. Sercombe**, assistant controller of the Union Pacific System, have been appointed assistants to **R. S. Lovett**, director of the division of capital expenditures of the United States Railroad Administration at Washington.

W. L. Reid has been elected vice-president and general manager of Lima Locomotive Works, Inc., with offices at Lima, Ohio. Mr. Reid was born at Paterson, N. J. His entire business life has been connected with locomotive building. He served his apprenticeship in the drawing office and shops of the Rogers Locomotive & Machine Works at Paterson and became successively erecting shop foreman, assistant superintendent and superintendent of the same plant. Leaving the Rogers works he was appointed assistant superintendent of the Brooks Locomotive Works and two years later superintendent of the Brooks works. After serving only 20 days in the latter position he was appointed superintendent of the Schenectady works of the American Locomotive Company. He was later appointed manager of the Schenectady plant and general works manager of the American Locomotive Company. Resigning from the American Locomotive Company he became general manager of the National Brake & Electric Company, Milwaukee, Wis. Six months later he resigned to become general superintendent of the Baldwin Locomotive Works at Eddystone, which position he held up to the time of his recent election.

The **Permutit Company**, manufacturers of water softening and water rectification apparatus and for several years past located at 30 East Forty-second street, New York, announces its removal to 440 Fourth avenue, New York, where after March 15 the entire top floor will be occupied by its offices. The entire top floor will be occupied by its offices.

Tar Carbolinum Wood Preserving Company, of 34 Greene street, New York, which for over 40 years has sold Avenarius Carbolinum, has changed the name of its product to Protexol and under this trade name will continue to supply a wood preservative identical in every respect with the one sold for many years under the name Avenarius Carbolinum.



W. L. Reid

Ira C. Rogers, formerly general purchasing agent for the Worthington Steam Pump Company at New York, has recently been appointed general manager of W. R. Keene & Co., also of New York. W. R. Keene & Co., represent the Bay State Tap & Die Company, Alvord Reamer & Tool Company, Sterling Products Company, Keene Twist Drills and Massey Vise Company. Mr. Rogers, before his connection with the Worthington Steam Pump Company, was assistant general purchasing agent of the Pittsburgh & Lake Erie until 1915, at which time he became general purchasing agent of the Worthington Steam Pump Company and resigned February 1, to take the above position with W. R. Keene & Co.

Karl J. Eklund has been appointed general manager of Mudge & Co. in charge of the engineering and manufacturing departments, with headquarters at Chicago. Mr. Eklund was born on July 8, 1884, and was educated in the grammar and high schools of Keene, N. H.

He started his railroad service as a blacksmith helper in the Boston & Maine shops, and from March, 1903, to April, 1906, served his apprenticeship as machinist on that railroad. During the next two years he was employed on various railroads as journeyman machinist, and in 1908 returned to the Boston & Maine as machinist and foreman in the Keene, N. H., shops. On March 1, 1910, he left the service of this road to accept a position with the Piliiod Company, of New York and Swanton, Ohio, as Baker valve gear inspector, and on February 1, 1915, he was appointed assistant to the president of the Piliiod Company, with headquarters at New York. He occupied this position until April 1, 1917, when he was appointed assistant to the president of Mudge & Co., Chicago, the western representatives for the Piliiod Company, and served in this capacity until his appointment as general manager on March 1, 1918. In this capacity he will continue to direct the service departments of the Piliiod Company and the Chambers Valve Company, both of whom are represented in the west by Mudge & Co. He will also have charge of the service department of Mudge & Co. in addition to the engineering and manufacturing departments.



K. J. Eklund

Western Electric Company

The Western Electric Company in its fiscal year ended December 31, 1917, did the largest business in its history, the gross sales of \$150,340,359 being 41 per cent greater than in 1916. After the deduction of expenses, taxes, interest and a reserve of \$2,000,000 for contingencies on account of the large merchandise investment and the prevailing high costs, there was a balance available for dividends of \$2,851,716, an increase of \$527,100 over 1916. After allowing for dividends of \$2,550,000 there was left a surplus of \$301,716 or \$7,100 more than in 1916. These dividends compared with \$2,100,000 in 1916 and included the usual 6 per cent dividends on the preferred and \$3 a share on the common.

The company is controlled by the American Telephone & Telegraph Company, and a large part of its output is for the Bell Companies. The balance sheet showed that plant and equipment were increased \$4,200,000 in value during the year and investments were marked up about \$1,000,000. Inventories on December 31 were valued at \$44,415,028, an increase of \$11,414,000 over the same date in 1916.

In his report to the stockholders, H. B. Thayer, president of the company, draws attention to the fact that the business of the company was larger than in any previous year.

"This is true of both the sale of its own manufactures and in

the sale of property at a price not made by it. In our own manufactures the demands from regular customers (the Bell Telephone Companies) were very heavy at the beginning of the year, but as the demands for equipment to meet emergency requirements directly or indirectly caused by the war have increased, the ordinary requirements have decreased so that to a large extent a more expensive and less profitable business kept us busy during the latter part of the year. Therefore, while the profits in this class of business have been larger than in 1916, they have not as compared with earlier years, been in proportion to the increased activity in the business.

"On sales of our handse not made by us the profits have been very satisfactory.

"There is no return from foreign investments included in the profits of the company for 1917. As to some, information is entirely lacking, and as to others, it is incomplete. It is our belief, however, that, as a whole, a conservative valuation of them would require an addition to reserves, the earnings of some of them being apparently sufficient to offset the possible losses of others.

"On the entry of this nation into the war we practically placed our Engineering Department at the service of the nation and believe that it has rendered important service. This has involved large expense and indirect loss through the interruption of our regular engineering program, but because we believed that we were able to render great service, we believed also that the responsibility upon us to render it was great and that our stockholders would approve of our action. On such orders as we undertake for the military departments we have agreed to a basis of cost plus a fair, moderate profit.

"Our shop force increased during the year from 18,928 to 21,549 employees. The total number of employees at December 31, 1917, was 30,737.

"The sales for 1917 were \$150,340,000. For 1916 they were \$109,987,000 and for 1915 they were \$63,852,000.

"The orders on hand at December 31, 1917, were \$1,950,000 in value less than on December 31, 1916. The average value of an order filled during 1917 was \$107 as compared with \$75 for 1916."

ASSETS		LIABILITIES	
R. Fee and Charges	\$12,911,537	Preferred stock, 300,000	
Mails and postage	12,134,759	Shares	\$30,000,000
Merchandise	44,415,028	Common stock, 150,000	
Cash	4,357,150	Shares no par value	25,755,364
Due from	1,177,166	Bonded debt	15,000,000
receivables	4,678,194	Bills payable	10,600,000
Supplies and materials	1,504,686	Acc'ts. payable	9,194,558
Plant and equipment	\$11,668,520	Reserve for Dep.	16,285,136
		Reserve for Emp. Ben.	
		Fund	1,500,000
		Res. for other	4,333,462
		Grand total	\$11,668,520

United States Rubber Company Buys American Locomotive Plant

The United States Rubber Company announced last Friday the purchase of the plant of the American Locomotive Company at Providence, R. I. It is understood that the price paid for the property was around \$500,000. The property consists of about ten acres of land with extensive buildings, centrally located in the city of Providence, and adjoins the Keeler tire plant of the rubber company. The plant was used for many years by the American Locomotive Company when it was engaged in the automobile manufacturing business.

President Johnson of the rubber company said that the plant will be used for the extension of the manufacture of truck tires. One of the buildings will probably be used for the manufacturing of railroads for the United States government.

A LUMBER PRODUCTION IN THE UNITED STATES OF 39,200,000,000 feet in 1917, or an increase of 2 per cent as compared with the output of 1916. The estimate made by the Forest Service based on incomplete reports received up to February 20.

U. S. AVIATORS MAKE FIRST FLIGHT IN ITALY.—Two American aviators on March 15 accomplished a fast flight from Foggia to Rome flying the 212 miles in 158 minutes. The aviators were Major Ryan, commander of the American Flying Corps at Foggia, who acted as pilot, and Captain Frost, who made the trip as observer.

Railway Financial News

CANADIAN PACIFIC.—The Canadian Government has passed an order in council providing for special taxation of the Canadian Pacific Railway. The Wall Street Journal says the order provides that the company shall pay:

1st—Half its net earnings from railway operations in excess of 7 per cent on its common stock (after paying fixed charges) appropriation for pension fund and dividends on the preferred stock).

2nd—Income tax on the company's special income (including all the company's income except earnings from railway operations) under provisions of the income war tax act of 1917, or any amendment thereof hereafter enacted.

The order in council provides that the total amount to be paid in taxes each year by the company shall not be less than:

1st—The company's net earnings in such year from railway operations and from special income as defined above in excess of 10 per cent on its common stock, after paying fixed charges, appropriation for pension fund and dividends on the preferred stock, up to \$7,000,000, or

2nd—The amount by which its net earnings from railway operations exceed net earnings from railway operations for the fiscal year ended December 31, 1917, due to increase in freight and passenger rates granted by order of the Board of Railway Commissioners dated December 26, 1917.

This order shall be deemed to have come into force and effect on the first day of January, 1918, and to continue in force and effect during the present war and until further orders.

DENVER & RIO GRANDE.—A judgment for \$367,085,529 was entered in the Supreme Court at New York on March 13 against the Denver & Rio Grande in favor of the Equitable Trust Company as the balance due with interest on a judgment for \$38,270,343 recovered in the United States District Court at New York on May 18, 1917, in favor of the trust company which sued for the payment of interest on a \$50,000,000 bond issue guaranteed by the Rio Grande for the Western Pacific Railway.

Ernest Howard of New York has issued a protest against the decision which adjudged to the Western Pacific damages of approximately \$38,000,000 against the Denver & Rio Grande. Mr. Howard claims that the Western Pacific property was worth from \$10,000,000 to \$20,000,000 when the court sold it for the absurd price of \$18,000,000.

GRAND TRUNK.—This company has issued a statement regarding its inability to pay dividends on its guaranteed or preferred stocks, owing to the enormous increase in operating expenses notwithstanding the fact that during the past year the company carried the largest traffic in its history. The hope is expressed that the Canadian Government will in the near future make such action as will enable the company to meet these unparalleled war conditions.

NEW YORK, NEW HAVEN & HARTFORD.—The directors have sent a circular to the stockholders outlining the terms of a new issue of preferred stock, which if authorized for an issue will raise \$43,588,300, sufficient to pay on the \$43,000,000 of the company's 5 per cent notes falling due on May 1, next. The circular states that stockholders owning 100 shares of business on March 20, will be offered one share of the new preferred stock for each four and one-half shares now held and that holders of the company's 5 per cent convertible bonds will get one share of the new preferred for every \$450 held of the bonds in their possession. The total amount of stock now outstanding is \$157,177,000, all of one class, while \$39,020,000 of the bonds are in the hands of the public. It is stipulated that the new stock shall be paid for as follows: on or before Apr. 5, or in four quarterly installments, the first on that date and those made later on July 1, October 1 and January 2, 1918, respectively. The stock to be a 7 per cent cumulative issue, the dividends to be paid quarterly. Howard Elliott represents the New Haven, conferring with John Skelton Williams, director of the business section of the railroad administration, in the proposed offering, but a final decision has not been reached.

Railway Officers

Executive, Financial, Legal and Accounting

H. A. Taylor, general attorney of the Erie, has been appointed assistant to **Walker D. Hines**, assistant to Director General McAdoo.

William J. Moule, auditor of disbursements, of the Canadian Pacific with office at Montreal, Que., has been appointed assistant controller.

The election of **C. B. Seger** as acting chairman of the executive committee of the Union Pacific, to succeed **R. S. Lovett**, is commented on elsewhere in this issue.

Walter J. Stevenson was appointed auditor of commissary accounts of the Northern Pacific, with office at St. Paul, Minn., succeeding **J. A. Swanson**, resigned, effective March 16.

C. C. Higgins, consulting engineer, with **J. W. Kendrick** has been appointed assistant to vice-president, of the St. Louis-San Francisco, with office at St. Louis, Mo., effective March 15.

William Ellis, formerly commerce counsel of the Chicago, Milwaukee & St. Paul, and **Nathan Matthews**, of Boston, Mass., have been appointed assistants to **John Barton Payne**, general counsel of the United States Railroad Administration at Washington.

E. E. Adams, consulting engineer, and **F. W. Sercombe**, assistant controller of the Union Pacific System, have been appointed assistants to **R. S. Lovett**, director of the division of capital expenditures of the United States Railroad Administration at Washington.

C. C. Barry, auditor of the Los Angeles & Salt Lake, with office at Los Angeles, Cal., has been elected secretary, with headquarters at Los Angeles, vice **W. H. Comstock**, assigned to other duties, and **P. J. Hunt** has been appointed acting freight claim agent, with office at Los Angeles, vice **J. R. Bordeaux**, resigned.

Operating

George Masten has been appointed superintendent of the Tennessee Central, with office at Nashville, Tenn.

A. J. Hasenbalg, trainmaster of the Chicago, Milwaukee & St. Paul, with office at Chicago, has been appointed assistant superintendent of the Chicago Terminal succeeding **W. C. Bush**, transferred.

J. C. Stamm, trainmaster of the Alabama & Vicksburg, with office at Vicksburg, Miss., has been appointed superintendent of the Vicksburg, Shreveport & Pacific, vice **H. B. Hearn**, resigned to engage in other service, and **L. B. Harris** has been appointed trainmaster of the Alabama & Vicksburg, vice Mr. Stamm.

H. C. Nutt, general manager of the Los Angeles & Salt Lake with headquarters at Los Angeles, Cal., having accepted a commission as deputy director general of American railroads for service in France, **W. H. Comstock**, secretary, with office at Los Angeles, has been appointed acting general manager during Mr. Nutt's absence.

S. L. Racey, superintendent of the Third division on the Colorado lines of the Denver & Rio Grande, with headquarters at Gunnison, Col., was transferred to the Green River division, with headquarters at Helper, Utah, succeeding **J. A. Shepherd**, transferred. **C. E. Leverich**, chief dispatcher on the Utah line, with headquarters at Salt Lake City, Utah, has been appointed trainmaster of the Salt Lake division, with the same headquarters, succeeding **W. R. McPherson**, who was appointed assistant superintendent of the Green River division, with headquarters at Green River, Utah, succeeding **G. E. Wilcox**, promoted, effective March 14.

E. L. Desjardines, who has been appointed superintendent of the Canadian Government Railways, Transcontinental

division, with headquarters at Edmundston, N. B., as has already been announced in these columns was born on August 17, 1859 at St. Jean Port Joli, Que., and was educated at the St. Anne College. He began railway work in August, 1876, as a telegraph operator on the Intercolonial Railway and subsequently served as train baggage master. From 1880 to 1898 he was train dispatcher at Riviere du Loup, and then became chief dispatcher at Levis. In 1912 he was appointed assistant superintendent, which position he held at the time of his recent appointment as superintendent as above noted.

W. F. Kirk who has been appointed superintendent of the Central Division of the Missouri Pacific, with headquarters at Van Buren, Ark., as announced in these columns March 1, was born at Osage City, Kan., on August 19, 1881. He was first employed as a messenger on the Atchison, Topeka & Santa Fe in November, 1897. In April of the following year he was transferred to the maintenance of way department as a section laborer. In November, 1899, he entered the service of the Wells-Fargo Express Co. as a messenger. In February, 1900, he was employed by the Pecos Valley as a telegrapher, being promoted to dispatcher in June, 1900. From December, 1900, to March, 1901, he was a dispatcher on the Michigan Central, and from April, 1901, to January, 1902, he was a telegrapher with the Missouri Pacific, since which time he has served consecutively to date as dispatcher, chief dispatcher, trainmaster, assistant superintendent and assistant to the general superintendent of transportation. In December, 1917, he became acting superintendent of the Wichita division and served in that capacity until his appointment as noted above.

Traffic

H. L. Hammill, traveling agent of the Chicago & North Western with office at St. Louis, Mo., is to assume the duties of **G. F. Brigham**, general agent, resigned, effective April 1.

H. J. Titus, superintendent of the dining car service of the Northern Pacific, with headquarters at St. Paul, Minn., has resigned to become associated with the Chauncey Wright Restaurant Company of Seattle, Wash.

Engineering and Rolling Stock

Arthur Crohn has been appointed general master mechanic of the Missouri, Kansas & Texas, with headquarters at Denison, Tex.

H. R. Manby, superintendent and engineer maintenance of way of the Tennessee Central with office at Nashville, Tenn., has been appointed chief engineer and the position of engineer maintenance of way has been abolished.

G. B. Herington has been assigned as supervising engineer of the Tucson division of the Southern Pacific, with headquarters at Tucson, Ariz., and during such assignment will have general charge of all matters pertaining to maintenance of way and structures.

Purchasing

A. H. Young, tie and timber agent of the Seaboard Air Line, with office at Hamlet, N. C., has been appointed general storekeeper, with office at Portsmouth, Va., vice **D. D. Cain**, resigned to accept services with another company, and **J. G. Calori** has been appointed tie and timber agent, vice Mr. Young.

Obituary

Richard H. L'Hommedieu, formerly assistant to the vice-president of operation of the Michigan Central, died in Detroit, Mich., March 18, age 68 years.

WOOD AS FUEL is proving quite popular at Brantford, Canada. The West Brantford municipal yards are being turned into a wood depot for next winter, the city authorities being determined that this city shall not be caught by a fuel famine as was the case during the past winter. Orders will be placed for 5,000 cords of wood, and to facilitate handling, a railway siding will be laid into the yard, the rails being available from the street railway there.

EDITORIAL

Railway Age

EDITORIAL

DAILY EDITION

Further proof of the wisdom of the action of the American Railway Engineering Association in proceeding with this convention is evidenced by the registration of its members. In spite of the statements frequently made by pessimists previous to the convention, that railway men would be so busy that they could not attend the convention, the registration of members for the first day was 293, or 4 more than last year; for the second day 103, for the third day 20, or a total registration of 416 members. Including guests, over 600 railway men attended the meeting. A feature which characterized all of the sessions was the large number of men present in the hall. Although the convention extended well beyond the usual time of closing on Thursday afternoon, over 200 men remained until adjournment and the discussion was active until the close of the meeting. The attendance at the Coliseum was equally encouraging, that on Wednesday being 6,203, and up to 6 p. m. yesterday 2,656. The outstanding feature of this year's attendance was the fact that the people who visited the exhibit showed greater interest in what the exhibitors had to show, this being particularly true with reference to labor-saving devices and economical methods of doing work. Another outstanding feature is the very small attendance of the local public, who have attended the exhibits in fairly large numbers in other years. The attendance this year has been limited almost entirely to railroad officers and men who, realizing the serious conditions existing at the present time, came here to make a thorough and careful study of all devices that can help them to obtain more efficient results.

The report on the comparative merits of ballast and reinforced concrete trestles, resubmitted by the committee on Wooden Bridges and Trestles after reconsideration by that body since its original presentation last year, revives a controversy between the advocates of these two types of structures which was carried on at some length at previous conventions, notably in 1911, when the committee on Masonry submitted a report on reinforced concrete trestles. As presented so lucidly in the report considered yesterday, the problem is purely one of the relative life as compared with the relative costs of the two structures, for, as pointed out in the report, "even though actual installation costs of the two structures under comparison are lacking, their relative ultimate economy can be computed as a ratio of the two costs regardless of the numerical value thereof." There are, however, other factors that enter into a consideration of this subject, some of which have been discussed in detail at previous conventions. Among these may be mentioned the appearance; relative sense of security or solidity as affecting the traveling public; fire hazard, etc. The life to assume in the case of "permanent" structure is also a question. There is a stone arch viaduct on the Baltimore & Ohio that has been in service since 1829 and is apparently good

for many years to come. On the other hand, many structures have been abandoned in connection with grade and line revisions after very limited periods of service. The contention in the discussion yesterday was entirely concerned with the principles of economics involved. As long as the same method of financing is assumed in each case, the results to be obtained with the use of the several formulæ are the same. Just which method is correct seems to be still a matter of question, and in view of this, the action of the association in adopting both analyses for publication in the Manual seems well taken.

Obviously the convenience of railway officers and employees cannot be taken into consideration in the program for curtailing passenger service now being undertaken to expedite the movement of freight. Nevertheless, a reduction in the number of passenger trains will tend to reduce the efficiency of many employees of the engineering and maintenance of way departments. While railway officers, including the division engineer, are usually supplied with annual passes on neighboring roads, enabling them to make the most of the train service on adjoining lines in the same territory, it has not been customary to make similar provision for men in subordinate positions. Reductions in passenger service will not only work a hardship on the men not now enjoying the privilege of foreign passes whose duties take them over various parts of the line, but even with a material increase in night traveling the proportion of their time devoted to effective employment will suffer a pronounced decrease. It is true that such men are commonly accorded the privilege of riding on freight trains, but with time freights making only a limited number of stops and tonnage trains moving at low speeds, the use of freight trains will fall far short of compensating for the reductions in the passenger train service. The natural remedy for this situation would seem to be an extension of the foreign pass privilege to the men in the subordinate positions. With the unified operation obtaining under government control there would seem to be less objection to this practice than under normal competitive operation, while the unavoidable abuses of such transportation can be reduced to the minimum by limiting the passes to the territory in which the employee can make use of them in his daily work.

The announcement of the Committee on Iron and Steel Structures that it has undertaken the revision of the Association's General Specifications for Steel Railway Bridges is an evidence of the progress that has been made in steel railway bridge design since the adoption of these specifications in 1906. That these rules for bridge design fulfilled a definite need is indicated by their very general acceptance throughout the country. It is also in keep-

Timber and Concrete Trestles Compared

More Foreign Passes Required

Work of Committee on Iron and Steel Structures

ing to call attention to the fact that much of the progress which is rendering these specifications obsolescent is the direct result of the efforts of this same committee.

Chief among the results secured through its efforts has been a determination of the actual impact influence of moving trains. The committee has supplied definite information on a subject which was formerly a matter of pure conjecture. Further progress on this subject is contained in the contemporary report and demonstrates specifically that the influence of electric locomotives is materially less than that of steam locomotives of the usual types. While the committee indicates that further work must be done on the subject of secondary stresses before the information now at hand can be made available for general use, it has already done much to clear up this perplexing subject.

In giving this committee credit for the work it has done, it is necessary in all fairness to mention the epoch making work of the Special Committee on Columns of the American Society of Civil Engineers, the results of which were made available early this year. The report on column tests presented by the A. R. E. A. committee this year contains information which is in a measure supplementary to the work of the A. S. C. E. committee.

A Great Opportunity

THE AMERICAN RAILWAY ENGINEERING ASSOCIATION is entering the most important and the most critical period in its history. Never before has it been confronted with greater responsibilities or with larger opportunities for constructive work. The extent to which it will measure up to its full opportunities will be determined largely by its actions during the next few months.

The association is now entering the twentieth year of its existence. A study of the proceedings of the annual meetings and the Manual cannot fail to impress one with the wide range and the high value of the work which has been done. The fact that these volumes are to be found in the libraries of almost every railway officer having to do with engineering and maintenance of way matters in this country indicates the high esteem in which they are held.

The entrance of the United States into the world war last April has led to radical changes in conditions in every line of activity. No industry has been affected more directly or more deeply than the railroads. These changes are creating new problems in all branches of railway service, not excluding the engineering department. It is now the primary duty of all organizations to concentrate on the solution of the main problem confronting this country—that of winning the war. The Engineering Association made important progress in this direction during the past year, as was evidenced during the meeting which closed yesterday afternoon. The committee on Yards and Terminals presented a valuable questionnaire on yard improvements for use by railway officers confronted with the problem of increasing the capacity of their yards with minimum changes. The discussion of the report of the committee on Iron and Steel Structures was directed largely toward means of carrying structures over rather than renewing them under present conditions. The committee on Economics of Railway Labor also reported on certain phases of the labor problem which is now of paramount importance.

The coming year will present to this association greatly enlarged opportunities for service. In order to be of the

maximum value to its members, to the railways and to the government it may be necessary to modify existing practices and to disregard long-established precedents, but this has been almost universally necessary in every activity. The Board of Direction can do much to facilitate the war-time activities of the association by giving primary consideration in the assignments of subjects, to the selection of those topics which are of the greatest importance in the light of present day conditions.

It may also be considered advisable to issue advance reports or bulletins on certain subjects for which there is a demand for immediate information without attempting to hold them for the annual convention. Conditions are changing so rapidly and the association has such an excellent opportunity for collective work that it would seem eminently fitting to take up for consideration some of the more pressing problems and, by concentrating the attention of certain committees upon them, to prepare reports for presentation very early. A considerable amount of valuable information regarding labor saving devices was developed during the discussion of that part of the report of the committee on Economics of Railway Labor bearing on that subject and it has been suggested that an attempt be made to collect all of the available material of this character into a booklet for publication within the next few weeks. This is illustrative of similar opportunities in other phases of the work.

Since the government has assumed control of the railroads and is now directing their operations it must necessarily assume responsibility for the maintenance of these properties. This in itself will give rise to many problems. The director-general has shown his desire to call upon railway men and railway organizations for assistance in the solution of his problems. The American Railway Engineering Association has been engaged in the study of maintenance of way problems for 20 years. It includes in its membership almost all of the more prominent railway engineers in the country. Its proceedings, therefore, may fairly be considered to represent the consensus of opinion regarding best practices in engineering and maintenance of way matters. As expressed in the resolution passed yesterday afternoon the association has offered to co-operate with the director-general in any way in which it can be of assistance and it is very probable that he may desire to call upon this organization for information concerning practices already established as well as to practices which are still in the process of development.

The Effect of Speed on Maintenance Charges

IN UNDERTAKING AN ANALYSIS of the influence of the speed of trains on the cost of maintenance the Track committee has directed its attention toward a problem, the solution of which will be of much importance to the railways. It is a matter of common knowledge among railway men that a high-speed train is more destructive to track than a slow one. The difficulty has been in determining the amount of this increased destruction.

This question has been brought prominently to the front in litigation relative to passenger fares in a number of middle western states. Following the general enactment of two-cent fare legislation in these states a few years ago, the roads have attempted to prove that these rates were confiscatory. This has made necessary an analysis of operating expenses and the allocation of these expenses to the various classes of traffic. Many of the operating expenses can be charged directly to the

traffic giving rise to them. Others cannot be divided so readily. This is particularly true of a large part of the maintenance of way expenditures for the tracks are used in common by trains of all classes. These expenses must be distributed on some arbitrary basis and the difficulty has been to arrive at a basis which can be mutually agreed upon between the representatives of the railroads and the states as fair and equitable.

In their desire to prove the reasonableness of low passenger rates, the states have contended for a low distribution of maintenance expenses chargeable to passenger traffic, while the representatives of the railroads have contended for a high ratio which would add to the expenses of passenger traffic, and tend to prove that the rates were unreasonably low. In one instance a state has endeavored to maintain the position that the distribution should be on the basis of the gross ton miles of freight and passenger traffic, in this way disregarding entirely the effect of speed. This is typical of conditions which exist in a number of states and of controversies which will rise in the future because of the present tendency to make each class of service bear its full proportion of operating costs. The Track committee has cut out for itself a hard problem, but its proper solution will be of great value to the roads.

Illinois Central Signal Men at Coliseum

The Illinois Central signal department was well represented at the Coliseum, nine out of eleven of its signal supervisors attending the exhibit, in addition to seven foremen and a large number of maintainers, helpers and repairmen.

W. C. Pembroke Promoted

W. C. Pembroke, assistant engineer of the Coal & Coke railway, with headquarters at Gassaway, W. Va., has been appointed engineer maintenance of way with the same headquarters, succeeding A. C. Hawkins, who has resigned.

Signal Department Changes

J. W. Peck, signal supervisor of the Missouri, Kansas & Texas with headquarters at Waco, Tex., has been appointed general signal inspector of the Chicago Great Western with office at Chicago. J. A. Murrell, signal foreman, has been appointed supervisor to succeed Mr. Peck.

A. R. Eitzen Appointed

Bridge Engineer on "Katy"

Arthur R. Eitzen, formerly office engineer in the bridge department of the Kansas City Terminal railway, and more recently with the Kansas City Bridge Company, has been appointed bridge engineer of the Missouri, Kansas & Texas with headquarters at Dallas, Texas.

Union Pacific Promotions

C. B. Segar, vice-president and controller of the Union Pacific system, was elected a member of the executive committee, and also acting chairman of the committee, succeeding R. S. Lovett, resigned, to become director of the Department of Capital Expenditures on the staff of Director-General McAdoo. He was also elected a member of the executive committee and acting chairman of the Oregon Short Line and the Oregon, Washington Railroad & Navigation Company. W. A. Harriman, vice-president, was made a member of the executive commit-

tee of the Union Pacific and also elected a director of the Oregon Short Line, succeeding Mr. Lovett. C. A. Peabody, vice-president of the Delaware & Hudson, was elected a director of the Oregon, Washington Railroad & Navigation Company, succeeding Mr. Lovett.

Changes in Illinois Central Signal Organization

P. G. Pendorf, formerly signal supervisor of the St. Louis division of the Illinois Central at Centralia, Ill., resigned effective March 16 to accept a position with the sales department of the Buda Company, with headquarters at Chicago. E. E. Goddard was appointed signal supervisor in his place. Mr. Keller has been appointed signal supervisor, with headquarters at Champaign, Ill., effective March 16.

Orders of Railroad Administration

Regarding Capital Expenditures

(From Our Washington Correspondent)

President Wilson yesterday (Thursday) signed the Railroad Control Bill.

Designs for standard cars and locomotives have been practically approved. They were gone over by the regional directors Monday and Tuesday and the final specifications are being revised in Pittsburgh this week for submission to the director-general next Monday.

Director-General McAdoo yesterday issued General Order No. 12, giving rules to be observed with respect to railroad work involving charges to capital account. He declared it is important to avoid expenditures not absolutely necessary. The construction of new lines, branches or extensions is not to be entered upon without the director-general's approval.

No new locomotives or cars are to be ordered or constructed without the director-general's approval.

Work contracted for or started before January 1 may be continued. No work involving charges to capital account of more than \$25,000 shall be contracted for unless authorized by the director-general.

Changes on the Salt Lake Line

Owing to the practical cessation of construction work and the approaching completion of the valuation work on the Los Angeles & Salt Lake, the office of engineer of maintenance has been consolidated with that of chief engineer and the duties have been assumed by Arthur McGuire, chief engineer. R. K. Brown, engineer maintenance, has been appointed division engineer at Salt Lake, succeeding Frank Strong, who has resigned to enter military service. W. H. Comstock, secretary of the Los Angeles & Salt Lake, has been appointed acting general manager, succeeding H. C. Nutt, general manager, granted leave of absence to accept a commission as major with the railway forces in France.

Fitzpatrick for Protection

"What's your name?"
 "Isaac Fitzpatrick Cohen."
 "What's the Fitzpatrick for?"
 "For protection."

Under U. S. Control

Inquirer (at South Station, Boston): "Where does this train go?"
 Brakeman: "It goes to New York in ten minutes."
 Inquirer: "Goodness! That's going some!"



Bridge Over the River Khor in Siberia Over Which Japanese Forces May Move Copyright by Underwood & Underwood, New York

American Railway Engineering Association Proceedings

A Report of Thursday's Sessions Including the Presentation of Ten Committee Reports With Discussions

THE FINAL SESSIONS OF THE American Railway Engineering Association were held on Thursday. The morning meeting was called to order promptly at 9:30 by President Sullivan. Owing to the large amount of time taken up in the discussion of the report on

Wooden Bridges and Trestles, seven reports were held over for the afternoon session. Final adjournment was taken about 5:30. The abstracts of the reports and discussion of the various subjects considered are given below:

Report of Committee on Wooden Bridges and Trestles



THE COMMITTEE RECOMMENDED the following revisions in the Manual:

(1) In the standard specifications for Southern yellow pine bridge and trestle timber, change the heading, "Standard heart grade, longleaf yellow pine," above paragraph 4, on page 231, to read, "Standard heart grade, dense yellow pine," and change the heading, "Standard grade, longleaf and shortleaf yellow pine," above paragraph No. 10, on page 232, to read, "Standard grade, sound yellow pine." This is to conform to the classification of yellow pine timber as adopted by the Association in 1916.

(2) That all illustrations, tables and diagrams in the Manual be designated by the number of the page on which they appear, instead of being numbered consecutively, using subscripts when more than one reference appears on any single page.

(3) On page 246, change the last part of paragraph No. 2, "The inner guard rail should not be higher or over one inch lower than the running rail," to read, "* * * should not be higher or more than one inch lower * * *"

(4) On page 232, paragraph No. 9, and on page 241, paragraph No. 26, change the term "guard rails" to "guard timbers" to conform to the definitions given on

page 220 and to the use of the term of page 234, paragraph No. 6.

Comparative Merits of Ballast and Reinforced Concrete Trestles

All conclusions of the committee's report of last year were adopted by the Association except one, namely: "Creosoted Timber Trestles are more economical than concrete, except when the cost of the concrete structure is less than one and one-half times the cost of the wooden structure."

Upon presentation of the report to the convention considerable discussion occurred, the general purport of which was that this conclusion should be reconsidered by the committee, principally with respect to the method employed in reaching the results.

The suggestion has been made that the sinking fund method is more nearly correct in principle for indicating the comparative ultimate economy than the method used by the committee and heretofore called the "Capitalization Method." Accordingly, much effort and study has during the past year been devoted to the practical effects of the application of the methods to the problem at hand, and the committee desires to present to the Association the results of its endeavors along this line, both for the specific purpose under discussion and for other purposes of a similar nature.

To ascertain whether application of the sinking fund method of financing in matters of the kind under discussion is generally used or advocated by railway officers, the chairman of the committee sent out 154 inquiries. Out of a total of 122 replies, answering for an aggregate of

rather than to attempt the assignment of what must necessarily be a speculative monetary value thereto, and this course has been followed.

Conclusions.

Attention is invited to the committee's recommended disposition of its report of last year of all these uncertain and indeterminate factors, which were mentioned in detail, and we beg to submit briefly a repetition of such recommendation, based on the following considerations:

(1) The capitalization method properly shows the relative worth of the capital invested in structures of

in assumed life of timber trestle we think ample to compensate for the indeterminate elements and consider further refinement totally unnecessary, especially since there is likely to be a difference of opinion, even to the extent of 100 per cent., in the assumption as to the probable life of the concrete.

We, therefore, believe conclusion No. 6 of last year's report wholly warranted, and, after thorough reconsideration, again recommend its adoption for printing in the Manual in the order and substance as therein stated: "Creosoted timber trestles are more economical than concrete, except when the cost of the concrete structure is less than 1½ times the cost of the wooden structure."

A recommendation is also made for the adoption by the Association for printing in the Manual of the formula for the capitalization method.

In order that the members may also have at hand for convenience in any purpose for which applicable all the results of the committee's work, it is further recommended that the statement of ratios of installation costs developed by the capitalization method be adopted and printed in the Manual.

Comparative Cost of Installation of Ballast Deck Trestles per Linear Foot to Produce Equivalent Economic Value; Interest at 6 Per Cent. Per Annum Assuming Creosoted Timber Trestle Will Serve 20 Years.

CREOSOTED TIMBER SERVICE LIFE 20 YEARS	JUSTIFIABLE EXPENDITURE FOR CONCRETE SERVICEABLE FOR									
	30 Yrs	40 Yrs	50 Yrs	60 Yrs	70 Yrs	80 Yrs	90 Yrs	100 Yrs	100 Yrs	100 Yrs
\$10.00	\$12.00	\$13.00	\$13.74	\$14.09	\$14.28	\$14.39	\$14.46	\$14.49		
11.00	13.20	14.39	15.12	15.50	15.71	15.83	15.90	15.94		
12.00	14.40	15.70	16.49	16.91	17.14	17.26	17.35	17.39		
13.00	15.60	17.01	17.86	18.32	18.57	18.70	18.79	18.83		
14.00	16.80	18.32	19.24	19.73	20.00	20.14	20.24	20.28		
15.00	18.00	19.63	20.61	21.14	21.43	21.58	21.68	21.73		
16.00	19.20	20.94	21.99	22.54	22.86	23.02	23.13	23.18		
17.00	20.40	22.24	23.36	23.95	24.28	24.46	24.57	24.63		
18.00	21.60	23.55	24.74	25.36	25.71	25.90	26.02	26.09		
19.00	22.80	24.86	26.11	26.77	27.13	27.34	27.46	27.53		
20.00	24.00	26.17	27.48	28.18	28.57	28.77	28.91	28.98		

different serviceable lives and is, therefore, a desirable criterion for comparing ultimate economy.

(2) In the absence of authentic data as to cost of current maintenance, inspection, insurance and uncertain renewal cost of both or either of two types of structures, the annual expense of upkeep should evidently be omitted in any comparative statement of cost, leaving the relative influence thereof to be considered by the investigator.

The committee has been guided by these two principles in reporting its conclusions—the first in using the

Use of Lag Screws in Trestle Construction

For several years the committee has had the subject of lag screws under investigation. A comparison of the best methods of application has been made the subject of careful study. Early in 1914 various inquiries were sent to a large number of carriers throughout the country, outlining to them the desire of the committee and requesting certain information to enable it to further study the merits of lags. The constant aim of the committee has been to locate the source of trouble where lags had been in use, and later discarded on account of not meeting requirements.

A study of the 131 replies received to inquiries of the committee, aggregating 203,000 miles of railway, showed that 103 roads, with a combined mileage of 159,000 miles, never used lag screws in any form, while 28 roads, with a combined mileage of 44,000 miles, had used them in some form or other with varied success. To formulate a more conclusive comparison, another circular was sent to such carriers as had not yet used lags to induce them

Ratio of Installation Costs of Structures to Produce Equivalent Ultimate Economy in Their Perpetual Maintenance. Based on an Interest Rate of 6 Per Cent. Per Annum for Capital Invested Therein, and Neglecting Costs of Repairs.

SERVICE LIFE YEARS	5	10	15	20	25	30	40	50	60	70	80	90	100
100	3.94491	2.25779	1.71099	1.44850	1.29994	1.20725	1.10721	1.05429	1.02822	1.01422	1.00702	1.00234	1.00000
90	3.93569	2.25251	1.70699	1.44551	1.29690	1.20442	1.10462	1.05182	1.02582	1.01185	1.00467	1.00000	
80	3.91711	2.24205	1.69906	1.43869	1.29087	1.19883	1.09949	1.04694	1.02105	1.00715	1.00000		
70	3.88660	2.22613	1.68700	1.42848	1.28371	1.19032	1.09168	1.03951	1.01380	1.00000			
60	3.85663	2.19582	1.66403	1.40963	1.26426	1.17411	1.09355	1.04126	1.01500	1.00000			
50	3.74177	2.14153	1.62288	1.37419	1.23300	1.14505	1.05019	1.00000					
40	3.56295	2.03918	1.54532	1.30852	1.17407	1.09035	1.00000						
30	3.26770	1.87020	1.41727	1.20008	1.07678	1.00000							
25	3.03470	1.73684	1.31621	1.14151	1.00000								
20	2.72290	1.55840	1.18098	1.00000									
15	2.30564	1.31958	1.00000										
10	1.74725	1.00000											
5	1.00000												

This statement is developed from formula in Addenda (1), Analy. No. 1.

capitalization method for indicating the justifiable expenditure in installation costs of concrete trestles to produce ultimate economy equivalent to various installation costs of creosoted timber trestles, and the second in its suggestion as to the assumed life of the timber structure to be used as the argument, for notwithstanding the practical unanimity of the best authorities in that the creosoted structure will last 25 years, it has recommended to the Association the use of a 20-year life in considering economic value. This arbitrary reduction

to make a test along lines outlined by the committee. Of the 75 replies received in answer to this circular, 37 roads, with a combined mileage of 74,000 miles, indicated their willingness to make a test of lag screws along such lines and under such instructions as the committee might direct. A plan was prepared illustrating the recommendations of the committee. On this same plan there were shown designs illustrating the practice of a few of the roads relative to their method of use of lags. This plan was sent to each of the 37 roads previously express-

ing its willingness to give lags a trial on one or more structures on the line of its road. To this request, 17 roads, with a combined mileage of 39,600, complied and reported the results of their test to the committee. Only two of these roads reported in any way adversely, while the large majority of them were convinced that lags had certain advantageous features not common to bolts.

The principal features of the test, as recommended by the committee, are the elimination of the dapping of guard timbers and ties, and the use of lags in each tie with a drift bolt in each second tie to securely fasten the tie to the stringer. It is also evident from an examination of the plan that the lining of the track on the stringers is materially simplified, since there is no dapping of ties over stringers to interfere.

Where the suggestions of the committee were followed in the test almost universal satisfaction was obtained.

Conclusions

1. The committee recommends that the changes in the Manual be adopted.

2. The committee recommends that the following conclusions in regard to the use of lag screws in trestle construction be adopted and published in the Manual:

(a) Lag screws require greater care than ordinary bolts and nuts to properly install, but are cheaper on account of ease of application.

(b) Lag screws, where properly applied, hold ties from bunching equally as well as bolts and nuts, and better than daps, in timber guard rails.

(c) If the lag screws are tightened after timber has shrunk, there is less cost of maintenance than with bolts and nuts.

(d) Use of lag screws renders unnecessary the dapping of guard timbers, and, therefore, decreases cost of trestles without impairing quality.

(e) Surfacing (sizing) ties and guard timbers is better construction than dapping; makes a better riding track, thus decreasing impact stresses, and is therefore good practice.

(f) For proper application of lag screws, holes in guard timbers should be bored with auger bits $\frac{1}{16}$ in. less in diameter than the nominal size of lag screws used.

The committee recommends the following subjects for next year's work:

1. Revision of the Manual.—Revise the table of recommended stresses on page 244 of the Manual and enlarge it to include stresses in treated timber.

2. Revision of Manual.—Consult with the Committee on Grading of Lumber and prepare changes required to eliminate duplication.

3. Continue study of details of docks and wharves.

4. Select the best types of timber trestles and prepare standard details.

Committee: E. A. Frink (S. A. L.), chairman; W. H. Hoyt (D. M. & N.), vice-chairman; F. Auryansen (L. I.), H. C. Brown, Jr., A. D. Case (B. & A.), A. H. Freygang (B. & O. S. W.), E. A. Hadley (M. P.), F. F. Hanly (B. & O.), G. A. Haggander (C. B. & Q.), H. T. Hazen (C. N.), C. S. Heritage (K. C. S.), A. O. Ridgway (D. & R. G.), F. S. Schwinn (I. & G. N.), C. S. Sheldon (P. M.), I. L. Simmons (C. R. I. & P.), D. W. Smith (H. V.), A. M. Van Auken (M. C.), W. H. Vance (St. L. S. W.), D. R. Young (D. L. & W.).

Discussion

(Earl Stimson, B. & O., presiding.)

E. A. Frink (Chairman): The Board of Direction assigned four subjects to the committee for this year's work. I do not think it necessary to read any of this preliminary matter.

The first thing I will call your attention to is the revision of the Manual and Appendix.

The committee recommends four changes in the wording of the Manual. These do not make any changes in the subject matter of the Manual, but the first one simply makes the specification of the Committee on Wooden Bridges and Trestles agree with the standard wording of the Yellow Pine Rules that we have adopted.

(Mr. Frink then read the matter under appendix A.)

Mr. Frink: I move the adoption of the changes recommended by the committee.

C. W. Baldrige (Santa Fe): Does that motion cover all four sections?

The Vice-President: All except No. 2.

Mr. Baldrige: In No. 3, in which they propose a change of importance, in regard to the inside guard rail, providing that the inside guard rail should not be higher or over one inch lower than the running rail. I think that is important, and suggest that the words "or more than one inch lower" be omitted, and that you make a little wider variation.

Mr. Frink: The change the committee makes completes the meaning of the clause now in the Manual. We are not changing the provision now in the Manual, we are making it clear and grammatical. It now says "the inner guard rail should not be higher or over one inch lower than the running rail."

The expression "one inch lower" does not seem good sense, and we want to make it something that is sensible, and that is the only purpose of the change. If the convention desires a revision of the inner guard rail specifications, that is another matter.

Mr. Baldrige: If I am not mistaken the present minimum height fixed was adopted prior to the adoption of our present heavy rail section, and it seems to me in view of the height of the heavy rail sections, a change should be made in the minimum height permissible for inner guard rails. A high guard rail has one disadvantage, in that it is more likely to follow the arch bar bolts or anything hanging down over a track, and if the truck is derailed, it may prevent the guard rail from acting as it should. I think we should alter the minimum height in line with the heavier rail sections, which are now recommended.

The Vice-President: The committee will consider that during the coming year.

(The motion made to adopt the four recommendations was put to vote and carried.)

Mr. Frink: The second subject assigned to the committee this year was to report on Docks and Wharves. We are now planning various details of wharf structures as a beginning, but are not prepared to make anything but a progress report on this subject.

The third subject was to report on the comparative merits and economic features of ballast deck and reinforced concrete trestles. In appendix B you will find a full discussion of the question and the reasons which led us to bring back to you the same conclusion we presented last year. I move that this section be adopted and printed in the Manual.

J. G. Sullivan (C. P.): I discussed this matter last year, and I want to say that it has been not so much a difference of opinion, but a misunderstanding on the part of the committee of the stand I took at that time. That there may be no misunderstanding, you will note that the committee says: "The replacement method consists in renewing a structure with new money or with funds taken from operating income. This method is in practically universal use in this country." That, I think,

is a fact. "The capitalization method as used by the committee is the investment of a fund of such an amount and in such manner"—now, mark this—"is the investment of a fund in such amount and in such manner that the accumulation of interest thereon will periodically amount to a predetermined sum." I think that is correct, and exactly the idea I had of the capitalization method. The committee further says, "The Sinking Fund as used in the Sinking Fund Method employed by this committee is a fund accumulated by equal periodical increments invested in such manner that at the end of a certain cycle the total will amount to a predetermined sum." That also is a statement of fact.

Now the committee says: "The Sinking Fund Method is identical with capitalization method, when interest rate on annuities is same as interest rate on original investment cost, which equality of interest rate is logical, desirable and imperative for the conservation of finance." I do not know what that has to do with the problem under consideration, when you are figuring to decide in your own mind what you are going to do.

Another difference of opinion is that the committee has evidently understood that because I said in our company and in our experience, to be on the safe side I figured the interest on our sinking fund or reserve, or whatever you call it, at a lower rate of interest—because I made the mistake, if it was one, of working on the conservative side, and figuring at a lower rate of interest, it did not by any means vitiate the method.

The committee then sent out a circular letter to all of the railways to find out, as they said, how many roads use the sinking fund method. They found that only one or two roads use the sinking fund method, but all the other roads wrote they believed it was the proper method to apply.

But had they asked the question, how many roads did their financing on the capitalization method, I venture to say that they would not have got one single solitary positive answer.

I have never heard of any concern, commercial, railroad or any other concern, doing business on such a basis. I have shown this discussion to two or three prominent railroad auditors and vice-presidents in charge of finance, and they seemed to pooh-pooh the idea of any commercial business being done on that method.

To sum up, the committee admits that if you take the same rate of interest, the results will be identical. Of course, they must be identical. That is just a matter of figuring.

If I had a certain amount to figure and I assumed the wrong rate of interest, that is not going to affect the finances of my company nor change its condition.

Mr. Frink: It seems that there has been a pretty general misunderstanding all around on this proposition. What this committee has been engaged in trying to do is to make a yard-stick to make a more definite measure of relative value of structures, not to either create or designate as proper a method of financing renewals. But in getting our yard-stick shaped up, we ran across these various methods to provide for renewals, and it seemed to us that an investigation of them and an explanation of them to the convention was necessary in order to understand the basis of the conclusions that we have formulated.

It seems to me that practically the effect of the three methods, the replacement method, the capitalization method and the sinking fund method, is the same. To my mind, those things are practically alike. Mr. Sullivan says no concern on earth that he knows of provides for the replacement of structures by the capitalization

method. You are all doing it, every one of you, as far as I know, except one concern. You are providing for replacements of structures by taking the money out of accumulated earnings, or else borrowing new money when the time comes. In order to get a sinking fund, you have got to put aside capital. Therefore, you have used the capitalization method.

Mr. Sullivan: I agree with everything that Mr. Frink has said, only that that applies to the sinking fund method, and not to the capitalization method. Renewals are charged to maintenance, but charging has nothing to do with it. The cost of replacements may be three or four times the amount of earnings.

Mr. Frink: If you set aside an amount of capital to draw interest to produce a certain annual sum for repairs, you are doing just exactly the same thing as if you had that capital in your business earning that money. There are two points that I want to speak of very briefly. One is the ultimate cost. It seems to me unquestionably that the ultimate cost of a structure is the measure of value of that structure to you. In the formula the annual cost is given as to the ratio of the ultimate cost; therefore, in this particular case, the question of cost is a proper criterion, and that may be so in all cases. The committee is perfectly willing to concede that.

The other point is the sinking fund.

You will all agree with me that the popular conception of a sinking fund is a fund that is detached entirely from your capital. If that is true, necessarily a sinking fund must earn a lower rate of interest, because it is, I think, always true that the more secure an investment is, the more detached it is from ordinary business, the lower the return.

It has been the contention of the committee, and it is still their belief and conclusion, that any method used for the replacement of structures should keep, in the working capital of the company, all the money that is to be accumulated for a reserve, so that whatever interest you earn on your money will be devoted entirely to replacement. Of course, if you are so unfortunate as not to earn anything on the money, then the argument of the committee would fall to the ground; but we are assuming you can earn at least as much as capital is worth.

S. S. Roberts (consulting engineer): I spoke last year in support of this committee, and I wish to again speak in their support. I have used satisfactorily similar formulas to those proposed by the committee. The formulas are not new and untried. I agree thoroughly with the chairman, that these formulas have nothing to do with the methods of financing. They are simply means of comparing relative merits. I believe that the method this committee proposes is the best method for making comparison.

Mr. Sullivan: I have no objection to these formulas as such, and on the assumption on which they were worked out, I think they are admirable. On that assumption we will get correct results. I think the committee is entitled to the approval of the association for the care with which they have worked out this problem on a theoretical basis. The formula justifies itself, in so far as the assumptions on which it was worked out go, and if those assumptions are in accordance with the method of financing railway operations, then this is the proper formula to use; but if your particular railroad does not finance its operations, on the assumption on which this formula rests, then that formula is not a correct formula for you to use in advising your company as to the financial economics involved in the question of the expenditure of money. You must take this formula

or any other formula to the auditor of a railway company and have the auditor justify it before you can say that the results from the formula represent the financial results to the company.

(The motion for the adoption of the committee's conclusion was put to a vote and carried, and on a motion of Mr. Sullivan, Mr. Frink's motion to adopt the analysis on the capitalization method was amended to include also the fund method, and the comparison of the two.)

Mr. Frink: The next subject assigned to the committee was the use of lag screws in trestle construction. We believe that we have gotten sufficient information to justify a final report and conclusion. Our final report is shown in appendix C.

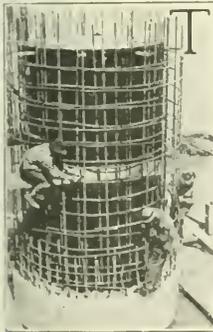
G. H. Gilbert (Sou. Ry.): The Queen & Crescent, for a period of six or eight years, at least, used bolts, and I regard that as much safer than the use of lag screws. Your ties may be split, and then you will have derailments under those conditions. A washer on the bottom of a tie will hold the bolt from falling out. I have seen many derailments through split ties, but only a very few bolts were out. Under the same conditions, I believe that you will find all of your lag screws will be torn out, therefore it does not seem to me that the lag screw is as safe to use.

J. C. Nelson (S. A. L.): I happened to be connected with the Queen & Crescent during this period that the gentleman mentions. One of our great difficulties at that time was to keep the nuts on the bolts, and I think I am safe in saying that after a year's period you can go to any trestle and pick up 80 or 90 per cent of the nuts. We adopted the plan of turning the bolts with the heads down, and putting in a slotted washer with a nail in it. Even with that, the bolt itself would turn and fall out, and we did not get any better results from that than we had with the other. I had never used lag screws until going to the Seaboard Air Line Railway in 1907. I found it in use there, and at first I was very skeptical about it, but I watched it for two years, and I found that there were fewer ties bunched on that railroad, where it had at that time something like 60-odd miles of wooden trestles, all of which used lag screws for their rails—I found fewer ties bunched than on any railroad I have known of or been connected with, and I have been watching them now for a little over 11 years.

(A motion that the conclusions be adopted and printed in the Manual was carried.)

The committee was dismissed with the thanks of the association.

Report of Committee on Masonry



OF THE CLASSIFICATION of Masonry on page 247 of the Manual should be added under the column headed "Dressing, Face or Surfaces," the different finishes of concrete, viz., spaded, rubbed, faced, unfaced, washed, acid treated, sand blast, tooled. This should be placed opposite "Bridge and Retaining Wall and Arch." Opposite "Culvert" "spaded" should be placed. On page 248 the definitions should be changed to agree with the definitions given in the adopted Specifications for Cement.

On page 249 under "Dressing" the definitions of concrete surface finishes as follows should be added:

SPADED FINISH.—Having surface formed by spading coarse aggregate back from the form into the mass concrete, so as to bring a surface of mortar next to the form.

RUBBED FINISH.—Having surface treated by rubbing with Carborundum or Cement Bricks, or Wooden Floats to remove all form marks and irregularities.

FACED SURFACES.—Having surface formed by placing a special aggregate not less than one inch next to the forms and contiguous with the body concrete.

UNFACED SURFACE.—Having surface formed by careful grading of the entire mass mixture and spading mixture to prevent voids leaving the coarse aggregate next to the forms.

WASHED OR SCRUBBED FINISH.—Having surface formed by rubbing or scrubbing to expose the aggregate.

ACID TREATED FINISH.—Having surface formed by dissolving cement with acid together with scrubbing to expose the aggregate.

SAND BLAST FINISH.—Having surface formed by the wearing effect of the sand blast.

TOOLED FINISH.—Having surface formed by dressing with bush hammer, crandall or other desired tool to a uniform depth and finish.

Page 252 should show after masonry specifications the new specifications for cement in accordance with the Supplement to the Manual, of July, 1917.

Report on Cost and Method of Constructing Concrete Piles and Make Recommendations on How and Where to Be Used. Present Additional Typical Designs for Concrete Piles for Different Loading and Rules for Driving Under Various Conditions and Loading

The committee, during the past year, has revised the definitions, specifications and information as to the manufacture and use of concrete piles which was submitted last year and presents with other data typical plans for their construction. The committee has not attempted to go into the details of design, as each condition of loading and of sub-soil demands special designs.

Advantages of Concrete Piles

In general, the more important advantages gained by the use of concrete piles are as follows:

(1) Foundations can be constructed above ground water level.

(2) As their size is not limited, piles of large diameter may be used in confined areas to reduce size of foundation and increase supports at points of greatest pressure.

(3) Concrete piles may be used in trestles where the height is such as to permit their use, making possible a permanent structure at a considerably less cost than the ordinary type of pier bridge.

(4) Concrete piles may be used to advantage for sheet piling for docks and wharves where lateral loads as well as vertical loads are to be resisted.

Classification and Description of Concrete Piles

Concrete piles may be properly divided into two classes:

(A) Pre-molded piles. Piles which are molded previous to driving.

(B) Molded-in-place piles. Piles which are molded in holes in the ground.

Pre-Molded Piles

There are many patented piles that are now available, many of which vary in some degree from the types submitted, each one having its particular advantages for some classes of work. The more common shapes used are the square and octagonal sections, depending upon the style of structure the piles are to carry. The square pile may best be used where a maximum top section is required to distribute the load. The octagonal pile, by reason of its comparative constant diametric section, presents the most suitable shape for general conditions. All shapes are used in the uniform section and in the tapered pile.

The uniform section pile should be used when the pile rests on solid rock or hardpan, or is driven through sand or other similar material which is subject to flow on account of future excavations or from other causes, tending to cause the piles to act as a column. The uniform section pile is more commonly used for all purposes on account of its greater strength for handling and lower cost of construction. The tapered pile possesses advantages over the uniform section pile when conditions require a close spacing, as its smaller volume causes less displacement of surrounding soil and piles. In general the tapered pile can be driven advantageously in all cases where the soil is clay or similar material, where skin friction will serve as a factor in the bearing power of the pile.

The typical designs for concrete piles, accompanying specifications for construction of concrete piles furnish, in the opinion of the committee, a sufficient variation to give information in regard to design of pre-molded piles that may be suitable for various classes of work. In general, piles which are designed to withstand handling are of sufficient strength for driving. The length, design and amount of steel reinforcement required depend upon the following factors:

- (1) The load which the pile is to carry.
- (2) The nature of the soil into which it is to be driven.
- (3) Whether the pile acts as a single column or whether skin friction may be obtained.
- (4) Forces to which the pile is subjected in handling.
- (5) The method employed in driving, including the use of the water jet.

The forms for concrete piles are generally supported on skids and are collapsible, the bottom being left under the piles until they are sufficiently seasoned to permit turning on the skids. The cost of constructing pre-molded piles depends upon the requirements as to design and on the manufacturing facilities.

The total cost of constructing and driving pre-molded concrete piles varies from 75 cents to \$2 per linear foot, with an average price of about \$1 per foot, varying with the conditions, length and number of piles made. Where the ordinary method of sheltered curing is employed, piles should be seasoned not less than 28 to 40 days before handling and driving, depending upon the amount of driving expected and the season of the year when the piles are made. The use of steam or other similar methods may be used to reduce the period of seasoning, or as a means of maintaining a uniform seasoning temperature during the winter season of the year.

Specifications for Constructing

Pre-Molded Concrete Piles

1. Piles shall be made in accordance with the dimensions shown on the drawings.

2. The workmanship and materials shall be in accordance with the Specifications for Plain and Reinforced Concrete and Steel Reinforcement of the American Railway Engineering Association, with the following modifications:

Aggregates

3. The coarse aggregate shall consist of material such as crushed stone or gravel varying in size from $\frac{1}{4}$ in. to $\frac{3}{4}$ in.

Proportions

4. The proportions of the concrete shall be one part cement, two parts fine aggregate and four parts coarse aggregate.

Forms

5. The forms shall be supported vertically or on skids sufficiently close to prevent sagging of forms.

Reinforcement

6. The longitudinal and transverse reinforcement shall be assembled and securely wired together in accordance with plan before being placed in form. Care shall be taken to maintain the proper position of reinforcing unit in the form until concrete has been placed and compacted.

Freezing Weather

7. In freezing weather concrete materials shall be stored, and mixing and placing shall be done in a building maintained at a temperature of not less than 40 deg. F. Piles shall not be exposed to a lower temperature for at least 10 days after forms are removed.

Curing

8. Where the ordinary method of sheltered curing is employed, piles shall be seasoned for a period of not less than three days before being moved on the skids and not less than twenty-eight days before handling and moving to the site or driving. No method of accelerated seasoning shall be used until approved by the engineer.

Marking

9. Each pile shall be stamped or marked with the date of its manufacture.

Handling

10. Piles shall be handled carefully, avoiding any dropping or heavy jarring while in horizontal positions.

Explanatory Notes

Longitudinal Reinforcement

Piles not exceeding 30 ft. in length are reinforced with 8 longitudinal bars, of which 4 are cut so as to stop at the beginning of the tapered point.

Piles exceeding 30 ft. in length are shown as having additional reinforcing bars placed midway between the longer bars throughout the middle third length of the pile in order to provide for handling.

Specifications for Driving Pre-Molded Concrete Piles

1. Piles shall be protected while being driven with an approved cushion cap.

2. The driving or jetting of piles shall be governed by "Pile Driving—Principles of Practice," given in the Specifications for Workmanship for Pile and Frame Trestles in the Manual of the Association.

3. In driving, a steam hammer shall be used unless otherwise specified by the engineer. Where a drop ham-

mer is permitted, a heavy hammer with a short drop shall be used.

4. Any pile injured in driving or driven out of place shall be either replaced by a new pile or pulled and re-driven, as the case may require.

5. On sloping ground, and where necessary, a suitable hole shall be dug at the location of each pile, sufficiently deep to hold the pile in proper position for the first few blows.

6. Before driving, the piles shall be carefully located and set to the line called for on the plan, and the pile driver leads held in proper position by means of guy lines. Unless otherwise called for on the plans, piles shall be driven as nearly as possible in a plumb position. Any pile out of plumb more than one-half inch per foot shall be pulled and re-driven if so required by the engineer.

7. Reasonable efforts shall be made to drive the concrete piles to plan cut-off, the lengths of the piles having been determined by borings or test piles. Driving will be continued until this point is reached or until the following rate of penetration is secured, as specified by engineer. (Cases where driving is through soft soil to hard bottom or rock excepted.)

8. Piles shall be driven to a point requiring the following minimum number of blows for the last 2 in. of penetration of single-action steam hammer (weight of plunger 5,000 lb., drop 36 in.), or hammer of like mechanical effect.

(a) When piles are to carry 18 net tons—3 blows to last 2 in.

(b) When piles are to carry 25 net tons—4 blows to last 2 in.

(c) When piles are to carry 50 net tons—10 blows to last 2 in.

(d) When piles are to carry a load in excess of 50 tons, number of blows will be as specified by the engineer.

9. When driving is interrupted before final penetration is reached the record for degree of penetration shall not be taken until after at least 2 in. of penetration has been obtained. When necessary to obtain the required penetration, piles may be driven not to exceed 4 in. below plan cut-off.

Cutting-off Piles

Where it is not possible to drive concrete piles to plan cut-off, the portion of the pile above this point shall be removed, but, unless otherwise specified, a variation of 4 in. will be allowed above the plan cut-off for the inequalities of the tops of the piles. All loose parts of the head of cut-off piles shall be removed. Where reinforcement has to be cut off, it shall be done by a hack saw or oxy-acetylene torch.

"Molded-in-Place" Piles

"Molded-in-place" piles may be divided into three general groups, according to their method of construction. The successive steps in each method are briefly enumerated below:

(a) A collapsible steel mandrel encased with a spirally reinforced sheet-steel casing is driven to the required penetration. The steel mandrel is then withdrawn and the steel casing which is left in the ground as a form, is filled with concrete.

(b) A cylindrical casing with a protecting point is driven to the required penetration. The casing after being filled with wet concrete is removed, and the space left by the casing is allowed to fill with concrete, thus forming the pile.

(c) A cylindrical casing with a core as a protecting and driving point is driven to the required penetration.

The core is removed. A charge of concrete is placed and the core is used as a rammer to compress the surrounding soil at the base, thus forming an enlarged base to the pile.

Under conditions where "molded-in-place" piles may be used, the main advantages over the pre-molded piles are as follows:

(1) The length of the pile need not be definitely predetermined on account of being able to vary the lengths in driving.

(2) Saving in labor and material on account of the length of each pile being determined before concrete is placed, thus saving cut-offs.

(3) The delay resulting from allowing sufficient time for piles to season before they are handled is eliminated.

(4) Entire omission of reinforcement against handling.

The "molded-in-place" piles, by the nature of their construction, are essentially foundation piles, and may not in all cases be a substitute for the pre-molded piles. In the use of "molded-in-place" piles it is necessary to consider the effects of vibration and soil movement due to the driving of adjacent piles. When the core of the pipe casing is driven for a given pile, it displaces and compresses the earth adjacent to the hole which is formed, and the elastic earth tends to relieve its stress by crowding back. Many rules have been formulated for driving these piles in order to protect the unseasoned concrete of piles previously placed. As the result of tests, each of the following rules have been adopted on various pieces of work:

(a) No concrete shall be deposited in any pile form until all driving is completed within a radius of 9 ft. center to center of the pile to be filled.

(b) The setting of the concrete in any pile must not, under any consideration, be disturbed by driving another pile or piles within a radius of less than 9 ft. from it center to center, after a minimum interval of three hours or before the expiration of seven days from the time the concrete was mixed with water for that pile. The contractor may, however, at his own option drive pile forms within the 9-ft. radius to a depth not more than 3 ft. from the total estimated penetration inside of the 3-hour limit, and before the expiration of the seven-day limit, complete the driving of those forms.

The requirements necessary vary with the plans and the soil encountered. The unseasoned concrete is more liable to damage on account of the driving of piles when soil is made up of thin, hard strata alternating with soft strata.

The above rules for driving of adjacent piles have been neglected in many cases, on account of the expense incurred in their operation and the lack of definite knowledge as to their necessity.

It should also be added that the construction of molded-in-place piles requires more careful supervision to secure good results on account of the manner in which concrete is deposited, and the surrounding conditions which preclude inspection of the pile after the concrete is all in place.

All "molded-in-place" piles are patented and are generally driven by companies either owning or controlling the patented features. The diameter and shape of the piles vary; tapered piles average an 8-in. tip and an 18-in. top diameter for a pile 25 ft. in length. The uniform section piles are circular and average 17 in. in diameter. No general specifications can be made for their construction, as each type of pile has its individual features demanding special methods of construction.

The cost will vary from 85 cents to \$2 per linear foot,

with an average cost of \$1, depending upon the number of piles driven and their lengths. Lengths of piles are always measured from cut-off to tip of pile. The expense of moving and setting up the special equipment necessary for this type makes them more economical on larger rather than smaller pieces of work.

Loading of piles may be calculated from the same data as that given for pre-molded piles.

**Typical Design of Foundations for Piers,
Abutments, Retaining Walls and Arches
in Various Soils and Depths of Water
(Not Including Pneumatic Foundations)**

There are a number of important elements entering into the design of foundations and on which the committee has found a large divergence of opinion, and it is on these points that the committee presents the following as its opinion of the best practice to be used in designing foundations:

(1) That for important structures wash borings as a means of determining character and bearing values of foundation soils are not generally reliable. That for important structures core borings give the most reliable data. The borings should in general be carried at least 10 ft. into rock, when encountered. Diamond, calyx or similar drills furnish cylindrical cores of all strata of hard material. Soil, sand, clay and lighter materials will be brought to the surface similar to wash borings.

(2) That for important structures, where there is no reliable data, or where there is any question of the safe bearing value, soil bearing tests be made; the test loads being increased until settlement occurs or until twice the bearing load it is proposed to use in the design has been reached. That one-half the ultimate load thus found be used in designing the foundation except that $\frac{3}{4}$ of the ultimate load may be used for maximum toe pressures produced by tractive force or wind; provided, however, that the safe load thus found does not exceed the safe crushing value of the materials of the substructure.

(3) That pile bearing formulas based on the fall and weight of the hammer are not always a true index of the safe bearing value of the pile, but are of value in determining the extent to which driving is necessary in a soil of known resistance. That for important structures where data is lacking or where there is any question of the safe bearing value, load tests be made; the loading being increased until settlement occurs or until twice the load per pile it is proposed to use in the design is reached.

That one-half the ultimate load thus found be used in designing the foundations except that $\frac{3}{4}$ of the ultimate load may be used for the maximum pressures produced by tractive force and wind; provided, however, that the safe bearing value of the piling or materials of the substructure are not exceeded.

(4) That in general the buoyancy of structures in water be not considered as reducing the foundation load except in the case where water has free access to the base of the foundation or when calculating stability from overturning.

(5) That the loads to be considered in designing foundations are the total dead load of the substructure and superstructure, the live load, including an allowance for impact, tractive force, wind and ice pressure, and earth pressures in the case of retaining walls and abutments.

(6) That in general the cut-off of wood foundation piles in tidal waters shall not be above mean daily tides and shall not exceed 2 ft. above mean low water. That in general timber in foundations in tidal waters shall

not be used above mean daily tides nor shall it be used at a greater elevation than 2 ft. above mean low water. That in general wood foundation piling and timbers be kept entirely below the probable lowest ground water level, except in the case of tidal waters as above noted. That in all waters where marine borers exist, no untreated timbers should be used above the permanent mud line of the bottom.

(7) That the spacing of wooden piling in foundations be not less than 2 ft. 6 in., center to center.

(8) That the bottom of foundations should be placed entirely below the line of frost action, the depth of foundation depending on the locality.

(9) That the calculations of foundation pressures be made in accordance with the rules and formula for the design of retaining walls published in the Supplement to the Manual, Vol. 19, No. 197, pp. 47-55.

**The Wisdom of the Use of Blast Furnace Slag
in Reinforced Concrete Work, Taking Into
Special Consideration Its Probable Duration**

The use of slag as an aggregate in concrete covers a period of 20 years or more, but it is only within recent years that it has had extended use, particularly in reinforced concrete. Beginning with its utilization for the concrete structures of the steel companies the greatest development has been in the communities tributary to the steel mills. Large quantities of slag are used in building operation, particularly in Birmingham, Cleveland and Youngstown, Ohio. The use of slag in concrete is sanctioned by the building ordinances of Detroit, Cleveland, Chicago, Philadelphia and Youngstown. Probably the most general use has been at Cleveland, where a large number of reinforced concrete buildings have been constructed with slag as a coarse aggregate. Specific examples of concrete structures in which slag is used include the grade separation structures of the Seaboard Air Line at Birmingham, involving 11,000 cu. yd.; the Rocky River Bridge at Rocky River, Ohio; subway structures of the Philadelphia Rapid Transit Company and the North Howard Street Bridge at Akron, Ohio. The last is an arch bridge nearly 800 ft. long with a roadway 190 ft. above the bed stream and required the use of 5,000 cu. yd. of concrete.

Numerous tests have been made of slag concrete which show conclusively that a properly selected slag when used as the coarse aggregate with a good quality of sand as the fine aggregate will produce a strong concrete. These tests brought to notice in recent years go to show that slag concretes are as strong as stone or gravel concretes containing the same quantity of cement, provided a properly selected material is used. The strength bears little relation to the weight of the slag used, the porous varieties producing concretes of fully as great strength as the dense materials for tests at 28 days. For greater ages the concretes made of denser slags show a greater increase in strength. Owing to the fact that slag is generally more porous than stone it is necessary to exercise care in proportioning to provide sufficient mortar to fill the voids in the particles as well as between them.

Soundness

A more important question is that of the soundness of slag concrete. This question is raised by the fact that some slags slake or disintegrate upon exposure to the air and are entirely unsuitable for use as aggregate. It is common practice to allow the slag to weather for a number of months before removing from the bank. This results in a hardening or toughening of the stable slags

and permits the detection of those that disintegrate upon exposure to the atmosphere. A considerable difference of opinion and practice exists as to this seasoning, but good practice would seem to demand a period in the bank of six months to a year. However, it is a fact that some slags are used after only a few weeks' exposure with apparently satisfactory results.

The most discussed point in the use of slag as an aggregate in concrete arises from the presence of sulphur. It is contended that a lack of stability of the compounds of this element occurring would result in the eventual disintegration of the concrete and also that its presence would lead to the formation of sulphuric acid which would result in the corrosion of embedded steel. Sulphur usually occurs as a sulphide of calcium, a form in which it is inactive, but in the presence of water it is contended that sulphuric acid would result. On the other hand, slag concrete has been used extensively in foundation work and numerous examples are cited of anchor bolts and other embedded pieces of iron and steel which have been in close contact with slag concrete containing sulphur for many years without any sign of injury.

Summary

(1) The strength of concrete in which selected slag is used as the coarse aggregate is equal to that of a concrete made of stone if an equal amount of cement is used per volume of concrete.

(2) The extensive use of slag concrete over a period of years has demonstrated its permanence for buildings, retaining walls, bridges and foundations work where the structure is exposed to ordinary conditions.

(3) No data on water-tightness, or behavior when submerged, were obtained.

(4) No case has been brought to notice where embedded steel became corroded in a slag concrete.

(5) In general, slag concretes are superior to stone or gravel concretes where exposed to high temperatures.

(6) The user of slag for a concrete aggregate should satisfy himself as to suitability of the material tributary to his locality, from observation of the method of production and the service records of structures previously built.

Designs and Recommended Specifications for Construction of Concrete Culvert Pipe

Plans and specifications of concrete pipe were obtained from all railroad companies known to have plans and specifications of their own, from firms manufacturing concrete pipe and from the highway departments of several states. The designs are of four types as to form and reinforcement:

1. Circular in cross-section with two concentric layers of reinforcement, one near the outside surface and the other near the inside surface of the pipe.

2. Circular in cross-section with one layer of reinforcement placed elliptically so as to pass continuously through all parts of the pipe that are subject to tension.

3. Oval in cross-section with one layer of circular reinforcement placed so as to pass continuously through all parts of the pipe that are subject to tension.

4. Circular in cross-section with one layer of concentric reinforcement.

As the points of greatest bending moments in the pipe are the segments crossed by the vertical and the horizontal diameters with the resulting tensile stress in the inner portion of the pipe for the vertical and in the outer portion for the horizontal moments, the fourth type of design does not provide reinforcement for the tensile stress from the horizontal moments and is, therefore, not recommended for use for culverts. Pipes reinforced

as in types No. 2 and No. 3 should have the top plainly marked in order that the pipe may be placed so that the reinforcement is in the proper position to carry the tensile stresses.

In designing reinforced concrete culvert pipe the use of unit stresses per square inch of 700 lb. compression in the concrete and 16,000 lb. tension in the steel may be considered good practice, and to develop these stresses approximately 0.88 per cent of reinforcement is required. The following formulae are proposed for the thickness of the pipe and the area of the reinforcement, in which:

- t = distance in inches from the center of the reinforcement to the compression face of the concrete.
- a = distance in inches from the center of the reinforcement to the tension face of the concrete.
- $\rho = t + a$ = total thickness of the pipe.
- A = area of reinforcement in square inches.
- d = mean diameter of the pipe in feet.
- w = weight per square foot of the load on the pipe in pounds.
- p = 0.83 per cent of reinforcement.
- fs = 16,000 lbs. = unit tensile stress in the reinforcement.
- fc = 680 lbs. = unit compressive stress in the concrete.

- (1) $t = 0.023d\sqrt{w}$ or
- (2) $t = 0.03d\sqrt{w}$
- (3) $A = 0.10t^2$
- (4) $t^2 = t + a$

These formulae are derived from those developed by Prof. A. N. Talbot from his experiments and tests of the strength of pipe published in Bulletin No. 22 of the Engineering Experiment Station of the University of Illinois.

In view of the possible lack of extreme care in bedding the pipe and in filling around it, the value of equation (2) for the value of "t" is recommended, viz.:

$$t = 0.03d\sqrt{w}$$

The load per square foot "w" will be the weight of the prism of earth above the pipe, the load from an engine and the load from impact. The weight of the earth will increase with the height of the fill while the load from the engine and from impact will decrease; the latter probably need not be considered except for low fills. It is evident also that the proportion of the weight of the prism of earth coming on the pipe decreases as the height increases. The committee has given considerable study to the problem, to find a value for the load per square foot that would be sufficient for general use, but have been unable to find enough data to determine this satisfactorily.

The desirability of one value for all heights of fill under ordinary conditions is very evident, and we ask that further investigation be made for that purpose

Specifications for the Construction of Reinforced Concrete Culvert Pipe
Concrete Material

Cement

1. The cement shall be Portland and shall meet the requirements of the Standard Specifications for Portland cement of the American Railway Engineering Association. Cement that has deteriorated or become damaged during transportation or storage shall not be used.

Fine Aggregate

2. The fine aggregate shall consist of sand or crushed stone, graded from fine to coarse, and passing when dry a screen having 4 meshes per linear inch. It shall preferably be of hard silicious material, clean, coarse and free from dust, soft particles, lumps and vegetable or other foreign matter.

Not more than 20 per cent shall pass a sieve having 50 meshes per linear inch and not more than 6 per cent shall pass a sieve having 100 meshes per linear inch.

Coarse Aggregate

3. The coarse aggregate shall consist of crushed stone or gravel which is retained on a screen having 4

meshes per linear inch and shall not exceed $\frac{3}{4}$ in. in greatest dimension for pipe $4\frac{1}{2}$ in. or less in thickness, or 1 in. in greatest dimension for pipe of thickness greater than $4\frac{1}{2}$ in. The coarse aggregate shall be a gradation of sizes from the smallest to the largest particles, and shall be clean, hard, durable and free from all deleterious matter. Aggregates containing dust, soft or elongated particles shall not be used.

Water

4. The water shall be free from oil, acid, alkali and vegetable matter.

Steel Reinforcement

5. The steel for reinforcement shall meet the requirements of the Standard Specifications for Steel Reinforcements of the American Railway Engineering Association.

Workmanship

Proportions

6. The proportions of the materials for the concrete shall be: 1 part Portland cement, 2 parts fine aggregate, and 4 parts coarse aggregate.

Measurement

7. The unit of measure shall be a cubic foot. A bag containing not less than 94 lb. of cement shall be assumed to measure one cubic foot of cement. The fine and coarse aggregate shall be measured as loosely thrown into the measuring receptacle. The various ingredients, including the water, shall be measured separately, and by such methods as to invariably secure the proper proportions.

Mixing

8. The concrete materials shall be mixed to the desired consistency in a batch mixer of an approved type. The mixing shall continue for at least 2 min. after all the materials, including the water, are in the mixer.

Consistency

9. Sufficient water shall be used to produce a concrete of such consistency that it will flow around the reinforcement, but not enough to allow the coarse aggregate to separate from the mortar.

Retempering

10. Retempering of mortar or concrete, that is, re-mixing with water after it has partially set, will not be permitted.

Placing Concrete

11. The concrete shall be placed in layers so as to completely fill the entire space between the inner and the outer forms in one continuous operation; and shall be well spaded and compacted around the reinforcing metal, to obtain a concrete of maximum density, thoroughly bonded with the reinforcement, and smooth, dense watertight surfaces inside and outside of the pipe.

Temperature

12. No pipe shall be manufactured in a temperature below 40 deg. F. Both aggregates shall be heated if necessary to remove frost and frozen lumps.

Forms

13. The forms shall be steel or metal-lined, true to plan, substantial and unyielding. They shall be kept free from rust, carefully cleaned of all adhering concrete after each use, and well oiled or greased each time before the concrete is placed.

Design

Classes

14. Reinforced concrete culvert shall be of the following classes or forms:

A—Circular in cross-section with 2 concentric layers of reinforcement.

B—Circular in cross-section with 1 layer of reinforcement placed elliptically.

C—Oval in cross-section with 1 circular layer of reinforcement.

In all classes the location of the reinforcement shall be so designed that it will receive and carry the tensile stresses.

Thickness and Area Reinforcement

15. The thickness of the pipe and the area of the reinforcement shall be based upon unit stresses of 700 lb. per square inch compression in the concrete and 16,000 lb. per square inch tension in the steel and 0.83 per cent. of reinforcement, and shall be determined by the following formulæ:

$$t^2 = t + a$$

$$t = 0.03d\sqrt{w}$$

$$A = 0.10t^2$$

In which:

t = total thickness of the pipe in inches.

d = mean diameter of the pipe in feet.

w = load per square foot on the pipe in pounds.

a = distance from the center of the reinforcement to the tension face of the concrete.

t = distance from the center of the reinforcement to the compression face of the concrete.

A = area of the reinforcement in square inches.

"a" shall not be less than $\frac{3}{4}$ in. for pipe less than 4 in. thick, and not less than 1 in. for pipe of thickness greater than 4 in.

"w" shall be the weight of the earth fill, assumed at 130 lb. per cubic foot to which shall be added for the engine load an amount obtained by dividing 4500 lb. by one plus one-half the height of the fill above the pipe in feet. In no case shall "w" be less than 2000 lb.

Details of Construction

Reinforcement

16. The reinforcement shall consist of transverse and longitudinal rods of the size and spacing required by the design; or of triangular wire mesh or similar wire mesh of the size and weight required. The transverse and longitudinal rods shall be securely wired together at their intersections with No. 16 gage soft steel wire.

When 2 layers of reinforcement are used they shall be connected together at proper intervals by tie struts so arranged that the two layers may be handled as one member.

The reinforcement shall be thoroughly cleaned of all rust and scales, accurately placed and rigidly secured against displacement during the placing of the concrete.

Splicing Reinforcement

17. All splices shall be made at points of minimum stress. The splices in wire mesh shall lap at least two spaces or not less than 8 in. Rods shall lap not less than 24 diameters and the laps shall be tightly wired with No. 16 gage soft steel wire.

Joints

18. The joints shall be of the bell and spigot type. Where the thickness of the pipe is sufficient the bell may have the same external diameter as the body of the pipe; where the thickness is not sufficient to permit this the end of the pipe shall be flared out to form the bell.

The reinforcement shall be extended into the bell and bent to its form; with rod reinforcement 2 transverse rods shall be placed in the bell and the longitudinal rods, bent if necessary to the form of the bell, shall be securely wired to these transverse rods.

The top of pipe with reinforcement placed as in Classes "B" and "C" shall be marked on both ends with the word "Top" in order to insure the proper placing of the pipe.

Finish

19. All pipe shall have a clean, smooth finish both inside and outside. All smoothing, trimming or cleaning shall be done immediately after the forms are removed.

Curing

20. The forms shall not be removed until the concrete has thoroughly hardened and will not be injured or the pipe deformed in handling; and in no event in less than 24 hrs. after the concrete is placed.

The pipe shall be kept moist by frequent sprinkling

with water for not less than 7 days, sheltered from the sun during hot weather, and allowed to cure for 28 days before shipping; and shall not be subject to full loading in less than 45 days after casting.

Patents

21. The contractor or manufacturer shall pay all royalties for the use of patented designs or devices or forms of construction, and shall protect the railroad company from all claims of infringements or liability for the use of such patents.

Inspection

22. All material and all processes of manufacture shall be subject to inspection and approval at all times. Free access shall be provided for all authorized inspectors to all parts of factories and plants in which the pipe or the materials for the same are made or prepared.

All facilities for the desired inspection of materials and workmanship shall be furnished free of charge by the contractor as requested. In general the cement and reinforcing material will be inspected at the factory or mill. The aggregates and process of manufacture will be inspected at the pipe plant.

At the time the forms are removed the inspector shall carefully examine each piece of pipe and shall stamp or print the date of manufacture on the bell end of each pipe accepted.

Pipe that is injured or develops imperfections while stored at the manufacturer's plant will be rejected, notwithstanding the inspector's previous acceptance. No defective pipe shall be loaded for shipment. All pipe shall be so loaded and braced that they will not be broken in transit.

Suggestions for Future Work

1. Preparation of new specifications for plain and reinforced concrete and steel reinforcement.

2. An investigation of different methods of depositing concrete under water and disintegration of concrete and corrosion of reinforcing material in connection with use of concrete in sea water.

3. Preparation of specifications for slag concrete.

Committee: F. L. Thompson (I. C.), chairman; J. J. Yates (C. R. R. of N. J.), vice-chairman; R. Armour (G. T.), John C. Beye (A. T. & S. F.), G. E. Boyd (D. L. & W.), H. A. Cassil (P. M.), C. S. Coc (F. E. C.), T. L. Condon (Cons. Engr.), J. K. Conner (L. E. & W.), C. S. Davis (P. L.), J. L. Harrington (Cons. Engr.), W. K. Hatt (Purdue Univ.), L. J. Hotchkiss (Cons. Engr.), Richard L. Humphrey (Cons. Engr.), Noah Johnson (Wab.), M. S. Ketchum (Univ. of Colo.), W. M. Kinney, W. S. Lacher (Ry. Age.), A. E. Owen (C. R. R. of N. J.), W. M. Ray (B. & O.), C. P. Richardson (C. R. I. & P.), G. H. Scribner, Jr. (Cons. Engr.), F. P. Sisson (G. T.), I. E. Smith (Univ. of Ill.), Job Tuthill (P. M.), B. A. Underwood (S. N. E.).

Discussion

F. L. Thompson (Chairman): I will take up the subjects as assigned to the committee.

The changes suggested in connection with the revision of the Manual are only changes that are necessary to make it conform to specifications heretofore adopted by the association.

The President: As this appears to be a matter of diction and uniformity, unless there is some objection these revisions will be approved and printed in the supplement to the Manual.

Mr. Thompson then read appendix B and said: Last year these specifications were temporarily adopted by the convention and later the question came up of submitting these specifications with plans and the commit-

tee was instructed to resubmit them this year, with a set of plans. That has been done.

H. S. Jacoby (Cornell Univ.): Last year the report of the committee used the term "cast in place" for class B, and I do not recall that a single voice was raised against its appropriateness, I therefore move that the line be amended to read: (B) Cast-in-place piles. Piles which are constructed in holes in the ground.

The President: The committee will accept that suggestion.

Mr. Thompson: I move that the specifications for constructing pre-molded concrete piles be accepted by the convention and printed in the Manual.

The President: Unless there is objection, the motion made by Mr. Thompson will stand approved.

Mr. Thompson: The next thing is the specifications for driving pre-molded concrete piles. These specifications have been gone over and revised in accordance with the suggestions made on the floor last year, and are now recommended for adoption by the convention and insertion in the Manual. I move that they be adopted and printed in the Manual.

A. A. Robinson (Santa Fe): I want to urge that the committee, in submitting these specifications either remove or remodel paragraph 8. I do not believe we are entitled to give any such set of rules for the last two inches of penetration of the piles that there shall be used a single-action steam hammer of 5,000 lb., drop 36 in., or a hammer of like mechanical effect. I do not think as an association we want to go on record as saying that they shall be driven in a certain manner, if they are going to have 50 tons load or more, and prescribe that in the case of 50 tons there shall be 10 blows to the last 10 in.

The President: The committee will accept the suggestion, leaving the paragraph out.

Mr. Ford: I think the committee was right in the way it prepared this paragraph. I hope if the paragraph is dropped that the committee will ultimately bring in something as a guide on the load for concrete piles. The situation is different from wooden piles.

Mr. Robinson: I move that the paragraph be omitted and passed back to the committee, with the suggestion that they investigate that phase of the matter further and report later on.

The President: The committee will take cognizance of that.

C. P. Richardson (Rock Island): There is a misunderstanding here. Paragraph 8 was written as a continuation of paragraph 7, as an alternative method.

Mr. Robinson: Paragraph 8 is misleading and not clear and it should be left out.

The President: The committee will accept the recommendation and will look after it.

I. L. Simmons (Rock Island): Paragraph 3 does not seem to be clear in the last part, which says: "Where a drop hammer is permitted, a heavy hammer with a short drop shall be used." Would it not define what we mean if we said: "and a short drop used?"

The President: The committee will accept that.

(The motion that paragraphs 1 to 9 be approved, with the exception of paragraph 8, and be included in the Manual, was carried.)

Mr. Thompson: With relation to the matter on "molded-in-place piles," this is submitted as information to be printed in the Proceedings.

(Mr. Thompson then referred to the matter in appendix C, reading a part of the beginning.)

Mr. Thompson: This subject has been before the con-

vention for the past three years, and it is the recommendation of the committee that the matter on pages 731-2-3 be accepted as information and printed in the Proceedings.

Mr. Jacoby: I move that the paragraph marked (3) and the following one be amended to read as follows: "(3) That the computed bearing value of a pile given by a formula based upon the fall and weight of the hammer is not always a true index of its actual bearing power, but is of value in determining the extent to which driving is necessary in a soil of known resistance.

The bearing value of a pile computed by means of a formula measures the resistance of the pile immediately after driving ceases. Therefore, in the case of soft soils, in which the frictional resistance of a pile increases materially after a period of rest, a test should be made with the hammer after such period of rest, in order that the computed bearing value may be a fair measure of

the actual bearing power of the pile when supporting the structure. Formulas for the bearing power of a pile are not applicable to piles driven through very soft soil to rock or other hard material, since they act like columns under those conditions.

The President: The committee will accept that.

Mr. Jacoby: There is one more point that I would like to make and that is, should not the word "static" be inserted in the 3rd line from the bottom of p. 732 before the word "load tests?"

Mr. Thompson: Yes, that is right. In appendix D is given the report, "The wisdom of the use of blast furnace slag in reinforced concrete work, taking into especial consideration its probable duration." This matter is submitted as information.

The President: That will be accepted.

(The committee was excused with the thanks of the association.)

Report of Committee on Roadway



A CIRCULAR LETTER was addressed to representatives of about 50 of the larger roads asking for information concerning the practice followed in draining the roadway through station grounds. About 20 replies were received.

After consideration and discussion of the above replies the following conclusions were drafted and submitted for approval:

1. The drainage of the roadway through stations and yards should be treated in accordance with local conditions.
2. Surface water should be carried off the roadbed into drains as quickly as possible.
3. Items influencing the mode of procedure are: Soil condition, the contour of adjacent grounds, the grade of tracks, the number of tracks, the amount of rainfall, etc.
4. Surface water should be taken care of first by open ditches as much as possible, where they will not interfere with the work of employees or the safety of passengers.
5. Where the subgrade is of such a nature that it will absorb water and not retain it, a sub-ballast of engine cinders should be used, the surface of which should not be allowed to become foul, but kept open so that water will penetrate the subgrade through the cinder. Where the subgrade will hold water, special effort should be made to carry it away from the subgrade by means of drains.
6. Tracks in yards should be so constructed where practicable that tracks adjacent to main lines will be about two inches below them and each succeeding track stepped down to suit the normal trend of drainage, thus providing drainage laterally as well as longitudinally.
7. Cross-drains of cast iron pipe, with catch basins between tracks, should be placed where necessary.
8. If the subsoil is of such a nature that it retains water and becomes saturated therewith, place bell and vitrified drain pipe with open joints between tracks and about four feet below base of rail, using special care to put them below frost and deep enough to get below the movement of the soil; these pipes running into cross-drains leading to natural drainage.

9. If the subsoil is silty or of such consistency as to fill up the pipe quickly, a wide ditch should be dug, preferably between tracks, and filled with large stone, having pipes leading off from it to the natural drainage.

10. At station platforms a subdrain of iron pipe, with catch basins at frequent intervals, should be laid alongside the curbing, or bell end vitrified pipe may be laid between tracks a sufficient depth to be below frost and movement of the soil. These drains to be connected by means of side drains to natural ditches, or in cuts to bell end vitrified subdrain laid in the ditch line.

Recommendations for Next Year's Work

The committee recommended that all subjects assigned for consideration this year, except the one reported on above, be reassigned for next year's work.

Committee: W. M. Dawley (Erie), chairman; J. A. Spielmann (B. & O.), vice-chairman; J. R. W. Ambrose (T. T.), H. E. Astley (N. Y. N. H. & H.), C. W. Brown (L. & N. E.), S. P. Brown, B. M. Cheney (C. B. & Q.), C. W. Cochran (C. C. & St. L.), W. C. Curd, Paul Didier (B. & O.), S. B. Fisher (M. K. & T.), W. C. Kegler (C. C. & St. L.), F. Ringer (M. K. & T.), H. W. McLeod (C. P.), C. M. McVay (K. & M.), F. M. Patterson (I. C.), W. H. Petersen (C. R. I. & P.), P. Petri (B. & O.), W. F. Purdy (P. & W. Va.), R. A. Rutledge (A. T. & S. F.), W. H. Sellow (M. C.), J. M. Sills (St. L.-S. F.), G. R. Talcott (A. T. & S. F.), W. P. Wiltsee (N. & W.).

Discussion

J. A. Spielmann (Vice Chairman): Our committee was assigned to subjects as found on page 403. We are only able to report on No. 6. In regard to No. 6 we sent out inquiries to 50 of the principal railroads in the country and received 20 replies.

(Mr. Spielmann then read the conclusions).

C. E. Lindsay (N. Y. C.): In number 7, I approve of the conclusion generally, but I think it ought not to be confined to cast iron pipe. If the committee would omit the words "cast iron pipe," the conclusion would be just as clear and less restricted. The same criticism will apply to No. 10, where they specify iron pipe.

The President: The committee will accept that suggestion.

C. W. Baldrige (Santa Fe): In regard to conclusion No. 8, it seems to me that the committee should make a little wider provision there for cases where it is not feasible to place the drain 4 ft. deep. In such cases it might be advantageous to use a drain composed of a ditch filled with rock or something of that nature.

Mr. Spielmann: In this we state about 4 ft., we do not specify exact depth, but it is well to get it below the frost line.

Mr. Baldrige: It is not the depth I object to particularly, but frequently, if you lay pipe that is not deep enough below the surface of the ground it will be broken in the winter time by frost, and in that case it might be better to use some other kind of drain than pipe drain.

W. P. Wiltsee (N. & W.): I believe we can get around this if we would change the wording, place bell and vitrified drain pipe with open joints, or other drains between tracks, and cut out; And about four feet below base of rail."

Earl Stimson (B. & O.): I think that it is essential that mention be made as to the depth the vitrified pipe drain be placed. I believe the paragraph as it is covers the situation very well, and that we ought not to say something and then modify it so it really does not mean anything, or becomes very indefinite. I would suggest that the committee stand pat on this section.

The President: The necessity for putting in drains is evidently where we disagree, on the kind of drain and

the depth. That is controlled by local conditions to such a great extent that I am afraid it will be hard to get a convention of men from so many different parts of the country to agree on a depth. We would have to put our pipe 8 ft. below the surface to keep away from frost.

Mr. Spielmann: Your committee now suggests that this clause read: "If the sub-soil is of such a nature that it retains water, and becomes saturated therewith, place bell and vitrified drain pipe or other drains with open joints between tracks," leaving out the words "and about four feet below base of rail"; "using special care to put them below frost, and deep enough to get below the movement of the soil."

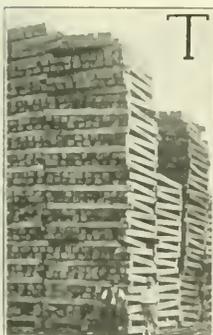
The President: If there is no further discussion, No. 8 will stand as the committee has amended it.

(Mr. Spielmann read paragraphs 9 and 10, leaving out the words "of iron pipe" in the first line.

The President: If there are no objections, the conclusions will be adopted and printed in the Manual as reported by the committee.

(The committee was dismissed with the thanks of the Association.)

Report of Committee on Ties



THE COMMITTEE recommended that forms M. W. 301, 302, 303 and 304 be withdrawn from the Manual. The membership lines were asked as to their use of these forms and 100 replies, representing 232,026 miles, were received. Not a single road is using them and but 12, representing approximately 10,521 miles, contemplate doing so.

Methods in Use by Various Railroads for Controlling Tie Renewals

The committee submitted as information a report on the methods in use by various roads to control tie renewals. The following questions were sent to all the principal railroads, represented in the Association:

1. Who originates the data on which the estimates of tie renewals are based?
2. Are these estimates based on
 - (a) Detailed inspection of the entire track, or,
 - (b) Detailed inspection of portions of the track, or,
 - (c) Tie renewal statistics, or,
 - (d) Otherwise?
3. Are these estimates checked independently in the field, in whole or in part?
4. By whom are these estimates revised before approval?
5. Are individual ties designated to be renewed, or is the estimate merely to determine the number of ties required for renewals?
6. What latitude, if any, is allowed the Section Foreman in deviating from the approved inspection?
7. What check is made of the Section Foreman's work?
8. Please submit any general instructions you may have covering tie renewals.

Replies were received from 100 railroads, with an ag-

gregate mileage of 223,000. A summary of these replies is appended to this report.

	Per Cent. of Total Number of Roads Reporting	Per Cent. of Total Mileage of Roads Reporting
Renewals based primarily on detail inspection of track.....	89	92
Renewals based partly or exclusively on tie renewal statistics.....	16	14
Renewals based exclusively on tie renewal statistics.....	9	4
Detail inspection made by section foremen.....	58	54
Detail inspection made by others than section foremen.....	33	42
Individual ties for renewal designated by spots or otherwise.....	38	52
Individual ties for renewal not designated.....	62	48
Section foremen limited in renewals to ties authorized except such additional as are required for safety.....	67	67
Section foremen not limited in renewals to those authorized.....	33	33
Work of making renewals checked by roadmaster (or supervisor).....	77	74
Work of making renewals checked by others than roadmaster (or supervisor).....	33	19

The committee wishes to point out that the method in most general use is not necessarily the best, and that methods may very properly differ on different roads, depending upon the organization, physical conditions, and other factors. A study of the replies shows that all roads depend largely upon an inspection of ties removed for the purpose of checking renewals. A majority of the roads place the principal responsibility for renewals upon the section foreman, while a considerable number place this responsibility primarily upon an inspector working independently of the section foreman. The other variations in method represent individual opinions as to the best method of checking the original source of information. This checking takes the form of an independent review of the original check in the field and also checking same against statistics.

Report on Trials of Substitute Ties

The information furnished by the various railroads using substitute ties was abstracted as usual, and the results to date were shown on a tabulated statement. This statement is intended to include all installations on steam railroads in America reported to the Association, and is

thought to cover practically all substitute ties used so far in this country.

Conclusions

(1) The committee recommends that forms Nos. M. W. 300, 301, 302, 303, 304 be withdrawn from the Manual.

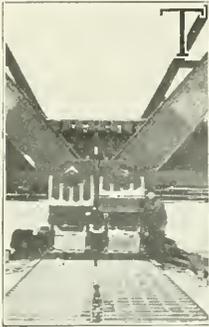
(2) That the report as to methods in use by various railroads for controlling tie renewals be received as information.

(3) That the report on substitute ties be received as information.

Committee: F. R. Layng (B. & L. E.), chairman; H. S. Wilgus (P. S. & N.), vice-chairman; C. C. Albright (Purdue Univ.), W. C. Baisinger (A. T. & S. F.), M. S. Blaiklock (G. T.), Theo. Bloecher (B. & O.), F. Boardman (N. Y. C.), W. J. Burton (M. P.), W. A. Clark (D. & I. R.), S. B. Clement (T. & N. O.), E. L. Crugar (I. C.), L. A. Downs (I. C.), G. F. Hand (N. Y. N. H. & H.), L. C. Hartley (C. & E. I.), E. D. Jackson (B. & O.), J. B. Myers (B. & O.), A. J. Neafee (D. L. & W.), R. R. Paine (N. P.), G. P. Palmer (B. & O. C. T.), Louis Yager (N. P.).

(The report was accepted without discussion and the committee was dismissed with the thanks of the association.)

Report of Committee on Iron and Steel Structures



THE COMMITTEE HAS undertaken a revision of the subject-matter of the Association's General Specifications for Steel Railway Bridges which were adopted as part of the committee's report to the 1906 convention. There has been no substantial revision of them since. In this work, it is expected to co-operate with a corresponding committee of the Canadian Society of Civil Engineers, which has in progress a revision of that society's specifications. Incidental to the revision of the specifications, there will have to be a revision

of the rules and unit stresses for the capacity rating of existing bridges.

The committee is investigating the use of plastic compounds for the protection of steel work exposed to the blast action from locomotive stacks. The committee this year has investigated the Schoop metal spraying process for the protection of iron and steel from corrosion. It was found that laboratory tests made by certain railroads, showed unsatisfactory results. In all cases it was reported that the coatings were pensive to water. Where bronze, lead and aluminum coatings were exposed to brine, the bronze and lead coatings were practically destroyed after a few weeks' exposure; the aluminum coating was in good condition, but was raised off the plate, showing the action of rust beneath the coating. It is concluded from information obtainable to date that the Schoop metal spraying process does not afford satisfactory protection from corrosion.

The committee submitted detailed Specifications for Movable Bridges and recommended that they be printed in the Proceedings as information. The purpose of this recommendation was to make the specifications available for use, and to incite constructive criticism, with the expectation that the specifications may be adopted in revised and satisfactory form for inclusion in the Manual a year or two later.

Impact Tests on the Electrified

Section of the C. M. & St. P. in 1917

The question of impact under electric locomotives has been thoroughly studied by the committee, and during the summer of 1917 some important tests were made on bridges on the electrified section of the Chicago, Milwaukee & St. Paul in Montana. The tests on the Norfolk & Western made in 1916 did not include spans exceeding 90 ft. in length, and the speeds available did not exceed about 29 miles per hour. Those tests, therefore,

while of very considerable value, did not have sufficient range to be as conclusive as might be desired. The results obtained were very satisfactory, so far as they went, and tended strongly to confirm the opinion previously expressed that impact under well-balanced electric locomotives would be very small. The value of the results of those tests was very considerably enhanced by making use on the same structure of two types of steam locomotives; the consolidation type and the Mallet type. The very great difference between the results obtained with the steam locomotives and with the electric locomotives, especially on the longer spans, was very significant as tending to show the relatively small impact from electric locomotives. However, the limited range of span length and the limited speed made it very desirable to continue the tests if possible on longer spans and at higher speeds. The very best conditions for such tests were to be obtained on the electrified lines of the C. M. & St. P. in Montana, and a request by the committee for the necessary facilities was promptly acceded to by this company.

Character of Structures Tested

The structures tested consisted of the following types and span lengths:

- FIRST CROSSING OF MISSOULA RIVER NEAR MISSOULA, MONT.
 - 60-ft. through girder.
 - 80-ft. through girder.
 - 100-ft. riveted pony truss.
- SECOND CROSSING OF MISSOULA RIVER NEAR CYR, MONT.
 - 210-ft. deck truss.
- THIRD CROSSING OF MISSOULA RIVER NEAR CYR, MONT.
 - 240-ft. deck truss.
- VIADUCT NEAR SALTISE, MONT.
 - 62-ft. and 46½-ft. span lengths.

The test load consisted of an electric locomotive composed of two units, followed by a sufficient number of loaded cars to cover the structure. The locomotive had its motors geared to the driving-wheel axles, no side rods being used in this type. All rotating parts are presumed to be balanced, so that any impact effect would be due to such causes as roughness of wheels and track and deflection of structure.

The apparatus used in these tests was the same as that used in previous tests made by the committee. In addition to this apparatus, the committee made use, to a small extent, of certain extensometers employed by Prof. A. N. Talbot in the track experiments which he is conducting on behalf of the joint committee established for the study of track stresses. These extensometers record directly, without multiplication, the strains in the members to which they are attached. These instruments were used on a floor beam and on a short stringer. The re-

sults obtained on the floor beam indicated small impact, and tended to confirm the results obtained by the other type of extensometer which was applied to another beam of the same bridge. The results from the stringer indicated considerable impact, but many more observations would be necessary and much more experience with this type of apparatus before reliable results on the short spans could be secured. It is hoped that this field of experimentation can be adequately covered at some future time.

The tests were made in the same general manner as those previously reported, namely, the special test train was run over the structure a considerable number of times at various rates of speed. Movements were made at low speeds of 8 to 12 miles per hour so as to secure readings not affected by impact. These readings were considered to represent static stresses, and the excess of stress resulting from movements at higher speeds was considered to represent the impact effect. Speeds were readily obtained up to about 60 miles per hour and above. No tests were made with steam locomotives. It was thought the very numerous experiments heretofore made with steam locomotives on structures of the kind herein described were sufficient to furnish a basis of comparison. The results of these tests, therefore, may be compared with the general results of those heretofore presented.

In general, the impact effects were in most cases very small, and particularly so in the long truss spans. The relatively large impact of 23 per cent in the top flange of the pony truss was probably due more to lateral movement than to vertical vibration. In the 60-ft. girder, instrumental vibration for speeds greater than about 50 miles per hour made the records valueless, but the results obtained for speeds below 50 miles per hour indicate that there was very little impact stress in the structure. The deflectometer readings are reliable.

Conclusions

From the results of the tests on the electrified section of the Chicago, Milwaukee & St. Paul, the tests made in 1916 on the Norfolk & Western, and the few tests made in 1909 at Schenectady, New York, it would appear to be fairly well established that the impact effect from electric locomotives is very much less than from steam locomotives of the usual type. Comparing results obtained in these tests with the results from steam locomotives, it would appear that the impact from electric locomotives on structures exceeding, say, 25 ft. span length, is not more than one-third of the impact produced by steam locomotives.

Column Tests

The program of column tests to be made by the Bureau of Standards for this Association was described fully in Vol. 16, p. 636. Of the eight column sections which it was originally decided to have tested, only Column No. 1 of Series No. 1, consisting of two channels with flanges turned in, has been touched so far.

Complete reports of the tests of the first eighteen columns tested already have been published. (Vol. 14, page 96; Vol. 15, page 435; Vol. 16, page 636, and inset at back of Volume, and Bulletin No. 173 for January, 1915.)

The present report covers tests of 24 columns made during 1916 by the Bureau of Standards under the direction of Dr. S. W. Stratton. These columns are variations of Column No. 1, Series No. 1; the same general dimensions, area of cross-section, and slenderness ratios are used, the variations consisting of (1) changes in

size of rivets and lacing bars; (2) the leaving off of wing and base plates; (3) the substitution of batten plates for lacing with varying distances between the batten plates.

The Bureau of Standards intended to supplement these tests by a series of compression tests of short specimens, cut from the channels of the columns, which tests were intended to bring out the reason why the columns made of thick material always fail at lower unit stresses than those made of thin material. It was hoped that these short compression tests could have been made during 1917, and, in fact, many of these tests have actually been made, but, owing to stress of other business, the Bureau has been unable to complete the series and to furnish the committee with reports of the results. However, it may be stated that the short specimen tests show that, in compression, the thin material has a higher elastic strength than the thick material, although the original tensile specimen tests on which the material was accepted, gave practically identical results as regards the elastic limit in tension for the thick and the thin material. While the specimen tensile tests, in all cases, gave results reasonably close to the prescribed limits of 37,000 to 39,000 lb. per sq. in., the short compressive tests showed yield points varying from below 30,000 lb. per sq. in. to above 41,000 lb. per sq. in.

This series of column tests proves, as have all the previous ones both for this Association and for the American Society of Civil Engineers, that the columns built of thin material almost invariably show higher unit stresses at failure than the similar columns built of thick material. The series also seems to show that, with lacing bars and rivets somewhat larger than standard practice calls for, the column will show additional strength.

As regards the substitution of batten plates instead of lacing bars, this series of tests shows conclusively that, in order to develop the full strength of the column, batten plates should not be used. It also shows that, where the distance from center to center of outer rivets on adjacent battens is fixed so that the $1/r$ distance for the individual channel is about the same as that for the column considered as a whole, the column is weaker than when this distance is reduced. In all cases, the columns with battens failed at an ultimate strength from 6,000 to 9,000 lb. per sq. in. less than the corresponding column with lacing, and, in one case, the heavy section with $120\ 1/r$, as much as 15,000 lb. per sq. in. less.

In all cases, the length for computing the slenderness ratio of the column was taken as the entire length of the column, or the length between base plates, where base plates were used. When failure is emphasized by the complete visible destruction of the column, it usually becomes quite apparent that points of inflection occur not far from the ends of the column. This is less noticeable in the batten-plated columns, where the method of failure is usually by sudden bending at the batten plates.

Conclusions

The conclusions that seem warranted from the tests so far made in the proposed series are:

- (1) Columns in which batten plates are substituted for lacing bars will not develop the full strength of the section and should not be used.
- (2) The specimen tensile tests on which material is ordered and accepted afford no proper criterion for the strength of a column.
- (3) A column designed so that it fails as a whole and not by reason of local weakness will have an ultimate strength of which the compressive yield point of the

material of which it is made up is an index, since the higher this yield point is, the stronger will be the column.

Specifications for Bronze Bearing Metals for Turntables and Movable Railroad Bridges

1. Phosphor bronze shall be a homogeneous alloy of crystalline structure. It shall be made from new metals, except that scrap of known composition produced by the foundry at which the bronze is cast may be used. It shall not contain sulphur. The phosphorus shall be introduced in the form of phosphor-tin or phosphor-copper. Castings shall be sound, clean, and free from blowholes, porous places, cracks and other defects.

2. The alloy shall be cast into ingots and allowed to cool, and the castings shall be poured from the remelted ingots. Care shall be exercised that the metal is not overheated and that the temperature at pouring and the conditions of cooling are such as will be most likely to secure dense castings.

3. There shall be four grades:

Grade A is to be used for contact with hardened steel discs under pressures exceeding 1,500 lb. per sq. in., such as are used in turntables and center-bearing swing bridges.

Grade B is to be used for contact with soft steel at low speeds under pressures not exceeding 1,500 lb. per sq. in., such as trunnions and journals of bascule and lift bridges.

Grade C is to be used for ordinary machinery bearings.

Grade D is to be used for gears, worm wheels, nuts, and similar parts which are subjected to other than compressive stresses.

4. The chemical and physical qualities shall conform with the requirements in the table following:

Chemical and Physical Qualities

Alloy of	GRADE			
	A Copper and Tin	B Copper and Tin	C Copper, Tin and Lead and Zinc	D ^a Copper, Tin and Zinc
Copper per cent.	20 max.	17 max.	82 max.	89 max.
Tin per cent. ....	.....	.....	11 max.	11 max.
Lead per cent. ....	.....	.....	.....	.....
Zinc per cent. ....	.....	.....	.....	2.25 max.
Phosphorus per cent.	1.0 max.	1.0 max.	1.0 max.	0.25 max.
Other elements per cent.	0.5 max.	0.5 max.	0.7 min.	0.5 max.
Elastic limit in compression, pounds per square inch.	24,000 min.	18,000 min.	.....	.....
Permanent set under 160,000 pounds, .06 min. ....	.....	.....	.....	.....
Permanent set under 50,000 pounds, .10 max. ....	.....	.....	.....	.....
Permanent set under 50,000 pounds, To be recorded ....	.....	.....	.....	.....
Yield point in tension, pounds per square inch. ....	.....	.....	.....	To be recorded
Ultimate strength in tension, pounds per square inch. ....	.....	.....	.....	33,000 min.
Elongation in 2 in. per cent. ....	.....	.....	.....	14 min.

5. The chemical analysis of each heat shall be furnished.

6. Test specimens shall be made from coupons which are a part of the casting and which have been fed and cooled under the same conditions as the casting.

7. Compression test specimens shall be cylinders one inch high and of one square inch area. The elastic limit in compression shall be the load which gives a permanent set of 0.001 in.

8. Tension test specimens shall be turned from a coupon not less than one inch in diameter to the form shown in Fig. 2 of the American Railway Engineering Association, General Specifications for Steel Railway Bridges. The diameter of the turned specimen shall be one-half inch.

9. At least one compression test shall be made from each melt for grades A, B, and C; and one compression and one tension test for grade D. For castings weighing

over 100 lb. finished the prescribed tests shall be made for each casting.

10. The hardness of the finished castings shall be tested by the Brinell ball method and a record of the test furnished. The ball shall be of hardened steel 10 mm. in diameter. The load shall be 500 kg. and shall be applied for 30 seconds to a finished plane surface. At least two hardness tests shall be made upon each heat. A test shall be made on each trunnion bearing and each disc.

Cracks or other evidence of excessive brittleness in compression test specimens after load may be cause for rejection.

Recommendations

The committee recommended:

(1) That the conclusion regarding methods of protection of iron and steel structures against corrosion be approved.

(2) That the Specifications for Movable Bridges be received as information and published in the Proceedings, with a view of revising and adopting them for inclusion in the Manual a year hence.

(3) That the report on impact tests be received as information and published in the Proceedings.

(4) That the report on Column Tests be received as information and that the conclusions therein be approved for publication in the Manual.

(5) That the Specifications for Bronze Bearing Metals for Turntables and Movable Railroad Bridges be approved for publication in the Manual.

Suggestions for Future Work

1. Examination of the subject-matter in the Manual and definite recommendations for changes.

(a) Revise the General Specifications for Steel Railway Bridges.

(b) Revise the rules and unit stresses for classifying and rating the capacity of existing bridges.

2. Methods of Protection of Iron and Steel Structures against Corrosion.

Report upon the use of plastic compounds for the protection of steel work exposed to the blast action from locomotive stacks.

3. Relative Economy of Various Types of Movable Bridges.

Revise the Specifications for Movable Bridges and report them for adoption.

4. Secondary Stresses and Impact.

(a) Report definite principles for design to reduce secondary stresses and rules for computing or allowing for them.

(b) Study and draw conclusions from records of impact tests.

(c) Continue impact tests and stress measurements as funds may be available.

5. Column Tests.

Continue with program of column tests as far as the work of the Bureau of Standards will permit.

6. Design, Length, and Operation of Turntables.

(a) Report specifications for the design of turntables and turntable pits.

(b) Report specifications for steel for turntable roller and disc bearings.

7. Ballast Floor Bridges and Methods in Use for Waterproofing.

Report principles for detailed design of flashing, drainage, and reinforcement for waterproofing purposes.

8. Track Scales.

Collaborate with the committee on Yards and Terminals in the design of track scale superstructures.

Committee: O. E. Selby (C. C. C. & St. L.), chairman; F. E. Turneure (Univ. of Wis.), vice-chairman; J. A. Bohlund (G. N.), W. S. Bouton (B. & O.), A. W. Carpenter (N. Y. C.), Charles Chandler (I. C.), J. E. Crawford (N. & W.), F. O. Dufour, W. R. Edwards (I. C. C.), A. C. Irwin (Port. Cem. Assoc.), J. M. Johnson (I. C.), B. R. Lettler (N. Y. C.), Crosby Miller (C. & O.), W. H. Moore (N. Y. N. H. & H.), P. B. Motley (C. P. R.), C. D. Purdon (St. L. S. W.), Albert Reichmann (Am. Br. Co.), J. W. Reid (C. & A.), A. F. Robinson (A. T. & S. F.), H. B. Seaman (Cons. Engr.), C. E. Smith (Cons. Engr.), I. F. Stern (Cons. Engr.), H. B. Stuart (G. T.), G. E. Tebbetts (K. C. T.), L. F. Van Hagan (Univ. of Wis.), Dr. J. A. L. Waddell (Cons. Engr.), H. T. Wely (N. Y. C.).

Discussion

O. E. Selby (Chairman): Reference is made to subject 1, "Revision of Manual." (Mr. Selby then read this matter down to "submitted" in the second paragraph.)

I want to impress that on the members, that these specifications are 12 years old, far from complete and more or less out of date in many respects. We cannot hope to get a complete and satisfactory revision unless we get the ideas of members who have given the subject study. The only way to get that in satisfactory form, is to have them send the matter in to the committee in time to be incorporated in the draft. It would be out of the question to submit specifications to this convention, and have them acted on in detail. The committee presents one conclusion, which is as follows:

"It is concluded from information obtainable to date that the Schoop metal spraying process does not afford satisfactory protection from corrosion."

(After discussion this conclusion was accepted as information only.)

(Mr. Selby then read the matter relating to Subject No. 3).

The President: I must confess that I have not read these specifications carefully, but they show evidence of hard work and considerable thought and study. It is hoped the members of the association will offer their criticisms as invited by the committee, as in this way only can we get the best work done.

(Mr. Selby read the matter under No. 4.)

Mr. Selby: These tests, as you know, are a continuation of tests that have been made by Prof. Turneure's subcommittee for several years past, and the results of these particular tests are given in the form of a conclusion, although the matter is not presented to the convention in the form of a conclusion for adoption in the Manual.

C. P. Howard (I. C. C.): I ask whether that reference to electric locomotives includes the kind that have counter-balance and rods like a steam engine, like the Pennsylvania type, does that refer to that type?

Mr. Selby: The committee will revise that conclusion by the addition of a paragraph showing that there were no reciprocating parts in the locomotives used.

The President: The members will be interested in knowing that the Railway Bureau of the Government of India has requested by cable this week that two of the extensometers used by this committee and designed by Prof. Turneure, be shipped to Simla, India, for the making of impact tests on the locomotives in that country.

(Mr. Selby read the matter under No. 5.)

Mr. Selby: These tests, as you know, have been continued as a series during several years past at the Bureau of Standards in Washington, and they have produced exceedingly valuable results.

(Mr. Selby then read the matter under No. 1, No. 2 and No. 3, on page 793.)

The President: There being no discussion, the matter will be approved and printed in the Manual.

(Mr. Selby here read the matter on subject No. 6.)

The President: As these have been before the members for a year, if there is no further discussion, the chair will entertain a motion to adopt them as a whole.

The President: That completes this report, and while we have a long program, I would suggest that we have a little general discussion on the subject of carrying over bridges and maintenance of bridges that probably would otherwise be replaced, but owing to the present conditions in the world and the difficulty of getting steel, cannot be. Some of the members may have some valuable information if they will tell us what they are doing in this direction.

P. B. Motley (C. P. R.): It seems to me that the Committee on Wooden Trestles and Wooden Stringers should be consulted in regard to the unit stresses in considering carrying over, as far as specifications are concerned, and the subject of over-stress. The Canadian Pacific has a long mileage, and about 68 miles of bridges, if they were all added together. These structures date from about 1887 to the present time. Last year we put in some concrete bridges which are of an extremely interesting character. I refer to two reinforced concrete trestles over 100 ft. high and 600 ft. long, where we are using 37-foot open spans. These trestles were erected by the usual methods of concrete building construction; that is to say, the towers were put up with the usual form work, and the slabs or open spans were put in by a 100-ton wrecking crane. The slabs themselves are made in T-sections, the upper part being used as a deck slab, as well as a compression member. They weigh about 55 tons, and the system of erection is decidedly interesting.

I mention this to show one of the ways in which we can carry over. The cost of steel is just now such as to lead our engineers to consider reinforced concrete, and these two instances are examples of what can be done. So that if our respective managements will not buy 300-foot spans of arch construction or other orthodox steel details, we can go to concrete for such things as trestle work. This is, in other words, the season for short spans. I think that is all I have.

R. H. Ford (C. R. I. & P.): It seems to me there are two thoughts that have to be kept in mind. The first is that we are in, probably, for a very long war. The second is that the roads of this country are going to be placed at a tremendous strain to carry the traffic with decreased manpower, as they have got to do during that period.

A. F. Robinson (A. T. & S. F.): Mr. Chairman and gentlemen: We have got to meet unusual conditions. It is generally relatively easy to determine as to just how much unit stress we dare carry in our steel structures. We may not be able to hold to the unit stress under these conditions even to reasonable limits. I have been asked to rate our bridges on the Cooper's series, with the idea that the Government Committee might be able to make our ratings, say, to E-50, E-55, or something of that sort.

We have got to consider not always what every one of us may count absolutely safe. We have got to find out just how far it is reasonably safe to go, and there will be different locations, different traffic conditions which will modify the judgment. We cannot lay down the rule positively.

There is one phase of this matter, gentlemen, which is not exactly a part of the work of this Committee, you may not call it. It is the timber bridges and timber stringers; 7 in. by 8 in., by 16 in. stringers, it is almost an impossibility to obtain today, because of the shipping work. It is an extremely difficult matter to lay down

fixed rules as to the maximum fiber stress permitted on the stringers. I have recommended to our people something in the way of a sliding rule. We do not adopt any maximum fiber stress. We found that on certain sections of the line we had broken stringers, say with a 3-ply chord, and on other sections of the line with very similar loading we had almost no broken stringers.

The only rule we can go by, I think, is this matter of the percentage or number of broken stringers. We cannot always expect to get along without broken ones. We must, however, use the limit. We have to consider those features, and not attempt to establish a fixed fiber stress. It is going to vary with the different climatic conditions and with different traffic conditions.

E. A. Frink (S. A. L.): Mr. President, it seems to me that judging the capacity of an existing structure is perhaps the most important and at the same time the most difficult problem that the engineer has to face. You can make formulæ for it, you can establish criteria, but they do not answer the full purpose that you want. You can establish certain limits of stress beyond which you ought not to go. But there are so many other questions that come in, that the unit stresses in themselves bear a comparatively small part. I realize the importance at this time of being as liberal as we can safely in allowing overloading of bridges, but personally I think that the matter already contained in the Manual, which establishes the limits which are considered safe for stresses, will be hard to improve upon, except that it would be very well, indeed, to make any investigation possible on the question; but I seriously doubt if we will be able to exceed those limits.

W. H. Courtenay (L. & N.): In many structures it is advisable to strengthen them and carry them over for several years, until the times become better for rebuilding, and a very simple expedient is to put false-work under them. We have had several viaducts we have treated in that way, and some girder bridges. Oftentimes it is feasible to strengthen any ordinary truss bridge by going over it carefully, and if we find the floor weak, or other parts, or the members subject to counter-stresses, strengthen them. That has been done to a considerable extent. Also improve the columns, particularly the top chord sections in some of the older bridges, triangular trusses, inserting additional columns, shorten the length of the top chord sections, and also suspending the web compression members so as to get rid of the effect of their weight. (Mr. Courtenay then described some unique strengthening work done on a trestle in Rigolets pass, on the Gulf coast.)

I. L. Simmons (C. R. I. & P.): It would seem to me with the material conditions as they are now today, that there has never been a time when railroads could so well afford to spend money on engineering as at the present time. You undoubtedly all have a number of bridges built prior to 1892. We have a great many, some of these are truss bridges and some of them are girder bridges. In the case of the truss bridges that were designed prior to 1892, you will find undoubtedly, even for the main sections in most cases they are very good, while the details are not strong enough. It is, therefore, for the engineer to determine what part of the structure is weak. You can well afford to spend considerable money to find out what is the matter and what are the determining features as to the rating of the bridge.

You may find the rivet connections are weak, and that it is a simple matter to ream out the $\frac{3}{4}$ -in. rivet holes, and put in $\frac{7}{8}$ -in. rivets, which will usually take care of the trouble. After you determine what part of the struc-

ture is weak, and whether or not it can be repaired and strengthened, the next question is if the structure has to be changed, what can you put in, and that is the point where you can put in good time and money at this time. Many of the structures cannot be reduced in size. Some, of course, you will have to lengthen.

I believe we should then make a study to find out what kind of structure we can put in and where we can get material of bridge size. This will lead us into the use of concrete, of which I am very much in favor. I am not very much in favor of carrying bridges on false-work. I believe that isn't safe. You are justified in such a procedure only when the work has to be done and you do not have the money to do it properly. I believe it should be worked out gradually.

I believe it would be a good thing for this association to establish a permissible loading for branch lines, or recommended loading for branch lines. We cannot all make our branch lines the same strength we do our main lines. If we could work to that, I believe we would get somewhere with it.

B. R. Leffler (N. Y. C.): I wish to call attention to some methods of reinforcing old steel trestles. In one particular case a trestle was about 75 ft. in height, and an attempt was made to reinforce it by putting timber bents in the middle of the span. I regard that as a questionable practice. In fact, it may be absolutely dangerous. If timber had a co-efficiency of elasticity as high as steel it might work, but being only about one-twentieth the co-efficient of steel, it can be easily seen that any load on a high trestle supported or re-enforced by wooden bents, the wooden bents would not take the load as might be supposed.

The same applies to re-enforced trusses. We have seen trusses with framed bents underneath panel points. The idea being to decrease the span. The result is some eye-bars are placed in compression, and there are a few of these points which must be borne in mind in using timber in conjunction with steel. Think of it in this way—a plate girder is supported rigidly at each end, and in the middle you attempt to support it by a spring about one-twentieth the elasticity of steel.

P. B. Motley (C. P.): If I may be permitted to say something more, I would like to make one remark about the question of overloading. One of the speakers spoke of arriving at a decision as to how we shall allow in our steel bridges for engines that are heavier than the ideal engine for which the bridge is designed.

After a long experience, I consider that it was impossible for this association or this committee to state a definite figure for this purpose. In our experience the only way we have found satisfactory is to classify the floor of a given bridge according to Cooper's loading, and the trusses likewise. Then the engine is also reduced to Cooper's loading, and then one sees quickly whether the flooring or the trusses are overstressed and how much.

Each bridge has to be considered from the point of view of its design, and sometimes a certain point is discovered to be the ruling factor, and then the engineer must use his common sense and fix the limit for the fiber stresses at that particular point. It is no easy task, and especially when the Vice-President and certain other officials want to run certain heavy engines over the road, and put up to you the problem of the investment at stake.

W. S. Bouton (B. & O.): The unit stresses given in the Manual are 22,000 lb. for iron and 26,000 lb. for steel, as the maximum limits for bridge spans used on our road for many years, and we have used those limits without any trouble. The bridges are figured on the

basis of the Cooper E loading and the engines are rated in accordance with the Cooper loading, and the structures worked out in detail. It was, of course, necessary to watch the action of the structures very carefully after they are put in service for some time, but normally there is no trouble at all under such loading. I do not think we can go much beyond the 26,000 lb. on steel. I think that in order to carry structures over during this period, that possibly the trestling of structures offers the quickest remedy.

(F. Auryansen (L. I.) described in some detail a method used for strengthening iron bridges that had steel beam floors carrying brick jack arches. J. L. Campbell (E. P. & S. W.) outlined an example of conservation in the case of the viaduct of the Southern Pacific over the Pecos river. This structure is one of the high bridges of the world. It became necessary to have a heavier structure, and a scheme was worked out for reinforcing the bridge, which was accomplished by putting in a third truss in the center line of the track and strengthening the columns by riveting additional angles to them.)

Mr. Leffer: I happen to think of another important

feature in connection with taking care of old bridges. I have in mind bridges constructed with plate girders. In all my experience I have not found a plate girder that failed by direct tension in the bottom flange. It is nearly always a failure, if there is one, by buckling of the top flange, due to improper lateral bracing.

In many old concrete spans such as were made along in the 90's, the lateral system did not receive the attention in designing that it should have received, and by removing the lateral system, which requires a very small amount of steel, many plate girder spans can be made very serviceable.

Another feature is to make old girder spans and double them up, and it seems to me that right there lies a field where the different roads could interchange material.

Mr. Auryansen: One simple expedient is to revert to the slow order. That immediately reduces our load. The only trouble is that it is very apt to be overlooked. These orders have to be observed, and it is not sufficient to have some papers in the file. Otherwise that method would automatically reduce our loads and increase the capacity of the bridges by just that much.

(The committee was excused with thanks.)

Report of Committee on Signs, Fences and Crossings



LAST YEAR THE committee submitted considerable information relative to the depth and width of flangeways in use on steam and electric railways throughout the United States. Owing to the great variety in dimensions of flangeways and to the great amount of information submitted by the railroads, the committee was not able to present this information in the form it desired, nor was it able to make any study looking to a recommendation for standard dimensions of flangeways. During the year this information

has been tabulated showing the dimensions of flangeways in use on the different steam and electric railways. After a careful consideration of this data, the committee recommends the following dimensions for flangeways:

STRAIGHT TRACK.					
Steam Railways		Electric Railways			
Depth of Flange	Width of Flangeway	Depth of Flangeway	Depth of Flange	Width of Flangeway	Depth of Flangeway
M. C. B. Standard	1 3/4 in.	1 7/8 in.	1 7/8 in.	1 3/4 in.	1 3/4 in.
			1 in.	1 5/8 in.	1 1/2 in.
			1 1/2 in.	1 3/4 in.	1 3/8 in.

For flangeways in curved tracks of steam railways an increase in width of 1 1/16 in. for every 2 deg. of curvature over 2 deg. is recommended. For flangeways in curved tracks of electric railways no special increase is recommended, as the above dimensions cover ordinary operating conditions. On some roads the width of flangeway is increased as the gage is increased, so as to keep the distance between the gage line and the wearing surface of the opposite guard rail uniformly 4 ft. 6 3/4 in., which is good practice and recommended for excessive curvature.

For flangeways of steam railway tracks located in paved streets, the reports show widths generally ranging from 1 1/2 in. to 2 1/2 in., with one case each of 3 in. and 4 in. These flangeways are formed by rails laid on side, rails placed upright with separators, planks and other

paving materials, and special guard rails. For flangeways of electric railway tracks, located in paved streets, the widths generally range between 1 1/2 in. and 2 in., although one case reported a width of 3 in., another 3 1/2 in.

The depth of flangeways of steam railway tracks varies generally from 1 1/2 in. to 2 in., with two cases of 3 in.; while the depth of flangeways of electric railway tracks varies generally from 7/8 in. to 1 3/4 in.

Signs—The Principles of Design and Rules for Their Use

The committee had prepared a progress report embodying a set of signs for general use, the scheme being a rather radical departure from the signs at present in use on the railroads of the United States and Canada, in that lettering was largely eliminated. The underlying principle in the design was that signs used in connection with the operation of trains and for warning the public at highway crossings should be made as prominent as possible, while those delineating property and marking corporation limits, mileage, bridges, etc., should be made less conspicuous.

Upon taking the matter up with the committee on Signals and Interlocking, it was found that that committee had given the matter very careful consideration, and had arrived at the following conclusion:

"Some of the so-called signs govern train operation just as much as the movable semaphore of an interlocking or block signal system, and these signs are recognized in the standard code of the American Railway Association as signals. A note to the definition of fixed signal, on page 235 of the Rule Book of the American Railway Association, reads as follows: 'The definition of a "Fixed Signal" covers such signals as slow boards, stop boards, yard limits, switch, train order, block, interlocking, semaphore, disc, ball or other means for displaying indications that govern the movement of a train.' Under this definition, slow boards, stop boards, etc., are in fact signals. It seems that the work of this committee should be confined to designing these signals, and that the designing of information signals is properly a subject to be handled by committee No. 9, excepting that there

should be conference between the two committees to the end of avoiding any confliction which might result in confusion."

The committee is in accord with the above conclusion and can see no advantage in submitting another set of designs at this time.

In view of the fact that we now have government control of railroads, which may lead to the transfer of men from one road to another, as is being done with equipment, it would seem most desirable that uniform signs should be adopted by all railroads. As efforts are being made from year to year to secure more permanent materials for various structures, it is considered most desirable that concrete be utilized for all information signs and, when possible, for other signs, all suitably marked to convey the necessary information.

Legal Requirements Relative to Right-of-Way Fences and Stock-Guards

Last year the committee submitted abstracts from the laws of the various states of the Union and Canada, on the legal requirements relative to the provision of fences for right-of-way and installation of stock-guards. In the discussion of the report at that time, it was suggested that a tabulated statement be prepared, giving the principal information shown in the abstracts—when the laws were passed, what constituted a legal fence, and other information of this character. The committee therefore presented, in tabulated form, the information suggested in the discussion.

The laws of but 19 states and the Dominion of Canada specify the height of a legal fence, and the laws of but 26 states and the Dominion of Canada specify the material to be used in their construction. The laws of a number of the remaining states are entirely silent on the matter of what constitutes a legal fence, some of the laws making no mention whatever of the material to be used or the height, but specifying in a general way that the right-of-way shall be fenced so as to turn the various kinds of live stock. In a few instances, the railroad companies are obliged to secure the approval of the railroad commission for both fences and stock-guards.

From the above, it would seem apparent that some concerted action should be taken by this Association, or by some other similar body, looking to the adoption of a uniform fence law. Under present conditions, it is difficult in many cases to decide damage cases on account of the uncertainty as to what constitutes a legal fence.

Types of Fences

This year the committee collected a number of photographs illustrating special fences suitable for use around industrial plants, railroad yards, etc. The investigation has disclosed the fact that there is a great variety of fences in use at this time for the above purpose, ranging from the ordinary wood picket fence, in general use years ago, to the solid board fence surmounted by strands of barbed wire, and from the ordinary iron picket fence to the heavy galvanized woven wire fence, surmounted by strands of barbed wire, shown in the accompanying illustrations. These fences are usually about eight feet in height, and their use has increased very rapidly within the last year or two, particularly around industrial plants engaged in the manufacture of material used in connection with the prosecution of the war.

Another rather common form of fence around railroad property consists of angle iron rails and pickets with flat iron bars for posts and braces.

Over and Under Grade Crossings

The committee presented abstracts of laws or regulations of the public utilities commissions of 47 states and the District of Columbia relative to over and under grade crossings—their method of construction, distribution of cost, etc.

End or Strain Posts

It does not appear that special devices, which have been introduced by the manufacturers of steel posts to avoid the expense attendant upon the use of concrete with strain and corner posts, have been adopted by railroads to any extent. But one correspondent reports the use of such devices with tubular posts and, as these were only installed in 1917, their effectiveness has not been determined. The cost of the 8 ft. 6 in. No. 9 gage post in this instance is given at \$2.80 and the cost of setting at 40 cents. Two of these devices are shown on the accompanying drawing. With that marked "A," a hole is dug for the strain post large enough to admit the anchor plate. After backfilling the hole the face plate is driven. The brace plate is driven after attachment to the brace rod. It is necessary to dig a trench to receive the lower end of the brace rod. The post shown at "B" is driven into the ground as indicated, the post is split at the bottom and is spread out as it nears its final position. This is accomplished by first driving to proper depth a rod having a wedge-shaped enlargement at the lower end greater in diameter than the interior of the post. This arrangement does not work very well in soft ground because the spreader will be forced down with the post.

Some information has been received from the manufacturers concerning a steel line post of U section. These posts are about 2 in. square. Rectangular steel pegs about 18 in. long are driven through slots in clips bolted on to the posts just below the ground surface to hold the fence in line. Strain and corner posts are tubular, 2½ in. or 3 in. in diameter. A horizontal tubular strut is placed between the strain post and the adjacent line post at about two-thirds the height of the fence and a tie wire or rod leads from the line post end of this strut to the strain post at the ground line. The manufacturers report considerable use of this fence about industrial plants and two railroad companies are also reported to be users. This post is also shown in the drawing.

Another form of anchor post is shown at "D." This post consists of two standard line posts placed back to back, and either bolted or riveted together, and braced by a standard line post attached to the anchor post as shown by the illustration. This style of post has been used considerably for fences subjected to the lighter service, and has also been used to some extent in railroad right-of-way fences.

Some companies have continued the use of wood strain and corner posts with steel line posts. This has the advantage of cheaper first cost, but its final economy depends, of course, on the relative length of life of the wood post, the steel line post and the wire.

The ordinary method of setting steel strain and corner posts in concrete is well illustrated in the standard fence of the Elgin, Joliet & Eastern. There is considerable variation in the amount of concrete used by different companies. Blocks 8 in. square by 36 in. deep are reported by one company, while another uses a block 20 in. square and 42 in. deep. A fair average for such blocks is 18 by 18 by 30 in. Brace rod blocks have about one-half the above volume.

Angular strain posts are provided with a cross angle, similar to a cleat, attached at the bottom by means of a triangular plate. Brace angles, which are attached to the

post by means of a bolt or rivet, are similarly enlarged at the bottom. Sufficient information to form an opinion as to the effectiveness of this arrangement has not been received.

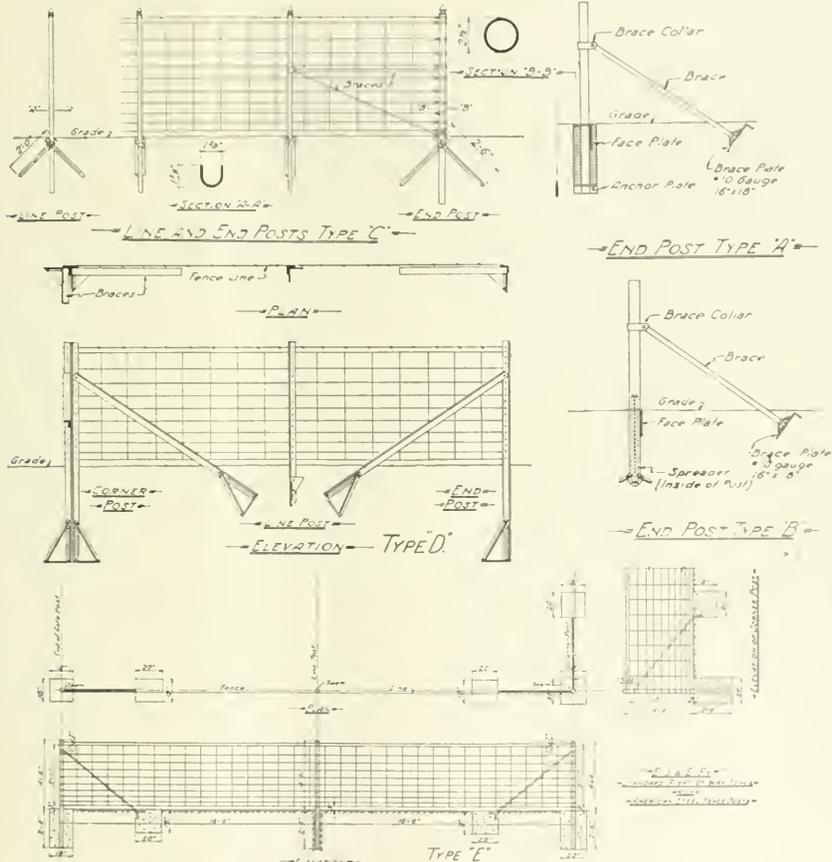
Concrete Fence Posts

While the committee does not have any definite data as to the annual expenditure of the railroads for fence posts, it is probable that it is considerably over \$1,000,000. There are more than 250,000 miles of railroad lines in the United States and, while this committee does not know just what percentage of this mileage is fenced, it

extensively have abandoned using concrete posts until a more satisfactory design has been gotten out or brought to their attention.

Of the 18 roads that have tried concrete posts, 10 favor their use, 1 favors steel, 3 favor wood and 4 are undecided. Of the 66 roads that are not using concrete posts, 3 favor the use of concrete posts, 1 favors steel and 8 favor wood. The other 54 roads did not express a preference. Thus, of the 25 roads that did express a preference about 50 per cent favor concrete posts, 10 per cent favor steel, and 40 per cent favor wood.

The committee is led to the conclusion that concrete



Several Designs of Fence Construction

is quite certain that there are at least 75 to 100 million posts in use, costing on the average 15 cents or more each.

Apparently the Pennsylvania Railroad began experimenting with concrete fence posts about five years before any of the other roads, the first posts being set by them in 1904. Such good results were obtained with these first posts that in 1909 they began to experiment on a larger scale. Since 1909 the use of concrete posts by railroads has gradually increased until at the present time there are about 800,000 in service. In a general way, it may be said that these posts are giving good satisfaction, although for various reasons a great many failures have occurred and several roads that have experimented quite

line posts having a strength sufficient to resist a force of 200 lb. acting along or at right angles to the fence line and applied 60 in. above the ground line, the post acting as a cantilever beam, are strong enough to give good results. Too much stress can hardly be laid on the use of an adequate amount of steel properly placed. In 1914, under the direction of this committee, 78 concrete line posts of different types were tested to destruction at the Lewis Institute, Chicago. In spite of the fact that the concrete used in the posts varied in its crushing strength from 1,530 to 3,250 lb. per sq. in., every post failed in tension. It is probable that some of the failures were indirectly due to poor concrete, allowing the steel to slip,

but by far the greater number were due to the failure of the steel itself. Among the other things that were brought out by these tests was that stranded or crimped reinforcing should not be used, but that the steel, whether smooth or deformed, should be in the form of a straight, stiff bar. The committee also believes that square or round rods, moderately deformed, are preferable to strap iron, since the former permit the concentration of the steel further from the neutral axis and since the latter tend to set up lines of cleavage in the concrete.

The committee, in sending out its inquiry blanks this year, asked the members to describe the methods used to fasten the fencing to the line posts and to state what success they were having with such methods. Ten companies are using tie wires around the posts and 8 of the 10 express themselves as satisfied with this method. Five are using posts with a hole in the same through which a wire or a nail is passed and fastened to the reinforcing. Four of the 5 are satisfied with this method. Three companies are using staples embedded in the concrete, through which the tie wires or nails are passed for fastening the fencing; this method being satisfactory to all three. When posts are tapered, a tie wire around the post, if properly applied, will prevent stock from crowding the fencing down, but the experience of some roads indicates that it will not prevent hogs from raising it up, so that in districts where hogs are raised extensively some other method of fastening is preferable.

As to the annual cost of concrete line posts, it seems probable that with prices as high as they now are and will doubtless be for several years, the minimum will be about two and a half cents. In the case of materials that have a comparatively short life, such as wooden fence posts, anything that materially increases or decreases the average life will have a considerable effect on the annual cost. For example, if a wooden fence post costing 35 cents in place has a life of 10 years, its annual cost will be 4.55 cents; whereas, if its life were 15 years the annual cost would be only 3.22 cents. On the other hand, if concrete line posts costing 45 cents have an average life of 50 years, the annual cost would be 2.47 cents, and increasing the average life to 60 years would only reduce the annual cost to 2.38 cents. In other words, if we can produce concrete line posts that will have an average life of, say, 50 years, we gain very little, as far as annual cost is concerned, by adding a few more years to their life, and any material decrease in this annual cost will have to be effected by reducing the first cost. This brings out the fact that excessively large and expensive concrete posts are to be discouraged and that a post should be built to the size and strength that is economically profitable and no larger.

In line with this idea, it appears to this committee that any specification as to minimum size and reinforcing of concrete posts is a mistake. In spite of all devices and safeguards the quality of concrete is and will always be largely dependent on the human element and on local conditions, and the committee believes that such posts should be built to a minimum strength rather than size. Just what this strength should be, the committee is not prepared to say at this time, but it is quite certain that posts capable of withstanding a load of 200 lb. when tested as a cantilever beam would be strong enough and it is thought that this strength may be greater than is necessary, particularly in some localities.

Conclusions

The conclusions of the committee, based on the information obtained this year, may be summed up as follows:

1. The committee repeats its conclusion of 1914 that, "Concrete fence posts are practical, economical and a suitable substitute for wood."
2. Reinforcement should be placed as near to the surface of the post as practicable, say $\frac{1}{2}$ in. from the surface.
3. Posts should taper from base to top.
4. Square corners of posts should be rounded off to a radius of not less than 1 in.
5. Concrete should be made from clean, hard, aggregates, the percentage of the various sized grains being such as to produce a dense concrete, using screen analysis as a guide. The minimum size of the particles of gravel or crushed stone should not be less than $\frac{1}{4}$ in. nor more than $\frac{1}{2}$ in. Concrete should be mixed in the proportion of one part cement to not more than four parts of mixed aggregate. Concrete should be of such a consistency that water can be brought to the surface by tamping; the use of an excess of water is detrimental. Concrete should be very thoroughly mixed in a batch, not a continuous mixer.
6. Reinforcing should be in the form of stiff round or square rods, preferably deformed, made from steel with a high elastic limit. Crimped or stranded reinforcing that would be straightened out when brought into tension should not be used. Some method of positively holding the reinforcing in its proper place in the post throughout its entire length should be used.
7. Jogging or vibrating molds to compact the concrete in the post, or some other method that will accomplish the same purpose, should be employed.
8. Posts should be carefully made so as to secure a uniform strength in substantially all posts, and this strength should usually be such that the post will withstand a force of not less than 180 lb. at right angles to the axis of the post, the post acting as a cantilever beam supported at the ground line and the force being applied 60 in. above the ground line. It is not economical to make posts that will have the strength to resist a force of over 200 lb. when the post is tested in the manner above described.
9. Square, or nearly square, posts are more efficient than round posts in resisting the forces that ordinarily cause failure, but the difference is not very great and may in some cases be offset by an increased resistance to deterioration and better methods of manufacture.
10. On account of the rapid failure of reinforced concrete when exposed to air containing salt spray, concrete fence posts should not be used within twenty or twenty-five miles from large bodies of salt water.
11. Posts should not be made out of doors in freezing weather. They should not be exposed to the sun, and should be sprinkled with water the first eight or ten days after being made to aid curing.
12. Molds should be carefully oiled or soaped to prevent concrete sticking to them.
13. Posts should be cured for not less than 90 days, when cured naturally, before being set or shipped.
14. Posts should be carefully handled and packed in straw, sawdust or other suitable material for shipment.
15. The study of the results obtained from concrete line posts should be continued from year to year and the results tabulated for the information of the Association.

Analysis of Cost

For the purpose of making a revised analysis of the comparative annual cost of fences, inquiries were sent out soliciting data on concrete and steel line posts only, the intention being to use the data collected in 1915 for wood posts. In 1913, information was submitted with

respect to the comparative cost and economy of steel and wood posts. The figures relative to steel posts given at that time were furnished largely by the manufacturers. This year information has been received from 20 users of about 140,000 steel posts and 18 users of about 800,000 concrete posts and a comparison has been made between this and the rather full information relating to wood line posts, presented in 1915.

From 1915 data it appears that the average cost and life of wood posts is as follows:

Kind of Wood	Life	First Cost	Handling	Setting	Total Cost
Bois D'arc	26 Yrs.	14c	1.72	8.52	2434c
Catalpa	15 Yrs.	17c	1.72	8.52	2734c
Cedar	15 Yrs.	16c	1.72	8.52	2644c
Chestnut	11 Yrs.	14c	1.72	8.52	2434c
Cypress	11 Yrs.	20c	1.72	8.52	3034c
Locust	17 Yrs.	20.5c	1.72	8.52	3034c
Pine	9 Yrs.	14.5c	1.72	8.52	2434c
Oak	8 Yrs.	11c	1.72	8.52	2134c

Of the above the cedar post is the cheapest, with the exception of the Bois D'arc, and is used in much larger quantities than any of the others. The steel and concrete posts will be compared with it. Information received this year indicates the average first cost of the steel line post to be 27 cents and the cost of handling and setting, 7 cents. The average estimate of life is from 15 to 20 years. The average first cost of concrete line posts is about 25 cents, and the cost of handling and setting about 20 cents. The estimated life of concrete posts is placed at 50 years.

As in the 1913 report, interest is assumed at 6 per cent. The result of this comparison is as follows:

	Wood 20 yrs.	Steel 50 yrs.	Concrete 50 yrs.
Estimated average life	15 yrs.	0.340	0.4500
Average first cost in place	0.2625		
Annual Cost			
Interest on first cost at 6 per cent.	0.0157	0.0204	0.0270
Amount to be set aside annually to reproduce			
First cost at end of life	0.0113	0.0092	0.0015
Total annual cost	0.0270	0.0296	0.0285
Cost per mile (640 posts)	17.28	18.97	18.24

The above comparison should be considered as roughly approximate only, when applied to a particular case, because the life of wood, steel and concrete posts is affected by locality and the weight of metal and quality of galvanizing must be taken into account. At the present time steel posts are from 50 per cent to 75 per cent higher in price than quoted above, and deliveries are very indefinite.

The information received relative to the cost of strain and corner posts in place is so meager and variable that a comparison similar to the above for line posts does not seem warranted.

Conclusions

The committee recommended in its report:

1. That the recommendations under "Flangeways" be approved and published in the Manual.
2. That the recommendations of the committee in reference to "Types of Fences" be approved and published in the Manual.
3. That the recommendations of the committee in reference to "Concrete Fence Posts" be approved and published in the Manual.
4. That the remainder of the report be accepted as information.

Committee: W. F. Strouse (B. & O.), chairman; Arthur Crompton (G. T.), vice-chairman; F. D. Batchellor (C. H. & D.), H. E. Billman (M. P.), C. G. Bryan (I. C.), G. F. Black (Me. C.), A. C. Copland (C. & O.), A. S. Butterworth (M. P.), B. J. Dalton (M. K. & T.), F. T. Darrow (C. B. & Q.), G. N. Edmondson (N. Y. C.), R. C. Gowdy (E. W. & D. C.), Paul Hamilton (C. C. & St. L.), Maro Johnson (I. C.), L. C. Lawton (A. T. & S. F.), S. L. McClanahan (C. R. I. & P.), L. A. Mitchell (Un. Tr. Co.), T. E. Rust (W. C. F. & N.),

A. Swartz (T. & W.), W. D. Warren (N. Y. N. H. & H.), W. D. Willson (Cin. Nor.), K. G. William (C. R. I. & P.)

Discussion

W. F. Strouse (Chairman): The committee was assigned eight different subjects. In reference to subject number 1, the report on this subject appears in appendix A, and the recommendations of the committee are given at the end of that section for approval and publication in the Manual. In connection with that report you will find series of tables giving the dimensions of flangeways of electric railways, steam railways, etc., and the conclusions that are recommended for placing in the Manual. I move the adoption of the sections concerning flangeways.

(Motion carried.)

C. E. Lindsay (N. Y. C.): I apprehend that there might be a possibility in widening the flangeway $\frac{1}{4}$ in. for every 2 deg. of curvature that it might in some cases violate the action of the guard-rail; that is, it might decrease the distance between the top of the rail and the frog point so that it would strike.

Mr. Strouse: I would say in answer to that, this contains the statement:

(Mr. Strouse read the sentence beginning "on some roads.")

I think that will take care of it, and that impression is borne out by the information that was furnished the committee, a great deal of which was not published in this report.

Mr. Lindsay: That is obligatory, that it shall not violate that distance.

Mr. Baldrige: I should like to ask the committee whether or not it has taken into consideration in fixing this width of flangeway, the proposal which has been acted upon, I think, by some other committee, sanctioning the thickening of the flanges of the wheels?

Mr. Strouse: So far as I know that matter has not been given consideration.

Mr. Baldrige: If I remember correctly, one of the other committees has in its report a statement sanctioning the proposal of the Master Car Builders' Association thickening the car wheel flange $\frac{1}{8}$ in. If that matter has not been considered by this committee, it seems to me it would be advisable to hold this another year to consider that.

John R. Leighty (M. P.): There is no reason why we should defer action on this committee's work on account of the subject just mentioned, so long as this report does not violate any of the conditions proposed. The design of frogs and switches and their flangeways will be taken care of in the same way as the other.

Mr. Baldrige: If I remember our flanges for frogs and switches, they provide for 1 $\frac{3}{4}$ in. on the rail side and 1 $\frac{3}{4}$ in. on the frog side. That gives $\frac{1}{8}$ in. more in that case than we are providing in this case. Unless that matter has been considered, I think the committee should take it up. As I remember, the other report provided for sanctioning the thickening of the flange of the wheels, provided the face of the flange of the wheel extended a certain amount. Why not refer this back and have the adjustment made?

The President: My idea was that it was the face to face distance, wasn't it?

Mr. Baldrige: I understand the face is the side of the flange next the rail.

The President: The point that seems to be dangerous here, if you get up to 25 deg. you have gone beyond the limit of that equation. However, it is immaterial.

Mr. Strouse: Last year copies of the laws relating to

fences for rights of way were presented, and the committee was asked to tabulate the principal information contained in those laws. This has been done, and is presented as information.

The President: It will be so accepted.

Mr. Strouse: Subject No. 5 is, report on Classification of Fences into Types. Several years ago the committee revised the specification for fences as given in the Manual and submitted considerable other information as in connection therewith. This year we have some photographs of a number of different styles of fences that are used. The committee recommends the inclusion of these photographs in the Manual as supplementing the sketches that are already in the Manual for illustrating other styles of fence.

I remember several years ago that in discussing the specifications for fences, the association was very guarded in recommending any particular type of fence; but it seems to me that that point could be covered very nicely by the passage of uniform fence laws. As it is now some of the fences are 4 ft. high, some are 4½ ft., some are allowed to be constructed of wood in various combinations, and others posts of various types, the result being that a different construction might be placed on what constitutes a legal fence in every state.

Mr. Lindsay: I was going to ask, whether the committee considered that with these illustrations and the material already in the Manual, they have shown all types of fences that are used on railroads.

Mr. Strouse: No, I would not say all types.

Your chairman was somewhat in doubt as to just what was meant by being asked to report on classification of fences into types. It did not seem to me to be anything very definite in the wording of the subject.

F. Auryansen (L. I.): There are two types of fence, one you can see through and the other that you cannot. I think the committee ought to get some data regarding concrete fences.

Mr. Baldrige: As there seems to be divergence of opinion, I move that this be referred back to the committee for another year.

The President: The committees say they will accept that suggestion.

R. C. Gray (B. & O.): Under the title, Ohio, the statement is made "the power to deal with matters of this nature is vested in municipalities." I think that statement should be made in counties and municipalities. In Ohio we have about as many overtures from boards of county commissioners as we have from municipalities.

The President: The committee will accept that.

Mr. Strouse: Appendix G is a further study on the subject of concrete fence posts; in other words, the subject has been brought down to date. Tables were prepared from information received from various railroads which have given the use of square posts, round posts, etc. The conclusions arrived at by the committee under the subject of concrete posts are similar to the conclusions that are at present in the Manual, except that they are somewhat more elaborate. This is supposed to be a substitute for what is in the Manual.

Prof. Talbot: In Sec. 10 I find no reference to the data on which that conclusion was based. Can the committee give us any further information in their report?

Mr. Auryansen: I might say in answer to Prof. Talbot that 25 miles from salt water includes all of Long Island, and the Long Island Railway built quite a number of fences having 3-in. slabs which were reinforced and properly held in place so that they could remain in the center of the slab. The fences are over 10 yrs. old and there is absolutely no sign of deterioration.

Prof. Talbot: In view of that statement, I make the motion that that No. 10 be referred back to the committee.

A. O. Wilson (S. A. L.): Mr. President, the Navy Yard at Charleston is enclosed with reinforced concrete posts, and they show no deterioration whatever. This fence has been up a number of years, and I don't think that paragraph 10 will hold.

Mr. Strouse: In regard to that point, I only know in a general way that there have been a good many failures in concrete exposed to salt water, but whether it is necessary to place such a distance between the salt water and the structure is another question. I rather feel myself that that is a little too great a distance. I move that these conclusions, with the exception of No. 10, be adopted and placed in the Manual, as revised.

(The motion was carried.)

Mr. Strouse: There is one other subject, number 8. The committee undertook to revise the cost and bring it down to date, but found the present time rather a bad one to attempt anything elaborate in that direction, on account of the excessive cost of labor and material, and the cost analysis that is given deals with the cost of various kinds of posts that have been in vogue the last few years. It is only submitted as information.

The President: It will be so accepted.

(The committee was dismissed with the thanks of the association.)

Report of Special Committee on Stresses in Track

THE JOINT COMMITTEE of the American Railway Engineering Association and the American Society of Civil Engineers has been conducting elaborate experiments on the action of track under standing and moving loads for the last five years. An extensive progress report was published in the Proceedings of the American Society of Civil Engineers for January, 1918. This same report was also presented to the American Railway Engineering Association yesterday. This report was abstracted in the *Railway Age* of February 22, page 403.

Committee: A. N. Talbot (Univ. of Ill.), W. M. Dawley (Erie), A. S. Baldwin (I. C.), G. H. Bremner (I. C. C.), W. J. Burton (M. P.), Chas. S. Churchill (N. & W.), W. C. Cushing (P. L. W.), Dr. H. P. Dudley (N. Y. C.), Robt. W. Hunt (Con. Engr.), J. B. Jenkins (B. & O.), George W. Kittredge (N. Y. C.), P. M. LaBach (C. R. I. & P.), G. J. Ray (D. L. & W.), H. R. Safford

(G. R.), Earl Stimson (B. & O.), F. E. Turneure (Univ. of Wis.), J. E. Willoughby (A. C. L.).

Discussion

Prof. Talbot (Chairman): The committee on Stresses in Track presents its first progress report. The report includes first an analysis of the action of track as an elastic structure; second, the description of the instruments and apparatus used, and the methods of conducting tests; and third, the results of the tests.

It is felt that the analysis of the action of the track as an elastic structure is of value, in giving something to permit comparison of results, and to add comprehension to what may be expected in track action. The Manual assumes a uniform elastic support, which, of course, is not the condition where ties are used, and is not the condition where the track is not well tamped, but it does

indicate some of the effects of the kind of ballast, of spacing and size of ties and the effect of the moment of inertia of the rail section. These enter into the treatment.

The results of the tests given here are mainly those relating to stresses in the rail, the work on stresses in ties, depression of the ties and the conclusion of distribution of the pressure downward and laterally through the ballast being held for a later report.

In regard to the stresses in rails, the report gives something on the effect of the load itself in forming a stress in the rail; of the distribution of the load along the rail as in the case of trucks or drivers of different spacing; gives something about the effect of the weight of rail with reference to the bending moment, as well as to the weight the moment develops, as well as to the stresses found in the rail.

Since this report was presented, tests have been made further, on the matter of the counter-weight. It seems

best to refer to that here, in order that the impression may not prevail that since no differences were found in the tests made as reported here on the effect of the position of the counter-weight of the drivers of the locomotive, that may not be considered to be the finding of the committee. In a case where tests have just been worked up, rather excessive effects were found from a locomotive which was undoubtedly either badly balanced or poorly designed.

The President: I would say that this was a little better than a report, that this was a classic, and judging from a mere glance at it, it would look as though we might spend considerable time in the discussion of it if the lateness of the hour did not forbid. I understand the committee will continue this work and submit another report at the next convention.

(The committee was dismissed with the very sincere thanks of the association for the very good work that apparently has been done.)

Report of Committee on Rail



THE MANUAL FOR 1915, page 88, shows three locations of borings for chemical analyses of rails, one in an upper corner of the head, one in the interior of the head near the web and the third in a flange. Experience and special tests have shown that the samples from the corner of the head and from the flange have about the same chemical composition and for general purposes the flange sample may be omitted.

The same page of the Manual also shows a drawing for the tensile test specimen of

1½-in. diameter and 2-in. gage length, with threaded ends. This followed the standard of the American Society for Testing Materials, which have modified its standard by omitting the threaded ends and allowing the ends to be of any form which will fit the holders of the testing machine. Our drawing should also be modified in the same manner to accord with current practice in testing laboratories. The Rail Committee recommends this drawing be substituted for the one on page 88 of the 1915 Manual.

The 1915 Manual contains "Specifications for High-Carbon Steel Joint Bars" (page 89) and "Specifications for Heat-Treated, Oil-Quenched Steel Joint Bars" (page 91). At the convention of the Association in March, 1916, the committee submitted "Specifications for Quenched Carbon and Quenched Alloy Steel Joint Bars," to be held over for one year. At the 1917 convention, some changes were submitted and it was again recommended that the specifications be held over for another year. The committee now presents these specifications as modified last year, with the recommendation that they be adopted and supersede in the Manual the "Specifications for Heat-Treated, Oil-Quenched, Steel Joint Bars."

Specifications for Quenched Carbon and Quenched Alloy Steel Joint Bars

Access to Works

1. Inspectors representing the purchaser shall have free entry to the works of the manufacturer at all times

while the contract is being executed and shall have all reasonable facilities afforded them by the manufacturer to satisfy them that the joint bars have been made in accordance with the terms of the specifications.

Place for Tests

2. All tests and inspection shall be made at the place of manufacture, prior to loading, and shall be so conducted as not to interfere unnecessarily with the operation of the mill.

Rejection at Destination

3. Joint bars which show injurious defects subsequent to their acceptance at the place of manufacture or sale will be rejected and returned to the manufacturer, who shall pay the freight charges both ways.

Material

4. Material for joint bars shall be steel made by the Open-Hearth process or an acceptable alloy steel.

Chemical Properties

5. The chemical composition of each melt of steel from which joint bars are manufactured shall be within the following limits:

Carbon, per cent..... 0.42 to 0.55
Phosphorus, per cent, maximum..... 0.04

Note.—In the event of nickel and chromium being present to the extent of 1.00 per cent and 0.35 per cent, respectively, these elements will be considered as the equivalent of 0.07 per cent of carbon in the above requirements.

6. The manufacturer shall furnish the inspector a complete report of ladle analysis showing carbon, manganese, phosphorus and sulphur content of each melt represented in the finished material. The purchaser may make a check analysis from the finished material; such analysis shall conform to the requirements of Section 5.

Physical Properties and Tests

7. Joint bars shall conform to the following physical requirements:

	Quenched Steel	Alloy Steel
(a) Tensile strength, lb. per sq. in., minimum.....	110,000	130,000
(b) Elastic limit, lb. per sq. in., minimum.....	70,000	85,000
(c) Elongation, per cent in 2 in., not less than.....	1.00	1.00
Minimum, 12 per cent.....	Ten Str.	3.5-5.00
(d) Reduction in area, per cent, not less than.....	Ten Str.	Ten Str.
Minimum, 25 per cent.....		
(e) Cold bending of the quenched bar without sign of fracture on the outside of the bent portion through 90 deg around an arc, the diameter of which is three times the thickness of the test specimen.		

8. All test specimens shall be cut from finished bars.

(a) The tension test specimens shall be about $4\frac{1}{4}$ in. long with threaded or unthreaded ends, and with the central 2-in. length turned to a $\frac{1}{2}$ -in. diameter, in accordance with the form and dimensions for tension test specimens of the American Society for Testing Materials.

(b) The bend test specimens shall be $\frac{1}{2}$ -in. square in section or a rectangular bar $\frac{1}{4}$ -in. thick with two parallel faces as rolled.

(c) The elastic limit shall be determined by the use of the Berry strain gage, or similar instrument, and will be the load when the elongation shows a change in the rate of stretch, the machine being operated at not more than $\frac{1}{4}$ -in. per minute. After the elastic limit is reached the speed shall not exceed 2 in. per minute.

Quenching

9. (a) Joint bars shall be quenched in oil, or water if so specified, from a temperature of about 810 deg. C. (1490 deg. F.) and shall be kept in the bath until cold enough to be handled. A group thus treated is known as a quenching charge.

(b) Material which requires quenching in water will be acceptable at the option of the purchaser, provided it meets the requirements of the specification in all other respects.

General Requirements

10. Joint bars shall be rolled to dimensions specified in drawing furnished by the purchaser. No variation will be allowed in the dimensions affecting the fit and the fishing spaces of the rail. The maximum camber in either plane shall not exceed $1/32$ -in. in 24 in.

11. Joint bars shall be sheared to the length prescribed by the purchaser and shall not vary therefrom by more than $\frac{1}{8}$ in.

12. (a) All joint bars shall be punched, slotted and shaped at a temperature of not less than 800 deg. C. (1470 deg. F.).

(b) All bolt holes shall be punched in one operation without bulging or distorting the section, and the bars shall be slotted when required for spikes in accordance with the purchaser's drawing, the slotting being done in one operation. A variation of $1/32$ -in. in location of the holes will be allowed.

13. All types of joint bars shall be finished smooth and true without swelling over or under the bolt holes, and shall be free from flaws, seams, checks or fins. The fishing angles shall be fully maintained.

Branding

14. The rolled bar shall be branded or marked for identification in the following manner and a portion of this marking shall appear on each finished joint bar:

(a) A portion of the name of the manufacturer, the year of manufacture, the numbered design and the kind of material shall be rolled in raised letters and figures on the outside of the bars.

(b) The letters "O H" shall be used to indicate "Open-Hearth Steel."

(c) The letter "Q" shall be used to show that the joint bars have been "quenched." If the joint bars are also tempered, the letters "Q T" shall be used to show that they have been "quenched and tempered."

(d) The number of the melt shall be plainly stenciled on each lot of bars.

Inspection

15. The joint bars from each melt or heat treatment lot shall be piled separately until tested and inspected by the inspector. One joint bar for tension test shall be selected by the inspector for each melt or heat treat-

ment lot represented in finished bars. One joint bar for bend test shall be selected by the inspector for each lot of 1,000 bars or less presented or from each heat treatment lot.

Rail Failure Statistics

The statistics covering rail failures for the period ending October 31, 1916, were issued in Bulletin 199 for September, 1917. The average failures per 100 track miles of the rollings for the several years, including both Bessemer and open-hearth rails, are given herewith. This summary includes statistics from reports for 1913, 1914, 1915 and 1916:

Year Rolled	Years Service				
	1	2	3	4	5
1908	.....	.....	.....	.....	398.1
1909	.....	.....	.....	224.1	277.8
1910	.....	.....	124.0	152.7	198.5
1911	.....	77.0	104.4	133.3	176.3
1912	28.9	32.1	49.3	78.9	.....
1913	12.5	25.8	44.8	.....	.....
1914	8.2	19.8	.....	.....	.....
1915	8.9	.....	.....	.....	.....

It will be noted that the four years' rollings from 1908 to 1911, inclusive, show successively decreased numbers of failures compared on a basis of five years' service and the later rollings compared on a shorter period of service also show reductions. The improvement may probably be ascribed mostly to three things, namely, the gradual replacement of Bessemer by open-hearth rails, the adoption of heavier rails with stronger bases, and the improvement of the metal used for rails.

Special Investigations

During the year special reports have been presented by the Rail committee as follows:

No. 64—Mill Inspections of Rail in 1915 and 1916, by M. H. Wickhorst.

No. 65—Rail Failure Statistics for 1916, by M. H. Wickhorst.

No. 66—Influence of Gage Length on Elongation in Drop Test of Rails, by M. H. Wickhorst.

No. 67—Tests of Manganese Steel Rails, by M. H. Wickhorst.

No. 68—Inhibited or Delayed Transformations in Rail Heads, by Dr. P. H. Dudley.

No. 69—Intensity of Pressure on Rails, by a Sub-Committee. J. R. Onderdonk, chairman.

Track Bolts and Nutlocks

At the convention in March, 1916, the Rail committee submitted "Specifications for Quenched Carbon and Quenched Alloy Steel Track Bolts with Nuts," and "Specifications for Medium Carbon Steel Track Bolts with Nuts," as shown on pages 490-494, inclusive, of the 1916 Proceedings. The action of the convention was that these specifications be "held under consideration during the coming year with a view to final action next year." No action was taken on this matter at the 1917 convention. The committee now recommends that the specifications submitted in 1916, with some changes, be adopted by the Association for insertion in the Manual in place of the "Specifications for Track Bolts" appearing on pages 123, 124 and 125 of the 1915 edition.

Specifications for Quenched Carbon and Quenched Alloy Steel Track Bolts with Nuts

Access to Works

1. Inspectors representing the purchaser shall have free entry to the works of the manufacturer at all times while the contract is being executed and shall have all reasonable facilities afforded them by the manufacturer

to satisfy them that the bolts and nuts have been made in accordance with the terms of the specifications.

Place for Tests

2. All tests and inspection shall be made at the place of manufacture, prior to loading, and shall be so conducted as not to interfere unnecessarily with the operation of the mill.

Rejection at Destination

3. Bolts and nuts which show injurious defects subsequent to their acceptance at the place of manufacture or sale will be rejected and returned to the manufacturer, who shall pay the freight charges both ways.

Material

4. Material for bolts shall be steel made by the Open-Hearth process or an acceptable alloy steel. It shall be homogeneous and when broken in tension, shall show a uniformly silky fracture. Material for the nuts shall be soft, untreated steel.

Chemical Properties

5. The chemical composition of each melt of steel from which track bolts are manufactured shall be within the following limit:

Phosphorus, per cent, maximum.....0.04

6. The manufacturer shall furnish the inspector a complete report of ladle analysis showing carbon, manganese, phosphorus and sulphur content of each melt, represented in the finished material and any other elements used to obtain the specified physical properties. The purchaser may make a check analysis from the finished material; such analysis shall conform to the requirements of Section 5. The drillings for check analysis shall be taken parallel to the axis and from the end of the finished bolt.

Physical Properties and Tests

7. Track bolts shall conform to the following physical requirements:

	Carbon Steel	Alloy Steel
(a) Tensile strength, lb. per sq. in., minimum.....	100,000	110,000
(b) Yield point, lb. per sq. in., minimum.....	70,000	85,000
(c) Elongation, per cent, in 2 in., not less than.....	1,600,000	Ten. Str.
Minimum, 12 per cent.	3,500,000	
(d) Reduction in area, per cent, not less than.....	Ten. Str.	
(e) Cold bending of the unthreaded portion of the finished bolt without fracture on the outside of the bent portion through 90 deg. around an arc, the diameter of which is three times the thickness of the test specimen.		

8. All test specimens shall be from the finished bolts.

(a) The tension test specimens shall be about 4¼ in. long with threaded or unthreaded ends, and with the central 2-in. length turned to a ½-in. diameter, in accordance with the form and dimensions for tension test specimens of the American Society for Testing Materials.

(b) The yield point shall be determined by the strain gage.

Quenching

9. (a) Track bolts shall be treated by quenching in oil or water, if so specified, from a temperature of about 810 deg. C. (1490 deg. F.) and shall be kept in the bath until cold enough to be handled; a group thus treated being known as a quenching charge.

(b) Material which requires quenching in water will be acceptable at the option of the purchaser, provided it meets the requirements of the specification in all other respects.

General Requirements

10. Track bolts and nuts shall be made to dimensions specified in drawing furnished by the purchaser with al-

lowable variations in dimensions of bolts from standard as follows:

Length, 1⅞ in.

Diameter of shank, 1.64 in.

Shoulder, 1.64 in.

Diameter of rolled thread not more than 1.16 in. over the diameter of the body of ⅞ in. bolts.

Diameter of rolled thread not more than 3.32 in. over the diameter of the body of 1-in. bolts.

Variation in dimensions of elliptical shoulders under head of bolt of 1.32 in.

11. The heads and nuts shall be free from checks or burrs of any kind. All finished pieces shall be smooth, straight, of uniform size, with well-shaped symmetrical bends and well filled heads, free from injurious mechanical defects, and be finished in a first class, workmanlike manner. The head shall be concentric with and firmly joined to the bottom of the bolt with the underside of the head at right angles to the body of the bolt. The threads on the bolts shall be rolled, unless otherwise specified, shall be full and clean and shall be made in section and pitch according to the purchaser's standard. The fit between threads on the bolt and nut shall be accurate and nut shall go on with a 10-in. wrench from second to fifth turn. The force to turn the nut completely on the bolt with a 24-in. wrench shall not be more than 60 nor less than 40 lb.

12. (a) The nuts shall be made of soft untreated steel and shall be ¼-in. thicker than the standard nuts used for untreated bolts. They shall be of sufficient strength to develop the ultimate breaking strength of the bolts.

(b) Nuts of standard thickness will be accepted at the option of the purchaser if proved to be of sufficient strength to equal the ultimate breaking strength of the bolts. The length of the bolts shall be correspondingly reduced.

Branding

13. The heads of the bolts shall bear the manufacturer's identification symbol. The letter "Q" shall be used to show that the bolts have been "quenched." If the bolts are also tempered, the letters "QT" shall be used to show that they have been "quenched and tempered."

Marking and Shipping

14. When the bolts are shipped they shall have the nuts applied for at least two threads, be well oiled to prevent rust, and shall be packed in securely hooped kegs of 200 lb. net. All kegs shall be plainly marked as to material, size of bolts and name of manufacturer.

Inspection

15. Tension and bend tests shall be made of the test specimens selected by the inspector from each lot of 50 kegs. One specimen shall be selected for each test, and if it meets the requirements of the specification, the lot will be accepted. If the test specimen fails, two additional specimens shall be tested in the same manner as the one which failed, and if they meet the requirements of the specification, the lot will be accepted. If, however, either one of the pieces fails, the lot will be rejected. Both tension and bend tests shall pass the requirements for acceptance.

Specifications for Medium Carbon

Steel Track Bolts with Nuts

Access to Works

1. Same as above.

Place for Tests

2. Same as above.

Rejection at Destination

3. Same as above.

Material

4. Material for bolts shall be steel made by the Open-Hearth or Bessemer process. It shall be homogeneous and when broken in tension, shall show a uniformly silky fracture. Material for nuts shall be of soft steel.

Chemical Properties

5. The chemical composition of each melt of steel from which track bolts are manufactured shall be within the following limits:

Phosphorus, Maximum.	Per Cent.
Open-Hearth	0.05
Bessemer	0.10

6. The manufacturer shall furnish the inspector a complete report of ladle analysis showing carbon, manganese, phosphorus and sulphur content of each melt represented in the finished material and any other elements used to obtain the specified physical properties. The purchaser may take a check analysis from the finished material; such analysis shall conform to the requirements of Section 5. The drillings for check analysis shall be taken parallel to the axis and from the end of the finished bolt.

Physical Properties and Tests

7. Track bolts shall conform to the following physical requirements:

(a) Tensile strength, lb. per sq. in., minimum	55,000
(b) Yield point not less than 50 per cent of the ultimate breaking stress	1,500,000
	Ten. Str.
(c) Elongation, per cent in 2 in., not less than	2,200,000
Minimum, 20 per cent.	Ten. Str.
(d) Reduction in area not less than	
Minimum, 30 per cent.	
(e) Cold bending of the unthreaded part of the finished bolt without sign of fracture on the outside of the bent portion, through 180 deg. flat on itself.	

8. All test specimens shall be from the finished bolts.

(a) The tension test specimens shall be about $4\frac{1}{4}$ in. long with threaded or unthreaded ends, and with the central 2-in. length turned to a $\frac{1}{2}$ -in. diameter, in accordance with the form and dimensions for tension test specimens of the American Society for Testing Materials.

General Requirements

9. Same as above.

11. The nuts shall be made of soft, untreated steel and shall be of sufficient strength to develop the ultimate breaking strength of the bolts.

Branding

12. Manufacturers' identification shall appear on the head of each bolt.

Marking and Shipping

13. Same as above.

Inspection

14. Tension and bend tests shall be made of the test specimens selected by the inspector from each lot of 50 kegs. One specimen shall be selected for each test, and if they meet the requirements of the specifications the lot will be accepted. If one of the test specimens fails, two additional specimens shall be tested in the same manner as the one which failed, and if they meet the requirements of the specifications, the lot will be accepted. If, however, either one of the specimens fails, the lot will be rejected. Both tension and bend tests shall pass the requirements for acceptance.

Mill Practice

Information was gathered from the members of the Rail committee as to the results of their inspections of

rail at the mills which were given in the paper on "Mill Inspections of Rail in 1915 and 1916." This paper gave the general results of the mill inspections of rail manufactured in 1915 and 1916 for some of the railroads and also gives some discussion of the specifications on which the rails were bought. According to these results the average top discard from the ingot, of all rails, was 17.9 per cent; the average elongation in the drop test was 14.5 per cent, and the rejections were 6.4 per cent. Of all rejections, 42 per cent were A rails.

Intensity of Pressure and Rail Resistance

Extensive tests were made on the reciprocating wheel load machine at Sparrows Point, Md., dealing with the crushing effect on rail metal of various wheel loads. Small tapered holes were drilled through from side to side of the head of test rails at various distances below the top of the head and accurately fitted with tapered pins. Any flowage of the metal under rolling wheel loads would cause a flattening of the holes and its amount could be measured by the distance the pins lacked of going into their original position.

Dr. P. H. Dudley has made some extensive measurements on rails in track, of the areas of contact and the distribution of the intensity of the pressure within the area of contact. For the present, the only conclusions that can be drawn from the tests which have been made are but indications, as follows:

Laboratory Tests:

1. That for this section and composition of rail, initial loads of 30,000 lb. or more per wheel of cast iron and chilled tread, of 33 in. in diameter, were too great for the transverse holes, and produced flow or closure at least $\frac{3}{8}$ -in. below the bearing surface.

2. That loads of 25,000 lb. produced but slight flow or closure in the three uppermost transverse holes, and this extending not more than $\frac{1}{4}$ in. in depth.

3. That preliminary light loads, by cold-rolling the surface, may adapt the material to subsequent heavier loads.

Field Tests:

4. The diagrams of the plotted tables show that the stresses in the metals are locally less severe than we had expected to find in the surfaces of the pressure zone contacts of the wheel tread and the rail head.

5. It is important, as the theory and evidence show, that the metal of the circumjacent layer of each pressure zone of contact for the wheel tread, also that of the rail head, is in position not only to utilize the elasticity of the metal to help carry a given load, but to increase in area within the elastic limits of the metals nearly in proportion to the loads applied.

6. The action of the rolling wheels on the rail heads is a gradually applied load from zero to the maximum, then reducing again to zero, both for a unit length in the wheel tread or rail head, and is not a suddenly applied load, even for a mile-a-minute or faster trains.

7. The round type of area of contact shows the greatest average unit intensity of pressure.

8. The longitudinal oval, or the transverse oval type indicates the lowest average unit intensity of pressure.

9. The longitudinal elliptical or transverse elliptical, in which the major axis is two or more times the width of the minor axis, indicates also a favorable average unit intensity of pressure.

10. The transverse oval or elliptical under steel or cast-iron wheels is more favorable for the rail head than the round.

11. The reciprocal relations of the loads carried on

the metal of the wheel treads to the metal of the rail heads should be studied from the voluminous service tests now available.

Recommendations

The committee submitted the following recommendations:

1. That the locations for the physical test specimens and for chemical samples from rails as submitted with this report, be adopted by the Association to replace the diagrams shown on page 88 of the 1915 Manual.

2. That the "Specifications for Quenched Carbon and Quenched Alloy Steel Joint Bars," submitted with this report, be adopted by the Association and be substituted for the "Specifications for Heat-Treated, Oil-Quenched, Steel Joint Bars," on pages 91 to 93 of the 1915 Manual.

3. That the specifications for "Quenched Carbon and Quenched Alloy Steel Track Bolts with Nuts" and the "Specifications for Medium Carbon Steel Track Bolts with Nuts," submitted with this report, be adopted by the Association and be substituted for the "Specifications for Track Bolts," on pages 123 to 125 of the 1915 Manual.

The committee recommended that the same topics be reassigned for 1918 as were given the committee for the past year.

Committee: John D. Isaacs (S. P.), chairman; R. Montfort (L. & N.), vice-chairman; E. E. Adams (U. P.), E. B. Ashby (L. V.), J. A. Atwood (P. & L. E.), A. S. Baldwin (I. C.), W. C. Barnes (S. P.), Chas. S. Churchill (N. & W.), W. C. Cushing (P. L. W.), G. M. Davidson (C. & N. W.), Dr. P. H. Dudley (N. Y. C.), J. M. R. Fairbairn (C. P. R.), L. C. Fritch (S. A. L.), A. W. Gibbs (P. R. R.), Howard G. Kelley (G. T.), C. F. Loweth (C. M. & St. P.), H. B. MacFarland (A. T. & S. F.), C. A. Morse (C. R. I. & P.), A. W. Newton (C. B. & Q.), J. R. Onderdonk (B. & O.), G. J. Ray (D. L. & W.), H. R. Safford (G. T.), J. P. Snow, F. S. Stevens (P. & R.), Earl Stimson (B. & O.), R. Trimble (P. L. W.), M. H. Wickhorst.

Discussion

Mr. Churchill: The subjects assigned to this committee this year are the same as for the year previous, practically, and it will not be necessary to refer to them. The

first matter upon which the committee desires action is the revision of the Manual as far as test pieces on rails are concerned. It will be recalled that the Manual shows test pieces from three positions, which it has been found unnecessary to have. I move that this revision of the Manual be adopted.

(Motion carried.)

M. H. Wickhorst (Rail Committee): The laboratory tests consisted of pieces of rail being rolled over, and in order to measure the deformation or flow of the metal, holes were drilled through the rails from side to side at different depths, some close to the top surface, and others lower, and some farther down. These holes were small in diameter, a little over $\frac{1}{8}$ in., fitted with tapered pins, so that a reduction in diameter of 0.000,01 in. could be measured by the distance the pin would go into the holes.

The results of these laboratory tests are given in the paper, and the rails were put into track for a field test. The rails in the laboratory tests were rolled over with a load finally of 35,000 lb. on one wheel. When put into the track the maximum load was perhaps 25,000 lb., and the average load less than that. It was found that there was considerable closure of the holes after the rails were in service a short time.

Mr. Churchill: We have prepared a specification on Track Bolts and Nutlocks. We also submit in appendix A, Specifications for Quenched Carbon and Quenched Alloy Steel Joint Bars. I make a motion that these specifications be adopted and printed in the Manual.

(Motion carried.)

Mr. Churchill: We also offer in appendix B, "Specifications for Quenched Carbon and Quenched Alloy Steel Track Bolts with Nuts."

I move that these specifications be adopted for printing in the Manual.

(Motion carried.)

Mr. Churchill: We give specifications for "Medium Carbon Steel Track Bolts with Nuts." I move that this be adopted for printing in the Manual.

(The motion was carried and the committee was dismissed with thanks.)

Report of Committee on Track



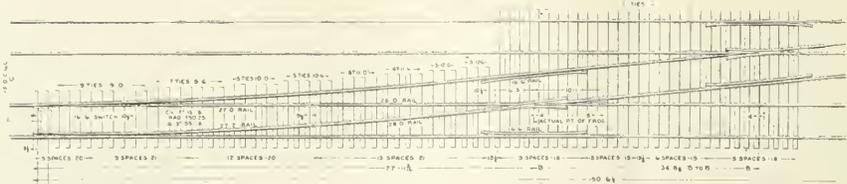
NUMBER OF CHANGES in the Manual were suggested of a detailed character and consisting principally in revisions of dimensions on the plans for standard turnouts and switches. Several changes in the spacing of ties throughout turnouts were recommended to make these dimensions agree with those on turnout plans. The committee did not believe it necessary to make any further changes in the specifications for tie plates for the present, but recommended that the revision of the tie plate specifications be given careful consideration by the next committee.

Typical Plans of Turnouts, Crossovers,

Slip-Switches and Double Crossovers

Drawings were submitted showing typical plan of a No. 10 turnout and a typical layout of a No. 10 crossover to conform with those now in the Manual for a No. 8 turnout and crossover.

The 16 ft. 6 in., style "A," switch submitted is a development of 16 ft. 6 in. switch shown on page 176 of the 1915 Manual, with changes that were thought advisable. The throw has been recommended as $4\frac{1}{2}$ in. at center line of the switchhead rod, which brings the throw at the end of the point $4\frac{3}{8}$ in. The throw is specified at the end of the point to be not less than 4 in. or greater than 5 in. On page 178 in the 1915 Manual the throw is specified as 5 in. at the center of No. 1 rod, which would make the throw $5\frac{1}{8}$ in. at the point. The committee considers this excessive. The risers for style "A" switch are specified $\frac{1}{4}$ -in., which affords a better shoulder for holding the stock rail in position, especially for heavy flange rails, than the $\frac{1}{2}$ -in. specified on pages 178 and 179 of the 1915 Manual. The angle of planing the character cut has been specified as 78 deg., as the 70-deg. angle specified on page 179 in the 1915 Manual is generally considered too abrupt and is not in common use. The switch point planing has been specified in much fuller detail and conforms to planing extensively used. The detail of stile plates has been specified to allow the use of a rectangular plate or of special rolled plates having risers narrower than the width of the plate, sufficient detail being given so that the plates and braces will be interchangeable. The heel plates have been specified to provide a shoulder, both for the lead rails and the stock rails, and the

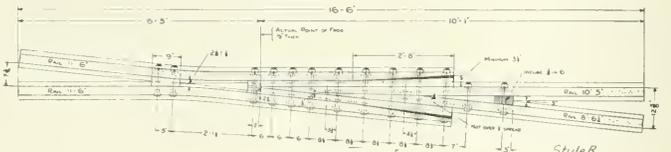


Typical Layout of No. 10 Crossover

Typical Plan of No. 10 Turnout

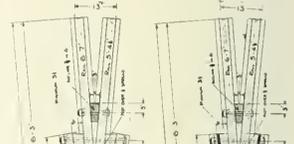


Style A

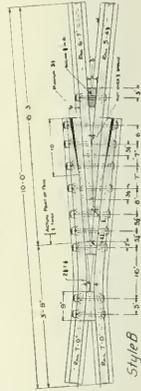


Style B

No. 10 Rigid Frog
Angle 5°-43'-29"

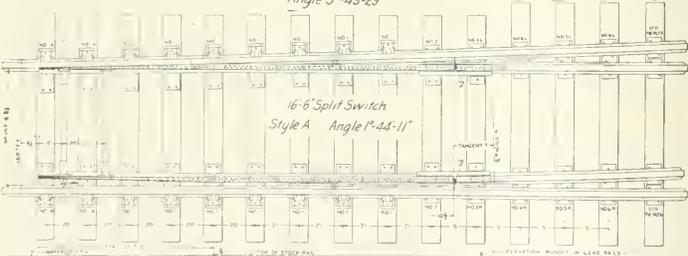


Style A

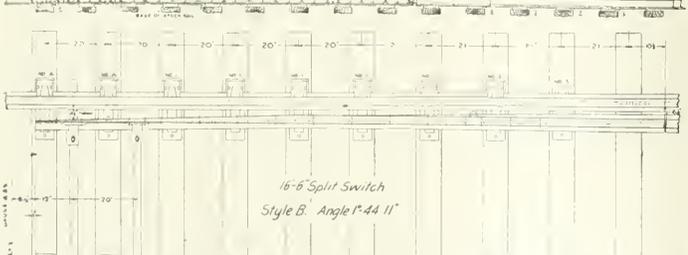


Style B

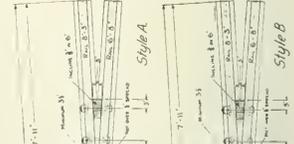
No. 6 Rigid Frog
Angle 9°-31'-38"



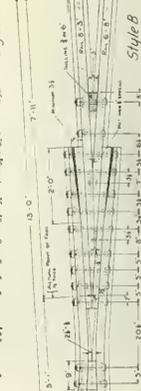
16-6 Split Switch
Style A Angle 1°-44'-11"



16-6 Split Switch
Style B Angle 1°-44'-11"



Style A



Style B

No. 8 Rigid Frog
Angle 7°-29'-10"

tie spacing given so that the same detail of plates will apply for turnouts Nos. 7 to 10, inclusive. The bars are specified 1 in. by 2½ in., instead of ¾-in. by 2½ in., as specified on page 180 of the 1915 Manual, and other details to conform to heavier materials now being largely used.

The style "B" switch has been developed for use where materials for style "A" switch have been considered heavier than warranted on class B or class C railways, and also for emergency requirements. On the style "B" switch the plates have been detailed 6 in. wide and a lesser quantity than specified for the style "A" switch. The tie bars are ¾-in. by 2½ in., and reinforcing on one side only. The planing, spacing of tie bars, spread, throw and essential details are the same as specified for the style "A" switch. The style "B" switch is especially intended where the style "A" switch is considered too expensive, and where the track is not tie-plated throughout.

The No. 8 frog has been detailed 13 ft. long, instead of 13 ft. 6 in. long, as specified on page 184 in the 1915 Manual, the 6 in. difference in length being made on the heel end of the frog. This change will not interfere with the theoretical alignment data heretofore published. The reason for the change is so that a No. 8 frog will cut out of a 33 ft. rail without waste in cutting. This is an important item of economy. If the 13 ft. 6 in. length is maintained the frog would not cut economically out of a 33 ft. rail, unless the wing rails are made too short for a first-class frog.

The No. 10 frog has been detailed 16 ft. 6 in. long, conforming to the previous established length, and will cut out of a 33 ft. rail with comparatively little waste.

The No. 6 frog has been detailed 10 ft. long, as this length provides ample room for splice bars. A longer frog has been considered objectionable in a sharp turnout. Plans have been detailed for style "A" and style "B" frogs in each case. The style "A" frog, with cast filling, is similar to what is being used on many of the large eastern railroads, while the style "B" frog, with rolled filling, is similar to what is being used on many of the western railroads. Both styles of frogs are widely used and are proposed for standard without recommendations as to which is the best. The cost will be practically the same, and there are arguments in favor of each style.

Reduction of Taper of Tread of Wheel to 1 in 38 and Canting the Rail Inward

At an early period in the history of car building it was found that a certain amount of cone in the tread of a new wheel was advantageous from many viewpoints. The amount of coning varied until in 1878 the ratio of 1 and 38 was adopted by the M. C. B. Association. This remained the standard until 1907, when the association revised the taper, making it 1 in 20, which is the present standard.

When a wheel rests on the rail, the location of the point of contact depends upon the taper of the wheel and the radius of the top of the rail. The normal position of the rails in track is with the vertical axes parallel and at right angles to the plane of the track. In this normal position the point of contact of wheels having a coning of 1 in 20 and rail of A. R. A. section with a 14-in. top radius of head is slightly less than ¾-in. inside of the center of the rail toward the gage side. For wheels having a coning of 1 in 38 the point of contact is slightly less than ¾-in. inside of the center of rail toward the gage side.

This eccentric loading appears to be a condition that should be corrected. It has been the practice of section

foremen to incline, or cant, the rail slightly to distribute wear over the top of the head. The result obtained is to bring the point of contact over the center of the rail. The heavier taper is carried on an inclined surface and produces stresses on the outside of the flange of the rail 40 per cent to 50 per cent greater than the stress on the inside flange due to outward thrust, as has been shown by the results obtained by the committee on "Stresses in Track."

It has been suggested that heavier coning with the resultant eccentric load on rail accounts for the location of transverse fissures on the gage side of the rail. While they are most common on the gage side, their appearance at the center and outside of the head would seem to indicate that they are developed in the line of contact or application of load. With the heavier coning the surface of the rail gradually wears to an inclined surface similar to the cone of the wheel. In this condition the abrasion of metal and slippage resistance is considerably increased.

Car wheel manufacturers have claimed that heavy taper supplies the condition favorable to true rolling motion and reduces to a minimum sliding of surfaces in contact.

Excessive wear on frogs is an objection to heavier coning. A wheel with a heavy cone trailing through a frog has its load carried by the narrow frog point and the load is not transferred to the wing rail until the frog point is passed. Theoretically, the drop from the frog point to the wing rail with a 1 in 20 tread having ⅜-in. chamfer is very near ¼-in. The result is damage to the frog point, as the concentrated wheel load is too great for the narrow section of metal at the point.

Even though the heavy taper is better from the standpoint of wheel-wear, in view of the fact that rail must be designed for the heaviest wheel-loads while the wheels are designed for a definite car capacity, it may be expedient to sacrifice some degree of service of wheel to favor the factor of safety and life of rail.

The very general use of taper of 1 in 20 makes the proposed departure from this standard a move needing to be fully substantiated by theory and practice. The use of 1 in 38 taper by the New York Central Railroad and the use of 1 in 13 taper by the Baltimore & Ohio, the former being flatter and the latter heavier than M. C. B. standard, represents some considerable difference of opinion. In any change of taper it would appear desirable to have the taper uniform from the throat radius to the radius of the sand chill, or the full width of tread.

Thirty railroads, representing 95,000 miles, report the use of canted tie-plates. Of these, four roads, with 15,000 miles, report that the rail is canted by adzing the ties where canted tie-plates are not used. Fourteen roads, with 52,900 miles, report the general use of canted tie-plates. Ten roads, with 32,900 miles, report canted tie-plates used, but not generally. Nineteen roads, with 55,000 miles, report canted tie-plates with slope varying from 1 in 20 to 1 in 174.

From these general conditions it would seem that if the rail was installed and maintained so as to provide a uniform bearing and wear on the head of rail, the best results would be obtained from both wheel wear and rail wear. If the rail does not have the full and proper contact, as well as bearing on the tie-plates or on the tie, whether the tie-plates are canted or not, the best results cannot be secured.

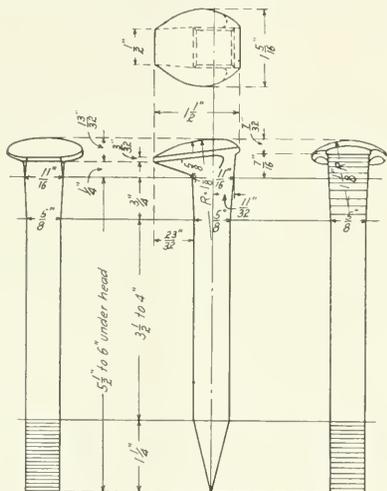
Consider Design of Cut Track Spikes

During the past season the committee has made a careful canvass of several mills in the United States, and found a uniformity of opinion among the manufacturers

that the standard as proposed by the committee in 1917 cannot be made with the automatic machines now in use. We understand that the main difficulty is overcome by the Canadian mills by using special rolled bars a little over-size in one dimension. We can see no reason why the same practice could not be utilized by United States mills. Nevertheless, on account of this general complaint, and because of the present war conditions, the committee has decided to make a reduction in the amount of reinforcing under the head, and accordingly submit a revised design.

The Effect of Fast Trains Upon the Cost of Maintenance of Way and Equipment

The economic value of a solution of this question depends upon the desirability of making each class of traffic



Revised Design of Track Spike

bear its own proportion of the total expense of transportation. There are three general speed classifications:

- First and lowest: Commodity freight tonnage.
- Second and intermediate: Merchandise and perishable freight tonnage.
- Third and highest: Passenger traffic or tonnage.

The committee does not feel that it is prepared to offer a conclusive report until it has given the matter further study. We have made an analysis of the actual expense for maintenance of way and structures for the year reported by the Interstate Commerce Commission's report of 1914 on all of the railroads in the United States having a gross earning of one and one-half million dollars and over. These roads comprise somewhat over 213,000 miles, so that averages deduced from this one year's experience may be taken as at least indicative of the real effect on maintenance cost of increasing speeds.

In this analysis, high speed and low speed are considered as synonymous with passenger traffic and freight traffic. The committee is conscious that this is not an entirely true assumption, but it offers the only opportunity for classifying the expense as incurred by the railroads in accordance with speed differences.

In making the analysis of the expenses, the car mile was chosen as the common unit of the two classes of traffic, on the assumption that it measured more nearly

the facilities required by each class of traffic than any other. The car mile and train mile were the only two common units reported by the Interstate Commerce Commission and, taken as a whole, there would be a fairly definite relation maintained between these two units so that the conclusions drawn would not be materially different, whichever unit is chosen. In making the analysis, a determination was made for each road; first, of the car miles per mile of road; second, the proportion of those car miles which were passenger car miles; third, the cost per mile of road for maintenance of way and structures.

In order to eliminate two of these three variables, the roads were grouped into classes:

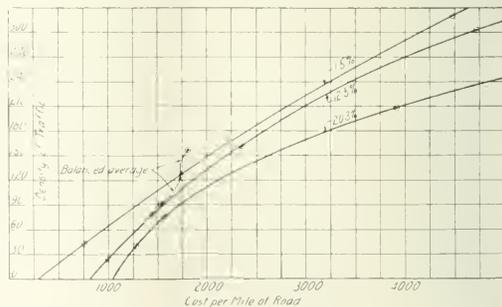
First, into groups of similar density of traffic, measured in car miles per mile of road.

Second, within each density group, roads of like per cent of passenger traffic were segregated.

The total car miles on all roads of like density and like per cent of passenger traffic were added, as were also the miles of road and the total cost of maintenance of way and structures. The total miles of road was divided into the total car miles, to get an average density, and the total miles of road was divided into the total cost to arrive at an average cost per mile of road for each group of like density and like per cent of passenger traffic. From the tables thus produced, there were picked out groups of like per cent passenger traffic and different densities of traffic. These groups of like per cent of passenger traffic were plotted as shown in the accompanying diagram.

A separate line represents each of the various per cents of passenger traffic to a horizontal scale of the average cost of maintenance of way and structures per mile of road, and the vertical scale represents the density of traffic in thousands of car miles per mile of road.

Three lines only were plotted, representing passenger traffic of 7.5 per cent, 12.5 per cent and 20.3 per cent of



Relation of Proportion of Passenger Traffic to Cost of Maintenance of Way and Structures

the total traffic. These particular percentages were chosen because a sufficiently large number of roads could be obtained at these per cents to produce more accurate plattings than of any other.

There are three factors which influence the cost of maintenance of way and structures:

- (1) The elements, sometimes called weather stress.
- (2) Density of traffic. (3) Character of traffic, here separated as between passenger and freight.

There may be a fourth factor, i. e., the ability of the management to regulate the expenditures in strict accordance with the demand of the traffic. If there be this fourth factor, it will lose force or disappear entirely

in the consideration of a large number of roads as is here done.

The three factors are disclosed by this chart, the weather stress being shown on the line of zero traffic, and having a different value for roads carrying different per cents of passenger traffic as might be expected because of the different amount and character of material entering into the construction of the lines doing these different kinds of business. The influence of the increased density of traffic on roads carrying a given proportion of passenger traffic is shown by all of the lines on the chart, showing an increased cost per mile of road with an increased density of traffic. The factor of increased cost due to speed (when used synonymous with passenger versus freight) is shown by the decreased cost per mile of road for any given density of traffic for the smaller proportions of passenger traffic.

The committee asked that this report be considered conclusive only in so far as passenger traffic versus freight traffic can be considered synonymous with fast speed versus low speed, and that the subject be referred back for further investigation and future report.

Report on Whether Widening of the Flanges of the Wheels Would Not Be Detrimental to the Present Standard of Track Construction

The committee was requested by the Secretary to report to the Board on subject 9 before the fall meeting of the American Railway Association. We submit herewith copy of a letter sent to the Secretary on October 23, 1917:

"With reference to the subject assigned to the Association by the American Railway Association and referred to the Track committee relative to the contour of chilled car wheels, throat clearances for frogs, guard rails and crossings, and the effect of an increase of thickness of wheel flanges, I beg to advise that at the last meeting of the Track committee, held in Chicago, October 15, the chairman was directed to send you the following communication:

"The Track committee is willing to agree that the flanges can be increased, as recommended by the Chilled Car Wheel people, without any serious detriment from a track standpoint, provided:

"(1) That the wheels are in all cases accurately mounted to $\frac{3}{8}$ -in. additional spread gage;

"(2) That the allowable flange wear before wheels are removed be changed so that wheels will be removed when the flange is worn to within $\frac{1}{8}$ -in. of the present limit of removal;

"(3) That more care be used in matching wheels on any given axle on account of the reduction in play and the corresponding reduction in compensation from coning;

"(4) That this flange width be confined to flanges of four-wheel freight car trucks;

"(5) That this conclusion on the part of the Track committee be not construed as an invitation to increase the axle load.

"With the above provisions, it is believed that it will be unnecessary to make any difference in the width of flangeway of frogs and crossings, or change the present method of track construction."

Conclusions

The committee makes the following definite recommendations to the Association:

Received as Progress Report

(To be considered further at the next convention.)

Subject 2 plans submitted for:

Typical plan of No. 10 turnout and typical layout of No. 10 crossover;
 16 ft. 6 in. split switch, style "A,"
 16 ft. 6 in. split switch, style "B," details
 16 ft. 6 in. split switch, style "H,"
 16 ft. 6 in. split switch, style "H" details
 No. 8 rigid frog, style "A" and style "B,"
 No. 10 rigid frog, style "A" and style "B,"
 No. 6 rigid frog, style "A" and style "B,"
 Sections and details for rigid frog.

For Adoption and Publication in the Manual

Subject (1) Proposed revisions to be made in the Manual.

Subject (5) Proposed specifications for relayer rails for various uses.

Subject (7) Proposed design of cut track spike.

Accept as Information

Subject (3) Report on reduction of taper of tread of wheel to 1 in 38, and on canting the rail inward.

Subject (8) Report upon the effect of fast trains upon the cost of maintenance of way and equipment.

Subject (9) Report on whether widening of the flange of the wheels would not be detrimental to the present standard of track construction.

Future Work

The continuation of subjects 1, 2, 3, 4, 6, 8 and 9.

Committee: G. J. Ray (D. L. & W.), chairman; J. R. Leighty (M. P.), vice-chairman; M. C. Blanchard (A. T. & S. F.), Geo. H. Bremner (I. C. C.), H. M. Church (B. & O.), Garrett Davis (C. R. I. & P.), A. L. Grandy (P. M.), G. W. Hegel (C. J.), T. H. Hickey (M. C.), T. T. Irving (G. T.), J. B. Jenkins (B. & O.), H. A. Lloyd (Erie), F. H. McGuigan, Jr. (G. T.), J. V. Neubert (N. Y. C.), R. M. Pearce (P. & L. E.), C. D. Perkins (N. Y. N. H. & H.), H. T. Porter (B. & L. E.), Thomas Quigley (I. C.), J. B. Strong (Kamapo Iron Works), W. P. Wiltsee (N. & W.).

Discussion

E. R. Leighty (Vice-Chairman): In connection with subject No. 2, in preliminary explanation of this plan for type A switch, I would say that there seemed to be a demand for a switch which was of somewhat stronger construction than the switch that is ordinarily used to meet that demand, and type A switch has been designed for that purpose. This report is not offered for the purpose of going into the matter this year.

Mr. Leighty: The statement in regard to subject 3 is submitted as information only, and we ask you to receive it as such and have it printed in the Proceedings.

The President: This is an important matter, and we will be glad to have written discussion on this subject.

Mr. Leighty: As to the fourth subject, this is a matter which has been before the association for some years, and we have had progress reports on it during the last few years, and nothing specially important has developed in the past year to warrant taking up time and space to make a report on it.

With reference to the fifth subject, we are asking that this subject be referred back to the committee to straighten out.

The President: The committee's suggestion will be accepted.

Mr. Leighty: With reference to subject 7, the design of cut track spikes, I move that the matter be present be adopted for printing in the Manual.

(Motion carried.)

Mr. Leighty: With regard to the 8th subject, the effect of fast trains upon the cost of maintenance of way and equipment, what we present is the beginning of an

investigation of this subject and is submitted as information only.

The President: This seems to be the beginning of an interesting subject.

A. B. Talbot (U. of Ill.): The data which are given in the chart is very interesting, and it seems to me it is worth while to call attention to the results which come from this diagram.

C. E. Lindsay (N. Y. C.): Will the committee give a statement regarding the weather stress?

Mr. Leighty: One of the costs of the maintenance of way structures is called weather stress, which is the course that would have to be incurred to keep the tracks and other facilities in operating condition, or in the same operating condition as when constructed, provided they were not used for traffic. This cost per mile of road is reduced down to the line of zero traffic. That is a projection carrying the averages found from the roads

where there is traffic, but when they are projected down to zero traffic we have an indication of what could be expected to be the weather stress cost on the different character of lines.

Mr. Lindsay: Why does the committee use "miles of road" instead of "miles of track?"

Mr. Leighty: Because we automatically use all the facilities required for increasing the traffic. If we used "miles of track" we would at once have to begin to adjust matters, and what we were after was to find the overhead or entire average cost.

The matter which we submit covering the 9th subject is submitted as information. It does not properly belong in the Manual, and the only action we can take, under the instruction we had, was that it be submitted as information to the American Railway Association.

(The committee was dismissed, with the thanks of the association.)

Report of Committee on Wood Preservation

THE COMMITTEE REPORTED PROGRESS on the subjects assigned. But little work was accomplished during the year, as the members were widely scattered and busily engaged with their regular work, which the war conditions have made increasingly exacting. The work of the committee is now of such a nature that it requires laborious experimental and research work and subsequent study to arrive at conclusions, all of which must be done by the individual effort of the members, so that under conditions such as prevailed during the past year but little can be accomplished.

It is the recommendation of the committee that the program assigned for this year be continued the coming year and that in addition it should report on:

- (1) The preservative treatment of Douglas fir.
- (2) Indicators for determining penetration of the preservative in freshly Burnetized ties and timbers.

Committee: Earl Stimson (B. & O.), chairman; C. M. Taylor (P. & R.), vice-chairman; F. J. Angier (B. & O.), F. C. L. Bond, E. H. Bowser (I. C.), J. F. Burns (L. & N.), W. A. Fisher, C. F. Ford (C. R. I. & P.), C. J. Graff (N. Y. C.), R. H. Howard (Wabash), C. H. R. Howe (B. & O. S. W.), J. E. Johnson (M. C.), George E. Rex (A. T. & S. F.), H. Stephens (N. Y. C.), E. A. Sterling, Lowry Smith (N. P.), O. C. Steimmayer (St. L.-S. F.), C. H. Teesdale, Dr. Hermann von Schrenk, J. H. Waterman (C. B. & Q.).

(The report was presented by the chairman by title only and without any discussion.)

Closing Business

Just prior to the installation of officers yesterday afternoon several resolutions were presented, among which were the following:

To the Honorable Wm. G. McAdoo,
Director-General, Washington.

The American Railway Engineering Association, in convention assembled, expresses its desire to render all possible assistance to you and your staff in maintaining the high degree of efficiency of railway operation and maintenance so essential to an early victory in the great world-wide conflict. The members are principally officers in railway service, although some are in government and other branches of engineering service related to railways operating on the North American continent. They are intensely interested in the many problems incidental to the construction, maintenance and operation of railways and particularly in the standardization of materials and methods of doing work. We are hopeful that our efforts may be the means of assistance to the Federal Government and that you will feel free to call upon us for such assistance.

Among other resolutions adopted was one calling attention to the shortage of creosote and to the fact that large quantities of coal tar are now being burned as fuel in the steel mills. In view of the importance of protecting timber against decay this resolution stated, "In view of the above factors the American Railway Engineering Association respectfully suggests to the Railway Administration at Washington that an investigation be undertaken to determine whether it will be possible to adjust the burning of the crude

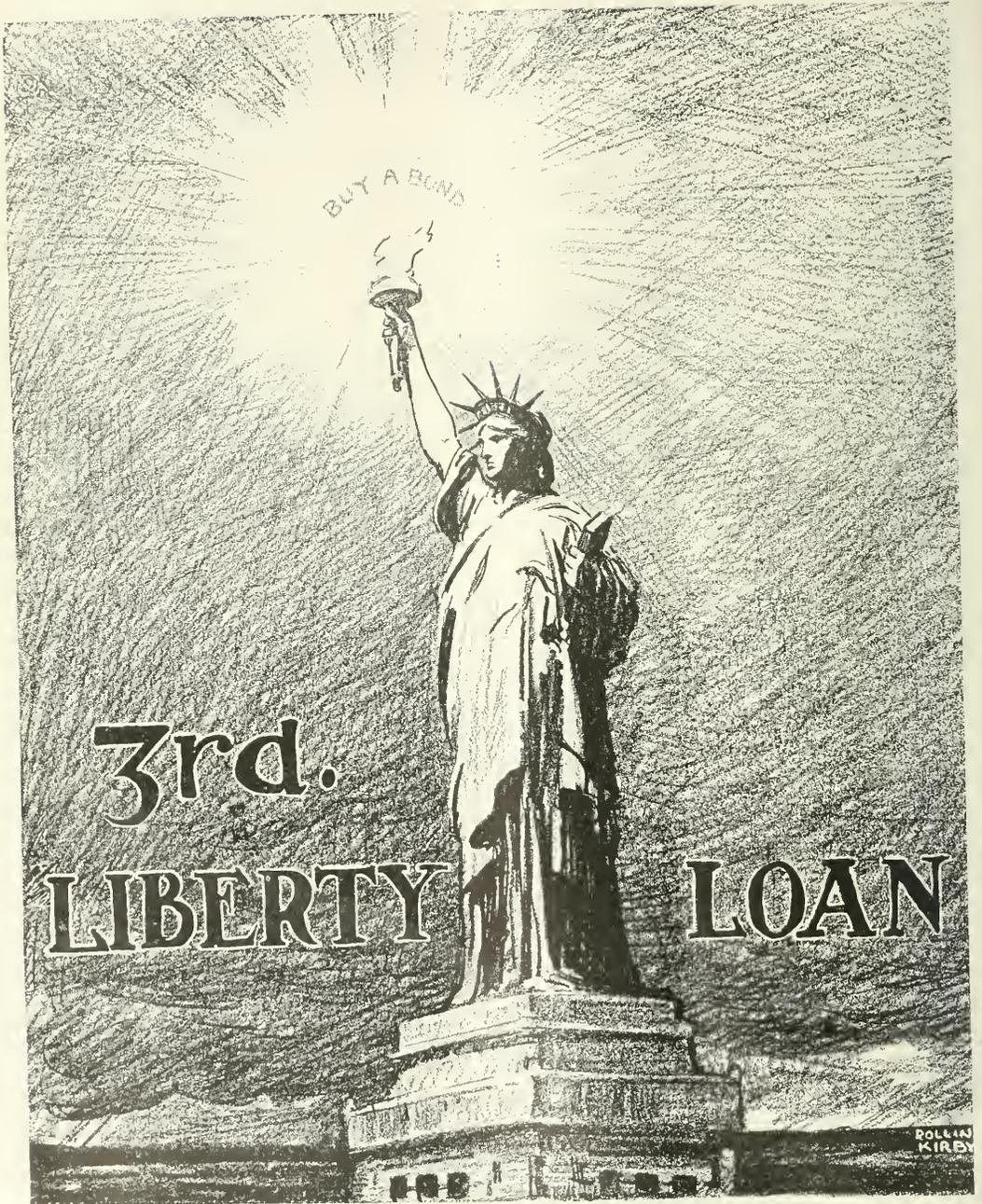
coal tar by the steel companies in such manner that steel production will not be interfered with and at the same time a certain amount of the tar now being burned can be released to the tar distillers and thereby increase the amount of creosote oil available."

A. R. E. A. Registration

Bachelor, F. J., Consulting Engineer, Chicago, Ill.
Barrett, W. C., Div. Eng., Lehigh Valley R. R., Sayre, Pa.
Bates, Onward, Con. Eng., Chicago.
Billman, H. E., Gen. R. M., Mo. Pac. R. R., St. Louis, Mo.
Camp, W. M., Editor, Railway Review, Chicago, Ill.
Clement, S. B., Chief Eng., T. & N. O. Ry., North Bay, Ont.
Conner, J. K., Chief Eng., L. E. & W. R. R., Indianapolis.
Downs, J. L., Roadmaster, I. C. R. R., Memphis, Tenn.
Gilbert, G. H., Eng. B. & B., Sou. Ry., Cincinnati, O.
Gowdy, R. C., Ch. Eng., F. W. & D. Ry., Ft. Worth, Tex.
Haggander, G. A., Bridge Eng., C. B. & Q. Ry., Chicago, Ill.
Hynes, M. V., Gen. Supt., C. I. & W. R. R., Indianapolis, Ind.
Laird, H. G., Supt. Timber Pres., A. C. Line, Gainesville, Fla.
McCallman, D. S., Danville, Ill.
Mitchell, L. A., Supt. Roadway and Bldgs., Union Tr. Co. of Ind., Anderson, Ind.
Podmore, J. M., Div. Eng., N. Y. C. R. R., Toledo, Ohio.
Rose, L. S., Eng. in Ch. of Val., Big Four Ry., Cincinnati, O.
Sharvey, O. L., Val. Eng., M. C. R. R., Detroit.
Stimson, Earl (Second Vice-President), Eng. M. W., B. & O. R. R., Baltimore, Md.
Turneure, F. E., Dean, Col. of Engr., U. W., Madison, Wis.

Guests

Snyder, J. A., Asst. Eng., M. C. R. R., Chicago, Ill.
MacNeill, D. A., Can. Govt. Rys., Moncton, N. B., Canada.
Geills, A., Genl. Roadmaster, St. Thomas.
Nyctune, W. M., Asst. Eng., Mo. Pac. R. R., St. Louis, Mo.
Carr, M. B., Res. Eng., Paducah & Ill. Ry., Metropolis, Ill.
McDougall, N. R., C. & W. T. R. R. Co., Chicago, Ill.
Idle, H. J., Val. Dept., C. R. I. & P. Ry., Chicago, Ill.
McEllis, Frank, Asst. Secy., A. R. E. A., Chicago, Ill.



The Message of the Torch

EDITORIAL

Railway Age

EDITORIAL

Organizing the Supply Industry

CONCERNS ENGAGED in the manufacture and sale of railway equipment and supplies suddenly have come to a realization that they have many important problems and many important interests in common. The purpose of the meeting to be held at the Hotel La Salle, in Chicago, on April 8, under the auspices of the Railway Business Association, is to so reorganize this association as to make it an agency for helping effectively to solve these common problems and promote these common interests.

Two things, at least, are essential to fitting the organization to accomplish these purposes. One is to make a concise, simple statement of what it ought to try, and is going to try, to do. The other is to provide means and machinery suitable and adequate to attaining the objects sought.

It ought to be made clear that the sole purpose of the organization is going to be to protect the rights and further the legitimate interests of the railway equipment and supply industry. Heretofore the association has devoted itself to trying to bring about better relations between the railways and the public. This has been the right and desirable thing to do.

It has been well done, but conditions have changed. Government control of railways has been adopted. The supply companies consequently find that they have not merely the railways, but the government itself to do business with. Furthermore, as a result of the war, they have got a large amount of business abroad which they ought to make concerted and strenuous efforts to hold and increase.

Therefore, while the supply companies should take even more interest than ever in the solution of the railroad problem, they should meet and deal with several problems which are peculiarly their own. They can best help the railways and the country, as well as themselves, by organizing primarily to protect their own particular rights and promote their own particular interests.

The railroads and the public are greatly indebted to railway supply interests for the improvements which they have made possible in efficient and economical operation, as well as for the cultivation of better relations between the railroad and the public. Undoubtedly, however, the railway supply industry will be in a position to do still greater things for the public and the railways.

The means to be used ought not to be narrowly defined at the start. It will be enough for the present to set forth that the railway equipment and supply interests are organizing to protect their rights and safeguard their legitimate interests by every legitimate means. What is needed is a flexible, effective fighting organization; the exact methods it will be desirable to use will become clear only in the course of developments.

Doubtless the exact way in which the association should be reorganized in order to have the maximum effectiveness will be thoroughly discussed at the meeting in Chicago; but here are a few suggestions:

(1) Make the constitution simple, concise and broad (avoiding detail statements of policies which no one is wise enough now to formulate).

(2) Assign broad questions of policy, such as export trade, trade acceptances, relations with the government, education of public opinion regarding the railway problem, etc., to committees with large power for quick and decisive action. In other words, the new organization should take the form of a board of trade. The cardinal defect of many associations is that they do not give to those to whom they assign specific tasks the authority and opportunity necessary to accomplish them.

Every concern or individual engaged, even though on a small scale, in the making or selling of railroad equipment, materials or supplies should be represented at the meeting in Chicago, and there should be full discussion of all the important questions in which the railroad supply industry is so vitally interested.

The holders of all classes of railroad securities are vitally interested in the adequacy of the equipment which the company owns. Many railroad companies

The Equipment Situation

for the last few years have not been buying new equipment in sufficient quantities to replace worn-out equipment and adequately to provide for a normal growth in traffic from year to year. In many cases making public this fact would not have changed the policy of the management because the company was already making purchases on as large a scale as its net earnings and credit would justify. On the other hand, even though security holders may be powerless to remedy a deplorable situation, they should be kept fully informed by the management as to what the facts actually are. All companies are required to report in some detail an inventory of their equipment to the Interstate Commerce Commission. Some include a detailed inventory in their annual reports to stockholders. A good many others fail to do so. While the roads were operating under the control of the Railroad War Board, L. L. Loree, president of the Delaware & Hudson, and chairman of the eastern department of the War Board organization, urged that all Class A roads be requested by the War Board to include a detailed inventory of equipment in their annual report. Before action was taken by the board, the government took control, but it is more important than ever that railroad security holders be kept informed as to each company's ownership of equipment. Under government orders, not only freight cars but also passenger cars and locomotives will be operated more or less away from the home roads. The failure to provide new equipment by a particular company might not be apparent in the operating figures, as shown in the company's annual

report, unless a detailed inventory is given. Each railroad president ought, therefore, to make it his duty to see that during the period of government control his stock and bond holders are kept fully informed, so that when the roads are returned to their owners there may be no unpleasant surprises. Copies of a suggested inventory are reproduced elsewhere in this issue.

What has become of our American efficiency that both the Bureau of Mines and people in general should find it necessary to lay such stress upon the exceptionally poor grade of fuel that is being given the railways to haul and our industries to use. Now as never before should our industries have the best coal obtainable and our railways be relieved of hauling more than 50,000,000 tons per year of worthless dirt and slate. E. G. Bailey in a lecture recently before the Johns Hopkins University, which is abstracted elsewhere in this issue, refers to the large percentage of ash and impurities in the coal we are now receiving as "sand in the bearings of transportation." And such it is, clogging our transportation system with 1,000,000 more car loads a year than if the normal attention was given to cleaning the coal. The remedy suggested by Mr. Bailey is to give a premium to those mines which produce the best coal. The consumers would be glad to pay it, for the loss in efficiency and the increased cost of maintenance caused by poor coal, costs more in the long run than if a higher price were paid for the better grade of coal. Price fixing has resulted in the working of mines that had previously been abandoned on account of the poor grade of coal produced. It has eliminated competition and with it, the incentive for the production of good coal. More attention must be paid to the quality of the fuel.

The Nation Must

Have Better Coal

Postmaster General Burleson has recommended and Congress is considering the government acquiring the telephone exchange in Washington, D. C., and having it operated by the postoffice department. The *Railway Age* recently has had much experience with both telephone and postal service in, and into and out of Washington. We are also familiar with the experience of many other people with them. The postal service is so much worse than the telephone service that to suggest having the telephone business handled by the postoffice department sounds like irony. The local mail service in Washington is very poor. The movement of mails in and out is slow and uncertain. When, last winter, train service was demoralized, the postoffice department blamed the railways. Now trains to and from Washington are running about normally, and the mail service is still almost as bad as ever. This applies to the first class as well as to other classes of service. The delays to all classes of mail between New York and Washington are unprecedented; and meantime the long distance telephone service between these cities is just as good as ever. The *Railway Age* is mailed in New York on Thursday. The postal department did not deliver the issue mailed in New York on Thursday, March 7, to subscribers in Washington until Wednesday, March 13; and it did not deliver the issue mailed in New York on March 21 to subscribers in Washington until March 27. Trains run between New York and Washington in five hours; but it takes six days for our "efficient" postal department to handle second class mail between the two points! The telephone company, the railways and the postal depart-

Postal versus Telephone Service

ment have had difficult problems presented to them by the great increases of population and of activities of many kinds at Washington. According to our experience and observation the postal department has shown far less capacity for promptly and satisfactorily solving these problems than either the telephone company or the railways. The postmaster general should be devoting his time to restoring the service of the postal department to the basis of comparative efficiency it was on before he took charge instead of seeking to add other services whose efficiency also probably would be reduced under his management.

The Railroad Man's Duty in This Hour of Peril

THE GREAT GERMAN OFFENSIVE has been launched. It looks as though the Kaiser has elected to risk all on one determined effort to smash his way through the lines of the Allies on the Western front. America and those with whom she has joined forces are being subjected to the acid test. The victory will not be gained without terrible toll in men and in money. Without money—and money in huge sums—the men cannot be supplied. Courage is needed at home as well as in the trenches. The whole-hearted cooperation and earnest endeavor of every citizen is necessary at this time.

A third issue of Liberty Bonds is announced for April 6. It should be a point of honor for every patriotic American to see that subscriptions exceed the amount demanded, however large this may be.

Railroad officers have a particular duty and privilege in this matter. They have been trained to direct and coordinate. They know the value of team work. If anyone knows the public, it is the railroad man who serves the public. He knows his fellow Americans in all their moods. He has had experience with more delegations than any government official. He has seen Americans irate and difficult; he has coped with Americans of every character and disposition. Now is the time for the railroad man to turn his experience to the good of his country. If the railroad officers of the country take off their coats and determine to make this Third Loan a grand success, they can come very near to doing it.

It is not sufficient that they should subscribe liberally themselves. Each must constitute himself a missionary to spread the gospel of this loan for Liberty. He must make the personal appeal in season and out of season. He must use every means of advertising that he controls. All of us can gain inspiration and increase our zest of living by entering with our whole souls into the campaign. It is well that we should get away for a time from the strictly sordid aspects of life.

As missionaries we must be prepared to be educators. All around us are hundreds and thousands who have been able as a result of conditions greatly to increase their earning power beyond all records of the past. Few of these know anything of investments. They should be taught what Liberty Bonds are, what they mean as a method of saving, as well as what they mean in their higher significance as contributions for the protection of those who are offering their lives that the cause of freedom may prevail.

All railroad men know what service means. All know the meaning of difficulties and how they are to be met and overcome. The greatest opportunity for service that can come to those who stay at home is offered by this Liberty Loan campaign; the best chance to tackle a really difficult task and see it through presents itself.

"Over there" are hundreds of boys from all branches of

the railroad service. Let us think of them. Let us make others think of them. Let us see that these others do more than think of those who but yesterday were working beside them. Money is needed to feed and clothe and protect these boys. It should pour in from every railroad centre in a great flood.

United States Standard Cars

WITHIN THREE MONTHS from the time of taking the office of director general of the railways of the United States, Mr. McAdoo has approved designs for standard freight cars. Specifications have been drawn and drawings made for bodies of a 40 and 50 ton steel frame, single sheathed box car (the designs are identical for both cars, different trucks being used); a 40-ton steel under-frame, double sheathed box car; a 50-ton steel high side gondola; a 50-ton composite high side gondola; a 70-ton low side steel gondola; a 50-ton hopper car and a 70-ton hopper car. There are three designs of trucks to be used on these body designs, having capacities of 40 tons, 50 tons and 70 tons.

A study of the specifications which appear elsewhere in this issue indicates that the government's standardization program has been along broad and rational lines. Adequate strength and interchangeability of parts have been given careful consideration. The M. C. B. standards have been used to a large degree and options have been left for detailed parts of different designs provided they are made to fit the limiting dimensions and to conform to the strength requirements. This should be of particular interest to the Railway Business Association which has sought so earnestly to keep the field open for further development of the special appliances that form a vital part in the construction of railway equipment. There are, of course, certain specialties which cannot be used on this equipment, either because they do not measure up to the strength or dimension requirements, or because the committee deemed it inexpedient to include them in the designs. For instance, only the wrought steel wheel is to be used on the 70-ton truck. It has been questioned by some engineers whether or not this was expedient. The all-steel roof has been excluded in favor of the outside metal roof laid over the roof boards. To be sure, the all-steel roof is somewhat more expensive than the design specified, but it saves approximately 500 lb. per car in weight. The specialties to be used are to be determined upon when the contracts for the cars are made.

The specifications call for friction draft gears and the M. C. B. standard coupler on all of the cars. Steel ends and outside steel roofs are required for the box cars. The arch bar type of truck frame is permitted on the 40 and 50 ton trucks and the cast steel frame either with the removable journal box or with the journal box cast integral is permitted on all three designs. A definite strength requirement has been made for the cast steel truck side frames, which in some cases will require new designs. The M. C. B. No. 2 brake beam is specified for the 40 and 50 ton trucks and the M. C. B. No. 3 brake beam is required for the 70-ton trucks. Specifications are also given for the paint to be used, for the journal box packing and for the journal box oil.

In so far as it is possible to determine from a study of the drawings, which have only just been released, it is apparent that the railways will be given car equipment of good design and adequate strength. While the weights of the different cars have not as yet been given out, it appears that they will be fairly heavy, which must always be the case where designs are more or less of a compromise. Interchangeability of parts has been given careful consideration

Many parts of the foundation brake gear are common to all cars and various other details of construction are interchangeable. With the care taken to provide limiting dimensions for the various optional material used, there should be little difficulty in properly maintaining the cars. As in the case of any new set of standards, however, the railways will be called upon to provide themselves with new material with which to repair the cars, which will take time and money. This feature will, of course, create some disturbance in the repair forces.

Canadian Pacific

THERE WAS NO INCREASE in freight business on the Canadian Pacific in the calendar year 1917 as compared with the previous year and no increase in the number of passengers carried, although the average passenger journey was about eight miles longer in 1917 than in 1916. The Canadian Pacific earned, however, \$13,000,000 more in 1917 than in 1916; the total earnings in 1917 amounting to \$152,389,335. In other words, there was a considerable increase in the average rates received for both freight and passenger. The ton mileage average in 1917 was 7 mills and in 1916 6.5 mills. The passenger rate per mile per passenger was 2.03 cents in 1917 and 1.96 cents in 1916.

The increase in rates, however, was not sufficient to offset the higher rate of wages paid and higher costs of material. There was no increase in the amount spent on maintenance of way; the 1917 expenditure being \$17,470,000 and the 1916 \$17,250,000. It is probably safe to assume, however, that scarcity of men was the limiting factor in the amount spent for maintenance of way.

The increased costs of actually moving the business (transportation expenses) and of maintenance of equipment are rather startling. Maintenance of equipment cost \$23,404,000 in 1917 and \$18,908,000 in 1916.

Transportation expenses mounted to \$53,029,000 in 1917 and \$42,385,000 in 1916. Trainmen, engineers and station agent and dispatchers' wages and fuel costs make up the bulk of the transportation expenses. This increase of 25 per cent in these expenses took place, notwithstanding the fact that passenger, freight and mixed train mileage all decreased. Total train mileage in 1917 was \$45,333,000, or 3.42 per cent less than the train mileage in 1916.

It is remarkable what progress the Canadian Pacific has made in car-loading and train-loading during the three years of the war. In the fiscal year ended June 30, 1915, the average loading per loaded car was 21.57 tons. In the calendar year ended December 31, 1917, this average was 26.19. In 1915 the average train load, including both revenue and company freight, was 463 tons. In 1917 the average train-load was 594 tons. When we remember that Canada has raised by the volunteer system 400,000 men and is now to raise another 100,000 by conscription which, in proportion to population, would be equivalent to raising an army of 7,000,000 men in the United States, we get some conception of the handicap of scarcity of labor which the Canadian railways have had to contend with. Increased train loading without any large change in the average power of locomotives or any considerable grade reduction is a matter of more skillful operation. To show such a marked increase in skill of operation as that on the Canadian Pacific is something that both the Canadian Pacific management and the people of Canada may well feel proud of. The Canadian Pacific management ascribes the better car-loading almost entirely to the success of the company's appeal to the patriotism of shippers. One thing that undoubtedly helped to bring up the average train-load in 1917 was a

reduction of 12 per cent in the mileage made by empty cars.

The principal changes in the character of traffic moved were an increase in the tonnage of flour and a decrease in the tonnage of grain and a very considerable increase in the tonnage of manufactured articles. The following table shows the classification of freight traffic and the quantities of each class moved in 1917 and 1916.

	1917.	1916.
Flour (bbls.)	\$13,727,970	\$11,119,890
Grain (bushels)	213,340,507	256,106,690
Live stock (head)	2,190,596	2,172,437
Lumber (feet)	3,178,554,667	3,017,964,134
Fire wood (cords)	295,277	289,471
Manufactured articles (tons)	10,148,568	8,871,928
All other articles (tons)	8,788,423	8,487,785

The economies effected in passenger service have been almost as great proportionately as in freight service. The number of passengers carried in the calendar year ended 1917 was 15,462,000 and in 1915, 13,086,000. Passenger car mileage in 1917 totaled 139,842,000. In the fiscal year ended June 30, 1915, passenger car mileage totaled 130,805,000; but the 1915 mileage was nearly 17 per cent smaller than 1914 mileage. In other words, curtailment of passenger car mileage was begun almost immediately after the outbreak of the war.

In 1916, the Canadian Government and the Canadian Pacific had outlined a plan under which the Canadian Pacific was to issue something less than \$200,000,000, 5 per cent collateral trust bonds and lend them to the Imperial treasury. This plan, however, was abandoned; but an issue of \$40,000,000 currency, 4 per cent consolidated debenture stock was made and this stock was loaned to the Imperial treasury, and an option given to the government to buy this stock at any time within five years at \$80 per \$100 share. No other security issue was made by the Canadian Pacific; but the company spent \$4,570,000 for additions and betterments on its own lines and \$7,505,000 on leased and acquired lines.

In 1917 the balance sheet shows under "Investments and Available Resources" \$10,586,734 cash and under "Working Assets" \$31,424,894 "Cash in Hand." In the 1916 balance sheet under "Working Assets" there is \$57,076,019 "Cash in Hand." Miscellaneous accounts payable totaled \$8,821,809 at the end of 1917 as compared with \$6,199,837 at the end of 1916.

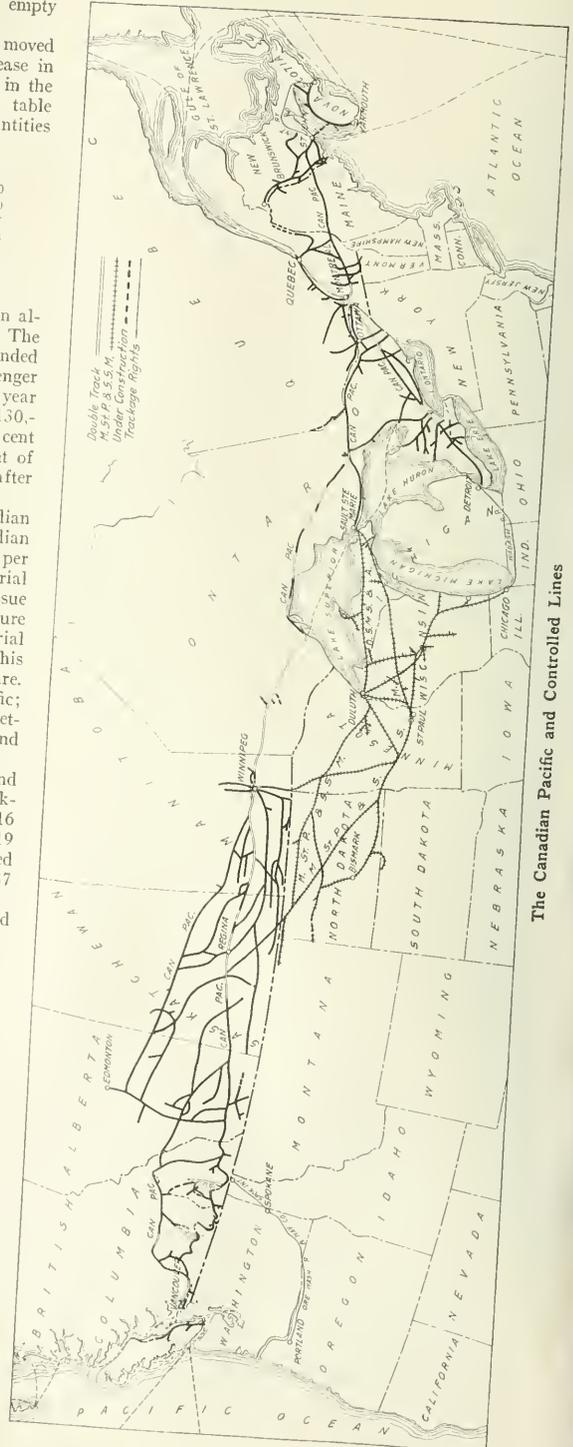
The following table shows the operating revenues and expenses for 1917 and 1916.

	1917.	1916.
Mileage operated	13,389	13,768
Freight revenue	\$103,635,795	\$96,454,896
Passenger revenue	30,238,986	26,849,282
*Total operating revenue	152,389,335	139,729,687
Maintenance of way and structures	17,470,069	17,249,500
Maintenance of equipment	23,404,263	18,908,464
Traffic expenses	3,084,944	2,940,872
Transportation expenses	53,029,260	42,385,348
General expenses	5,023,609	4,345,852
†Total operating expenses	105,843,317	89,253,188

* Includes revenue from mails, sleeping car, express, telegraph and miscellaneous.
 † Includes parlor and sleeping car, lake and river steamers, and commercial telegraph expenses.

The following table shows the income account of the Canadian Pacific for the calendar year 1917.

Gross earnings	\$152,389,335
Operating expenses	105,843,317
Net earnings	46,546,018
Interest and fixed charges	10,229,143
Appropriation for pension fund	500,000
Transferred to special income	1,968,683
Dividends paid from railroad earnings	21,427,276
Special income (interest and dividends received, earnings of steamship lines, etc.)	10,713,299
Dividends from special fund	7,800,000



The Canadian Pacific and Controlled Lines

Letters to the Editor

Breaking in Locomotives

CHICAGO, Ill.

TO THE EDITOR:

I notice on page 594 of the February 22 issue of the *Railway Age*, a suggestion from J. L. Coss, that locomotives be broken in after being turned out of the shop by having them handle bad-order cars or other work of a light nature, as the locomotive would reach the next terminal and be in condition to handle a full train on return trip.

I believe, if Mr. Coss had taken a second thought before making this suggestion, it might have occurred to him that the object in running a locomotive light as is customary on a trial trip, is to give the bearings a chance to find a permanent bearing and to prevent failures from hot boxes, or the journal heating up, as would be the case if Mr. Coss' suggestion were followed. Very often a failure or a hot-box caused from such handling would more than offset the saving made by utilizing the services of this locomotive for handling bad-order cars or light equipment.

To make the illustration a little plainer, it is customary with all manufacturers to break in and run the machines light before the load is placed on them. The breaking in trip also gives the shop organization a chance to correct any errors that may have been made, or to discover any imperfect work which has been done on the machine, thus making it a much safer machine to place in service than would be the case if handled the other way.

L. A. NORTH,
Shop Superintendent, Illinois Central.

Why Standardize Equipment Now?

NEW YORK, N. Y.

TO THE EDITOR:

Whatever may be the reason for the standardization of equipment, whether, as an emergency measure, to provide equipment for the country quickly, or to inaugurate a comprehensive and permanent standardization scheme, it seems that effort is being made to complete, within at most a few months, standardization work which should require years to accomplish.

Standardization means stagnation. It will remove from the car and locomotive construction field a vast amount of talent and effort heretofore expended upon improvement therein. Standardization means retarded development to an extent proportional to the field covered. A small line or a small territory can and does entertain the adoption of improvement much more freely than larger lines covering more extended territory, because the introduction of a new standard always involves a change which is usually expensive in proportion to the amount of territory covered. The benefits to be derived from the new standard must be weighed against the cost of its adoption more and more carefully the more widely extended the territory affected. The consideration of a standard of construction or maintenance applying to a large system receives much more careful consideration than on the smaller roads for obvious reasons. When the territory of standardization is extended to the entire United States, the inertia and delay which must be reckoned with, in the introduction of equipment design improvements, will be multiplied many times.

The determination, for the entire country, of the "best" in car and locomotive equipment, to the last detail, is a

colossal problem which cannot efficiently be solved within the time at the disposal of those with whom is lodged the responsibility for completion of the contemplated work. The task appears to be an impossible one, because the "best" for the United States cannot be obtained unless the "best" is also obtained for its various sections, territories or lines. There is not nor can there be a common "best" for all these sections, territories or lines, for many of the details to which, it appears, it is intended that standardization be applied.

In approaching this problem one first encounters consideration of the type of equipment to be adopted. It is needless to suggest anything on this subject, because the loss of efficiency to the country due to the use of standard types instead of other more efficient ones, especially adapted to the needs of the territory within which they are to be operated, must be apparent. The same applies to general dimensions and weights for the equipment types selected. Then comes the details of design and the specialties which are developed, manufactured and sold to the railroad companies and equipment builders by interests outside the ranks of railroad managers and employees, who must be accorded a large amount of the credit for the present state of the development of the art of railroad transportation. The standardization or the adoption of standards covering detail design and the selection of specialties will be an easy task for one vested with authority to make the necessary decisions, but the loss of efficiency which must become common throughout the country in connection, particularly with standardized locomotive equipment, will be enormous.

The details of design and the specialties referred to are all important factors, because they represent parts with which the men, immediately busied in repair and operation of equipment, come personally in contact and to which, through years of experience, they have adjusted themselves, their methods and their tools. The new design details and the new specialties are the points where "the shoe will pinch" by adversely affecting the operating efficiency, because these will affect the operating efficiency of the masses of men who have immediately to do with maintenance and operation of the equipment involved. The adoption of general standards involves an attempt to reconcile differences, which to many may appear to be only psychological, between the expressions of representatives of various sections on the matter of what design details or what specialties are most efficient. The number of such differences which might be cited even on a single large railroad system would be most astonishing and such a list would be greatly expanded if applied to all the lines in the United States. Though some of these differences might be dismissed as "only psychological" they must still be reckoned with. Failure to recognize the importance of the "human element" must very seriously and adversely affect operating efficiency.

The maintenance facilities, small and hand tools at shops and enginehouses, together with the stock of repair materials on hand is, in every section, in keeping with the needs of specialties and design details obtaining in that section. The introduction of new details or new specialties will involve immediately the expense of providing new repairing instruments and materials, a loss in efficiency until such are provided and the men interested in operation and maintenance accumulate experience and familiarity with the new. The country can now ill-afford to suffer the loss of efficiency and expense of the transitional period.

To summarize the whole situation it seems that standardization can only be part of an emergency program for quickly providing this country with the needed locomotive and car equipment, or a comprehensive permanent program which its sponsors believe will operate to the ultimate benefit of the country. If the purpose is the former, the standardization scheme as applied to the entire country appears to be unnecessary, detrimental and retarding; if the latter,

it is ill-advisedly considered now, because there are certainly greater things at stake than the final solution of this railroad equipment standardization problem, which should be postponed until after the present crisis is passed.

A CITIZEN WITH SOME RAILROAD EXPERIENCE.

An Unsafe Ruling

CLEVELAND, Ohio.

TO THE EDITOR:

Recently the conductor and engineman of a train were given an order stating, among other things, that a certain order was annulled. They did not hold a copy of that order and protested that they should be given a copy of it. The superintendent took the position that it was not necessary for the crew to hold the order, and further stated that if it were necessary for them to have a copy of the order the despatcher would have given it to them.

The point at issue here is vital to every operating officer because upon the correct understanding of the rules the safety of operation under the present train order system must depend. By denying the right of the trainmen to hold a copy of the original order the superintendent has placed himself in the position of having assumed that (a) the despatcher invariably supplies all orders which a train requires for safe movement under the rules and that (b) all orders placed by the despatcher at various points for a train are delivered to that train without failure; and that (c) such ruling violates no rule for movement by train order.

The ruling, to be safe, must be upheld by the rules and by experience in all three particulars. If a copy of the original order is denied the crew it must be shown that (a) the despatcher performs his duty perfectly, which manifestly is out of the question. But if the despatcher could be depended upon to issue all necessary orders there would be still the possible failure of the operator to deliver them. The government reports of accidents afford ample evidence on this point.

Nor do the rules permit such a ruling to stand unchallenged. Rule 201 in defining exactly what can enter into a train order, says "They must contain neither information nor instructions not essential to such movements"; and an order directing a train to annul an order which it does not hold would be "not essential" to the movement of that train. The superintendent's ruling created a hazard by the assumption that the crew could annul an order which it did not hold, or could take the alternative and disregard that portion of the order without danger.

The exact hazard in the ruling rests no less in the loose method of viewing the contents of a train order than in the actual danger which can result therefrom. Take an example. No. 108 is a train moving from A to Z, and is superior by direction. No. 121 is a train of the same class in the opposite direction. Order No. 4, directed No. 121 to meet No. 108 at B. This order was delivered to both trains. Order No. 15, directed No. 108 to meet No. 121 at C instead of B. This order was placed for No. 121 at D and delivered to No. 108 at A. No. 121 was delayed and the despatcher issued order No. 16 to No. 121 at E and to No. 108 at C, reading, "Order No. 15 is annulled." When No. 108 received order No. 16, it proceeded on its way without having any orders in effect concerning No. 121. No. 121 still held order No. 4 to meet No. 108 at B, as it had not received order No. 15. The conductor and engineman of No. 121 received order No. 16 at E, but as they did not hold order No. 15, they disregarded the annulling portion of the order, as instructed by the despatcher (after receiving their protest and conferring with the superintendent) and proceeded towards D, meeting No. 108 between E and D.

Should the operator fail to deliver a superseding order

the same thing obtains. It follows that the occasional failure of the despatcher to issue or properly place orders and the failure of the operator, at times, to deliver all orders held, uphold the wisdom of the rule which forbids the inclusion in an order of instructions not essential; and upholds the crew in demanding a copy of an order which it has been instructed to annul.

G. E. COLLINGWOOD.

Local Freight Agent Responsible for Unjust Criticism of Railroads

WASHINGTON, D. C.

TO THE EDITOR:

In spite of denials from authoritative sources a large percentage of the public is still convinced that the railroads are bent on making a failure of the present experiment of direct governmental operation of the carriers. I think no one acquainted with the situation will fail to agree that the charge is untrue so far as it concerns the vast majority of officers of individual lines. Why, then, the persistency of this belief?

A careful analysis of the great volume of appeals for transportation help which reach the United States Department of Agriculture, after due allowance is made for the abnormal, leads to the conclusion that the opinion is fostered by the attitude of the local freight agent. He has more work than he ever had before, with less and poorer help to get it done. He is human enough to follow the line of least resistance, and the imperative duty rests upon higher officers to keep before him the whole picture of our transportation problems. When a patient, but exasperated, shipper tries to get some information as to the whereabouts and probable arrival of a shipment which has been out from six weeks to three months, and which under normal conditions should have reached destination in six days, and is met with the statement, "The government is running the railroads, and we are doing no tracing," what other conclusion can he reach than that somebody is "laying down on the job?"

Some two years ago the American Railway Association adopted a resolution looking toward putting an end to the tracing abuse, an abuse for which, under the competitive system, the railroads were more responsible than the shippers. The resolution was a move in the right direction and it has had the support of all right-thinking people. It is recognized that the same conditions which today make the tracing of some shipments so necessary, militate against their efficient tracing. When, however, such commodities as agricultural implements, spraying material, seeds and fertilizers, imperatively needed at once for spring planting in order that there may be no curtailment of the production of food in the United States this year, have been in transit far beyond the length of time necessary to get them to destination, they should be traced. If they can't be traced, the shipper is at least entitled to an intelligent explanation of why it can't be done.

I cite tracing merely as one example. There are others. Are we going to educate the local agent at this crisis and put him in a position to help to forestall baseless criticism?

CHARLES BRAND.

Chief of Bureau of Markets, United States Dept. of Agriculture.

THE JAPANESE GOVERNMENT RAILWAYS with a view to relieving the enormous freight congestion are pushing forward the construction of hundreds of freight cars at the workshops by offering a bonus of Y.300 (\$150) a car for speedy completion.—*The Far Eastern Review*.



The Big Black River Bridge Nearly Completed

Improvements on the Yazoo & Mississippi Valley

Track Grades on 44 Miles of Line Near Vicksburg Have
Been Raised to Protect Against Floods

BECAUSE FLOOD WATER in the Mississippi river reached a higher stage early in 1916 than had been recorded previously, submerging the main line of the Yazoo & Mississippi Valley in the vicinity of Vicksburg, Miss., with a resulting suspension of traffic for a period of three weeks, the railway undertook an extensive project for raising the grade of its tracks over a distance of 44 miles. Of this distance 27 miles was north of Vicksburg and 17 miles south of that city. While the raises made were relatively light, the work taken in the aggregate assumed rather large proportions, over 1,500,000 cu. yd. of grading being required. The details of this work, much of which was carried on under traffic, are of considerable interest and the following account, taken from an article by M. P. Black, assistant engineer, in the *Illinois Central Magazine* of January, 1918, presents the salient features:

South of Vicksburg the proximity of the existing track to the foot hills made it possible to obtain the desired raise in grade more economically by a change of alignment, pushing the new line farther away from the river, but north of the city the work was necessarily confined to a raise of grade on the existing alignment. After exhaustive surveys, it was decided to raise the top of rail from Vicksburg north to the Yazoo river, a distance of 10 miles, to an elevation three feet above the highest recorded water level. From the Yazoo river to Smedes, a distance of 17 miles, it was determined to raise the top of rail to the elevation of the hydraulic gradient of the 1916 flood. It was considered unnecessary to go higher on this part of the line because the United States Government is contemplating the construction of a levee, from Terrapin Neck cut-off to the mouth of the Yazoo canal, an improvement which, it is thought, will reduce the flood level in the area north of the Yazoo river.

The work from Vicksburg to the Yazoo river was authorized in the early part of 1916 and begun on July 10. The raise on this piece of track ranged from one to five feet, all

of which was done under traffic. The earthwork amounted to 216,000 cu. yd., measured in excavation, and the raising of pile trestles to a total of 1151 lineal vertical feet. Besides this, 351 ft. of old trestle was eliminated. The total cost was \$150,000 and, except for a few minor details, was finished in December, 1916.

From Vicksburg to Smedes

The work from the Yazoo river to Smedes was authorized in March 1917. The raise on this part of the line was from one to four feet and was done under traffic. It included 600,000 cu. yd. of earthwork, 4743 lineal vertical feet of trestle raised and 637 lin. ft. of additional pile trestle.

On account of inadequate drainage, side borrow for the embankment was not permissible. A borrow pit was secured at Kings, in a desirable location, making the average haul for the work 13 miles. Work on the track lay-out at the pit was started on July 13, 1916, and a steam shovel was put at work on August 1. The pit was opened with a 15C Atlantic type Bucyrus shovel, but later a 60C Bucyrus shovel was installed. Other equipment including 40 western automatic steel air dump cars of 20 cu. yd. capacity, thirty 30-cu. yd. Western cars of an older type, one Marin McCann steel spreader and four 60-ton locomotives belonging to the railroad.

The spreader used was well adapted to this class of work as the main wings were designed to force the dirt back from the track for the passage of trains, but not so far as to increase the cost of placing the dirt in the track while it is being raised. The steel dump cars used were also satisfactory for this class of track raising work, especially where the embankment was not over eight feet high. The 30-cu. yd. cars of the same manufacture were too large for a low embankment, but would be satisfactory on a higher fill. For handling the dump cars, the locomotives were equipped with three-way valves, connected with the dumping apparatus so

that the engineman could dump the entire train in either direction on a signal from the dump foreman. The maintenance on the steel dump cars was light as one car repairer was sufficient to handle the running repairs on 70 cars.

The track was raised in one-foot lifts 1000 ft. long using gangs of 40 men working with ordinary No. 6 track jacks. The plan followed was to raise the track as high as possible on the available dirt, and then dump more. In this way the raising was always ahead of the dumping, giving the track

and the dirt pit by the construction department. The work is now practically completed. The ballast used was of a cementing gravel type, hauled from Whittaker pit, 106 miles south of Vicksburg.

South of Vicksburg

Of the 17 miles of reconstruction south of Vicksburg, all but five miles is on new alignment. The terrain being such that changes of line were advantageous in obtaining the desired raise in grade, further benefits in the new location were found in that it relieved the embankment of the wave wash to which it was subjected on the old location during high water and because an improved alignment could be secured. These improvements reduced the length of the line 0.32 miles and eliminated 233 deg. of curvature. The maximum grade used was 0.5 per cent and the maximum curve 2 deg. The work was authorized in July 1916, and it was started in August of the same year.

The work included 739,000 cu. yd. of earthwork, 2,197 lin. ft. of ballast deck trestle, 210 lin. ft. of open deck trestle, 80 ft. of concrete trestle and 1,173 lineal vertical feet of pile trestle raised, in addition to a new bridge over Big Black river consisting of six 75-ft. girder spans, one of which was equipped for hand operation as a Straus bascule span. The substructure is of concrete. The entire structure cost \$170,000. By the construction of two subways, an overhead bridge and one mile of road change, all public grade crossings over the new alignment on the main road from Vicksburg to Yokena, a distance of 13 miles, have been eliminated.

The grading was done by the H. W. Nelson Company of Chicago, and the bridge work was done by company forces except the masonry work on the Big Black river bridge which was done by the Union Bridge & Construction Company of Kansas City, Mo.

The equipment of the grading contractor consisted of three 70C Bucyrus shovels, two pumping plants and tanks, one water distilling plant, one Jordan steel spreader, one wooden spreader, seventy-five 12-cu. yd. wooden dump cars, eight 16-cu. yd. wooden dump cars, and four to eight 60-ton locomotives, (leased from the railroad company). A night and day shift were operated on the grading work during a portion of the time.

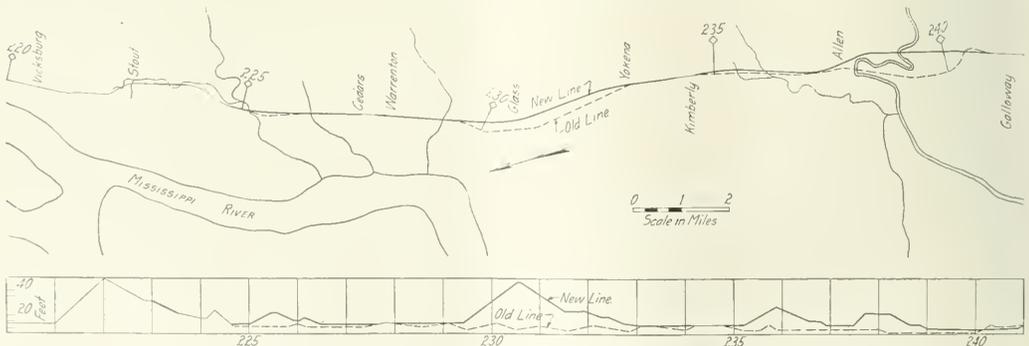
Considerable difficulty was experienced in three places



Typical Excavating and Hauling Equipment Used on the Work

good drainage, which was of great benefit during bad weather. The plans for the work called for an 18-ft. crown on the embankment with 1½ to 1 slopes. An allowance of 10 per cent was made for shrinkage and this seemed to work out very well for the material used.

To raise the ballast deck trestles, where the raise was two feet or less, additional caps were inserted, drifting them



Map and Profile of the Improvements South of Vicksburg

thoroughly. Where the raise was more than two feet it was made in like manner, but greater stability was secured by driving an additional pile at the ends of each bent and providing a top cap of sufficient length to bear on the two new piles. Additional sway bracing was also applied. The track raising was handled by the Vicksburg division forces

on account of the abrupt rise of the natural surface of the ground, as heavy as 10 per cent grades being used by dirt trains in reaching the shovels on the upper lifts. A very troublesome blue marl was encountered in several places in the excavation six feet above grade line, which would not sustain the load of the upper strata after the lateral pres-

sure had been removed. In one case the grade line was raised to the highest point of this material and in others the excavation was widened until an angle of repose was reached.

During the winter of 1916-17 a very high stage of the Mississippi river occurred, which overflowed the Big Black bottom and caused the failure of a frame bent trestle used



A Section of New Embankment

for dumping on the main line embankment there. This necessitated the construction of a temporary pile trestle, which was driven with a creeping driver during the high stage of water. Through Big Black bottom on a 32 ft. fill, approximately 4 ft. of subsidence and 10 per cent shrink-



Building a New Line Higher Up on the Hill Side

age of the embankment material took place during this overflow.

Big Black River Bridge

The bridge over Big Black river and a 1,200 ft. ballast deck trestle south of it were constructed in advance of the grading. The material for these bridges was moved over

a 7,000 ft. temporary track constructed through the bottom from the main track near Galloway. The first four bents of the 1,200-ft trestle were driven with a truck driver, after which a creeping driver was hauled on top and used to complete the structure. Pile foundations with a penetration of 25 to 35 ft. were required at the river bridge. Wakefield sheet piling was placed around each pier as a precaution against high water, but weather conditions and the stage of water in the Big Black river were entirely favorable throughout the work, the channel piers being constructed with only five feet of water in the channel.

The work was well planned and carried through efficiently. The plant consisted of three hoisting engines, three stiff leg derricks, one barge, one power saw, a 1 1/2-cu. yd. Ramsey mixer, two steam hammers and a compressed air plant complete. A temporary trestle was driven across the river and all material was transported on this. The mixer was located on the south bank of the river, concrete being moved across the trestle in dump buckets loaded on a push car and operated by a continuous cable, attached to the drum of



A Filling Trestle for a New Embankment

one of the hoisting engines. The material was then poured in forms by a second derrick.

Washed river gravel was used in the piers, but on account of a large percentage of sand it was screened. A large steel screen was rigged over the hoppers and the aggregate unloaded onto the screen with a clam shell direct from the cars. The screen was set at an angle of 40 deg. with the horizontal and distributed the material to the respective bins.

The bridge superstructure was erected by one of the system steel gangs with an ordinary track derrick. Two temporary pile bents were driven in advance of each pier to afford sufficient reach for the derrick to land the 75-ft. girders.

This work is now complete, but as 5,000 ft. of the new embankment has not sustained an overflow period, the old main track from Allen to Galloway will be kept in condition for service until after the next overflow to insure the regular movement of trains in case there is an excessive subsidence and shrinkage of the fill during high water. With these improvements complete, the entire line through the overflow territory except the Vicksburg terminal is ade-

quately protected from probable high water, and plans for improving the latter are now under consideration. The work described was carried on under the direction of A. S. Baldwin, chief engineer of the Illinois Central, with M. P. Black, assistant engineer, in direct charge.

Changing Standard Time

DIRECTOR GENERAL McADOO has issued an order to the railroads containing instructions, based on a report by the Committee on Transportation of the American Railway Association, to be followed in connection with the change in standard time caused by the daylight saving bill, which becomes effective at 2 a. m. Sunday, March 31. Immediately after the change is made, as no change will be made in the time-tables, all trains then on the road would be one hour late according to the time table. On the other hand, trains which do not start until after the change in time naturally would not be late, except for other causes. This creates a problem of adjustment to be worked out in arranging meeting points. The instructions are as follows:

"At 2 a. m., Sunday, March 31, all clocks and watches in train dispatchers' offices, and in all other offices open at that time, must be advanced one hour, to indicate 3 a. m.

"Employees in every open office must, as soon as the change has been made, compare time with the train dispatcher. Clocks and watches in all offices at the first opening, at or after the time the change becomes effective, must be advanced to conform to the new standard time and employees, before assuming duties in such offices, must, after the change is made, compare time with the train dispatcher.

"Each railroad will issue necessary instructions and arrange for such supervision and check of the watches of its employees as to insure that they have been properly changed to conform to the new standard time.

"Owing to the varying conditions which will prevail on the railroads of the United States, it is not advisable to issue a uniform rule or order to cover the details involved in the movement of trains at the period the change in standard time becomes effective. Therefore, each railroad must adopt such measures as may be necessary to properly safeguard the movement of its trains on the road at the time of the change."

Instructions for Train Dispatchers

On a double-track line, with each of the two tracks occupied only by trains moving in one direction, a general order, directing that, after 2 a. m., all scheduled trains shall run one hour late will afford all necessary simplification of the dispatcher's problems in ordinary cases. On a single track line, worked according to the Standard Code (with trains in one direction superior to all those of the same or a lower class moving in the opposite direction) the simplest plan for fixing meeting points safely is to annul all schedules and run the trains as extras. This is the plan adopted on a number of roads from whose officers information has been received. A typical general order, that of the Western Maryland, places on the dispatchers the following requirements:

1. Annul all regular trains which, according to their schedules, would be on the road at the time of the change, and run them as extras.
2. Make no use of time orders for one hour before the change and until twelve hours after the change.
3. Require trainmen on the road to have a general comparison of time. That is, require the conductor, engineman, fireman, head brakeman and middle brakeman to get together and see that they all have the same time; the conductor then to compare time with the flagman.
4. Require trains to stop at the first telephone booth

after the change and the conductor compare time with the train dispatcher, who will make a record of it. Train orders are transmitted by telephone and there are telephone booths not farther than three miles apart, so that this comparison can be made almost immediately after the change becomes effective.

5. Have local time inspectors make the change in standard clocks.

6. Require all train and enginemen, both road and yard, to compare time before starting out after the general change.

7. The local time inspectors will furnish a man at large departure points for the first twelve hours after the change, to compare and record the time of all men before they go on duty.

8. Clocks other than standard will be changed by the clerks in local offices.

It was expected that the commercial telegraph companies would couple in their master clocks and send time on the Morse wires on the first hour after the change, for the benefit of all within hearing.

On the Erie Railroad the instructions for single track lines require all trains between terminals at 2 a. m. to be at an open telegraph office at that hour. Before proceeding from such station, the conductor and the engineman are to compare time with standard clock, or with the train dispatcher; and to proceed only after receiving instructions from the dispatcher. All train orders in effect at 2 a. m. are automatically annulled; trains holding orders must then proceed only on new orders.

Absolute Meeting Points

On the New York, New Haven & Hartford all scheduled trains on the road at 2 a. m. are ordered to run to destination not less than one hour late. On the single track lines of this company all scheduled trains have the right to the road to schedule meeting points unconditionally as regards opposing scheduled trains of the same class, and whichever of two such trains arrives first must wait for the other. The order to the dispatchers provides, therefore, as regards opposing trains, simply that the dispatchers shall arrange meeting points for trains not of the same class. Prior to the change they must issue no time orders to be in effect after 2 a. m.

After 2 a. m. dispatchers must get from all conductors and enginemen then on the road acknowledgments that they have changed their watches, using for this purpose train-order form No. 31.

To provide against any possible misunderstanding the general manager of the New Haven ordered that at each train terminal and engine terminal a trainmaster, assistant trainmaster, road foreman of engines or other suitable officer should be on duty from 4 p. m. on Saturday, March 30, until 10 p. m. on Sunday, March 31.

JAPANESE TO EXTEND SHANTUNG RAILWAY.—An engineer of the Shantung Railway with an assistant started from Tsingtao recently to conduct preliminary surveys for the extension of the railway from Tsinan to Taokowchen.

SOUTH MANCHURIA RAILWAY TO BUY EQUIPMENT.—The management of the South Manchuria Railway is considering the appropriation of some Y.6,000,000 (\$3,000,000) for buying at least 600 freight cars and 12 locomotives in the estimates for the next fiscal year. This is at the rate of Y.150,000 (\$75,000) per locomotive and Y.7,000 (\$3,500) per freight car. This estimate is of course subject to variation according to the price of iron and steamer freights and is based upon a plan to buy not materials for construction, but ready-made rolling stock. This is reported to be decidedly cheaper than the purchase of materials. All these purchases are to be made from the United States.—*The Far Eastern Review.*

Specifications for the United States Standard Cars

Seven Types of Bodies for Box, Hopper and Gondola Cars and Three Types of Trucks Are Provided

THE DIRECTOR GENERAL has issued specifications for the standard cars recently designed by the government's car committees and which have been approved by the director general. These specifications cover designs for bodies of a 40-ton steel underframe, double sheathed box car; a 40 and 50-ton steel frame, single sheathed box car; a 50-ton steel high side gondola car; a 50-ton composite high side gondola car; a 70-ton low side steel gondola car with drop ends, a 55-ton hopper car, and a 70-ton hopper car. There are only three designs of trucks for these cars. They are of 40, 50 and 70 tons capacity. Those parts of all designs which could, have been made common to all of the designs.

Car Body Specifications

The friction type of draft gear has been specified on all cars and the following five types may be used: Cardwell, Murray, Sessions type "K," Westinghouse and Miner. The M. C. B. Type D standard coupler with the 6-in. by 8-in. shank is specified on all cars. M. C. B. specifications have been followed to a large extent and a complete specification for paint is included to be used for all cars. The dimensions

kets to meet M. C. B. specifications. Brakes to be applied to all wheels and also arranged to be operated from one end of the car by hand. Braking power to be about 60 per cent of light weight of car based on 50-lb. cylinder pressure. Piston travel to be between 5 and 7 in. Hand brake power to be approximately the same as the air brake power. All piping to be black steel, merchantable, standard weight, and fittings to be malleable iron.

Draft Gear.—To be of the friction type, having a minimum capacity of 150,000 lb. and a maximum travel of 2 3/4 in., designed so as to fit into the space provided by the drawings. Clearance between coupler horn and striking plate to be 3 in. The following types may be used: Cardwell, Murray, Sessions type "K," Westinghouse, Miner

Draubar Yoke.—To be of the vertical plane type of an approved design, arranged to take the key shown on drawing.

Coupler.—To be cast steel, in accordance with M. C. B. contour and specification, having 6-in. by 8-in. shank, 21 1/4 in. long, as shown on coupler condition drawing, and slotted tail of proper depth to suit draft gear.

Coupler Operating Device.—To be of the top operating

GENERAL DIMENSIONS OF THE UNITED STATES STANDARD FREIGHT CARS

	40-Ton Double Sheathed Box	40 and 50-Ton Steel Frame Single Sheathed Box	50-Ton Steel Gondola	50-Ton Composite Gondola	70-Ton Steel Gondola	55 Ton Hopper	70-Ton Hopper
Length, inside	40 ft. 6 in.	40 ft. 6 in.	41 ft. 6 in.	41 ft. 6 in.	46 ft. 6 in.	30 ft. 6 in.	39 ft. 6 in.
Width, inside	8 ft. 6 in.	8 ft. 6 in.	9 ft. 4 3/8 in.	9 ft. 1 1/8 in.	9 ft. 6 in.	9 ft. 5 1/2 in.	9 ft. 5 1/2 in.
Height, inside	9 ft. 0 in.	9 ft. 0 in.	4 ft. 8 in.	4 ft. 8 in.	3 ft. 0 in.	9 ft. 0 in.	9 ft. 0 in.
Length over striking plates	42 ft. 1 1/2 in.	42 ft. 1 1/2 in.	42 ft. 10 1/2 in.	42 ft. 10 1/2 in.	48 ft. 7 in.	31 ft. 11 in.	40 ft. 5 in.
Width over eaves	9 ft. 4 in.	9 ft. 4 in.	10 ft. 2 3/4 in.	10 ft. 2 3/4 in.	10 ft. 3 1/4 in.	10 ft. 2 3/4 in.	10 ft. 2 3/4 in.
Width over all	10 ft. 2 1/2 in.	10 ft. 2 1/2 in.	12 ft. 10 1/8 in.	12 ft. 10 1/8 in.	12 ft. 10 1/8 in.	12 ft. 10 1/8 in.	12 ft. 10 1/8 in.
Height from rail to top of car at eaves	12 ft. 10 1/8 in.	12 ft. 10 1/8 in.	8 ft. 3/4 in.	8 ft. 3/4 in.	6 ft. 4 3/4 in.	10 ft. 8 in.	10 ft. 8 in.
Height from rail to top of car body	14 ft. 1 1/4 in.	14 ft. 1 1/4 in.	8 ft. 7 3/4 in.	8 ft. 10 1/4 in.	7 ft. 1 3/4 in.	11 ft. 2 1/4 in.	11 ft. 2 1/4 in.
Height from rail to top of brake mast	14 ft. 1 1/4 in.	14 ft. 1 1/4 in.	8 ft. 7 3/4 in.	8 ft. 10 1/4 in.	7 ft. 1 3/4 in.	11 ft. 2 1/4 in.	11 ft. 2 1/4 in.
Height from rail to top of running board	13 ft. 6 3/4 in.	13 ft. 6 3/4 in.	8 ft. 7 3/4 in.	8 ft. 10 1/4 in.	7 ft. 1 3/4 in.	11 ft. 2 1/4 in.	11 ft. 2 1/4 in.
Distance center to center of trucks	31 ft. 1 1/2 in.	31 ft. 1 1/2 in.	31 ft. 10 1/2 in.	31 ft. 10 1/2 in.	37 ft. 7 in.	21 ft. 11 in.	30 ft. 5 in.
Height from rail to center of coupler	2 ft. 10 1/2 in.	2 ft. 10 1/2 in.	2 ft. 10 1/2 in.	2 ft. 10 1/2 in.	2 ft. 10 1/2 in.	2 ft. 10 1/2 in.	2 ft. 10 1/2 in.
Height from rail to bottom of center sill	2 ft. 4 1/2 in.	2 ft. 4 1/2 in.	2 ft. 4 1/2 in.	2 ft. 4 1/2 in.	2 ft. 4 1/2 in.	2 ft. 4 1/2 in.	2 ft. 4 1/2 in.
Cubic capacity—level full	1,820 cu. ft.	1,770 cu. ft.	1,820 cu. ft.	1,770 cu. ft.	1,880 cu. ft.	2,508 cu. ft.	2,508 cu. ft.
Cubic capacity—with 30 deg. heap	2,310 cu. ft.	2,230 cu. ft.	2,310 cu. ft.	2,230 cu. ft.	2,310 cu. ft.	2,235 cu. ft.	2,235 cu. ft.

of these seven types of cars are shown in the accompanying table. Following is a list of the specifications that are common to the bodies of all of the cars:

Center Sill Requirements.—The center sill construction is designed to meet the M. C. B. requirements, having an area of not less than 24 sq. in. in cross section and a ratio of stress to end load not exceeding .06.

Safety Appliances.—To be applied in accordance with United States safety appliances standard in effect on date of proposal.

Material Options.—Wherever more than one kind of material or construction is shown on drawing or mentioned in specification, it is understood that either may be furnished by the builder unless otherwise specified. Specialties to be as covered in contract.

Bolts and Nuts.—All bolts to have square head and nut unless otherwise specified. All bolts for securing steel against steel to have cotters, lock washers or lock nuts, in addition to common nut, and all bolts for securing wood against steel to be riveted over nuts.

Brakes.—Cars to be equipped with Westinghouse KD-10-12 type (the box cars are to be equipped with the KC-10-12 type) of air brakes of either Westinghouse or New York Air Brake Company's manufacture. Hose and gas-

type without the use of clevises, links and pins; that is, to be direct connected to the locking block. Apparatus to be in accordance with condition drawings.

Center Plate.—To be, first, drop forged, or second, cast steel.

Side Bearing.—To be, first, frictionless, or second, plain. Frictionless side bearings to be of approved type to meet conditions shown on drawing. Drawings are arranged so that plain side bearing can be used in repairs.

Material Specification.—The following M. C. B. specifications for materials are to apply:

A. 101	Steel	101	Steel
A. 102	Steel	102	Steel
A. 103	Steel	103	Steel
A. 104	Steel	104	Steel
A. 105	Steel	105	Steel
A. 106	Steel	106	Steel
A. 107	Steel	107	Steel
A. 108	Steel	108	Steel
A. 109	Steel	109	Steel
A. 110	Steel	110	Steel
A. 111	Steel	111	Steel
A. 112	Steel	112	Steel
A. 113	Steel	113	Steel
A. 114	Steel	114	Steel
A. 115	Steel	115	Steel
A. 116	Steel	116	Steel
A. 117	Steel	117	Steel
A. 118	Steel	118	Steel
A. 119	Steel	119	Steel
A. 120	Steel	120	Steel

Freight Car Paint Specifications No. 1008

Freight Car Color. I. This material will be bought in the paste form, and the paste must contain nothing but oil, pigment and moisture.

11. The proportions of oil, pigment and moisture must be as nearly as possible as follows:

Pigment	74 per cent by weight
Oil	5 per cent by weight
Moisture	1 per cent by weight

12. The oil must be pure raw linseed oil, as free as possible from foots, and well clarified by settling and age.

13. The pigment desired if it contains sulphate of lime or gypsum should have this fully hydrated. It may have as inert material sulphate of lime of gypsum fully hydrated, silica, kaolin, soapstone or asbestine, or mixtures of any of these, sulphate of lime and silica preferred. The pigment should have the following composition:

Sesquioxide of iron	5 per cent by weight
Inert material	71½ per cent by weight
Carbonate of lime	3½ per cent by weight

14. Material must conform to shade furnished and in fineness of grinding meet test in accordance with approved method of Standard Railway laboratories.

15. Shipments will not be accepted which:

1. Contain less than 23 per cent or more than 27 per cent of oil.

2. Contain more than 2 per cent volatile matter, including the moisture, the oil being dried to 250 degrees Fahrenheit, and the pigment dried in air which has been passed through oil of vitriol, at from 60 degrees to 90 degrees Fahrenheit.

3. Contain impure or boiled linseed oil.

4. Contain in the pigment sulphate of lime not fully hydrated, less than 20 per cent of sesquioxide of iron, less than 2 per cent or more than 5 per cent of carbonates, calculated as carbonate of lime, or have present any barytes, carbonates of alkalis, aniline colors, lakes or any other organic coloring matter, or any soaps or other emulsifying material.

5. Vary from shade.

6. Do not pass fineness of test.

7. Are a liver or so stiff when received that they will not readily mix for spreading.

Carbon Black. 1. This material must be furnished in paste form.

2. The material desired under this specification is a paste, made on the following formula:

Pigment	65 per cent by weight
Oil	35 per cent by weight

The oil must be pure raw linseed oil, as free as possible from foots, and well clarified by settling and age.

The pigment desired should consist of:

Lampblack, or carbon black	15 per cent
Red lead	5 per cent
Asbestine	10 per cent
Silica or other approved material	70 per cent

The lampblack must be of good quality, and of such a character as to produce the standard shade. Ground coal, etc., will not be considered. Phosphates, barytes, sulphates of lime or gypsum, carbonate of lime or whiting or any other carbonates of sulphates, or any constituents other than those given in the composition of the pigment desired, must not be used.

3. Material must conform to shade furnished and in fineness of grinding meet test in accordance with approved method of Standard Railway laboratories.

16. Shipments will not be accepted which:

1. Contain less than 32 or more than 38 per cent oil.

2. Contain more than 2 per cent of volatile matter, including the moisture, the oil being dried at 250 degrees Fahrenheit, and the pigment dried in air which has been passed through oil of vitriol at from 60 to 90 degrees Fahrenheit.

3. Contain impure linseed oil.

4. Contain in the pigment less than 13 per cent or more

than 16 per cent carbon, preferably in the form of lampblack or carbon black, less than 4 per cent of lead representing the red lead, or have present any phosphates, barytes, sulphate of lime or gypsum, carbonate of lime or whiting, or any other sulphates or carbonates or any other caustic substances, such as caustic lime, or any soaps or other emulsifying materials, or any constituents other than those given in the formula for the pigment desired.

5. Do not pass fineness test.

6. Do not contain asbestine according to the formula of the pigment desired.

7. Are a liver, or so stiff when received that they will not readily mix for spreading.

Red Lead. This paint shall be furnished in prepared form ready for application. It shall contain not less than 64 per cent or more than 68 per cent of pigment. The pigment portion of the paint shall contain 60 per cent red lead. The red lead used shall contain not less than 85 per cent Pb_2O_4 . The balance of the pigment portion of the paint shall consist of silicious matter such as magnesium or aluminum silicate or silica or a mixture thereof.

The vehicle shall consist of not less than 90 per cent linseed oil, the balance to be liquid drier and volatile thinner. The volatile thinner may be turpentine or mineral spirits or a mixture of the two. No rosin shall be present in the vehicle.

The prepared paint as received must have satisfactory working qualities and durability. It must be free from objectionable caking in the can. When applied to a smooth iron surface it must dry in twelve hours without running, streaking or sagging.

Box Cars

All designs of the box cars will have a steel underframe and steel ends. The bodies of the 40 and 50-ton single sheathed box cars are identical, the only difference is in the trucks. The specifications peculiar to the box cars and similar to all of the box car designs are as follows:

Flooring.—To be of fir or long leaf yellow pine, square edge and sound, 2¼ in. thick, tongued and grooved, 5¼-in. to 7¼-in. face width, secured to side and center sills, as shown on drawing.

End Lining.—To be yellow pine, No. 1 common, or fir 1½ in. thick, tongued and grooved, 5-in. face width.

Roof.—To be galvanized steel No. 22 gage, outside metal roof, laid over yellow pine roof boards, No. 1 common, or fir 13-16 in. thick by 3¼-in. or 5¼-in. face width as shown on drawing No. 1337. (The drawings state that the Murphy, Hutchins, or Chicago-Cleveland outside roofs may be used if they interchange with the designs shown.)

Steel Ends.—First, horizontal corrugated of three sheets: top sheet 3-16 in. thick, intermediate and bottom sheets ¼ in. thick with corrugations 2¼ in. deep. Second, vertical corrugated of two sheets, all ¼ in. thick with corrugations 2¼ in. deep. Third—Plain steel end with U-shape vertical stakes, as shown on drawings.

The following specifications apply only to the 40-ton steel underframe double sheathed box car:

Framing.—All dimension framing to be yellow pine, square edge and sound grade, or fir of sections shown on drawings.

Side Sheathing.—To be long leaf yellow pine, B and better, or No. 2 clear and better fir 13/16 in. thick, tongued and grooved, 3¼-in. or 5¼-in. face width, securing to framing as shown on drawings.

Side Lining.—To be yellow pine, No. 1 common, or fir 13/16 in. thick, tongued and grooved, 3¼-in. or 5¼-in. face width, secured to framing, as shown on drawings.

The side lining for the 40 and 50-ton steel frame, single

sheathed box cars is to be of, first, fir No. 2 clear and better, or second, yellow pine B and better. Lumber is to be thoroughly kiln dried, having maximum moisture of 5 per cent, tongued and grooved and with a 5-in. face.

The underframe for the double sheathed car is of different construction from that of the single sheathed car.

Gondola Cars

The gondola cars are designed to carry a concentrated load of two-thirds of the capacity of the car over a distance of 10 ft. at the center. Eight doors are provided on the 50-ton all-steel and composite high side cars. Those on the all-steel car are hinged cross-wise of the car, while those on the composite car are hinged along the center sill to dump toward the side. In both cases the doors are operated in pairs. The flooring for the composite cars is to be of long leaf yellow pine or fir, 2 3/4 in. thick, having a face of 5 1/4 in. to 7 1/4 in. The siding for these cars is of long leaf yellow pine or fir and 1 3/4 in. thick.

The underframe on all three of these designs is not the same in its entirety. There are, however, details which are similar. For instance, the draft sill construction and the body bolster center brace of both the 50-ton gondolas are the same as those used on the single sheathed box cars. The body bolster center brace and the rear of draft lug on the 70-ton gondolas are the same as those used on the 40-ton double sheathed box car. There are similarly other details which are common to the various designs.

Hopper Cars

The hopper cars are of all-steel construction, the 55-ton car having double hoppers and the 70-ton, triple hoppers. The four doors forming the center opening in the 70-ton car are operated by one mechanism and in all other cases the doors forming the openings are operated in pairs. These cars have the same end and draft sill and have the same design of rear draft lug. There are many details in the door opening mechanism which are common to both types of cars. The floor construction is the same and the hopper construction with the details is common to both. The side hopper sheets are the same.

Trucks

The trucks for all of the standard cars are covered by three specifications, one for 40-ton cars, one for 50-ton cars and one for 70-ton cars. The specification numbers for these trucks are 1274-B, 1276-B and 1241-B, respectively.

The following table gives the general dimensions of the three trucks:

	40-ton	50-ton	70-ton
Wheel base	5 ft. 6 in.	7 ft. 6 in.	5 ft. 8 in.
Distance center to center of journals	9 ft. 4 in.	6 ft. 5 in.	6 ft. 6 in.
Size of journals	5 in. by 9 in.	2 5/8 in. by 10 in.	6 in. by 11 in.
Diameter of wheels	33 in.	33 in.	33 in.

The specifications for all three trucks are similar, the provisions in the majority of cases being identical. The trucks for the 40- and 70-ton cars are each required to be of ample strength to carry a load 10 per cent above the rated capacity in addition to the light weight of the car body. The 50-ton truck, while nominally for cars of that capacity, is required to carry a load of 121,000 lb. in addition to the light weight of the car body, thus making it available for use under 55-ton cars. Except in the case of those sections which are not identical for all three trucks, the text of the specifications is given in full. Sections where differences occur have been summarized to cover all three trucks and the difference clearly pointed out.

Material Options—Wherever more than one kind of material or construction is shown on drawing or mentioned in specification, it is understood that either may be furnished

by the builder unless otherwise specified. Specialties to be as covered in contract.

Pattern Numbers—All castings shall have a pattern number, as shown on drawing, with the initials "U. S. S." as a prefix.

Forgings—Forgings may be made of either steel or wrought iron.

Truck Frames—For the 40- and 50-ton trucks, the truck frames are to be: (1) Cast steel side frame of U-section members with M. C. B. standard removable journal box, (2) cast steel side frame of U-section members with journal box cast integral, or (3) arch bar type. Except for the exclusion of the arch bar type, the same types of side frame are specified for the 70-ton truck.

The bars for cast steel truck side frame to be of the short type, two per frame.

Cast steel side frame must meet limiting dimensions shown on limiting dimension drawing, and interchange in all respects with arch bar truck where this type of truck is permitted. They must be made in accordance with M. C. B. specifications and have a transverse section modulus in the top member of eight for the 40-ton truck, 10 for the 50-ton truck, and 12 for the 70-ton truck.

Truck Bolsters—To be: (1) Cast steel bolster with integral center plate; (2) cast steel bolster with separate center plate, or (3) pressed steel or built-up bolster. Inside bearing surface of cast steel center plate to be dressed. Cast steel and built-up bolsters must interchange with pressed steel bolsters. Cast steel bolsters must have a section modulus vertically 10 per cent greater than pressed steel bolsters. Built-up bolsters must be as strong vertically as pressed steel bolsters. All bolsters to have a transverse strength at least 50 per cent of vertical strength.

Center Plates—To be: (1) Drop forged, or (2) cast steel.

Side Bearings—See body specifications.

Brake Beams—Each 40-ton and 50-ton truck to be equipped with two M. C. B. No. 2 brake beams, and each 70-ton truck to be equipped with two M. C. B. No. 3 brake beams, all conforming to limiting outline and general conditions shown on drawing.

Brake Shoes—To be: (1) With reinforced back, or (2) plain cast iron.

Wheels—For the 40-ton trucks the wheels are to be M. C. B. standard for cars having axles with 5-in. by 9-in. journals. To be cast iron, weighing about 700 lb. each. Wheels to be in accordance with M. C. B. specification, and to be mounted on axles with a pressure of from 40 to 60 tons.

For 55-ton hopper cars, the wheels are to be: (1) wrought steel, (1) cast steel, or (3) cast iron. For all other 50-ton cars the wheels are to be cast iron. Wheels to be M. C. B. standard for cars having axles with 5 in. by 10-in. journals. Cast iron wheels to have a nominal weight of 725 lb. each. Cast iron wheels to be mounted on axles with a pressure of from 45 to 65 tons and steel wheels with a pressure of from 65 to 85 tons.

The wheels for the 70-ton truck are to be M. C. B. standard, wrought steel, for cars having axles with 6 in. by 11-in. journals. They are to be in accordance with M. C. B. specifications, and to be mounted on axles with a pressure of from 70 to 95 tons.

Flats—To be of open hearted steel, smooth forged or round turned between wheel seats and journals to be finished. To be in accordance with M. C. B. specifications with sulphur and phosphorus content modified to limit of .06.

Journal Boxes—To be of malleable iron, cast or pressed steel, complete with lids and M. C. B. type reinforced wooden dust guards suitable for axles with 5-in. by 9-in. journals, 5 1/2-in. by 10-in. journals, or 6-in. by 11-in. journals, as the case may be. All boxes to be thoroughly cleaned and packed

with journal box packing which has been saturated with freight car lubricating oil.

Journal Bearings.—To be of brass, lead lined, M. C. B. specification grade "A."

Journal Bearing Wedges.—To be: (1) drop forged, or (2) cast steel. Wedges to be M. C. B. type, suitable for axles with 5-in. by 9-in., 5½-in. by 10-in., or 6-in. by 11-in. journals, as the case may be.

Painting.—Trucks to receive two coats of carbon black paint. Paints to be in accordance with United States Standard Specification, No. 1008.

Material Specifications.—The following M. C. B. specifications for materials are to apply:

Axles	Journal bearings
Bolts and nuts	Malleable iron castings
Boiled linseed oil	Mild steel bars
Brake beams	Steel castings
Brake shoes	Pressed steel bolsters
Carbon steel bars for railway springs	Raw linseed oil
Cast iron wheels	Red lead
Cast steel bolsters	Rivet steel and rivets
Cast steel truck side frames	Structural steel, steel plates and steel sheets for freight equipment cars
Steel wheels	Turpentine
Helical springs	White lead for lettering
Japan drier	Wrought iron bars

The following United States Standard Specifications are to apply:

Journal box packing (Specification No. 1009)
Journal box oil (Specification No. 1010)
Paint (Specification No. 1008)

Journal Box Packing

The following is the text of the United States Standard Specification No. 1009 for journal box packing:

The material desired under these specifications is curled vegetable fiber so curled as to impart to it the maximum resiliency; wool and cotton threads free from large lumps of any one component part and thoroughly machined and intimately mixed with the curled fiber in the following proportions:

(A)—Vegetable fiber—20 per cent
(B)—Wool waste —40 per cent
(C)—Cotton waste —40 per cent

Journal Box Oil

United States Standard Specification No. 1010 covers oil for journal boxes. The following is the text:

The oil required shall be well oil, and will not be accepted if it: (1) flashes from May 1 to October 1, below 298 deg. F., or from October 1 to May 1, below 249 deg. F.; (2) has a gravity at 60 deg. F. below 28 deg. or above 31 deg. Beaume; (3) from October 1 to May 1, has a cold test above 10 deg. F., and from May 1 to October 1, has a cold test above 32 deg. F.; (4) shows any precipitation when five cubic centimeters are mixed with 95 cubic centimeters of gasolene.

The precipitation test is to exclude tarry and suspended matter. It is made by putting 95 cubic centimeters of 88 deg. B. gasolene, which must not be above 80 deg. F. in temperature, into a 100 cubic centimeter graduate, then adding the prescribed amount of oil and shaking thoroughly. Allow to stand 10 minutes. With satisfactory oil no separate or precipitated material can be seen.

PERSHING TO USE CANALS.—The inland waterway system of France in the region occupied by American troops will be used for transporting some of General Pershing's supplies. A request from the American commander calls for the organization here of special engineer units for the operation and maintenance of the canals. The new units will probably be known as inland waterway companies. Men trained on American canals and rivers will be sought to fill up the ranks of the companies, and canal engineers will be selected as officers.

Rules for Capital Expenditures on Railroads

Director General McAdoo has issued General Order No. 12, prescribing the following rules to be observed with respect to all railroad work involving charges to capital account, viz.:

First: In determining what additions and betterments, including equipment, and what road extensions should be treated as necessary, and what work already entered upon should be suspended, please be guided by the following general principles:

(a) From the financial standpoint it is highly important to avoid the necessity for raising any new capital which is not absolutely necessary for the protection and development of the required transportation facilities to meet the present and prospective needs of the country's business under war conditions. From the standpoint of the available supply of labor and material, it is likewise highly important that this supply shall not be absorbed except for the necessary purposes mentioned in the preceding sentence.

(b) Please also bear in mind that it may frequently happen that projects which might be regarded as highly meritorious and necessary when viewed from the separate standpoint of a particular company, may not be equally meritorious or necessary under existing conditions, when the government has possession and control of the railroads generally, and therefore when the facilities heretofore subject to the exclusive control of the separate companies are now available for common use, whenever such common use will promote the movement of traffic.

Second: The construction of new railroad lines or branches or extensions of existing lines shall not be entered upon or contracted for without the Director General's approval.

Third: No new locomotives or cars shall be ordered or shall be constructed without the Director General's approval.

Fourth: Work contracted for or actually commenced prior to January 1, 1918, and unfinished, may be continued until further order, except insofar as in the judgment of the carrier concerned it may be possible to discontinue or curtail it without substantial loss, in order to conform to the general principles outlined in paragraph "First" hereof.

Fifth: Other work which does not involve charges to capital account in excess of \$25,000 may be contracted for and commenced without approval of the Director General, provided that:

(a) it conforms to the policy outlined in paragraph "First" hereof; that

(b) it also falls clearly within the policy of the particular carrier as that policy has been applied in practice during the two calendar years 1916 and 1917; and that

(c) a report giving a brief description of each project involving not less than \$5,000 nor more than \$25,000 chargeable to capital account and showing also the amount chargeable to operating expenses, shall be made in duplicate to the Director of the Division of Capital Expenditures at Washington and Regional Director for the District within ten days after the work shall be contracted for or commenced.

Sixth: No work involving a charge to capital account in excess of \$25,000 shall be contracted for or commenced subsequent to January 1, 1918, unless

(a) it conforms to the policy outlined in paragraph "First" hereof; and unless

(b) it be authorized by the Director General.

Seventh: The Director of the Division of Capital Expenditures is authorized to prescribe such forms, require such reports and issue such regulations and instructions as may be necessary to carry out this order.

Railway Wage Adjustment Board

A NEW PLAN for the adjustment of controversies between the railroads and the organizations of train service employees, growing out of the interpretation or application of the provisions of wage schedules or agreements, was formulated at a conference between the regional directors for the railroads and the executive officers of the four brotherhoods at Washington on March 22 and has been adopted and put into effect by Order No. 13 issued by Director General McAdoo. The plan provides for the creation of Railway Board of Adjustment No. 1 to deal with relations between the railroads and the brotherhoods. It is understood that announcement is to be made later of a similar board to deal with relations with other classes of employees, and that the entire plan was initiated by W. S. Carter, director of the division of labor of the railroad administration.

The plan is described in the following memorandum:

"Between A. H. Smith, C. H. Markham and R. H. Aiston, regional directors, representing the railroads in their respective regions, and W. S. Stone, grand chief engineer, brotherhood of Locomotive Engineers; A. B. Garretson, president, Order of Railway Conductors; W. G. Lee, President Brotherhood of Railroad Trainmen; and Timothy Shea, acting president, Brotherhood of Locomotive Firemen and Enginemen:

"It is understood that all controversies growing out of the interpretation or application of the provisions of the wage schedule or agreements which are not promptly adjusted by the officials and the employees on any one of the railroads operated by the government, shall be disposed of in the following manner:

"1.—There shall be at once created, a commission to be known as Railway Board of Adjustment No. 1, to consist of eight members; four to be selected by the said Regional Directors and compensated by the railroads, and one each by the chief executive officer of each of the four organizations of employees hereinbefore named, and compensated by such organizations.

"2.—This Board of Adjustment No. 1 shall meet in the city of Washington, within 10 days after the selection of its members, and elect a chairman and vice-chairman, who shall be members of the board. The chairman or vice chairman will preside at meetings of the board, and both will be required to vote upon the adoption of all decisions of the board.

"3.—The board shall meet regularly, at stated times each month, and continue in session until all matters before it are considered.

"4.—Unless otherwise mutually agreed, all meetings of the board shall be held in the City of Washington, provided that the board shall have authority to empower two or more of its members to conduct hearings and pass upon controversies, when properly submitted, at any place designated by the board; provided, further, that such subdivision of the board will not be authorized to make final decision. All decisions shall be made and approved by the entire board, as herein provided.

"5.—Should a vacancy occur in the board for any cause, such vacancies shall be immediately filled by the same appointive authority which made the original selection.

"6.—All authority vested in the Commission of Eight, to adjust disputes arising out of the application of the eight-hour law, is hereby transferred to the Railway Board of Adjustment No. 1, in the same manner as has heretofore been done by the Commission of Eight. All decisions of a general character heretofore made by the Commission of Eight are hereby confirmed, and shall apply to all railroads under governmental operation, unless exempted in said eight-hour law. Decisions which have been rendered by the

Commission of Eight, and which apply to individual railroads, shall remain in effect until superseded by decisions of the Railroad Board of Adjustment No. 1 made in accordance with this understanding.

"7.—The Board of Adjustment No. 1 shall render decisions on all matters in dispute as provided in the preamble hereof, and when properly submitted to the board.

"8.—The broad question of wages and hours will be considered by the Railroad Wage Commission, but matters or controversies arising from interpretations of wage agreements, not including matters passed upon by the Railroad Wage Commission, shall be decided by the Railway Board of Adjustment No. 1 when properly presented to the board.

"9.—Wages and hours, when fixed by the Director General, shall be incorporated into existing agreements on the several railroads, and should differences arise between the management and the employees of any of the railroads, as to such incorporation, such questions of difference shall be decided by the Railway Board of Adjustment No. 1, when properly presented, subject, always, to review by the Director General.

"10.—Personal grievances or controversies arising under interpretation of wage agreements, and all other disputes arising between officials of a railroad and its employees, covered by this understanding, will be handled in their usual manner by general committees of the employees, up to and including the chief operating officer of the railroad (or someone officially designated by him) when, if an agreement is not reached, the chairman of the general committee of employees may refer the matter to the chief executive officer of the organization concerned, and if the contention of the employees' committee is approved by such executive officer, then the chief operating officer of the railroad and the chief executive officer of the organization concerned shall refer the matter, with all supporting papers, to the director of the Division of Labor of the United States Railroad Administration, who will, in turn, present the case to the Railway Board of Adjustment No. 1, which board shall promptly hear and decide the case, giving due notice to the chief operating officer of the railroad interested and to the chief executive officer of the organization concerned, of the time set for hearing.

"11.—No matter will be considered by the Railway Board of Adjustment No. 1 unless officially referred to it in the manner herein prescribed.

"12.—In hearings before the Railway Board of Adjustment No. 1, in matters properly submitted for its consideration, the railroad shall be represented by such person or persons as may be designated by the chief operating officer, and the employees shall be represented by such person or persons as may be designated by the chief executive officer of the organization concerned.

"13.—All clerical and office expenses will be paid by the United States Railroad Administration. The railroad directly concerned and the organization involved in a hearing, will respectively assume any expense incurred in presenting a case.

"14.—In each case, an effort should be made to present a joint concrete statement of facts as to any controversies, but the board is fully authorized to require information in addition to the concrete statement of facts, and may call upon the chief operating officer of the railroad or the chief executive officer of the organization concerned, for additional evidence, either oral or written.

"15.—All decisions of the Railway Board of Adjustment No. 1 shall be approved by a majority vote of all members of the board.

"16.—After a matter has been considered by the board, and in the event a majority vote cannot be obtained, then any four members of the board may elect to refer the matter

upon which no decision has been reached to the director general of railroads for a final decision.

"17.—The Railway Board of Adjustment No. 1 shall keep a complete and accurate record of all matters submitted for its consideration, and of all decisions made by the board.

"18.—A report of all cases decided, including the decision, will be filed with the director, Division of Labor of the United States Railroad Administration; with the chief operating officer of the railroad affected; the several regional directors, and with the chief executive officers of the organizations concerned.

"19.—This understanding shall become effective upon its approval by the director general of railroads, and shall remain in full force and effect during the period of the present war, and thereafter, unless a majority of the regional directors, on the one hand, as representing the railroads, or a majority of the chief executive officers of the organizations, on the other hand, as representing the employees, shall desire to terminate the same, which can, in these circumstances, be done on 30 days' formal notice, or shall be terminated by the director general himself, at his discretion, on 30 days' formal notice."

In the order approving the agreement Director General McAdoo says: "In existing circumstances, it is the patriotic duty of both officers and employees of the railroads under federal control, during the present war, promptly and equitably to adjust any controversies which may arise, thereby eliminating misunderstandings which tend to lessen the efficiency of the service."

Pershing Reports Railway Engineers in Battle of Picardy

THE AMERICAN RAILWAY ENGINEERS, true to the record they made last fall at the battle of Cambrai, are again apparently giving a good account of themselves in the present great drive.

General Pershing in his despatch to Washington Monday, said:

"Summary of activities, noon, March 24-25:

"Nothing to report but usual patrol and trench activities, with some gas shelling by the enemy north of Toul.

"Reference to the German communiqués of the 24th and 25th regarding American troops: Two regiments of railway engineers are with the British armies involved in this battle. Three companies of engineers were working in the areas mentioned in the communiqué in the vicinity of the Crozat canal.

"No report other than the German communiqué yet received regarding these troops."

Associated Press despatches also report that the American railway engineers are engaged.

An Associated Press despatch from the American headquarters also dated Monday said: "The fact that the enemy has officially mentioned the presence of Americans on the battlefield of the Somme and has repeatedly reported that some were captured indicates the good account that American engineers gave of themselves when the Germans attacked.

"They probably threw down their picks and shovels, took up guns, and fought as they did at Cambrai. Such Americans as were captured were engineers, who may have fought like infantry, as they have carried rifles as well as tools since Cambrai.

"Official details, telling the part that American engineers have taken in the battle, are eagerly awaited here."

From British Army Headquarters in France the despatch said: "American engineers have again been in the throes of fierce conflict, in which they have done excellent work in transportation."

The Pennsylvania Railroad Accident at Elizabethtown

FURTHER DETAILS of the derailment of westbound passenger train No. 19, on the Pennsylvania Railroad, near Elizabethtown, Pa., on the morning of March 15, when two passengers were killed, increase the wonder that the number of injuries to persons was not larger. This accident, due to the falling of a mass of rock weighing several hundred tons, occurred about 1 a. m., and most of the passengers who were injured are said to have been asleep. Of the total number of injuries, 24, a large majority are said to have been classed as not grave. The conductor of the train, E. E. Edwards, sustained fractures of both legs and also suffered internal injuries.

In one of the day coaches there was a party of soldiers, going to Camp Taylor, Louisville, Ky., who promptly got out their first aid kits and rendered valuable service in attending to injured passengers. The physicians gave the soldiers credit for manifesting remarkable knowledge of first aid treatment.

The scene of the wreck is shown in the large photographic illustration. The smaller picture of the same scene, viewed from a different point, was taken a little earlier.

The sleeping cars which were wrecked were the Limedale, the Collington, and the Irvineton. The car which is completely wrecked at one end, shown in the view where no wheels are visible, is the Collington; and the other two views show the right and the left sides, respectively, of the Limedale.

The train was moving at about 40 or 50 miles an hour. There are at this point only two main tracks. The fall of rock, from the north, struck the side of the Limedale, the third car in the train, overturned it, and pushed it across the south track into the ditch. The next car was partly overturned and the next one, the fifth in the train, ran up on one of the rocks, and, although remaining upright, was inclined about 40 deg. above horizontal.

The fall of rock consisted principally of four large pieces. The heaviest weighed between 150 and 200 tons, and the smaller ones from 15 to 20 tons each. Including smaller pieces, about 600 tons fell altogether, and 400 lb. of dynamite was used in breaking up the large pieces so that they could be removed.

The body of rock which fell did not roll from the top of the cut but became detached from a larger body of stone; the upper part being about 27 ft. above the top of the rail. It fell over toward the track with its base acting as a pivot. The parting of the rock is thought to have been due to the action of the extremely severe frost during the winter, followed by heavy rains a few days before the accident.

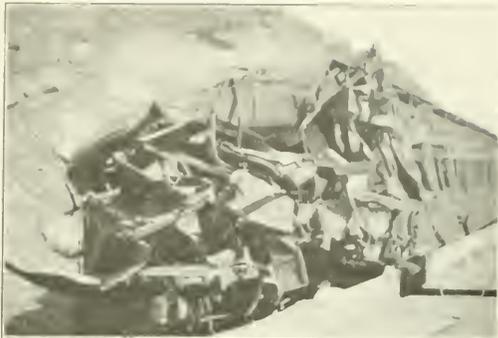
An officer of the road writes that this track is patrolled by watchmen day and night, every hour; and the records of the watchman show proper performance on that night. An investigation was made by the coroner, who exonerated the company from blame.

In the first sleeping car, the Limedale, there were 25 persons, all in their berths. The mass struck the car a glancing blow and turned it almost completely upside down. The disaster came with such appalling swiftness and surprise that the passengers were unable to describe the first shock.

The Masonic Home, at Elizabethtown, prepared beds to care for the injured, and sent motorcars to the cut to take them away; but the machines were not able to get near enough, so it was decided to send all of the injured to hospitals in Harrisburg and Lancaster. They were sent in the uninjured cars at the front and the rear of the train, the rear cars east to Lancaster and the front cars west to Harrisburg.



After the Removal of Two Cars



Sleeping Car "Collington"



Sleeping Car "Limedale"—Right Side



Sleeping Car "Limedale"—Left Side



Scene of Train Accident at Elizabethtown, Pa., March 15

Reprinted from Railway Age

Meeting of the National Industrial Traffic League

THE NATIONAL INDUSTRIAL TRAFFIC LEAGUE held its spring meeting at the Hotel La Salle, Chicago, on March 21 and 22, with a good attendance. H. C. Barlow, chairman of the executive committee, called attention to the proposed switching and spotting charges recommended at a recent joint meeting of Trunk Line, Central Freight Association and Western Trunk Line representatives, in Chicago. At this meeting it was recommended that in addition to the through rates applying between origin and destination points, the following charges be made for trap car service: (a) For trap cars containing minimum weight of 10,000 lb. the charge will be \$3.50 per car; (b) for trap cars containing less than 10,000 lb. the charge will be \$8.50 per car; (c) for trap cars containing 15,000 lb. or more, consigned to one consignee at one destination, no charge will be made, with the exception that for trap cars containing shipments of light and bulky articles no minimum weight will apply providing the car is loaded to full visible capacity. In order to avoid misuse of equipment carriers prefer not to furnish trap car service for cars containing less than 10,000 lb. and the charge of \$8.50 per car (which equals the charge of \$3.50 per car for trap car service plus a penalty charge of \$5 per day) is recommended to provide a basis for cars containing less than 10,000 lb. which may be delivered to carriers.

A motion was made and passed to the effect that the chair appoint a committee to express the opposition of the League to these proposed spotting and switching charges. Accordingly, the president appointed H. G. Wilson, traffic commissioner of the Toledo (Ohio) Commerce Club, chairman of the committee.

The executive committee announced that it had received a letter from Edward Chambers, traffic director to the director-general of railroads suggesting that shippers may now be expected to show the correct weight on I. C. I. shipments and that on c. l. shipments the weight shown by the originating carrier should govern. On this point the executive committee called attention to the report of the weighing committee and added its endorsement. The recommendation of the weighing committee was as follows:

"The weighing committee believes the present code of weighing rules should be maintained; that the use of weighing agreements should be extended rather than abolished and that Mr. Chambers should be advised, that before any action is taken by the director-general, the weighing committee of the League and the committee on relations of the American Railway Association should be called into conference, at which time those interested might present their views as to the best method of securing correct weights."

The committee on freight claims submitted new forms for the reporting of concealed loss and damage claims, one of which must be executed by the shipper and the other by the consignee. No definite action was taken at the meeting concerning these forms, but each member was requested to send his approval or disapproval of them to the secretary after he has had an opportunity to examine them.

Constructive Placement Under Demurrage Rules

The committee on car demurrage and storage submitted for approval a proposed amendment to Demurrage Rule 5, Section A. At the annual meeting of the League in New York last November, attention was directed to changes in this rule proposed by the American Railway Association to make it conform with the decisions of the United States Supreme Court in the cases of the Menasha Paper Company vs. the Chicago & North Western and the United States vs. the Denver & Rio Grande, 41 I. C. C. 712. These pro-

posed changes proved unsatisfactory to the League and subsequent conferences between representatives of the League and the American Railway Association brought out the suggestion that the following clause be added to the present form of section A: "Under this rule any railroad delay in making deliveries shall not be computed against the consignee." As amended in this manner Section A of Demurrage Rule 5 reads as follows:

"When delivery of a car consigned or ordered to an industrial interchange track or to other than a public delivery track cannot be made on account of the inability of a consignee to receive it or because of any other conditions attributable to the consignee, such car will be held at destination, or if it cannot reasonably be accommodated there, at the nearest available hold point, and written notice that the car is held and that this railroad is unable to deliver, will be sent or given to the consignee. This will be considered constructive placement. Under this rule any railroad delay in making delivery shall not be computed against the consignee."

The bill of lading committee reported that in accordance with the instructions of the League at the November meeting, the committee suggested to the Interstate Commerce Commission that two extra lines be provided in the new bill of lading, one to show the address of the consignee and the other to show the terminal delivery desired. A reply was received from the commission voicing the sentiment that no opposition to this amendment was anticipated on the part of either shippers or carriers and that it would receive due consideration by the commission in disposing of the bill of lading case.

The weighing committee reported that the adoption by the Trunk Lines of the National Code of Weighing Rules had apparently been shelved because of pressing war time duties. The committee called attention to the misinterpretation on the part of some roads of Section A, Rule 9, of the code of weighing rules and suggested the following interpretation to eliminate any chance for a misconception.

Rule 9, Section A, of the National Code of Weighing Rules provides: "When weights are obtained for the assessment of freight charges no charge will be made by the carrier for the service."

A car is weighed at point of origin by a switching line to ascertain weights for the assessment of freight charges.

Question: Can the switching line make a charge against the shipper for the weighing service?

Answer: No. Section A, Rule 9, applies regardless of whether the service is performed by a switching line or by a road haul carrier.

Question: Can the switching line make a charge for the service against the road haul carrier?

Answer: This is a matter of allowances and divisions between the railroads and does not come within the purview of the weighing rules.

Tracing Declared More Important than Ever Before

The special committee on tracing reported that there was even more need for tracing under present conditions than ever before. The committee considered the fundamentals of the question only, but recommended that detailed rules be worked out later and that the League should offer to appoint a committee to work with the office of the director general of railroads on this subject. The report read in part as follows:

"Unnecessary tracing is now condemned and discouraged as it has always been by this League. The necessity for tracing cannot now be determined by the length of time which has elapsed from date of shipment, nor by the distance traveled or to be traveled. No tracer shall be started where freight has not had a reasonable time to reach its destination, provided, however, that where the expedition of a particular

shipment is imperative because of its relation to the war, or where the preservation of life or property is involved, tracers shall be started by the railroad immediately upon request. Information as to forwarding, routing, passing records at junction or interchange points, arrival at destination and other information of record shall be promptly given upon specific request of consignor or consignee or their accredited representatives and is not to be construed as tracing.

The committee recommended (a) that whenever the shipper or consignee is willing to assume the telegraph expense the tracer shall be handled by wire and the information furnished promptly; (b) that when the carrier cannot secure and furnish promptly the desired information by mail, the tracing or expediting shall be done by wire at carrier's expense as at present. It was the view of the committee that a large part of the burden of tracing would be removed and the expediting of traffic materially aided if the records of passing at junctions, interchange and terminal points were maintained by the carriers and it recommends that the director general instruct the carriers to establish or reinstate such records.

The Poindexter Bill

The report of the executive committee endorsing the present fourth section of the Interstate Commerce Act and instructing the president of the League to appoint a committee to go to Washington and appear before the committees of Congress against the Poindexter bill was adopted. H. C. Barlow, chairman of the executive committee was appointed chairman of the special committee for this purpose.

Luther M. Walter Speaks at Banquet

Luther M. Walter, formerly attorney of the National Industrial Traffic League and now assistant to C. A. Prouty, director of public service and accounting of the United States Railroad Administration, addressed the League at dinner on the evening of March 21. He stated that the administration would make no changes merely for the sake of change, but would operate the railroads as economically as possible, with the prime purpose of winning the war. Rate relations, he said, would not be upset until shippers interested had opportunity to be heard. He said the same was true concerning the matter of uniform classification. He stated that railroad traffic men had become unduly alarmed by the turn of events and that although the duties of soliciting and advertising men might be seriously modified no one would be thrown out of employment. It was his understanding that the present routine methods of making and changing rates would be followed absolutely, except on such occasions as the President might wish to establish what might be called large percentage increases.

AUSTRIAN RAILWAYMEN STRIKE.—Austrian workers on the Northwestern Railway, the Ferdinand-Northern and several other lines have struck, according to the Lokai Anzeiger of Berlin. The military ordered the strikers to return to work, but they refused.

ITALY'S COAL FAMINE ACUTE.—Press despatches from Rome report that during interrogations in the Chamber of Deputies on February 21 regarding the question of coal, lack of which is crippling Italy's transportation facilities, it was shown that no importations of American coal were expected in view of the arrangement made with the English Government, that only one-third the necessary coal was arriving in Italy, and that locomotives were being ruined by burning clinker coal and lignite. Unless America acts to relieve the situation it will eventually be impossible to distribute food supplies throughout Italy or work mines properly. War industries face a shortage of coal. The present situation requires action and not discussion.

800 Miles of Railway at Front in 1918

“WE ARE BUILDING over here to fight a thirty-year war, if necessary, in order to establish the principles of democracy.” This is the answer of America's director general of transportation, W. W. Atterbury, vice president of the Pennsylvania Railroad, at the time when Germany is hammering on the Western gates, as given in an interview cabled by Wilkes Forrest to the New York Tribune Tuesday.

America's vast project to feed and equip her army in France rests on the shoulders of this American civilian. Next to the man whose responsibility is ships and then more ships, his is the responsibility of railroads in France and then more railroads in France.

Sitting in his map-walled office in a Paris boulevard today, this American civilian, garbed in the uniform of an American brigadier-general, talked to the Tribune correspondent while shells were falling in the capital. The dull booms hardly interrupted the conversation.

Like Working at Home

“We are building railroads, docks and transportation yards in France today as we would build them at home,” he said. “Our task is to make two lines of railroads from the sea bases to the front, wherever this front may be. We must Americanize the spurs, sidings, branch lines and yards, and it is most important that we do not interfere with the belts of French railroads which cross our path. We are digging under or going over these roads whenever we encounter them.

“The French lines have their own problems. The diversion of traffic due to the war has placed a heavy burden on the French ports, shipping and railway facilities. It is America's policy not to interfere. The French Government deserves the highest praise for its administration of the railroads under war conditions and the constantly depreciating equipment.

“France is giving us every possible assistance, but her great network of strategic railroads, planned and built for the protection of her frontiers, necessarily falls far short of the heavy requirements of the constantly growing American army. America, therefore, must build, and is building, all the excess lines necessary to handle our problem.

“Before the end of 1918 we will have not less than 800 miles of railroad constructed. All of our labor, rails and equipment must be shipped from home. We are now getting some of our ties from American forestry regiments working in French forests.

“You have seen many locomotives already here labelled ‘U. S. A.’ We will use about 1,500 locomotives, and of these 200 have arrived, and have been assembled, and 400 more have been generously contributed by the Belgian government. We will use about 20,000 American box cars, now under orders and being constructed. These will be shipped to France and rebuilt.

Yards Cover Miles

“Several of our great transportation yards cover many square miles and thousands of acres of storage space are being rapidly provided in order to act as a reserve for the enormous army which we will have at the front.”

Railroad building thousands of miles from America is an enormous task. It surpasses even the difficulties of the Hills, the Harlems and the O'Shaughnessys of North America. They faced the North American wilderness. America's military railway builder faces the wilderness of sea water, weather and submarines. He faces other things which cannot be told just now. But American military railroads are almost as vitally important to the American soldiers as ships are. They are gradually linking the sea to the firing line.

As the army grows, so must the railroads on which the army depends for the never-ending stream of everything that

keeps a fighting army fighting. These railroads, with their energetic American civilian builders, depend entirely on ships. "Everything vital to America's success in this war reverts to ships. As the army will depend on the railroads, both the army and railroads depend on ships."

He added:

"Did any one ever stop to think that in order to supply one pair of shoes to a soldier at the front, there must be not less than twenty-four pairs in various stages; from manufacturer to storage on the American side, from storage to docks, from docks to ships, then the 3,000-mile ocean transportation with sea and submarine menace, from ships to docks here, from docks to storage, and then the gradual movement through the supply depots, and finally to the soldier?"

Difficulties Faced

"When you realize that this situation applies to everything that the soldier eats and wears, and to all military supplies,

it must be recognized why these railroads and storehouses are necessary.

"Our difficulties are great in order to avoid tearing down parts of French towns for the enlargement of our railroad yards. We sometimes are forced to go outside of town and rebuild a complete new yard. Sometimes it is necessary to mar the landscape and the ancient landmarks which have made France famous.

"In one case we were forced to destroy an ancient chateau and fill the beautiful grounds with tracks and storehouses. The owners remonstrated, but it was 'c'est la guerre.'"

"Is America's vast project in France of a flimsy, temporary character?" I asked the general.

"No," he answered, as a German shell broke not far away. "We are building over here to fight a thirty-year war if necessary, to establish the principles of democracy."

But, like the man at the front, his success depends on ships.

Universal Interline Freight Waybill Adopted

To Be Used With or Without Through Rates. Last Road to Be the Final Arbiter of Rates and Divisions

THE UNIVERSAL INTERLINE WAYBILL, prescribed by Director General W. G. McAadoo and noticed in the *Railway Age* last week, page 728, is shown on the opposite page. The director general's order, No. 11, dated March 10, is addressed to the "chief executive officer" of each road and is as follows:

1. Effective May 1, 1918, all freight forwarded from one point in the United States to another point in the United States (including freight passing through Canada or Mexico enroute), and moving over two or more railroads or boat lines under federal control, must be waybilled through from point of origin to destination, regardless of the absence of joint rates. When destination station is on a railroad not under federal control, freight should be waybilled to the junction point with such road; provided, however, that nothing in this paragraph shall prohibit through waybilling arrangements between carriers now under federal control and others not so controlled.

2. A separate waybill must be made for each less carload consignment and for each carload; provided, however, that a single waybill may be made to cover a special train moving at a lump sum charge for the train, or for shipments which, on account of their length, require more than one car.

3. Waybills for carload freight must move with the cars. Waybills for less carload freight must be moved with the cars when practicable; otherwise so as to reach the transfer point or destination station with or in advance of the cars. In the event that waybills for solid cars of less carload freight are mailed direct to destination or transfer stations, a separate waybill [to go with the car] must be made on standard form, showing destination of car, and bearing notation:

"Merchandise car, waybills mailed to _____" Junction agents must show stamps on this waybill in the same manner as provided in Paragraph 4.

4. Complete routing must be specified on each waybill as and when made, in the space provided therefor. Each forwarding junction agent must stamp each waybill in the space at the bottom of the waybill. . . . Stamp must be 1 1/2 in. by 3/4 in.

5. When freight moves on a joint through rate, each waybill must show freight charges from point of origin to destination.

6. Freight moving on a combination of rates: (a) If the billing agent is in possession of all necessary tariffs, the rate and freight charges to and beyond the rate breaking points must be shown successively, one beneath the other, and the total of all freight charges indicated. For example, a shipment from New York to Denver will show:

	Weight	Rate	Freight
To Miss. River.....	200	\$1.055	\$2.11
Miss. River to Denver.....	1.62		3.24
Total			\$5.35

(b) If the billing agent is not in possession of the rates beyond the rate breaking point, the waybill must be headed to destination, and the rate and freight charges shown to the via which the shipment moved, in the following manner: rate breaking point, with the movement beyond indicated. For example:

	Weight	Rate	Freight
To Miss. River.....	200	\$1.055	\$2.11
Miss. River to Denver.....			

In this case the billing agent will stamp or endorse waybill as follows: "Shipment not rated through. Junction or destination agent will insert charges omitted." (c) The junction receiving agent must revise rates on inbound billing to the rate breaking point, insert the divisions of revenue accruing to the roads up to the rate breaking point, and certify to their correctness, by use of an appropriate rubber stamp. (d) Agents forwarding shipments from rate breaking points must insert rates and freight charges applicable to destination or to the next rate breaking point. If in any case this plan is not practicable arrangements may be made to have such rates and charges inserted by destination agents.

7. When miscellaneous charges, of any character, accrue in transit, and they are to be collected from consignee, they should be shown as separate items in the freight charges column on waybills, with notation opposite each item indicating the nature of the charge, the point at which it accrued, and the road to which due. In final settlement, such charges will be allowed as an arbitrary to carrier to which they are due.

8. A standard form of waybill [8 1/2 in. x 11 in.] is hereby prescribed, and must be used on and after May 1, 1918. (a) This waybill blank must be printed on paper equal in weight to "80 pound No. 1 Manila, 24 x 36 in."

(b) Only the original and one copy of waybill shall be made. The original must accompany the shipment as herein provided and the copy must be retained by the company making the waybill. (c) This waybill shall also be used for astray freight. (d) This waybill is designed to be folded vertically; the left side contains all information for the physical movement of the car. (e) For special classes of traffic, requiring a larger waybill, the form may be 8 1/2 in. by 22 in. (f) Supplies of waybill forms now on hand may be used for local business.

9. The Plan of Audit Office Settlement recommended

will be made, except as to advances and prepaid, and to establish lists of unreported waybills.

11. The following forms must be used in preparing Audit Office Settlement accounts: (a) Interline abstract, Form A. A. R. A. O. 104. (b) Division sheet, Form A. A. R. A. O. 105. (c) Summary of interline accounts, Form A. A. R. A. O. 110. These forms are recommended by the Association of American Railway Accounting Officers, and samples are shown in that Association's 1917 Synopsis.

12. Unless and until otherwise ordered revenues shall be apportioned among carriers in accordance with the route via which the shipment moved, in the following manner:

(a) Where joint through rates are in effect, established divisions, or any simplifications thereof which may have been perfected, shall be used. (b) Combination rates shall be divided as made. If one or more of the factors in the combination are joint through rates, such factors shall be divided as provided in sub-paragraph a preceding. (c) When neither of the above division bases can be used, revenues shall be divided on twenty mile block mileage basis, each carrier to be allowed at least twenty miles and originating and terminal carriers an additional twenty miles each as constructive mileage.

13. Simplified bases for apportioning inter-road freight revenues are now being considered upon their determination carriers will be advised thereof in a subsequent order.

14. Immediate steps shall be taken to make the foregoing regulations effective as of May 1, 1918, and to procure supplies of the prescribed waybill and accounting forms, and to issue the necessary instructions to all concerned.

BRITISH CAR REPAIR COMPLAINTS AMPLIFIED—The annual report of the British Wagon Company said that for some time past the directors have experienced inconvenience in the freight car repairing branch of the business. A large number of the employees are now engaged on military service, thereby causing a serious shortage of labor of all kinds, and there is great difficulty in obtaining the necessary materials. Owing to these facts considerable loss has occurred

in the repair of freight cars, and serious consideration has been taken place in traffic. The Railway Executive Committee appealed to the car repairing companies to take steps to deal with the difficult position. Recognizing the necessity for immediate action, some of the directors have conferred with directors of the other principal car repairing companies, and it has been decided to form a new company, which will take over the freight car repairing business.

NORTH & SOUTH RAILROAD CO. FREIGHT WAY-BILL		YARD STAMPS MUST NOT BE SHOWN ON FACE OF THIS WAY-BILL				
Ship This Car	For	Gross Weight of Car and Contents for Engineering Rating		Tons		
At		To		Car No.		
CAR MOVEMENT RECORD		TRANSFERRED				
CAR INITIALS	CAR NUMBER	To		At		
ROUTE Show Each Junction and Carrier in Route Order		Date				
TO (STATIONS)		Waybill No.				
CONSIGNEE AND ADDRESS		R.R.M.				
INSTRUCTIONS REGARDING HOOD, VENTILATION, MILLING, WEIGHING, ETC., IF USED, SPECIFY TO WHOM CHARGING SHOULD BE MADE		Market		WEIGHED		
		At		Gross		
		At		Tare		
		Allowance		Net		
		Net				
LADING	WEIGHT	Net	RATE AND TARIFF NO.	FREIGHT	ADVANCES	PREPAID
<p>Report here across numbers, bill of lading numbers, or such other reference numbers as are essential.</p>						
<p>JUNCTION FORWARDING AGENTS WILL SHOW JUNCTION STAMPS IN THE SPACE AND IN THE ORDER PROVIDED BELOW</p>						
1st Jct.	2d Jct.	3d Jct.	4th Jct.	5th Jct.		

United States Standard Interline Way-Bill

Revised _____

by the Association of American Railway Accounting Officers, as outlined in that Association's 1917 Synopsis—Paragraphs 16, 17, 18, 28, 29 and 30 shall govern. This plan requires that destination carriers shall make settlement with each of the carriers in interest for its proportion of revenue.

10. The total freight charges, as reported by destination carrier, and the divisions thereof, must be accepted by all interested carriers as final. No recheck of such settlement

The Coal Problem*

By E. G. Bailey

THE LARGEST AND MOST IMPORTANT QUESTION before the American people today is the coal problem. Some may disagree and claim that it is transportation but sift the present situation to the bottom and you will find that the coal problem, or rather the abnormally high percentage of ash and impurities in the coal, is like sand in the bearings of transportation, of ocean shipping and of practically all industries, slowing them down at the most critical time in our history.

The less ash and impurities in coal, the less number of tons you need. The greater the demand for coal, the higher the price and, under present conditions, the poorer its quality. Price has been regulated; but quality has run riot.

Why have we allowed this to happen just at the time when we need heat units in their most concentrated form? Why are the railroads burdened today with hauling millions of tons of utterly worthless dirt? To say that this excess of ash in the coal is worthless, does not describe the situation. The price paid for this dirt is only a small fraction of the damage. The rest of its cost is in the decreased efficiency, the lowered capacity, the increased labor and the excessive repair bills involved in the combustion of this coal, and in the necessity of closing down industries because of the lack of the coal which might have been shipped in place of these so-called "worthless," but costly impurities.

Coal Shortage or Dirt?

Results show a 10 per cent decrease in quality of coal delivered to many plants during the past year. Considering that the navy and other government requirements receive a greatly increased tonnage of the best coal, a very conservative estimate of 5 per cent is made as representing the increased demand for coal due solely to the poorer quality of that received. With a total production of about 600,000,000 tons of coal in 1917 this means that 30,000,000 tons of utterly worthless slate and dirt were loaded into cars and delivered to the consumer, where it caused additional trouble in burning the coal with which it was mixed.

Cost of Dirty Coal

On the basis of the average price of coal delivered to the consumer being \$4 per ton, this excessive amount of impurities has cost the country \$120,000,000 during the past year. Adding to this the various estimates made of the cost of our heatless holidays, ranging from \$1,000,000,000 on up, it is obvious that this question of impurities in coal is of such tremendous importance that an effective remedy must be found immediately. Manufacturers would be glad to pay a dollar per ton more for coal of standard quality.

Competition normally compels the mine operator to clean his coal, but when the coal shortage began in 1916 manufacturers were so anxious to get coal that they offered and gladly paid prices of \$5 to \$6 per ton at the mines and took anything that was black. For this reason quality went from bad to worse. A similar condition existed in the bituminous coal industry during the anthracite strike of 1902 and 1903. Prices went sky high and quality dropped off decidedly. The same economic factors which caused this condition then prevail today. Under the present system of paying the operator prices fixed by the government, no distinction whatever is made between the best and poorest grades of coal. So why should one operator go to additional expense of shipping clean coal when he receives no more pay than his competitor who loads dirt?

To simply appeal to the miners and operators, even on the grounds of patriotism, is not sufficient. To increase the

government price on the present basis of control to \$5 per ton at the mines would not reduce the percentage of impurities in the coal one iota.

The remedy suggested is to establish standards of quality and pay a premium for clean coal. The price paid to the operator should be based on standards established by the Fuel Administration according to different mining districts, etc., with premiums based almost entirely upon percentage of ash, and especially the free ash, as slate and rock which can and should be eliminated at the mines.

Coal sampling stations should be established by the government at certain central points where large quantities of coal are received direct from mines such as New York, Philadelphia, Baltimore, Hampton Roads and the lake loading ports. Each station should be equipped with machinery for obtaining representative samples from as many individual cars as necessary to determine the average quality of coal shipped from each mine during each month.

Load Cars with the Cleanest Coal

The operator would not know what cars were to be sampled, for the Fuel Administration could consign or reassign any cars in transit to the coal piers or power houses where the sampling stations were located. The mine operator would therefore have a real incentive to load every car with as clean coal as possible.

The car distribution at the mines, which is an important point to the operator, should also be based upon the quality of coal produced so that there would be an added incentive to load clean coal, and the market would always be supplied with a greater proportion of the better quality of coal, than if the empty cars were pro-rated equally among the poorer and better mines as at present.

Actual knowledge of the quality of coal would also be of great benefit to the Fuel Administration in classifying various mines into pools so that the consumer, and particularly the railroads, would receive coal of uniform quality, thereby enabling them to obtain maximum capacity and efficiency in the combustion of this coal.

There is sufficient labor at the mines to clean the coal, and the railroads can haul enough good coal, but they can not get the necessary heat units to the consumer if they must be burdened with hauling 30,000,000 tons of unnecessary dirt. We have our choice of either building thousands of locomotives and a hundred thousand cars and adding to the terminal facilities of our railroads within the next few months or removing the excessive impurities from the coal. The latter can be done quickly and effectively. It is the only feasible remedy for our present "Coal Problem."

Clean Coal or Heatless Holidays Next Winter?

Are we going to have coal enough to see us through the coming winter? The present indications are that, unless some radical steps are taken immediately, the coal shortage will be much worse than it has been. To be satisfied with preferential shipments and permit many of our basic industries to close down, is to play the quitter's game, when, by concentrating our efforts on loading clean coal at the mines, and improving the efficiency of its combustion in furnaces we can have ample coal for all, thereby helping instead of hindering the Thrift Campaign.

We have heard the argument that we should be patriotic and be content with inferior coal, old culm banks and other refuse fuel the same as we are with wheat substitutes in our bread. But the food and fuel problems are very different. Economy in their use applies equally to both, but the neck of the bottle of the food question is production, while the weakest link of the coal problem is transportation. It is a crime to burden our railroads with hauling dirt when it is within our power to ship clean coal and supply heat units in their most concentrated form.

*Abstract of lecture delivered at the Johns Hopkins University, Baltimore, Md., as one of the J. E. Alford lectures on engineering practice.



On the Pekin-Kalgan Railway Near the Great Wall. This and following photographs copyrighted by Press Illustrating Service.

China's Greatest Need Today Is Transportation

This Enormous and Rich Country Has Only 6,000 Miles of Railway and Practically No Good Roads

CHINA NEEDS MANY THINGS TODAY, but one of the things that it needs most is means of communication. Today there are in China with its enormous area of 1,335,000 square miles and 386,000,000 population, only about 6,000 miles of railroad—3 miles to each 100 square miles and 0.19 miles to each 10,000 people. In a recent series of three articles in *Engineering* of London, a writer examining this situation clearly brings out these facts and

per ton mile would be greater than either on roads or standard gage railways, their capacity would not be sufficient and there would also be comparatively costly transshipment required. But further than that he draws attention to the fact that practically all the railways at present in China are of standard gage and emphasized that narrow gage lines would not be proper for a country so enormously rich and of such great potential traffic as China.

An abstract of the three articles follows:

The war in Europe has undoubtedly set back the development of China for many years unless the government can gain the confidence of the people and foster some spirit of patriotism. China at the outbreak of the war was committed to the construction of some 6,300 miles of railway, practically all of which was to be built by foreign loans. Had this scheme been carried out, the very slow development of the country would have made great strides. As it is, the country is nearly bankrupt, the government insecure and without the confidence of the country. The people as a consequence are very chary of investing in government controlled concerns. It is fairly obvious that China must still look for money abroad, and there is very little doubt that it will be more costly than heretofore. Consequently, the study of economy will be more of a necessity than it has been in the past.

The Great Plain

It will be seen from the above table that the bulk of the population is concentrated in the following provinces: Anhwei, Honan, Hupeh, Chih, Shantung, Kiangsu and Northern Chekiang. These provinces form what is known as the Great Plain of China.

Roughly, the area of this plain is 210,000 sq. miles, with a population of 132,000,000, or 625 persons to the square mile, the densest in the world. In fact, the nine eastern provinces in or near the Great Plain have an area of 502,192 square miles (two-fifths of the whole 18 provinces) and an average population of 458 persons to the square mile.

The necessity of railways for the development of this area

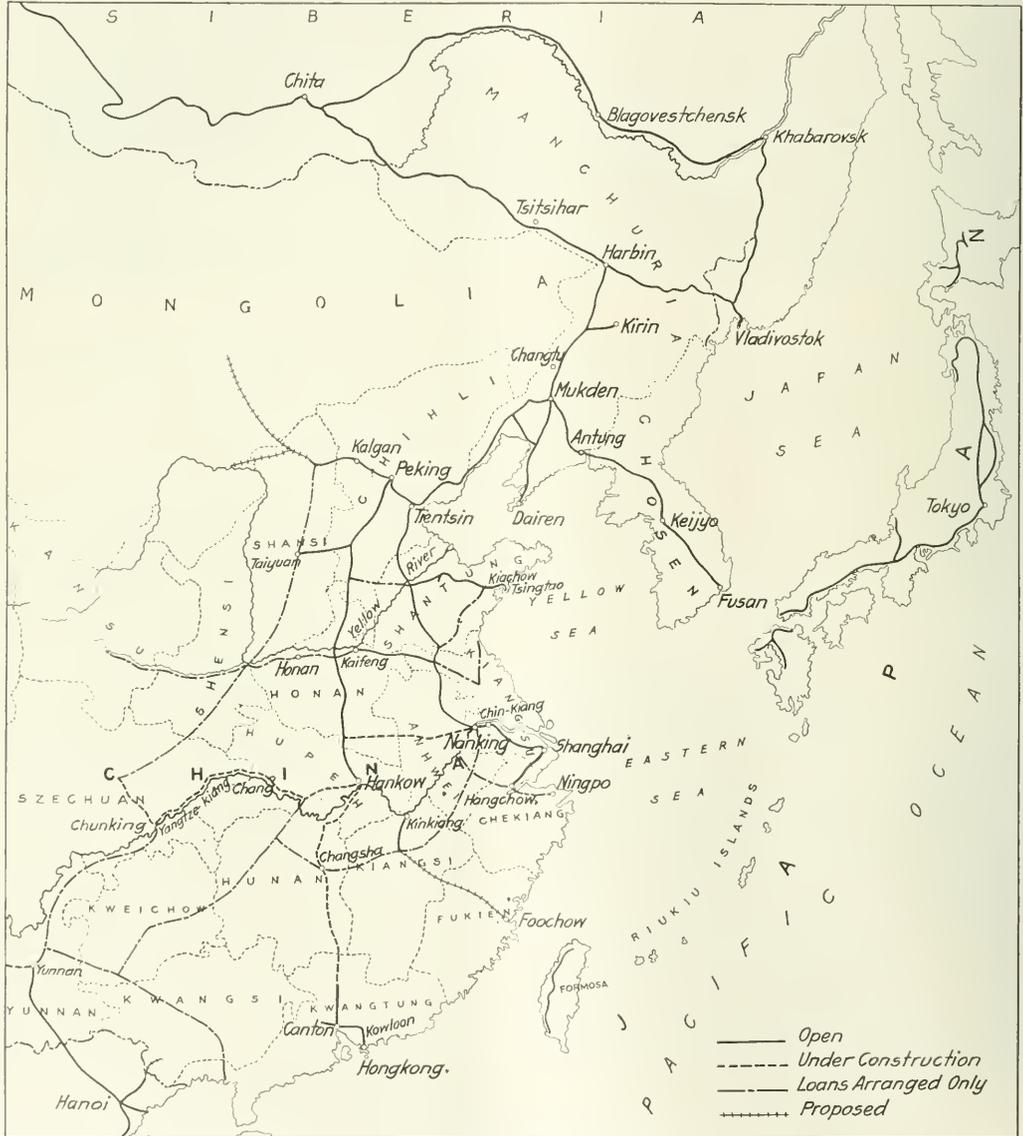


Type of Wheelbarrow in Common Use

emphasizes the necessity of constructing new lines of standard gage railway and of feeder lines of good roads for use by steam or motor tractors or motor trucks. He also discusses the proposal to build light 2 ft. narrow gage lines as feeders in place of roads, but dismisses the idea as extremely unwise. There would be small savings in the first cost of light railway construction, he says, but operating costs

is extremely obvious when its mineral wealth, cheap labor and present lack of transport facilities are considered. Practically the whole of the western portion of this plain is one vast coalfield, with smaller coalfields in central Shantung and northern Chili. Other minerals, ironstone in particu-

also responsible for a large proportion of the coal production of China. It is served by the Peking-Hankow, Peking-Mukden, and Peking-Kalgan railways, the Peking-Mukden Railway providing its outlet to the sea via Tientsin and the Peiho. This river, the only one of importance, is navigable



The Railways of China

lar, are also present in large quantity on the eastern boundary. The mineral and other resources, agricultural and transport, are as follows:

Chili, the metropolitan province, has an area of 58,949 sq. miles. It produces wheat, maize, oats and salt, and is

for steamers drawing 15 ft. of water as far as Tientsin, 40 miles from its mouth. This port is kept ice-free in mild winters at considerable expense, but is always liable to be closed from December to March on account of ice. The Peiho is tortuous, has a bar at its mouth, and is continually

silt up). Most of the coal produced is shipped through the ice-free port of Chingwangtao, the property of the Chinese Engineering & Mining Company, whose accommodation for shipping has been designed with a view to its own requirements only.

The estimated populations of the 18 provinces of China proper, together with their areas, are given in the accompanying tables.

Shantung

Shantung has an area of 65,104 sq. miles. It is extremely fertile. Cotton, the clothing of the people, silk, straw-braid,



A Scene Outside the Peking Wall

glass, earthenware and bean oil, are some of its products. It has considerable mineral wealth, producing a fair quantity of coal, some gold and copper.

This province prior to the war was the German sphere

very poor. The province is traversed by the Grand canal, which runs from Tientsin to Hangchow, but this in some places has been allowed to silt up and is generally in poor condition, and of little use as a waterway. The Yellow river, the only one of importance, is only navigable in parts, for small steamers as far as Tsinanfu, the provincial capital, 200 miles from the mouth of the river. This river owing to its tendency to silt up and burst its banks is of more ex-

The Populations and Areas of the Provinces of China Proper

Province	Area sq. miles	Population	Number to square mile
Anhui	48,461	9,596,000	425
Chekiang	39,177	17,799,000	296
Fukien	88,506	31,199,000	574
Honan	66,913	11,115,000	240
Hunan	74,310	9,496,000	88
Hupoh	70,450	34,346,000	486
Kansu	42,450	6,287,000	74
Kiangsi	73,176	24,534,000	240
Kwangsi	78,350	5,878,000	65
Kiangsu	44,506	6,915,000	470
Kwantung	79,456	29,706,000	377
Kweichow	64,854	7,669,000	118
Chihli	58,940	17,937,000	304
Szechuan	116,800	67,287,000	406
Shensi	56,258	12,114,000	11
Shantung	53,761	36,247,000	557
Shensi	67,400	8,427,000	126
Yunnan	10,706	1,721,000	108
	1,335,841	386,000,000	292

pense than utility, costing the government about 750,000L (\$3,750,000) per annum for conservancy. A railway along its banks for efficient handling administration of the conservancy works would appear to be one of China's most urgent needs. All railways and mines in the province are now worked by the Japanese.

Honan

Honan has an area of 66,913 sq. miles and is extremely fertile. Its principal agricultural product is beans, and a large amount of coal is produced. It is served by the Peking-Hankow Railway, which provides its outlet to the sea via Hankow and the Yangtse river. It has also another outlet to the same river via the Huai river and the Tientsin-Pukow



A Heavy Load for Poor Pavements

of influence and has been exploited with the usual thoroughness. It is served by the trunk line from Tientsin to Pukow, and has rail connection with the excellent once German port of Tsingtau. All the railways were either German owned or under German control. Internal water communication is

Railway, but this route, which would serve much of Central Honan and Northern Anhwei, is at present undeveloped, only junks of 80 tons maximum carrying capacity at present using this river.

Anhui has an area of 48,461 sq. miles, and is said to

be the poorest province in China. It has never got over the devastating effect of the Taiping rebellion of 1866, and is in more of an arrested state of development than the other provinces of the plain. It produces tea, hides, rice and silk, and has deposits of coal and copper which have not been developed. The province is served by one line of railway, the Southern Section of the Tientsin-Pukow Railway, which is a British-built line. Water communication is poor, the only navigable rivers being the Yangtse and the Huai, the latter providing the only outlet to the sea for the northern part of the province via the above railway. This last river,

of canals, of which there are some 50,000 miles. In addition, they are traversed north and south by the Grand canal, and east and west by the Yangtse river, so that there is no very crying need for railways in this section of the country.

Hupei

Hupei has an area of 70,450 sq. miles, and produces tea, hides, iron and coal. It is served by the Peking-Hankow Railway, which provides its outlet to the sea via the port of Hankow and the Yangtse. Water communication is indifferent, the only navigable rivers being the Yangtse forming the southern boundary of the province and the Han

THE RAILROADS OF CHINA

Road	Gage	Mileage	Loco- motives	Freight cars
Chinese Government Rys.:				
Pekin-Mukden, Tungchow, Ting- how & Moukden.....	4 ft. 8½ in.	766	132	3,104
Canton-Hankow (Hupei-Hunan Sec- tion).....	4 ft. 8½ in.	31	7	50
Canton-Kowloon (Chinese section).....	4 ft. 8½ in.	89	13	64
Han-Fuch-Chuan.....	.....	.....	.....	.....
Hankow-Szechuan (Hankow-Ichang section).....	.....	16	.....	.....
Kaifong Honan.....	4 ft. 8½ in.	353	26	806
Kin-Han.....	4 ft. 8½ in.	841	147	3,024
Kirin-Changchun.....	4 ft. 8½ in.	79	13	142
Lungtai-Pienlo.....	.....	234	.....	.....
Pekin-Kalgan and Changsui.....	4 ft. 8½ in.	270	60	843
Shanghai-Hangchow Ningpo.....	4 ft. 8½ in.	168	.....	.....
Shanghai-Nanking.....	4 ft. 8½ in.	203	33	424
Shantung.....	4 ft. 8½ in.	295	.....	.....
Swatow and Chao Chou.....	4 ft. 8½ in.	26.5	3	50
Takow-Chinghua.....	4 ft. 8½ in.	93	10	160
Tcheng-Tsi.....	Meter	155	57	.....
Tientsin-Pukow.....	4 ft. 8½ in.	680	.....	.....
Chinese Eastern (Russian).....	5 ft.	1,005	.....	.....

and lack of maintenance on the Grand canal, have been responsible for a series of most disastrous floods and their attendant famines. To properly conserve this river is one of the most urgent needs of the province, both for the above reason and because the usefulness of the river below its junction with the railway is very limited at present, as it loses itself in the very extensive but extremely shallow Hungtse lake.

Kiangsu and Chekiang

Kiangsu and Chekiang have an area of 45,000 sq. miles and 39,150 sq. miles respectively, and they produce beans,



The Chinese Equivalent of the American Live Poultry Car

silk, tea and salt, among other things agricultural. Min-erally these provinces are of small value. There are practically no railways within this area except the Shanghai-Nanking Railway in Northern Chekiang, whose usefulness is very limited, as it can never compete with a magnificent waterway like the Yangtse, with which it runs practically parallel. At present this line is merely a link in the trunk system and can only prosper when feeder lines are built. These provinces have, however, a most wonderful system



A Chinese Cart Whose Destructive Effect on Roads Can Be Readily Appreciated

river, a tributary, flowing in a northerly direction from Hankow. This province is in the center of the modern iron industry of China and should, if properly developed, be of huge importance in the opening-up of the country.

Resources Enormous—Communications Poor

From the above very summary details it is obvious that the resources of this area are enormous, and that communications are extremely poor. The provinces are like water-tight compartments as far as communications are concerned. At present there may be famine in one and excess in another, and no attempt is made to manufacture for more than local needs.

The railway situation in China can be summarized thus. With some 6,000 miles of railway in operation China proper has 0.3 miles of railway to each 100 sq. miles and 0.19 miles for each 10,000 people. For comparative purposes the United States has 253,000 miles of railway and one mile to each 360 people, Australia has one mile of railways for each 250 people, and the United Kingdom one mile to each 11 sq. miles. If the length of railway is summarized for the areas under consideration it will be found to amount to 2,679 miles, or one mile for each 127 sq. miles of country.

Water transport within this area is practically confined to the Yangtse river, which forms the southern boundary of the plain. This river, as far as Hankow, 600 miles from the mouth, is navigable for ocean-going steamers. The great drawback to the river is the enormous variation in the summer and winter levels, amounting to as much as 40 ft. at Hankow, and rendering navigation above this place difficult at low water. Above Hankow, in addition to the lack of water between Hankow and Ichang, there is also this difficulty coupled with the existence of rapids. However, small river steamers run between Hankow and Ichang all the year and between Ichang and Chungking when water permits; usually the river is closed from December to April. Ichang is 970 miles from the mouth of the river and Chungking about 1,400 miles.

This handicap makes a railway connecting Hankow and Chengtu, the capital of the enormously populous and rich province of Szechuan, one of the most urgent needs of the country. Another railway of some urgency is a line through the province of Shansi and Shensi to the capital of the isolated province of Kansu. All these provinces are said to be very rich minerally, but owing to lack of transport have no chance of development.

South of the Yangtse the country, with the exception of the province of Fukien, is less populous and much more mountainous. Railway construction would therefore be more expensive, and is less needed, as the bulk of the wealth and population is concentrated either on the southern side of the Yangtse valley or on the seaboard where there is water communication. China should, therefore, concentrate on the Great Plain, the development of which will entail least investment of much-needed capital and offers more certain returns than elsewhere.

Road Transportation

One form of transport has been altogether neglected in the above summary, namely, road transport, which is of very little value owing to the neglected state of the roads. There are said to be 2,000 imperial roads in China, but



And Then the Modern Automobile

with the exception of the courier roads these highways are mere tracks or footpaths. The chief roads radiate from Peking, connecting that place with the various provincial capitals. In some places these roads are paved with stone blocks of large size, and the ruins of signal towers and military posts at fixed intervals show that one time some importance was attached to them.

The upkeep of the roads is at the present time in the hands of local officials, each village taking responsibility for its own roads. Only what are considered, according to local ideas, necessary repairs, are undertaken, with the consequence that no real road maintenance has been done for some centuries. The roads as built are unmetalled, and the bridging scanty, so scanty in fact that the majority of bridges have only been designed to take the dry-weather flow, with the consequence that for most of the year the approaches are flooded. In addition, where country of any difficulty has been encountered, the road has degenerated into a mere footpath capable of taking only wheelbarrow, coolie or mule traffic, so that all car-borne goods have to be transhipped.

On all these so-called roads in the plain goods are circulated by mule, wheelbarrow or carts, but transport is rendered difficult and often impossible by the state of the roads, which are purely of the dry-weather order. Mule, donkey and wheelbarrow transport are universal all over China, but

the cart is only met with north of the Yangtse, with the consequence that the roads in South China have degenerated into tracks of footpath width. Into the cart usually seen in North China the farmer will put a load of 1 ton to 1.5 tons, or rather more than is put into the English cart, which has a tire width of 5 in. against 2 in. in the Chinese cart. That roads in a country with 30 in. or more of rain per annum become impassable in the wet season is not to be wondered at, when their unmetalled state, their poor drainage and the traffic they carry are considered. North China has the great advantage of so severe a winter that even these roads would take the heaviest traffic, but this only holds from December to March, for the rest of the year the roads are as much dependent on weather for their usefulness as the rest of the country.

In the southern part of the Great Plain the cart is used; it is pulled by a trace, and carries the same loads as the northern cart, but has even narrower tires in a district with about twice the rainfall of the north. The wheelbarrow is even more destructive of roads, as it is, as often as not, unevenly loaded, causing the wheel to tilt and thus present less than the normal tire surface. The tire width is usually about 1 1/4 in., and the barrow often carries as much as 800 lb. The wheelbarrow is as much used for passenger traffic as for anything else; it will seat four people the charge being about 4 cents a mile. The wages of a wheelbarrow coolie vary from about 12 cents a day in North China to 16 cents in the Yangtse valley.

Such ill-designed transport and abominable roads make the stagnation, ignorance and misery which exist within 30 miles of any railway or treaty port easily understandable. The civilizing influence of railways in this country needs little illustration, but it may be stated as an instance, that previous to the building of the Southern Section of the Tientsin-Pukow Railway, there were in existence three entirely different systems of coinage in a length of about 150 miles. The units of length and capacity varied from village to village, and most men believed their market town to be the biggest city in the world. This is typical of conditions in the closed portions of the country. It should also be stated that the roads all over the country are infested by bandits.

Finally, that this, the richest part of China, has repeatedly suffered from famine, is another proof of the wretchedness of communications. Thus, in 1877-8, a famine in Honan, Shansi, Shantung and Chili is estimated to have wiped out 8,000,000 people. Also in 1910-11, famine and floods in Northern Anhwei and Kiangsu were responsible for thousands of deaths. With regard to the cost of the various modes of transport, this necessarily varies somewhat in a country where labor increases in cost from north to south, wages in the Yangtse valley being about 50 per cent and in Canton 100 per cent higher than North China. The following are fair averages:

Type	Cost per ton-mile	Remarks
Cart	4 cents to 9 cents per ton-mile	Max. load 1.5 tons. In some districts 500 lbs. cart 15 ft. long, 5 ft. wide, 15 in. high.
Water	2 to 4 cents per ton-mile	Seasonal, but in some districts 100 tons. In some districts 100 tons.
Wheelbarrow	4 cents to 1 cent, for freight	to 100 lbs. load, 15 ft. long, 15 in. high.
Mule	6 cents to 1 cent, for freight	to 100 lbs. load, 15 ft. long, 15 in. high.
Railway	4 cents to 1 cent, for freight	to 100 lbs. load, 15 ft. long, 15 in. high.

It is of some interest to compare the cost of water and rail carriage in European countries:

Country	Water carriage per ton-mile	Rail carriage per ton-mile
Russia	18 to 84 (Vilga)	11 to 70
Germany	1 cent to 2.53	11 to 70
Austria	74 cents (Danube)	11 to 70
France	82	22 to 1.56 cents.
Belgium		16 to 1.56 cents.

Considering that the price paid for labor generally is

about one-tenth that paid in Europe, transport in China is expensive, uncertain and under present conditions incapable of handling any large volume of traffic except on the railways, which are too few.

China Needs Roads and Railways

What China needs most are roads and additional standard gage railway lines, the roads to act as feeders to the railways and to enable these railways to be operated nearer to capacity. Narrow gage railroads have been proposed, but their savings over roads or standard gage lines are not sufficient to justify their use.

Turning now to the question of economy the most obvious one is for the country to build the railways with the revenue of the existing lines or to induce the people themselves to invest in railways under government control and guarantee. Foreign loans increase the cost of Chinese railways owing to commission and other charges, by \$5,000 to \$4,000 per mile, according to the cost of the line. It is believed that this, the greatest economy, might be to a large extent effected by the reorganization of the road system.

These roads might serve as feeders to the existing railways, and would be infinitely cheaper both in first cost and operation than branch lines. The financial position of the government railways shows that the majority of the lines are not worked to their full capacity. Thus, in 1915, of the 15 government railways, only five were run at a profit, the net profit on all the railways amounting to about \$4,000,000, practically all of which is derived from the Peking-Mukden, Peking-Kalgan and Peking-Hankow railways. Even on these lines receipts have apparently reached a maximum. Not one of the railways, even the paying lines, has reached the maximum capacity for single-line traffic. It is then obvious that an enormous source of revenue lies in the development of the existing railways. Thus, if the present mileage of government railways would produce a net revenue of \$3,000 per mile, the annual revenue from this source would amount to \$11,040,000 sufficient to build 300 miles of new line per year. It should be stated that the net revenue per mile on the Peking-Mukden Railway amounts to \$6,350 at present. This line does not traverse the richest part of the country by any means, so that a net revenue of \$3,000 per mile can not be called an extravagant expectation.

Undoubtedly this development would be carried out most cheaply by road development, and in doing this China would only be following the example of European nations in the development of their overseas possessions. In every case road construction has gone hand in hand with the construction of railways, roads being built to tap those districts not sufficiently prosperous to be able to afford a railway. China can build first-class roads in this part of the country (the Great Plain) at a maximum cost of \$5,750 per mile, proximity to quarries would reduce this to \$4,500 per mile, and in districts where both government land and stone were available the cost might be still further reduced to \$3,600. On this basis 800 miles of good roads could be built every year if only the present income from the railways were allocated to this purpose. Convict labor would still further reduce the cost if properly handled.

Roads should undoubtedly be built as pioneers of railways in the hill country south of the Yangtse. In this way the undoubtedly great mineral wealth of the province of Yunnan might be most cheaply developed; at present this province is dependent on mule and coolie transport over the most appalling roads for those districts off the metre-gage line, traffic on which is regularly interrupted in the wet season for weeks at a time.

With good roads and motor truck transportation encouraged by the government, it is estimated that freight could be carried at a cost of something like 6 mills per ton mile.

Wages 22 to 30 Cents a Day

Should the government adopt this road policy, it will, at any rate, have given the people a chance of development they never had before. Easy access to the existing railway zones would be of enormous educational value, and would probably stimulate trades now stagnant or dying, while it would render easily possible the absolute suppression of the brigandage so rife everywhere at present.

The government would of necessity encourage the idea of motor traction. There is no difficulty about the supply of drivers and mechanics. The Chinese make excellent drivers, are fair fitters and, best of all, have no trade unions, strikes or eight-hour days. The Chinese mechanic is a sober, quiet, and quite contented person on his magnificent wage of 22 cents to 30 cents per day. Roads at a maximum cost of \$6,000 per mile, of unlimited traffic-handling capacity, are undoubtedly a sounder investment than 2-ft. gage lines costing \$8,000 per mile and with very limited capacity.

Narrow Gage Railways Not Justified

On standard gage railways the cost per ton mile would probably be about 4 mills, but on 2 ft. gage light railways it would more likely approach twice that amount. Narrow gage railways, can be constructed at from 7 to 12 per cent cheaper than standard gage railways, but their capacity is not great and transfer of freight is a comparatively costly matter even in China.

But what is most important is the fact that 2-ft. gage railways have no place in a populous and potentially rich country like China. When the enormous potential wealth, the high order of intelligence of the population, their great numbers and small wages are considered there is very little room for doubt that at no very distant date every railway in this area will be able to work at its full capacity. Breaks of gage should, therefore, on no account be tolerated here when the small savings which result are considered. The future must also be considered from a strategic point of view.

In connection with this gage question it is significant that the Japanese, at the close of the Russo-Japanese war, at once converted what is now the South Manchuria Railway from 3-ft. 6-in. gage to 4-ft. 8½-in. gage and shortly afterwards the 2-ft. 6-in. gage line from Antung to Mukden. The Japanese are also seriously considering altering all the lines in Japan from 3-ft. 6-in. to 4-ft. 8½-in. gage. China has already to cope with the gage question but not to any serious extent. All the lines not of standard gage are metre, and the only one in the Plain is the Cheng Tai Railway, but as this may be important in the future trunk system, and as the country traversed is mineral rich the break of gage is regrettable. This line is at present only 151 miles in length but was exceeding costly, the country being rather difficult. The line cost \$57,500 per mile, whereas the standard-gage line from Peking to Kalgan which is through very heavy country cost \$41,000 per mile exclusive of interest and financial charges.

Of other non-standard gage lines the biggest is the Franch Yunnan Railway of which 289 miles is in Chinese territory out of a total of 534 miles. This is an isolated system, and if ever connected up with the Burinese Railways there would be no break of gage. Another small metre-gage line is the Tsi-Tsi-Har Light Railway, 17 miles in length, which was built at a cost of \$8,675 per mile in country similar to that in the Plain. It has 30-lb. rails and is run at a loss. China is thus not so far committed, at any rate, in the richest part of the country, to more than one gage and should, therefore, profit by the experience of the world which is undoubtedly against break of gage in a populous and potentially wealthy country.

Train Accidents in February¹

THE following is a list of the most notable train accidents that occurred on the railways of the United States in the month of February, 1918:

Collisions						
Date	Road	Place	Kind of Accident	Kind of Train	Kil'd	Inj'd
1.	Pennsylvania	St. Clair	rc	F. & F.	4	0
2.	Pennsylvania	Toledo	bc	F. & F.	1	2
3.	N. C. & St. Louis	Nashville	bc	F. & F.	1	4
4.	N. Y., N. H. & H. T.	Bristol	rc	F. & F.	0	5
5.	Minn. & St. Louis	Albert Lea	bc	F. & F.	0	18
16.	Bangor & Aroostook	Caribou	rc	F. & P.	4	21
17.	M. K. & Texas	Mangum	rc	F. & F.	2	3
18.	Central N. J.	Ashley	rc	F. & F.	2	5
25.	Southern	Frost, S. C.	rc	F. & P.	12	30

Derailments						
Date	Road	Place	Cause of Derailment	Kind of Train	Kil'd	Inj'd
8.	Pennsylvania	Greensburg	b. wheel	P.	1	4
17.	Missouri Pacific	Guilbesville, Ark.	malice	P.	2	0
19.	Chicago, B. & Q.	Curtis	"	P.	2	0
20.	Norfolk & West.	Gibbswie	b. track	P.	2	10
21.	Pennsylvania	Major	d. track	P.	1	4
21.	Pennsylvania	Summerhill	b. spring	P.	0	0
25.	W. Maryland	Georges Creek	mis	F.	0	0

Other Accidents

Date	Road	Place	Cause of Accident	Kind of Train	Kil'd	Inj'd
4.	Baltimore & O.	Hutton, Md.	d. eq.	F.	1	0
18.	Del. Lack. & West.	Wayland	fire	P.	0	1

The trains in collision at St. Clair, Pa., on the first of February were an eastbound freight and a train consisting of a locomotive and a caboose. The freight had become uncontrollable on a steep descending grade and collided with the other train at high speed. Both engines were ditched and the caboose and 20 cars were wrecked. One conductor, one engineman and one brakeman were killed.

The trains in collision at Toledo, Ohio, on the 2nd, were a northbound freight of the Pennsylvania and a southbound freight of the Pere Marquette. One engine and several cars fell down a bank. One trainman was killed and two were injured. One of the trains had run past a signal set against it.

The trains in collision near Nashville, Tenn., on the 2nd were southbound freight No. 53, drawn by two locomotives, and a part of a preceding freight No. 55, sixteen cars of which had run back on a steep grade. These cars had been detached because of the inability of the locomotive to take the whole train to the top of the grade, and it appears that they were left standing without enough handbrakes set to hold them. One fireman was killed and four other trainmen were injured. Both of the locomotives and about fourteen cars of No. 53, as well as four cars of No. 55 were wrecked.

The trains in collision at Bristol, Conn., on the evening of the 2nd, were an eastbound passenger, standing at the station, and a following freight. The freight had become uncontrollable on a steep descending grade. Five passengers were slightly injured.

The trains in collision near Albert Lea, Minn., on the 3rd, were northbound passenger No. 5 and a southbound freight (Extra 450). Both engines and 3 cars were damaged. Ten passengers and 8 trainmen were slightly injured. The collision was due to the error of the conductor and the engineman of No. 5 in assuming that a train which they found on the side track at Manchester where they were to meet No. 450, was that train; whereas, it was No. 96.

The trains in collision on the Bangor & Aroostook near Caribou, Me., on the 6th, were an eastbound passenger, a snowplow ahead of the passenger train and another behind it.

The leading plow had been losing time and was run into by the passenger, and a short time after this collision the second plow ran into the rear of the passenger train. Three passengers and one employee were killed and 18 passengers and three employees were injured. The first snowplow was running as extra (X142) from Houlton to Van Buren, 94 miles. Passenger train No. 9 followed, and had a copy of the orders given to the plow. The collision occurred about 15 miles north of Presque Isle, and two miles south of Caribou. The passenger train left Presque Isle at 10:27 p. m., ten minutes behind the plow. Extra 142 was running at about 15 miles an hour; the man in the rear car, attending the flanger, was killed and the flagman in the caboose was injured. Train No. 9, scheduled at 32 miles an hour, had run from Presque Isle at about 27 miles an hour. It was several hours late. The second plow, which was X59, left Presque Isle 40 minutes behind No. 9. It ran into the passenger train and killed three passengers and injured 21. The flagman of the passenger train was back a full half-mile on straight track, and had put torpedoes on the rail, but it is thought that they did not explode. There was much ice and the temperature was about 30 deg. below zero. The flagman swung a red lantern with one hand and held up a lighted fusee with the other; he threw his lantern at the engine; and all of these signals failed to attract the notice of the engineman of the plow. Inspectors for the Interstate Commerce Commission investigated this case on February 8. It appears that the engineman of the passenger train had no notice of the proximity of the train ahead, as the markers on the flanger were, it is believed, obscured by snow thrown up by the flanger itself.

The trains in collision near Mangum, Okla., on the 10th, were northbound freights No. 914 and No. 558. The leading train had been stopped because of failure of steam. Two cabooses at the rear of this train were wrecked and destroyed by fire. Two trainmen were killed and their bodies were destroyed in the fire. Three other trainmen were injured. The cause of the collision was insufficient protection by flag.

The train involved in the collision at Ashley, Pa., on the 22nd, was a northbound freight which had become uncontrollable on a steep descending grade. It collided with a standing locomotive in the yard at Ashley and the crash included also four other standing engines. The engines and about 30 cars were wrecked. The wreck took fire and 12 loaded cars were mostly burnt up. One trainman was killed and six were injured, one of the six fatally. The cause of the runaway was not determined; but the brakes had been properly tested, and there is no evidence that they were not properly managed. The only theory that will account for the inability of the engineman to control the train is that an angle cock had been closed or partly closed.

The trains in collision at Frost, S. C., on the 25th, were southbound passenger trains, a local train which had been stopped because of failure of an air hose being run into at the rear by a following through train. Twelve passengers were killed and 80 were injured. The cause of the collision is said to have been the failure of the leading train to protect itself by torpedoes; that the flagman had been back a sufficient distance but had returned to his own train without placing the audible signals, and the express train came on just as the local was starting.

The train derailed near Greensburg, Pa., on the 8th, was an eastbound freight, consisting of a locomotive, 39 cars, 2 helping engines and a caboose. One of the locomotives fell down a bank and an engineman, fireman, conductor and two brakemen were injured. The engineman and brakemen were scalded, the former fatally. The cause of the derailment was a broken wheel on one of the cars.

The train derailed near Guernsey, Ark., on the 17th, was northbound passenger No. 6. No passenger cars ran off and no passengers were injured. The engineman and one tres-

¹ Abbreviations and marks used in Accident List:—rc, Rear collision—bc, Point collision—xc, Other collisions—b, Broken—d, Defective—mf, Unfreeseen obstruction—ung, Unexplained—derail, Open derailing switch—ps, Mismatch switch—acc, chst, Accidental obstruction—malice, Malicious obstruction of track—boiler, Explosion of locomotive on road—fire, Cars burned while running—F, or Pass, Passenger train—F, or Ft, Freight train (including empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly destroyed by fire—Dagger, One or more passengers killed.

passer were killed. The cause of the derailment was malicious tampering with a switch.

The train derailed near Curtis, Neb., on the 19th, was an eastbound passenger. Two coaches were overturned, and two passengers were killed and four injured.

The train derailed at Chilhowie, Va., on the night of the 20th, was eastbound passenger No. 42. Five passengers and five employees were slightly injured. The cause of the derailment was the failure of a baggage-car truck equalizer.

The train involved in the accident at Major, Pa., on the 21st, was a southbound passenger. The only vehicle derailed was a freight caboose at the rear of the train, which ran off the track and fell down a bank. One brakeman was killed and four other trainmen were injured. The cause of the derailment was settlement of track due to recent heavy rains followed immediately by a badly heaved condition due to zero weather, resulting in an irregularity of about 3 inches in the surface.

The train derailed at Summerhill, Pa., on the 21st, was westbound passenger No. 25. The train was running at high speed and the engine and seven cars left the rails, but the injuries to persons were reported as slight. The cause of the derailment was a broken trailer-truck spring on the engine.

The train involved in the accident at Georges Creek Junction, Md., on the 25th, was an eastbound freight. The engine and one car had been detached and 59 cars left standing on a grade had not been properly held by hand brakes and they ran away, most of the cars being thrown off the track at a curve. Most of them were loaded with coal.

The train involved in the accident near Hutton, Md., on the 4th, was eastbound passenger No. 46. A connecting rod was broken and the boiler was punctured; the fireman was fatally scalded.

The train involved in the accident near Wayland, N. Y., on the evening of the 18th, was an eastbound passenger. An express car was badly damaged, and its contents destroyed by a fire which is supposed to have been caused by the explosion of an oil lamp. The car was of steel. The express messenger was partially asphyxiated.

Electric Car Accidents.—The most serious electric car accident reported in February was a rear collision on the elevated line of the Brooklyn Rapid Transit Company, Brooklyn, N. Y., at Oxford avenue, February 3, in a fog, when 37 persons were injured, including a number of passengers standing on the station platform. Only three of the injured had to be sent to hospitals.

Shippers Required to Own and Maintain Industry Tracks

DIRECTOR GENERAL McADOO on March 26 issued General Order No. 15 prescribing the following requirements to be observed in respect of the construction, maintenance and operation of new industry tracks, and in respect of the operation and maintenance of existing industry tracks:

1. As to new industry tracks:

(a) The industry shall pay for, own and maintain that part of the track beyond the right of way of the railroad.

(b) The railroad company shall pay for, own and maintain that part of the track on the right of way from the switch point to the clearance point.

(c) Generally speaking, an industry shall pay for and maintain (although in special cases the railroad company may do so) and the railroad company shall own, that part of the track on the right of way from the clearance point to the right of way line.

(d) If the industry fails to maintain in reasonably safe condition the part of the track which it is required to maintain, the railroad company may disconnect the track or refuse to operate over it when not in such condition.

(e) The railroad company shall have the right to use the track when not to the detriment of the industry.

(f) The foregoing terms and conditions should be embodied in a written contract between the industry and the railroad company.

2. Where existing industry tracks are not covered by written contracts, they shall be maintained and operated in accordance with the provisions stated in paragraph 1 hereof.

3. Where industry tracks are covered by written contracts, such contracts shall be adhered to until otherwise ordered; but where any such contracts appear to work inequalities or injustice the circumstances should be brought to the regional director's attention, who will report thereon to the director general, if conditions seem to warrant.

4. The requirements of state statutes and of state commissions in respect of the construction, maintenance and operation of industry tracks shall be complied with, but in cases where such compliance involves what appears to be an unreasonable burden upon the United States Railroad Administration the circumstances should be brought to the attention of the regional director, who will report thereon to the director general if the conditions seem to warrant.



Copyright by Underwood & Underwood, N. Y.

A Motor Truck on Rails



Photo from Underwood & Underwood, N. Y.

New Zealand Troops Entrained



Side View of Thawing Plant at South Amboy, N. J.

A Modern Plant for Thawing Coal in Cars

Severe Winter Has Emphasized the Difficulty of Unloading
Materials Shipped in Open Top Cars

By Scott W. Linn,
General Contractor, Cleveland, Ohio.

THE UNUSUAL CONDITIONS EXISTING THIS WINTER as to the great demand for materials and finished products on one hand and the difficulty in producing and moving these products on the other have emphasized a number of problems which in previous years have been considered of minor importance. The specific causes of most of these troubles are perhaps due to circumstances over which the individual has little or no control. Scarcity of labor and prolonged severely cold weather have had much to do with the delay in moving materials from producer to consumer, and very little can be done on short notice to offset the retarding effect of either of these conditions. Expense and delay in handling materials is not due entirely to the inability of the carrier to make prompt delivery, but is often supplemented and greatly increased by conditions at terminals and other points of delivery.

In winter, freezing of these materials adds greatly to the cost and delay of unloading of coal, ore, sand, gravel or other materials which are usually shipped in open top cars. When these commodities are shipped any considerable distance or are held on cars for several days, they are in a more or less frozen condition depending on the severity of the weather and the amount of moisture in them. The percentage of moisture held in the materials varies greatly according to the coarseness or fineness of the material. A car of sand freezes harder than a car of stone. Crushed bituminous coal or finely divided anthracite coal will freeze harder than the coarser grades of either.

At tide water coal shipping ports, the handling of frozen coal forms one of the most serious problems in winter operation. It is necessary at most of these ports where coal is unloaded from cars to boats by car dumper that the work be carried on in winter weather at about the same rate as in summer. Much of the coast towns' supply of coal depends on shipment from these ports. Various schemes for thawing coal in the cars have been used, most of them without great

success from an economical operating standpoint. The plan mostly used until about seven years ago was the so-called point system. Thawing was attempted by driving gas pipe into the frozen coal and introducing hot steam into the coal through these pipes. This was an expensive and awkward method and was attended by considerable danger to workmen as well as carrying the objection that the coal was left in a saturated condition.

The thawing plants operated by the Eastern Coal Dock Company at its coal unloading plants at Philadelphia and at South Amboy, N. J., have been successful in producing satisfactory results economically. The unloading equipment at South Amboy consists of two McMyler car dumpers located on Pennsylvania Railroad property and are under the management of D. W. Reed, superintendent. Two thawing plants are in use at this place. The first, built in 1911, is a wooden building, 500 ft. long, with two rooms longitudinally through the building, each room containing one track. This plant has thawed an average of over 500,000 tons of coal each winter since it has been in operation. The principal objections to the use of a frame building for this purpose appear to be the rapid deterioration of the wood under the high temperatures carried and the fire hazard attending such construction.

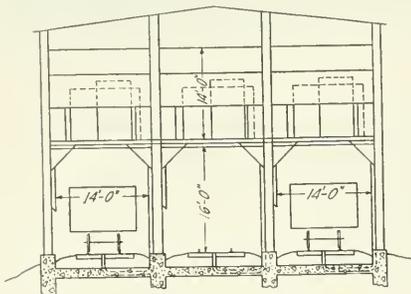
The latest thawing plant was put in operation in January, 1917. It is the same in principle as the other hot air plant, but embodies a more modern type of building construction. The latter plant is a building 570 ft. long with three rooms, each containing one track. The building was constructed on new fill, a part of which occupied the location of a former slip which had been used at one time for the storage of boats when trestles were used for unloading coal at Amboy.

The building is of pre-cast unit concrete construction and all members were cast in a yard near by. The structural members comprise columns, girders, beams, roof slabs and slabs for walls, ceilings and various partitions. All parts

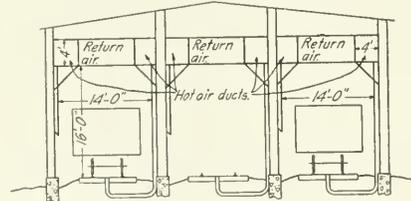
were reinforced to suit requirements and were properly cured before erection. In a building of this type there are such a great number of duplicate parts that erection can be carried on very rapidly. A row of piling under each wall carried the reinforced concrete foundation.

Each room of the building has an inside horizontal clearance of 14 ft. and 16 ft. vertically. In the center of the building is a two-story part about 50 ft. in length, in which the heating and blowing apparatus is located. Two hot-air ducts and one return air duct for each room lie between the ceiling and the roof and extend from the apparatus room to each end of the building. Openings in the bottom of the hot air ducts connect with flues extending downward along the walls and under the track. These flues are spaced about 5 ft. center to center. Kinnear rolling steel doors are used for end closures.

Steam is brought from the boilers about 400 ft. distant to the apparatus room. Water of condensation from the heaters



Section Through Blower House.



Section Near End of Building.

Sections Through the Thawing House

is returned to the boilers for feed water. The heaters and blowers are of B. F. Sturtevant make and are of sufficient size to provide a frequent change of air in the building at a temperature of 250 deg. for the air as it leaves the heaters. The blowers are the double discharge type and are arranged to blow through the heaters into the hot air ducts. Heated air is carried the full length of the building through the ducts and down through the flues and is discharged upwardly toward the bottom of the cars.

The air after contact with the bottom, sides and ends of the cars, enters the return air duct in its passage back to the blowers for re-heating. Frequent openings in the return air duct admit the air. It has been found that better results in circulation are had when the return air openings near the center of the building are closed and air is admitted at intervals some distance from the center and toward the ends of the building. The system of circulation and re-circulation gives a very uniform distribution of hot air in the building so that the material in cars is thawed well in from all surfaces.

This plant has a holding capacity of 42 cars each 40 ft.

long and, under severe freezing conditions and with the average coal, from 1½ to 2 hrs. are required to thaw the coal so that it will unload freely.

Patents covering the hot air system of thawing materials in transit are held by the Walter S. Newhall Company, Cleveland, Ohio, which company was the engineer and general contractor in the design and installation of these plants.

Car Service Section Urges the Sailing Day Plan

THE CAR SERVICE SECTION of the Railroad Administration has issued a bulletin to all railroads requesting those that have not already adopted the plan to make immediate study of the adoption of the so-called "Sailing Day Plan" in the handling of less than carload freight in order to effect further economical use of freight equipment. The bulletin says that some railroads have found the arrangement productive of very good results, as indicated by the figures furnished to the car service section by some of the lines that have adopted the method at some of their larger stations. Some examples of the successful operation of this plan are given in the circular, as follows:

During the month of October the Buffalo, Rochester & Pittsburgh effected a decrease of 41 per cent in cars used and an increase of 83 per cent in weight. The scheduling of local service for intermediate stations three instead of six days per week made it possible to effect a reduction of 10 local freight runs.

On the Boston & Maine, during the first week of October, 1917, which was prior to the adoption of the "Sailing Day" plan, at 13 stations 3955 cars were loaded with 30,761 tons of freight, an average of 7.77 tons per car, while for the week ending December 7, 1917, there was loaded at the same stations 3601 cars with 31,096 tons, an average of 8.63 tons per car, resulting in a saving of 354 cars, or 8.9 per cent, and at the same time an increase in track standing space at the platforms.

The New York Central for four months preceding December 1, 1917, handled 3,154,699,000 lb. of l. c. l. freight, using 221,688 cars. The average loading per car in the period named for 1917 was 14,230 lb. per car, and in the same period in 1916 was 10,279 lb. per car, an increase in 1917 per car of 38.44 per cent or an average saving per month of 21,305 cars.

The New York, New Haven & Hartford reports a saving of 780 cars a week, with standing room at freight houses materially improved. Two freight trains and entire crews have been discontinued and several train movements in the aggregate have been eliminated by reduction in cars to be handled, particularly in prevailing tonnage direction where trains are started only when full tonnage is available.

On the Pennsylvania Railroad 600 cars have been saved daily, and local train service has been reduced on a number of divisions. The former daily set up has been reduced to tri-weekly, semi-weekly and weekly service, according to the volume of business, which results in a saving of 25 per cent of track standing room. It is also estimated that 25 per cent of the freight is kept out of transfers.

The bulletin says: "There is no plan incapable of improvement from time to time and the results to be obtained in efficiency, reduction in train units, decrease in cost, increasing despatch and elimination of freight congestion, will be of material consequence; and the Car Service Section suggests that the arrangement be given very prompt and careful consideration; and . . . immediate study is requested, with definite outline of your plans."

Forms for Equipment Inventory

THE FORMS for an inventory of equipment are those which I. F. Lorce sent to the Railroad War Board before it was superseded by the Director General. Mr Lorce made the suggestion that the War Board request all class A roads to include an inventory in such detail as

is here shown in their annual reports to stockholders. See editorial comments elsewhere in this issue.

ENGLISH RAILWAYMEN CULTIVATE LANDS.—Six thousand employees of the London & South-Western cultivated plots of land by the side of the line last year.

CLASSIFICATION			TOTAL			
Item	TYPE	Tractive Power In Pounds	Number	Tractive Power In Tons.	Weight on Drivers In Tons	Weight of Engine and Tender in working order - In Tons
1	Passenger, Steam	20,000 or less				
2	" " "	Over 20,000				
3	" " "	All				
4	Freight, " "	40,000 or less				
5	" " "	80,000 or less				
6	" " "	Over 80,000				
7	" " "	All				
8	Switch & Work, " "	20,000 or less				
9	" " "	40,000 or less				
10	" " "	Over 40,000				
11	" " "	All				
12	All Steam	All				
13	Passenger Electric	All				
14	Freight " "	" "				
15	Switch & Work"	" "				
16	All Electric	" "				
17	Grand Total	" "				
18	Average Combined Passenger and Ton Miles per annum per pound of locomotive tractive power owned					

Inventory of Steam Railway Locomotives

Item	Type	CLASSIFICATION						Number of Cars and type of Construction				TOTAL	
		Number of Cars of Marked Capacity in Pounds						Wood	Steel Underframe	All Steel	TOTAL	Light Weight In Tons	Marked Carrying Capacity In Tons
		Less than 60,000	60,000 to 80,000	80,000 to 100,000	100,000 to 140,000	140,000 and over	TOTAL						
1	Box												
2	Stock												
3	Refrigerator												
4	Tank												
5	All Closed												
6	Handcarts												
7	Hopper												
8	Flat												
9	All Open												
10	All Other												
11	GRAND TOTAL												
12	Average Freight Ton Miles per annum per ton of Freight Car Carrying Capacity Owned												

Inventory of Steam Railway Freight Train Cars

Item	Type	Length Over Body End Sills In Feet	TOTAL							Carrying Capacity No. of Passengers	Tons of Commodities	Light Egt. in working order - tons
			Number				Total	No. of Passengers	Tons of Commodities			
			All Wood	Steel Underframe	All Steel	Total						
1	Coach or Chair - first class	Less than 60'										
2	" " "	Over 60'										
3	" " - Second " & Exigrant	All										
4	" " and Combination	" "										
5	Parlor	" "										
6	Sleeping	" "										
7	Dining	" "										
8	Staircase	" "										
9	All Passenger Carrying	" "										
10	Postal, Express & Baggage	Less than 60'										
11	" " "	Over 60'										
12	Miscellaneous	All										
13	All Commodity Carrying	" "										
14	Total	" "										
15	Passenger Motor	All										
16	Commodity Motor	" "										
17	Total, Motor	" "										
18	Grand Total	All										
19	Average Passenger Train Car Miles per annum per car owned.											

Inventory of Steam Railway Passenger Train Cars

Freight Operations for December

THE BUREAU OF RAILWAY ECONOMICS has issued its monthly report of freight operations of steam railways for the month of December and the combined months April to December, 1917, in the series which was compiled for the Railroads' War Board. Revenue ton miles handled in the month of December amounted to 29,050,017,536, a decrease of 2.6 per cent, as compared with December, 1916. Total freight train miles decreased 6 per cent, loaded freight car miles decreased 11.7 per cent, and empty freight car miles decreased 15.9 per cent. Freight locomotive miles decreased 5 per cent. The revenue ton miles per freight locomotive amounted to 943,979, a decrease of 2.7 per cent, and the revenue ton miles per freight car amounted to 12,509, a decrease of 6.1 per cent. The average number of freight locomotives in service was .2 per cent greater than December, 1916, and the average number of freight cars 3.8 per cent greater, and the tons per train increased 3.3 per cent, while the tons per loaded car increased 10.2 per cent, but the effect of the congestion in eastern territory is reflected by a decrease in the average miles per locomotive per day from 65 to 61.6, a reduction of 5.2 per cent, and a decrease in the average miles per car per day from 25.4 to 21.3, or 16.1 per cent. There was a reduction in the average mileage per car and per locomotive in all districts.

For the combined nine months, April to December, which marks the period during which the Railroads' War Board was in existence, there was an increase in revenue ton miles of 9.8 per cent, while the number of freight train miles increased only 2.6 per cent and the loaded freight car miles increased only .6 per cent. The revenue ton miles per freight locomotive show an increase of 8.6 per cent and per freight car of 6.7 per cent. The average number of freight locomotives in service shows an increase of 1.1 per cent and there was a reduction of 7.4 per cent in the average number of freight locomotives in shop or awaiting shop. The average number of freight cars in service increased 2.9 per cent, while the average number of freight cars in shop or awaiting shop decreased 3.9 per cent. The tonnage per train was 667 as compared with 624 in the corresponding period of 1916, an increase of 6.9 per cent. The tonnage per loaded car was 27.3 as compared with 25, an increase of 9.2 per cent. The average miles per locomotive per day increased from 66.6 to 67.9, an increase of 2 per cent, but the average miles per car per day had decreased 1.8 per cent, from

27.3 to 26.8. The percentage of empty car miles increased from 29.8 to 30.

Cash Disbursements

DIRECTOR GENERAL McADOO has issued the following circular to the railroads:

Unless and except so far as reasonable showing shall be made to the contrary, the Director General will proceed upon the theory that the total of accounts "cash," "demand loans and deposits," and "time drafts and deposits," appearing on the railroad company's books at the close of business December 31, 1917, was for railroad purposes and is therefore subject to the control and order of the Director General. If, and to the extent that, the Director General shall find it appropriate, in the mobilization and unification of the resources of the railroad companies, to transfer any such cash from the control of the officers of the company, full accounting provision will of course be made for the protection of the company's rights.

The Director General will entertain any applications which may be made to him to show that any portion of the cash on hand December 31 was not for railroad purposes and should not be under the Director General's control.

Carriers subject to federal control must not make disbursements out of the cash represented by the accounts above designated as of December 31, 1918, except as follows:

(a) The payment of interest maturing up to and including July 1, 1918, upon obligations of the railroad company.

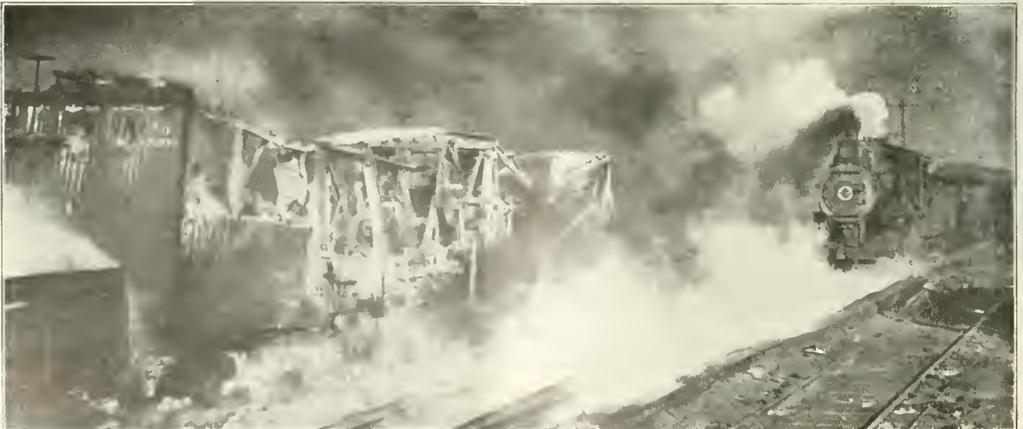
(b) The payment of dividends not in excess of regular rate of dividends during the three years ended June 30, 1917, in the regular installments, according to the established practice of the company, payable up to and including July 1, 1918.

(c) The payment for materials and supplies for railroad use and for other expenses of operation. Operation to include, both upon the debit and credit side, joint facility rents, car hire, and all items of that character which accrue out of the operation of the property.

(d) Taxes, including war taxes.

(e) Expenditures for permanent improvements.

Application will be entertained for any payments which the carrier may desire to make out of cash on hand December 31, 1917, for purposes other than those above specified or, as to clauses *a* and *b*, at dates beyond July 1, 1918.



In the Midst of the Fire at Jersey City Tuesday. Photo by Central News

General News Department

Among consumers of fuel oil, classified in a circular which has been issued by the Fuel Administration, prescribing the order in which manufacturers and distributors are required to give priority, railroads are placed first.

The sub-committee on war tax of the Association of American Railway Accounting Officers has issued a pamphlet of 35 pages giving final rules and regulations promulgated by the commissioner of internal revenue on the application of the war revenue tax to the transportation of persons and property.

Use of varnish is a subject on which Director-General McAdoo desires information. He has addressed to the railroads a questionnaire asking information concerning the use of varnish on cars and locomotives during the calendar year 1917. Reports must show the brand, vendor, manufacturer, amount used for various purposes, total cost and price per gallon.

No railroad legislation at this session, or until after the war, is the decision of the Committee on Common Carriers in the Kentucky legislature; and this rule has been confirmed by a vote in the Senate, where a bill to extend the powers of the State Railroad Commission was laid on the table; but not until after a discussion in which the "strangle-hold of the railroads" on the business of the state was emphasized with all due seriousness.

In an explosion and fire at the Jarvis warehouse, Jersey City, N. J., on March 26, the repair shops of the Erie Railroad, on the north side of the main line near the Jersey City passenger station, were destroyed; estimated loss, \$300,000; loaded freight cars to the value of \$200,000 (estimated) were also destroyed. The explosion caused, altogether, damage to the amount of about \$1,500,000, and fire brands were blown across the river to New York. The Erie station and ferry-house on the New York side were damaged \$8,000. The shop buildings destroyed were old, and it is understood that the company will not rebuild on the same site.

Ownership of coal mines is the subject of a circular which Director-General McAdoo has issued to the railroads. It calls for reports concerning ownership, operation or control of anthracite, bituminous and lignite mines, lands and operations. Each road is required to report regarding lands owned, leased or controlled which are not under development and which are under development; expenses of operation, cost per net ton of coal, proportion of production used for other than railroad purposes, etc. Names of railroad officers or directors who are interested directly or indirectly in any of the lands or mines are also asked.

"Whole-hearted and loyal support to Director-General McAdoo, and the officers of the New York, New Haven & Hartford Railroad," is the keynote of resolutions which have been adopted by the lodges of the Order of Railroad Telegraphers on the New Haven road, and sent to Mr. McAdoo. The telegraphers have "resolved not only to do their bit but to do their best," in maintaining the highest standard of efficiency. Mr. McAdoo, in a reply sent to L. J. Ross, general chairman, expresses his deep gratification. "Such a spirit," says Mr. McAdoo, "cannot fail to aid our beloved country in measurably, and to enable it to become victorious in this great war for America's vital rights and for the freedom and democratization of the world."

The Chestnut Hill branch of the Pennsylvania Railroad is now completely electrified and electric trains are to begin running regularly next week. A test train was run over the line on March 22. This branch is about six miles long and the passenger trains run through over the New York division, and the main line to and from the Broad Street Terminal, Philadelphia, twelve miles. Connection with the main line, electrified two

years ago, is made at Zoological Gardens. The cost of this electrification has been about \$1,500,000. The work has taken a little more than two years and has cost 20 per cent more than was estimated at the beginning. Difficulty in procuring materials has been one cause of delay in completion. In connection with the electrification and the installation of position light signals, twenty signal bridges were put up.

Track Elevation Work in Chicago Checked

The Chicago council committee on track elevation, which was prepared to recommend track elevation work in the city to cost about \$5,000,000, has been requested by W. G. McAdoo, director-general of railroads, to defer further consideration of this work until the conclusion of the war. The elevation work was planned to be done in the southwestern section of Chicago on the Grand Trunk Western, the Indiana Harbor Belt, the Chicago River & Indiana and the Atchison Topeka & Santa Fe. Mr. McAdoo's ground for his recommendation was that railroad improvements involving large expenditures should be avoided when they interfere with the execution of work absolutely essential to the successful conduct of the war.

Embargo on Movements East of Chicago Removed

R. H. Aishton, regional director of western railroads removed the embargo on carload freight destined for points east of the Illinois and Indiana state lines on March 20, after it had been in effect 10 days. The movement of freight to points east of Chicago is now limited only by the capacity of the eastern lines. The special attention which the western lines have been giving the movements of grain during the past two months has evidently taken care of the large quantities of grain which demanded transportation to prevent deterioration. At any rate, Mr. Aishton has recommended to Mr. McAdoo that he discontinue giving preference to grain in the loading of box cars, except as to wheat from points of origin to primary markets.

Reasons for Mail Delays

E. J. Ryan, president of the Railway Mail Association, which represents employees in the railway mail service, contributes the following in a Washington newspaper to the discussion of the reasons for delays in the mails.

"The statement that the delay of mails is only between New York and Washington is an error, as reports show that mails are being delayed practically throughout the entire service. Delayed mails exist on lines not so congested as the railroads operating on the Atlantic seaboard. The fact is that the policy of curtailing space for distributing mails en route in the railroad mail cars, and also reductions in the number of railway postal clerks, who performed this very important work of the postal service, is the real cause for the present situation. The war is not to blame.

"This policy has been adopted and was actually in effect for months before the country entered the struggle and before the abnormal demands arose which now cripple the transportation system. Even now there should be, in very little, if any, delay in mails upon their arrival at Washington. Mail cars are attached to passenger trains, not to freight trains. Frequent regular train service exists between New York and Washington.

"Six trains a day mail cars arrive in Washington each day from New York. Twelve trains carrying mails in closed pouches, but without mail cars or clerks, arrive each day from New York. Eight trains carrying mail mail cars and clerks, leave Washington each day for New York, and also eight trains carrying closed pouches without mail cars or clerks."

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER, 1917

Table with columns: Name of road, Average mileage operated during period, Operating revenues (Freight, Passengers, etc.), Maintenance of Way and Equipment, Traffic, Transportation, General, Total, Operating operation, Net from railway operation, Railway tax accruals, Operating income (or loss), Increase (or decrease) last year.

CALENDAR YEAR 1917

*Begin operation June.

Railroad Liberty Loan Purchases

Director General McAdoo has issued a circular to the railroads calling for the following information regarding Liberty bonds: 1—State the total amount, if any, of Liberty Loan 3½'s, and separately of Liberty Loan 4's, bought by your company or subsidiaries, (a) as investment; (b) for employees. 2—State aggregate amount now held of each of said issues, (a) as investment; (b) for employees.

Of amounts of each issue disposed of by you, other than bonds disposed of to employees, please show: (a) amounts sold in the market, or through brokers; (b) amounts sold at private sale to investors; (c) prices realized for each lot sold; dates of sale.

Railroad Bill Signed by President

The railroad control bill was signed by President Wilson on March 21, immediately after the passage of the war finance corporation bill by the House. The President held the bill for a week because if there had been a failure of the finance corporation bill, which provides for loans to railroads and other corporations whose operation is necessary for the war, it would have been necessary to seek a larger appropriation than the \$500,000,000 provided for in the railroad bill.

The war finance corporation bill had previously passed the Senate and is now in conference. It provides for a corporation of \$500,000,000 capital stock to be owned by the government, with a board of directors consisting of the Secretary of the Treasury and four others. Under the Senate bill the corporation would be authorized to issue \$4,000,000,000 of bonds, but in the House bill this was reduced to \$2,000,000,000 and the corporation is to make loans or advances direct or through banks for the assistance of industries whose operations are necessary or contributory to the prosecution of the war. The bill also provides for a capital-issues committee to investigate, pass upon and determine whether proposed issues of securities are compatible with public interest.

Contracts for Exchange of Transportation for Advertising to Be Honored

Contracts for the exchange of intrastate passenger transportation for advertising, which are not repugnant to state laws, may be carried out, provided they do not extend beyond the present calendar year. This is announced in a modification of General Order No. 6 issued by Director General McAdoo. The order prohibited the issuance of free transportation except as expressly authorized by the federal law. The carriers, in obedience to the order, withdrew the passes or mileage books which had been issued for newspaper advertising.

It later came to Mr. McAdoo's attention that contracts for newspaper advertising to be paid for in transportation at a fixed rate had been made in various sections of the country; that mileage books had been issued pursuant to such contracts; and that the war tax thereon had been paid as required by law. The legality of such contracts and a number of other questions growing out of General Order No. 6 were thereupon referred to the Interstate Commerce Commission for consideration, and the commission advised the modification of Order No. 6 to the extent of permitting a continuance of contracts already made for the exchange of intrastate passenger transportation for advertising to the termination of such contracts, but in no instance beyond the end of the current calendar year. It is pointed out that transportation issued under such contract may not be used in connection with other transportation on any interstate journey.

Railway Business Association

Indications are that the special meeting of the Railway Business Association, called for April 8 in Chicago, will be well attended, replies to the invitations to the meeting having come in in a very satisfactory manner.

Those in charge of the meeting are making every effort to secure the attendance of members of every company engaged in the manufacture or sale of railway supplies, whether they are at present members of the association or not. As has been previously announced in the *Railway Age*, the discussion will deal with the matters of present great importance to the railway and supply field and consideration will be given to the idea of reorganizing the association to make it better fitted to deal with the new aspects of the railway situation.

Traffic News

Distribution of anthracite coal has been put in charge of a supervising committee, announced by the Fuel Administration on March 26: J. B. Dickson, S. D. Warring and W. J. Richards.

The Car Service Section of the Railroad Administration has found considerable delay in transmission of embargo revisions which are sent to zone chairmen by third-class United States, or railroad mail. It is desired that these notices be sent as first-class matter.

Cheap Sunday excursions from Philadelphia to seaside resorts in New Jersey are to be restored. Congressmen from New Jersey have appealed to Director-General McAdoo, and he has authorized the restoration of certain Sunday trains, run to accommodate round-trip passengers at low rates, which were taken off because of freight congestion early in the winter.

On Wednesday, March 20, the post-office department made an experimental run with a motor truck, carrying parcels, from Lancaster, Pa., to New York City, 180 miles, leaving Lancaster at 4 17 a. m. and arriving at New York 4:15 p. m. The merchandise weighed about 2,900 lb., and was made up mainly of eggs, butter and honey. About 20 gal. of gasoline was used and the postage paid on the goods was \$31.01.

An embargo against all l.e.l. freight shipments to New York city, excepting perishable goods, foods, and other usual exceptions, was announced on March 23. It was concurred in by all of the trunk lines, and the notice, signed by George D. Ogden, chairman of the Freight Traffic Committee, said that it was to continue one week from Saturday night, March 23. Responding to recommendations presented by the Merchants' Association of New York, the railroads terminating in Manhattan have agreed to have freight stations open for the delivery of freight at 7 a. m. with cashiers and check clerks on hand; to allow consignees to take carload freight from piers after 6 p. m., and to pile inbound freight on the pier floor with more care, so that teamsters can locate their shipments more quickly. J. C. Lincoln, manager of the Traffic Bureau of the Merchants' Association, at the same time has issued an appeal to merchants and manufacturers to do their part towards reducing the unparalleled congestion of freight in New York stations.

Intermediate Rate Association

Representatives of the intermediate territory, including commercial organizations and state railroad commissions in the territory west of Denver, Colo., and immediately east of the Pacific Coast terminals, have organized the Intermediate Rate Association with the primary purpose of securing an amendment to the fourth section of the act to regulate commerce which will prohibit railroads from charging a higher rate for a shorter than for a longer distance when the haul is included within the longer and over the same line and in the same direction—for the purpose of bringing about a change in the freight rate adjustment to the intermediate territory which has long been the subject of constant litigation and controversy. Headquarters have been opened in Washington in charge of J. F. Shaugnessy, a member of the Nevada Railroad Commission, as president, and Charles W. Smith, commerce attorney, of Washington, as secretary. President Shaugnessy has issued a statement outlining the history of the trans-continental rate adjustment and the arguments in favor of the proposed amendment to the law. He declares that because of the discriminatory rate adjustment capital is withheld from investment in the intermediate territory and that this condition will continue until the Director-General of Railroads should change the discrimination during the period in government control unless there is a declaration by Congress that such a policy would be made permanent. Several bills have been introduced in Congress to amend the long and short haul clause so as to remove all restriction in the matter from the Interstate Commerce Commission, and hearings have been held before the Senate Committee on Interstate Commerce since March 13. An active

campaign of letter-writing to Congress has also been carried on by the representatives of the intermountain territory.

Coal Production

The output of soft coal during the week ending March 16 was the largest since November 24, according to the weekly bulletin by the Geological Survey, Department of the Interior. The total bituminous production during the week ending March 9 is estimated at 11,228,000 net tons. The daily average for the week was exceeded in the week of January 5, but at that time the total production was reduced by the New Year holiday. The improvement has been made possible, the report says, by relief of the railroad freight congestion. Anthracite and coke, both beehive and by-product, reflect the increase in bituminous production. The total production for the week ending February 23 was 10,616,000 and for the week ending March 2, 11,111,000. Anthracite shipments arose to 42,207 cars, the largest since the week of December 1. Bituminous shipments by carloads on 121 roads have shown a steady increase since the week ending February 2 from 170,552 carloads to 199,582 carloads in the week ending March 9. The percentage of full time output lost on account of the car shortage for the last six weeks as shown by the report, has been as follows: January 26, 26.6; February 2, 29.2; February 9, 27.7; February 16, 20.2; February 23, 22.3; March 2, 20.8.

Uniform Classification of Freight

One result of the elimination of competition between railroads is to be a speeding up of the work which has been in progress for years toward a uniform classification of freight. Director General McAdoo has appointed a committee, composed of R. N. Collyer, chairman of the Official Classification Committee, R. C. Fyfe, chairman of the Western Classification Committee, J. E. Crosland, chairman of the Southern Classification Committee, J. E. Williams, chairman of the Uniform Classification Committee, and J. C. Colquitt, classification agent of the Interstate Commerce Commission, to formulate a report as to uniform rules, descriptions and weights, with a view to completing that part of the work. A considerable degree of uniformity as to the rules, descriptions and weights has already been accomplished and as the recommendations of the uniform committee have been made they have been gradually adopted by the regional classification committees. Uniformity of ratings has not been attempted. The committee appointed by the director general has been sitting in continuous session in Chicago for over two weeks. The report is to be submitted to the Interstate Commerce Commission and a public hearing will be had before the final regulations are put into effect.

Real-Life in New York; a Florida View

[From the New York Tribune.]

Carl C. Hatches, of Bradentown, Fla., who came to New York a week ago as a representative of about 100 farmers of Manatee County, Fla., to find out why they were losing money on produce they sent to New York, declared that he has solved the mystery.

"Just malicious destruction," he said. "The freight handlers employed by the Pennsylvania Railroad at Pier 29 have wasted thousands of dollars' worth of celery and cauliflowers from Florida during the week I have been here, and I have seen them do it. They use the longshoremen's hooks to drag down crates of perishable goods, the packages fall to the ground, fall to pieces and are tossed aside, to be trampled under horses' feet." He was asked if he thought the vegetables were destroyed in the attempt to keep food prices up.

"No," he said. "The commission men are glad to get the stuff. It's the laborers at the piers. Either they are incompetent workers or they are simply destroying stuff out of pure malice. Their wages are too low. They get 28 cents an hour, and it is raised to 30 cents if they work twenty-two consecutive days in each month.

"I will say, however, that there is police protection. I saw a policeman chase away a little boy who tried to snatch a cauliflower out of the mud and stuff it in a bag. In a few minutes the cauliflower was trampled down by horses' hoofs and wagon wheels."

Commission and Court News

Interstate Commerce Commission

The St. Louis Chamber of Commerce has filed a complaint with the Interstate Commerce Commission, through Joseph W. Folk, its general counsel, asking for an order requiring the railroads to cease from charging rates on coal to St. Louis higher than the rates to East St. Louis and other cities in the St. Louis industrial district. Mr. Folk recently resigned as chief counsel of the Interstate Commerce Commission to conduct a campaign against the arbitrary of 20 cents a ton on coal crossing the Mississippi river, against which St. Louis has been protesting for many years. The petition charges that the bridge arbitrary constitutes a discrimination against St. Louis which is a severe handicap to its manufacturing interests.

State Commissions

The New York State Public Service Commission, second district, has issued a memorandum, dated March 13, telling of a rear collision of freight trains, recently investigated, which resulted from the negligent acts of seven different employees. One employee was killed in the collision and two were injured. The date and location of this interesting collision are not given, nor is there any explanation of what was done or omitted by the different persons charged with responsibility; but the commission in its memorandum makes a special appeal "to all men engaged in operating trains to acquaint themselves thoroughly with operating rules, to observe them rigorously and to be vigilant and careful in the performance of their duties."

Court News

Setting Fires by Locomotives—Sufficiency of Evidence

Evidence for the plaintiff was circumstantial that an engine of the railroad company set the fire which damaged plaintiff's property. The evidence for the railroad was positive and uncontradicted that the engines alleged to have set the fire were equipped with proper spark arresters and were not emitting and did not emit sparks. The Georgia Court of Appeals holds that a verdict for the plaintiff was unauthorized by this evidence.—*Savannah & N. W. v. Guann (Ga.)*, 94 S. E., 914. Decided January 29, 1918.

Elimination of Grade Crossings—

Apportionment of Expenditures

The New York Appellate Division holds that the Long Island was entitled to an apportionment of all expenditures necessarily incurred by it in the elimination of a crossing pursuant to order of the Public Service Commission, although such expenditures were in part for moving structures of other companies, who could have been compelled by the commission to move them; the Long Island having no power to compel these companies to act.—*People ex rel. Long Island v. Commission*, 168 N. Y. Supp., 832. Decided February 1, 1918.

Power-Brake Law

The Safety Appliance Act, of March 2, 1903, §2, as amended, requires air brakes to be in operation on 85 per cent of the cars in each train, and more, if more cars properly equipped are "associated with" the 85 per cent. The Circuit Court of Appeals, Fourth Circuit, holds that if the required 85 per cent of the cars were operated, it was not a violation of the act to haul other cars in such train, which although power-braked, had their air brakes cut out, because defective and not in condition for use.—*United States v. Chesapeake & Ohio*, 247 Fed. 49. Decided October 8, 1917.

Implied Powers in Sales of Land

In an action against a railroad for commissions on the sale of land in which it was interested, but which it did not own, the Circuit Court of Appeals, Eighth Circuit, holds that it is within the implied powers of a railroad company, whose line runs through a territory largely unsettled as an aid to its own business, to encourage settlement of lands tributary to its road, and to that end it may make a valid contract to pay a reasonable commission on sales of such lands to settlers, although it does not own the lands.—*Thrailkill v. Crosbyton-Southplains*, 246 Fed. 687. Decided October 15, 1917. Rehearing denied, January 16, 1918.

Automatic Car Coupler Law

The Circuit Court of Appeals, Fourth Circuit, holds that it is a compliance with the coupler section of the Safety Appliance Act, 1893, for a railroad to provide appliances that would automatically couple by impact when the knuckles were open and provided with levers extending outside of the car by means of which the knuckles could be opened, so that a coupling could be made or cars uncoupled. Where a brakeman went between cars to open the knuckle of a coupling, although the lever was in good condition, there could be no recovery on the theory that the railroad should have provided automatic couplers the knuckles of which would at all times be open and ready for coupling.—*Chesapeake & Ohio v. Charlton*, 247 Fed. 34. Decided November 9, 1917.

Classification of Freight

The Alabama Supreme Court holds, by a divided court, that a tank wagon necessary to use with a traction engine and shipped with the engine, both set up, should be shipped under the same classification as the engine; and it is immaterial that it was not actually attached to the engine during its course of shipment, nor that each could be used without the other, or that there was a tank on the engine itself of a limited capacity. The ground of the dissenting opinion was that the engine was complete in itself and could be used without such an appendage, however convenient and desirable the latter might be for some of the uses to which the engine might be put; therefore, the tank wagon was complete in itself, and could be used, and was designed to be used, separate and apart from the engine. *L. & N. v. Newell* (Ala.), 77 So., 553. Decided June 7, 1917. Rehearing denied December 24, 1917.

Excess Charge from Passengers Without Tickets

The Mississippi Railroad Commission in 1907 prohibited all railroads from charging passengers who boarded trains without tickets a fare in excess of 3 cents a mile. In 1915 the Illinois Central and the Yazoo & Mississippi Valley adopted a rule requiring each passenger who had an opportunity to buy a ticket to pay 10 cents in excess of the regular fare of 3 cents a mile. The commission declined to approve the extra charge of 10 cents, and entered an order directing that if the charge was made after a given date the railroads would be fined \$500 for each offense. The railroads sought to enjoin the imposition and enforcement of such fines. The Mississippi Supreme Court holds that railroads may require a higher rate from passengers not having secured tickets, but cannot collect in excess of the fixed maximum rate of 3 cents a mile.—*Illinois Central v. Commission* (Miss), 77 So., 314. Decided January 21, 1918.

Absence of Showing of Railroad's Negligence

The body of a brakeman was found beside the track so that his death might have been caused by his falling from his moving freight train and crushing his head on the frozen ground as well as by coming in contact with a car on a side track while standing in the stirrup of a car of his own train to look for a hot box. In an action against the railroad for his death there was evidence that when the body was discovered the car on the side track was covered by frost which could not be touched without leaving marks, and yet gave no indication that the deceased had come in contact with it. The Utah Supreme Court held that judgment for the plaintiff

could not stand, since, where the proximate cause of the injury is left to conjecture, the plaintiff must fail as a matter of law. Although it were assumed that the deceased came in contact with the standing car, yet that would not necessarily establish the proximate cause of his death. Suppose he had come in contact with the car after he had lost his hold on the freight car on which he was riding, the proximate cause then would be the loosening of his handhold and falling from the moving car. Regarding the evidence from any point of view, therefore, the result would be the same, namely, that the cause of death was left wholly to conjecture.—*Tremelling v. Southern Pacific* (Utah), 170 Pac., 80. Decided December 4, 1917.

Effect of Interference of Plaintiff's

Agent in Loading of Live Stock

In an action for damages to a shipment of calves, alleged to have been caused by the negligence of the railroad, the defense was that the plaintiff, through his agent, undertook to load and did load the calves; that over its protest the car was overloaded; and that this and rough handling by the plaintiff's agent caused the damage. The Texas Court of Civil Appeals held that it was the duty of the railroad to load the cattle, but if the plaintiff, by his agent, undertook to so load them, and as a result of his negligence in overloading or rough handling the animals were injured, the defendant was not liable. On the other hand, if the plaintiff's agent merely assisted the trainmen in the loading, under the control of the conductor, and the car was negligently overloaded, then the railroad was liable for the resulting damage. In any event, the railroad would not be liable for any injuries sustained by rough handling of the cattle by the plaintiff's agent while loading. There was no evidence that the conductor authorized any such conduct by him. Judgment for the railroad was reversed and a new trial ordered on account of the improper admission of evidence.—*Massey v. Texas & Pacific* (Tex.), 200 S. W., 409. Decided January 17, 1918.

Warning Trespassers

A woman left a highway to walk around a freight train on a side track blocking the crossing. There was another freight on the side track, its engine facing that of the first train. Observing that there was a space of about 20 feet between the two engines, the woman walked between them over the side track and on to the main track, and in thus attempting to cross the main track was struck and killed by a passing passenger train. In an action for her death the petition alleged that her death was caused by the negligence of the railroad's servants in charge of the freight trains, in failing to warn her of the danger of going on the main track immediately before she was struck by the passenger train, and that the danger was not known to her, but was known to them. The Kentucky Court of Appeals held that to recover for such negligence of the freight train crews it would be necessary to allege that they saw her peril in time to warn her, and that she could not, by the exercise of ordinary care, have known of its approach; the trainmen owing no duty to warn a trespasser, and having the right to believe that she had ordinary intelligence and would not walk in front of the passenger train or place herself in a perilous position. There was no complaint that the passenger train did not give the usual signals for the crossing as it approached it, or that its rate of speed was unusual. A demurrer to the petition was held properly sustained.—*Sweatt's Adm. v. L. & N.* (Ky.), 200 S. W., 14. Decided January 25, 1918.

Effect of Federal Employers' Liability Act

on Contract Requiring Notice of Injuries

It is definitely settled by the members of the Supreme Court of the United States that it was the intention of Congress, by its legislation on the liability of railroads, for injury to employees while engaged in interstate commerce, to take entire and exclusive control over this subject with a view to making the liability in such cases uniform throughout the United States (*N. Y. C. v. White*, 244 U. S., 147). And, as in the case of liability of the initial carrier in interstate shipments, this liability is to be determined by the provisions of the legislation itself and the general common law, as administered by the Federal courts, unaffected by State legislation and decisions of

State courts, except as they may announce the common law. The Texas Court of Civil Appeals holds that, under sections 1 and 5 of the Federal Employers' Liability Act, the written contract of employment between a railroad and an employee, in so far as it provided that the road should not be liable for injuries unless the employee gave notice in writing of his claim, was void. The court held that, in the absence of legislative prohibition, such a contract would be valid at common law.—*Panhandle & Santa Fé v. Brooks (Tex.)*, 199 S. W., 665. Decided December 5, 1917. Rehearing denied December 19, 1917.

Boarding Moving Train

In an action by a passenger for injuries received while attempting to board a moving train with a child in his arms, when his foot slipped through a defective step, the Indiana Appellate Court held that the questions of the railroad's negligence and the plaintiff's contributory negligence were for the jury. It was prejudicial error to charge the jury that "the defendant owed to the plaintiff the duty of exercising the highest degree of care for the plaintiff's safety, and to permit the plaintiff to enter upon the defendant's train in safety." This instruction makes the standard of care due to a person merely on the station platform about to take passage on a train the same as that due one already on the train. Under it the railroad was, in effect, required not only to stop the train a reasonable length of time to allow passengers to get on, but it was also required to see and know that no one was attempting or intending to get on the train before starting it. The law recognizes a distinction between the care due to a passenger on the train and that due to one who is merely on the platform waiting to get on. To the former the railroad company owes the highest degree of care, while to the latter it owes ordinary care not to injure him. Judgment for the plaintiff was reversed and a new trial ordered.—*Pittsburgh, C., C. & St. L. v. Friend (Ind.)*, 118 N. E., 598. Decided February 8, 1918.

Injury to Trackman Cutting Rails

A trackman, while cutting a rail with a sledge hammer and cold chisel, was injured by a piece of steel which was chipped off and driven into his eye. A rule of the company required that goggles, provided for that purpose, should be worn when cutting rails, and goggles were in the toolhouse when the accident occurred. A short time before the accident, while cutting other rails, a piece of steel chipped off and struck this man on the wrist. On the day of the accident he told his foreman that he wanted something to protect his eyes, and the foreman replied, "Go on, that is all right; we never use them." Fearing to lose his job, he did as he was directed. In an action for his injuries the Circuit Court of Appeals, Eighth Circuit, holds that the plaintiff could not recover, for three reasons: (1) Because there was undisputed evidence that the company by adopting the rule and by providing the goggles had exercised reasonable care to discharge its duty; (2) as the work of cutting the rails was merely operation, the foreman was the plaintiff's fellow servant, for whose negligence the railroad was not liable; and (3) as the danger was obvious to the plaintiff, having been brought to his attention by the previous chip of steel which struck him in the wrist, he assumed the risk, and the company was not liable, though the foreman be treated as a vice principal.—*Union Pacific v. Marone*, 246 Fed., 916. Decided October 26, 1917.

Redemption of Unused Tickets

In an action to recover the value of a ticket and a penalty of \$100 under Iowa Code, Sec. 2,128c., for failure to redeem unused tickets, it appeared that the plaintiff bought a ticket over the Chicago & N. W. from Ottawa to Turin, but because of the lateness of the train abandoned his proposed passage and got there some other way. Five days later he presented his ticket to the agent from whom he had bought it and demanded the return of the fare, 14 cents. His demand not having been complied with within 10 days he brought action. The principal question was whether the company's rules were reasonable. The statute requires railroads to redeem unused tickets within 10 days from date of sale at the place of purchase and six months from date of sale at the general passenger agent's office. It requires the "provision and privilege of redemption" to be conspicuously

posted at each office. The defendant company's rules, properly posted, called for written notice, "stating reason why ticket was not wholly used and certifying that passage was not received for any portion stated to be unused." Blank forms were furnished to the ticket agent for use by claimants. The Iowa Supreme Court holds that these rules are a reasonable compliance with the requirements of the statute. "It would be an idle ceremony to require the railway to post conspicuous notices for the information of ticket holders if the rules thus published had no influence upon the course to be followed by them in demanding redemption. . . . The agent proposed to take the ticket and send it to the general passenger agent for redemption. The plaintiff refused to permit this to be done because the ticket constituted his evidence. The plaintiff had not, in fact, observed the posted notice, and did not, in fact, know of the regulations of the company. This fact would have its importance as bearing upon the good faith of the plaintiff, which is unquestioned in this case, but it cannot be made effective to penalize the defendant. The plaintiff was necessarily charged with notice of the regulations. While such rule of constructive notice might operate harshly in some cases where a ticket holder was ignorant and unable to read, such harshness is absent as to the plaintiff, who is one of the foremost lawyers in his county." It was therefore held the plaintiff's suit was premature, as his demand should have conformed to the company's regulations; and judgment for the plaintiff was reversed.—*Prichard v. Chicago & N. W. (Iowa)*, 166 N. W., 299. Decided February 9, 1918.

Loss by Act of God; Unprecedented Flood

The New York Court of Appeals, reversing the judgment of the Appellate Division (167 A. D., 738, 153 N. Y. Supp., 374), has decided in favor of the railroad in an action for the loss of goods destroyed in the New York Central freight yard at Troy in the flood of March 26, 1913, by fire from a car of unslaked lime. The court holds that the Carmack Amendment, making the railroad liable to the shipper of interstate freight for loss caused by it and prohibiting relief by contract from such liability, does not change the common law rule as to the effect of the act of God in excusing the railroad from loss resulting approximately therefrom. The court says: "In both the state and the United States courts where proof is given that goods are damaged in the hands of the carrier, the burden is upon him to show that the damage arose from some cause for which he was not liable. They differ, however, in this: In the United States courts where the carrier shows that the loss was occasioned by the act of God, he has done all that is required. If the shipper then claims that the carrier's negligence also directly contributed to the injury, he must show that fact. In New York, on the other hand, the burden is upon the carrier to show both the act of God and his own freedom from contributing negligence. *Michels v. N. Y. C.*, 30 N. Y., 564, 86 Am., Dec., 415; *Read v. Spaulding*, 30 N. Y., 630, 86 Am., Dec., 426. That is the only distinction. Both jurisdictions hold that to relieve the carrier the act of God must be the immediate, direct and efficient cause of the loss. Neither excuses him if his own negligence also directly and proximately contributes to the result. They may have differed as to when negligence did so directly contribute, as in the case of delays. Not as to the rule, only as to its application. *Condit v. Grand Trunk*, 54 N. Y., 500; *Cormack v. N. Y., N. H. & H.*, 196 N. Y., 442, 90 N. E., 56, 24 L. R. A. (U. S.), 1,209, 17 Ann. Cas., 949; *St. Louis I. M. & S. v. Com. Un. Ins. Co.*, 139 U. S., 223, 11 Sup. Ct., 554, 35 L. Ed., 154; *R. R. Co. v. Reeves*, 10 Wall., 176, 19 L. Ed., 909. As to the question of proximate cause, when we have to do with interstate shipments we must follow the United States courts." The court finds that the carrier's negligence did not directly contribute to the loss. "We must hold that any alleged delay on the part of the defendant, or any action on its part in placing the car near the car of lime, even were there evidence of negligence with regard to such delay, or with regard to placing the car, was not the proximate cause of the loss. Nor is there any evidence that the defendant knew or should have known that the car was in danger at the time it placed it in the yard, or in time to have permitted its removal. The flood was unprecedented, as has been said, and no such warning was given, so far as appears, and no such physical conditions existed, as to allow a jury to impute this knowledge."—*Barnet v. N. Y. C. & H. R. (N. Y.)*, 118 N. E., 625. Decided January 8, 1918.

Equipment and Supplies

Locomotives

THE CANADIAN GOVERNMENT RAILWAYS are expected to place orders shortly for 150 locomotives, 100 to the Montreal Locomotive Works, and 50 to the Canadian Locomotive Company.

UNITED STATES GOVERNMENT LOCOMOTIVES.—The Central Advisory Purchasing Committee of the Railroad Administration will hold a meeting in Washington next Monday with the manufacturers of locomotive specialties to consider the specialties to be used on the government's standard locomotives.

Freight Cars

J. R. WALSH, Savannah, Ga., is inquiring for 5 to 10 8,000-gal. capacity tank cars.

THE NEW JERSEY ZINC COMPANY, New York, is inquiring for 4 Goodwin Class C dump cars.

THE ROXANA PETROLEUM COMPANY, Tulsa, Okla., is inquiring for 100 10,000-gal. capacity tank cars.

THE CHICAGO, MILWAUKEE & ST. PAUL has been authorized by the Railroad Administration to build 5,000 freight cars in its own shops.

THE CANADIAN GOVERNMENT has placed orders for 8,150 freight cars as follows: Canadian Car & Foundry Company, 5,000 40-ton steel frame box cars, 450 40-ton, wooden ballast cars and 300 30-ton stock cars. Eastern Car Company, 750 40-ton steel frame flat cars and 650 50-ton coal cars; National Steel Car Company, 1,000 40-ton steel frame box cars. Other cars, including refrigerator, tank and passenger cars, are also expected.

UNITED STATES GOVERNMENT.—The United States Railroad Administration on Monday asked car builders to submit prices by Wednesday, March 27, on 100,000 cars to be built to standard specifications which were given to builders at a conference that day. Probably 50,000 more cars will be ordered in the next six months.

It is understood that the 100,000 cars to be ordered at this time will include 50,000 box, 25,000 gondola and 25,000 hopper cars.

The specifications and plans issued by the director general on Monday cover eight types of cars, as follows:

- 40-ton steel underframe, double sheathed box car.
- 40-ton steel underframe, single sheathed box car.
- 50-ton steel underframe, single sheathed box car.
- 50-ton steel high side gondola with 8 drop doors.
- 50-ton composite high side gondola with 8 drop doors.
- 70-ton steel low side gondola car with drop ends.
- 55-ton hopper car.
- 70-ton hopper car.

These specifications are particularly broad and those parts which are possible of interchange have been made common to all of the cars. An item under "material options" in all of the specifications, to the effect that the specialties to be used will be as covered in the contract, indicates that the government intends to maintain a liberal policy in this respect.

Further details concerning the design and specifications will be found elsewhere in this issue.

The car builders met with the purchasing committee on Monday regarding the 100,000 car purchase, and it is reported that the committee will meet with the car specialty men to consider the specialties to be used on these cars in the latter part of the week.

Signaling

THE LEHIGH VALLEY has ordered from the General Railway Signal Company, an interlocking machine, to be installed at Easton, Pa.; 38 working levers, style A.

Supply Trade News

This week's Railway Age contains articles of special interest to railway supplymen as follows:

Organizing the Supply Industry—an editorial, page 775. Specifications for the United States Standard Cars, page 785. China's Greatest Need Today Is Transportation, page 797.

Next week's issue will be a Special Quarterly Issue and will contain several articles that railway men will ill afford to miss. There will be articles on the railway supply industry's part in the recent developments of the day, a number of articles on export trade in railway supplies—a matter which is receiving increasing attention on the part of progressive railway supply manufacturers—as well as many other articles on the general railway problems that are proving of prime importance at the present moment.

Warren R. Roberts, president of the Roberts & Scheffer Company, who has been a major in the emergency construction division of the Quartermaster Reserve Corps at Washington, has been promoted to lieutenant-colonel.

Richard Ward Baker, superintendent of outside construction, of the Watson-Stillman Co., New York, died March 24, at his home at Roselle, N. J., at the age of 68 years. He spent his entire business life in the services of the Watson-Stillman Co., having entered its employ at the age of 14, finally becoming superintendent, which post he held for many years. Upon the completion of 50 years' service in 1914, the Board of Directors of the Watson-Stillman Co. celebrated the event by the presentation of a substantial check and an engrossed copy of the resolution setting forth the company's appreciation.

Pettibone-Mulliken Company

The Pettibone-Mulliken Company, Chicago, reports net earnings of \$1,682,354 for 1917, as compared with \$617,751 in 1916. The surplus, after all charges and deferred dividends, amounted to \$628,458, as compared to \$178,724 available for dividends of the common stock in the previous year. The income accounts for the two years follow:

	1917	1916.
Manufacturing profits, less maintenance, taxes, selling and administration expenses.....	\$1,669,002	\$606,151
Interest, dividends, etc., received.....	13,151	11,597
Net income.....	1,682,354	617,751
Surplus carried forward.....	398,059	225,335
Total.....	2,080,413	843,086
First preferred dividend, 7 per cent.....	112,072	122,500
Second preferred dividend, 7 per cent.....	51,890	52,500
Depreciation of plant.....	100,709	95,000
First preferred stock sinking fund.....	590,235	175,000
Excess profits and income tax.....	440,000	
Surplus.....	1,077,517	398,086

Trade Publications

STONE FRANKLIN LIGHTING EQUIPMENT is the title of an instruction book and part catalogue just issued by the Franklin Railway Supply Company, Inc., 30 Church Street, New York. The first part of the book contains illustrations and wiring diagrams of the different types of Stone-Franklin car lighting equipment. Following this there are given information pertaining to terminal inspection, some condensed maintenance information, instructions for the application of generators and detailed statements of the principal features to be observed in operating and maintaining the equipment. The latter part of the book is given over to a complete list of parts. Complete drawings of the generators show exactly where these parts are located. The book contains many illustrations and will be found to be of much value to all users of Stone-Franklin lighting equipment.

THE UNITED STATES NAVY in the year ending June 30, 1916, used 47,000,000 gallons of oil fuel.

Railway Construction

ALABAMA INTERURBAN.—A contract has been given to A. T. Newell & Brothers, Birmingham, Ala., to build this line. The plans call for building a double track main line between lock 17 on the Warrior river and Birmingham, Ala., also numerous spurs to reach ore, coal and timber lands.—T. L. Cannon, managing director, Birmingham (March 1, p. 480).

HAVRE DE GRACE & TANEYTOWN ELECTRIC RAILWAY.—Incorporation has been granted to this company to build an electric line from Havre de Grace, Md., on the Baltimore & Ohio and the Pennsylvania Railroad, west via Towson to Finksburg, thence northwest via Westminster to Taneytown, on the Pennsylvania Railroad, about 70 miles. C. Stanley Stirling, president, 423 Calvert building, Baltimore.

MORGANTOWN & WHEELING.—This company is planning to carry out improvements during 1918 to reduce the grades to a maximum of 1.2 per cent and the curvature to a maximum of 16 degrees. The work will also include relocating the main track between Randell and Cassville, and building one steel bridge 100 ft. long and another 70 ft. long.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—This company recently completed a line from Hermitage, Tenn., to Hadley's Bend, 7.1 miles in 28 days. The new line will serve a \$60,000,000 powder plant of the government. The work involved 67,000 cu. yd. of embankment and 8,000 cu. yd. of excavation, as well as the construction of two large trestles, one over 1,000 ft. and the other 800 ft. long. The first day's work was done with two grading gangs numbering 50 men each. Because of the pressing need of the speedy completion of the line, the forces were rapidly increased until the number of men employed on work totaled 3,360.

TAMIAMI RAILWAY.—Construction work is to be started at once on this projected line, from Miami, Fla., west to Chevelier about 65 miles, thence northwest to Fort Myers, an additional 75 miles. There will be one steel bridge over the Miami river. The promoters expect to develop a traffic in lumber, farm products and sea food. J. F. Jaudon, president; F. K. Ashworth, chief engineer, Miami.

SOUTH MANCHURIA ROLLING STOCK.—The South Manchuria Railway Company has planned to construct eight hundred freight cars and three hundred locomotives as a piece of continuation work extending over the fiscal years of 1918 and 1919. This rolling stock construction program has been further supplemented by the intended construction of three hundred freight cars and one hundred locomotives for the exclusive purpose of transporting coal and materials for the Anshan Steel Works.—*The Far Eastern Review.*

NEW RAILWAYS FOR JAPAN.—The Japanese Railway Council at an extraordinary meeting January 18, adopted in toto Baron Goto's project for the construction of 589 miles of cross-country railways in Japan to link the present trunk lines. The Council voted a special appropriation of nearly \$46,000,000, which, added to \$62,500,000 previously appropriated, releases \$108,500,000 during the next ten years for the construction of these new lines. In addition to the \$121,000,000, which the present railway lines have standing to their credit in the form of appropriations already made for expenditure in improvements, the Council voted a special appropriation of \$9,000,000, totaling \$130,000,000 for improvements. Of this \$9,000,000, somewhat over half is to provide for the rising cost of rolling stock, and \$4,300,000 is to be expended in the widening of tunnels and in the widening of the space on the roadbed between the double tracks. This is done so that in the future, no physical obstacles will stand in the way of the installation of a broader gage. The Council's action, combined with previous appropriation yet unspent, provides that an expenditure of \$238,789,357 for building new railways and improving the present ones within the next ten years has been assured.—*The Far Eastern Review.*

Railway Financial News

CHESAPEAKE & OHIO.—The directors of this company, at their meeting on March 21, voted to appropriate out of the net earnings for the twenty months ended December 31, 1917, \$7,500,000 for property expenditures under the agreement made with Kuhn, Loeb & Co. and the National City Company in the spring of 1916 for the purchase of \$40,180,000 of the railroad's thirty-year 5 per cent convertible bonds. By this action the company anticipated its requirements for expenditures on additions and betterments by more than a year, as the agreement with the bankers stipulated that the road had until June 1, 1919, in which to spend the full \$7,500,000. In all the Chesapeake & Ohio agreed to spend \$15,500,000 to meet the requirements of the bankers before they would consent to underwrite the convertible bonds. The larger part of this issue was set aside to pay off \$33,000,000 five-year 5 per cent notes that mature on June 1 next year. Frank A. Trumbull, chairman of the board of directors, announced after the meeting that the surplus for the twenty months ended December 31, after the reserve for betterments had been set aside, amounted to \$1,768,500. "Thus we have done in twenty months," he said, "what we were allowed to do in three years."

CINCINNATI, FINDLAY & FORT WAYNE.—This road, which had been ordered discontinued by the district court at Cincinnati, will be kept running by the government, having been included among the government controlled roads.

GEORGIA & FLORIDA.—J. F. Lewis, president of the Citizens Bank of Valdosta, Ga., and his brother, E. S. Lewis, of Montezuma, Ga., have bought the interests of the Baltimore Trust Co. in the Georgia & Florida Railroad.

GULF, MOBILE & NORTHERN.—At the annual meeting of the stockholders of the company the following directors were elected for the ensuing year: John W. Platon, Charles K. Beekman, William H. Cloverdale, Joseph S. Dale, C. H. Murphy, New York; W. F. Owen, J. C. Rich, Mobile, Ala.; A. H. S. Post, T. Nelson Strother, Baltimore, Md.; I. B. Tigrett, Jackson, Tenn.; and Frederick W. Scott, Richmond, Va.

OREGON SHORT LINE.—W. A. Harriman, vice-president of the Union Pacific System, has been made a member of the executive committee and also elected a director of the Oregon Short Line, succeeding R. S. Lovett, resigned.

OREGON-WASHINGTON RAILROAD & NAVIGATION COMPANY.—C. A. Peabody, vice-president of the Delaware & Hudson, has been elected a director of the Oregon-Washington Railroad & Navigation Company, succeeding R. S. Lovett, resigned.

GOVERNMENT CONTROL OF COPPER IN SWEDEN.—By a decree dated January 18, effective the same day, the Swedish Government takes control of all trade in copper and copper scrap, including copper unmanufactured or in the rough, electrolytic copper, as well as all scrap or waste containing copper, such as copper scrap, brass scrap, nickel (white metal) scrap, britannia (yellow metal) scrap, and all other scrap in which copper forms a part.—*Commerce Reports.*

LONDON FOG CAUSES RAILWAY ACCIDENTS.—The densest fog for over 30 years occurred in the southwestern districts of London on the evening of Thursday, January 31. Road traffic was practically stopped, and railway transport completely disorganized. Many railway passengers fell off the platform, and three were killed from this cause on the Metropolitan District Railway.—*The Engineer, London.*

PROJECTED STEEL WORKS FOR NORWAY.—The village of Risør, Norway, which is between Christiansand and Christiania, is projecting steel works and roller mills to turn out 30,000 to 40,000 tons per year. It will utilize as far as possible electric power and electric heat for smelting. This will be derived from the Hope Falls, the first transmission project being 22,000 horsepower.—*Commercial Reports.*

ANNUAL REPORT

CANADIAN PACIFIC RAILWAY COMPANY—THIRTY-SEVENTH ANNUAL REPORT

To the Shareholders

The accounts of the Company for the year ended December 31st, 1917, show the following results:—

Gross Earnings	\$152,389,334.95
Working Expenses	105,843,316.50
Net Earnings	\$46,546,018.45
Deduct Fixed Charges	10,229,143.43
Surplus	\$36,316,875.02
Contribution to Pension Fund	500,000.00
	\$35,816,875.02
Deduct Net Earnings of Pacific Coast Steamships, Commercial Telegraph, and News Department, transferred to Special Income Account	1,968,682.56
	\$33,848,192.46
From this there has been charged a half-yearly dividend on Preference Stock of 2 per cent., paid October 1st, 1917	\$1,613,638.42
And three quarterly dividends on Ordinary Stock of 1 1/4 per cent. each, paid June 30th, 1917, October 1st, 1917, and December 31st, 1917	13,650,000.00
	15,263,638.42
	\$18,584,554.04
From this there has been declared a second half-yearly dividend on Preference Stock, payable April 1st, 1918	\$1,613,638.42
And a fourth quarterly dividend on Ordinary Stock of 1 1/4 per cent., payable April 1st, 1918	4,550,000.00
	6,163,638.42
Leaving net surplus for the year	\$12,420,915.62

In addition to the above dividends on Ordinary Stock, three per cent. was paid from Special Income

SPECIAL INCOME FOR YEAR ENDED DECEMBER 31st, 1917

Balance at December 31st, 1916	\$12,872,451.54
Less: Dividend paid March 31st, 1917	1,950,000.00
	\$10,922,451.54
Net Revenue from Investments and Available Resources, Exhibit "C"	2,010,911.76
Interest on Deposits, and Interest and Dividends on Other Securities	2,697,087.20
Net Earnings Ocean and Coastal Steamship Lines	3,724,720.27
Net Earnings Commercial Telegraph and News Department, Rentals and Miscellaneous	2,280,580.09
	\$21,635,750.86
Less: Payments to Shareholders in dividends; June 30th, 1917, October 1st, 1917, and December 31st 1917	5,850,000.00
	\$15,785,750.86

From this a dividend has been declared payable April 1st, 1918 \$1,950,000.00

The working expenses for the year amounted to 69.46 per cent of the gross earnings, and the net earnings to 30.54 per cent, as compared with 63.80 and 36.20 per cent, respectively, in 1916

The sales of agricultural land in the year were 789,055 acres for \$14,330,811, being an average of \$18.16 per acre. Included in this area were 38,681 acres of irrigated land which brought \$43.99 per acre, so that the average price of the balance was \$17.90 per acre

Before the adoption in 1913 of the plan of selling lands to settlers only, considerable areas had been bought by Land Companies and others for speculative purposes. Nearly all of these purchases were in default and nothing was being done with the lands. To remedy this year's Directors negotiated the cancellation of the contracts and the restoration of the lands to the Company. Some of these have already been resold to settlers, and through the Company's agency purchasers will be found for the balance at prices somewhat better than those specified in the cancelled contracts. The cancellations have been adjusted in the accounts submitted

Besides the substantial amount already invested in the securities of, and loans to Great Britain, Canada and the United States, your Company subscribed to \$10,000,000 of the recent Canadian Victory Loan. A substantial amount has been set aside to meet the requirements of the allotment payable in the current financial year

The arrangement for the redemption by the Company of Callaghan Trust Bonds to be loaned to His Majesty's Government, Treasury was abandoned for the reasons given at the last Annual Meeting of the Shareholders. As stated by the President in his address to the Shareholders the Company had, however, with due authority, issued and deposited by way of loan with the nominees of the Imperial Treasury, \$40,000,000 currency 4% Consolidated War Loan Stock. The period of the loan is 5 years from January 1st, 1917, but the Lords of the Treasury reserved the right to return the Stock to the Company at any time after January 1st, 1919, on giving three months' notice, or to purchase the Stock in whole or in part at 80% of its face value in New York funds or their equivalent. The annual premium of 1/2% resulting from this transaction was not taken into the revenue of the year, but was written off against the face value of the security. Apart from this the Capital Account remains unchanged, all capital expenditures during the year having been met from surplus revenue

The gross earnings of your transportation system in the fiscal year 1917 exceeded those of the previous year by \$13,000,000, but the net earnings were less by \$4,000,000. This large addition of \$17,000,000 to the working expenses may be attributed almost entirely to the advance in wages and in the cost of fuel and materials of every description

Subject to your approval, your Directors have authorized expenditures on Capital Account during the present year of \$3,200,000, apportioned to the following works, viz.:—Replacement of temporary structures on branch lines by permanent work, \$512,000; transfer slip at Vancouver, additional coaling plants, small stations and section houses, \$815,000; interlocking and protective signal apparatus, \$160,000; additional terminal and side track accommodation, \$450,000; and a variety of additions and improvements to the property designed to secure greater convenience and economy, \$1,263,000

The undermentioned Directors will retire from office at the approaching Annual Meeting. They are eligible for re-election.

MR. I. K. J. ROSS,
 BY: H. LOUG SHAUGHNESSY, K.C.V.O.,
 SIR THOMAS SKINNER, BART.

For the Directors,
 H. LOUG SHAUGHNESSY,
 President and Chairman.

MONTREAL, March 11th, 1918.

CANADIAN PACIFIC RAILWAY COMPANY

General Balance Sheet December 31st, 1917.

ASSETS		LIABILITIES	
PROPERTY INVESTMENT:		CAPITAL STOCK:	
Railway, Rolling Stock Equipment and Lake and River Steamers	\$38,510,563.24	Ordinary Stock	\$260,000,000.00
Ocean and Coastal Steamships, Exhibit "A" (Present estimated value, \$65,000,000.00)	26,810,547.40	Four Per Cent. Preference Stock	60,681,921.12
ACQUIRED SECURITIES (Cost):		FOUR PER CENT CONSOLIDATED DEFERRED STOCK	216,284,882.10
Exhibit "B"	123,126,925.85	Mortgage Branch 1st Mortgage 5 1/2 per cent.	3,650,000.00
ADVANCES TO CONTROLLED PROPERTIES AND INSURANCE PREMIUMS	6,747,258.86	NOTE CERTIFICATES 6 PER CENT.	52,000,000.00
INVESTMENTS AND AVAILABLE RESOURCES:		PREMIUM ON ORDINARY CAPITAL STOCK SOLD CURRENT	45,000,000.00
Including amount held in trust for 6% Note Certificates, \$37,147,628.81		CURRENT:	
Deferred Payments on Lands and Townsites	\$55,826,108.51	Audited Vouchers	\$1,381,063.72
Imperial and Dominion Government Securities	33,366,588.87	Pay Rolls	5,064,458.54
Provincial and Municipal Securities	2,673,721.17	Miscellaneous Account Payable	8,871,809.18
Debture Stock loaned to Imperial Government	40,000,000.00		19,761,331.48
Miscellaneous Investments, Exhibit "C"		ACCRUED:	
Cost	25,465,452.98	Rentals of Leased Lines and Equipment	535,000.00
Assets in Lands and Properties, Exhibit "D"	12,373,923.50	Mortgage Bonds	10,031,000.00
Cash	10,586,733.55	EQUIPMENT OBLIGATIONS	
	27,660,558.91	RESERVE AND ADVANCEMENTS:	
WORKING ASSETS:		Equipment Reserve	\$9,011,011.30
Material and Supplies on Hand	\$17,960,955.51	Steamship Reserve	50,000.00
Accruals and Conductors' Balances	2,641,464.96	Reserve for Contingencies	
Net Traffic Balances	378,439.71	Contingencies	10,000.00
Imperial and Dominion Governments, Accounts due for Transportation, etc.	4,344,300.15	Loss and Missing Equipment Fund	33,200,000.00
Miscellaneous Accounts Receivable	6,379,312.86		
Cash in Hand	31,424,893.61		
	63,201,149.64		
	\$1,038,074,993.66		

H. LOUG SHAUGHNESSY,
 President

We have examined the above and find it to be a true and correct statement of the assets and liabilities of the Canadian Pacific Railway Company for the year ended December 31st, 1917, and having compared the same with the accounts of the Company, we certify that the same are correct. Signed this 11th day of March, 1918, at Montreal, Quebec.

PRICE, WATERHOUSE & CO.

MONTREAL, MARCH 11th, 1918. Chartered Accountants (England).

RECEIPTS AND EXPENDITURES.
YEAR ENDED DECEMBER 31st, 1917.

Cash in hand, December 31st, 1916.....	\$57,076,018.77
RECEIPTS:	
Surplus Revenue as per statement.....	\$35,848,192.46
Special Income as per statement.....	10,713,299.32
	44,561,491.78

LAND DEPARTMENT:

Lands and Townships:	
Proceeds of Sales and Interest.....	18,944,291.02
Less Sales Expenses and Irrigation.....	3,004,605.25
Cost of Alberta Ry. & Irr. Co. Land.....	33,011.45
	3,037,616.70
	15,906,674.32

Less contracts of sales made in previous years surrendered and cancelled.....	8,299,247.79
	7,607,426.53
Deferred Payments on previous year's sales.....	4,387,657.19
	11,995,083.72

Amount remaining in Deferred Payments on the sales of the year after reduction by cancellation as above.....	5,406,343.32
	6,588,740.40
Amount applied in reduction of Cost of Mining Properties, Exhibit "D".....	267,944.00

ADD:

Agents' and Conductors' Balances.....	2,642,246.96
Net Traffic Balances.....	335,439.71
Imperial and Dominion Governments.....	4,344,300.35
Miscellaneous Accounts Receivable.....	6,579,312.86
Advances to Controlled Properties and Insurance Premiums.....	6,747,258.86
	20,648,558.74
Amount at December 31st, 1916.....	65,575,485.44
	44,926,926.70

	\$153,421,121.65
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EXPENDITURES:

Dividends on Preference Stock:	
2 per cent. paid March 31st, 1917.....	\$1,613,638.42
2 per cent. paid October 1st, 1917.....	1,613,638.42
	\$3,227,276.84

Dividends on Ordinary Stock:	
2½ per cent. paid March 31st, 1917.....	6,500,000.00
2½ per cent. paid June 30th, 1917.....	6,500,000.00
2½ per cent. paid October 1st, 1917.....	6,500,000.00
2½ per cent. paid December 31st, 1917.....	6,500,000.00
	26,000,000.00

Construction of branch lines:	
Amount expended in previous years and included in advances on lines under construction, transferred to Cost of Railway.....	13,239,338.42
Expenditure during 1917.....	330,686.14
	13,570,024.56

Additions and Improvements, main line and branches, Exhibit "E".....	4,569,814.77
Expenditures on leased and acquired lines, Exhibit "F".....	7,505,176.12
Shops and Machinery.....	69,134.12

Ocean and Coastal Steamships:	
Payments on Steamships acquired and under construction.....	1,533,769.08
Expenditures in previous years transferred from Advances on Steamships.....	5,091,298.06
	6,625,067.14
Deposited with Trustee, Special Investment Fund.....	5,896,033.67

SECURITIES ACQUIRED:	
Alberta Ry. and Irrigation Co. Stock.....	10,080.00
Alberta Stock Yards Co. Stock.....	150.00
Public Markets, Ltd., of Manitoba, Stock.....	15,000.00
Spokane International Ry. Stock.....	94,694.39
Trustee Securities.....	6,335,857.58
	6,455,781.97

Securities of lines constructed in previous years, clearing cash advances:	
Calgary & Edmonton Ry. 1st Mortgage Bonds	1,540,000.00
Campbellford, Lake Ontario & Western Ry. 1st Mortgage Bonds.....	2,675,000.00
Kettle Valley Ry. 1st Mortgage Bonds.....	13,530,000.00
Kootenay Central Ry. 1st Mortgage Bonds.....	2,370,000.00
Lake Erie & Northern Ry. 1st Mortgage Bonds.....	2,265,800.00
	22,380,800.00
Securities and Properties. Allocation to Investments and Available Resources heretofore carried as Advances.....	2,317,734.57
Payment of Equipment Obligations.....	1,100,000.00
Payments on subscriptions to Imperial and Dominion Govt. Loans.....	18,522,499.60
Increase in Material and Supplies on hand.....	4,305,559.67
	122,544,903.03

DEDUCT INCREASE IN LIABILITIES:	
Current Liabilities.....	19,268,131.48
Interest on Funded Debt.....	53,025.47
Reserves and Appropriations.....	33,227,911.32
	53,031,068.27
Amount at December 31st, 1916.....	52,482,393.28
	548,674.99

	121,996,228.04
	31,424,893.61
Cash in hand.....	\$153,421,121.65

STATEMENT OF EARNINGS FOR THE YEAR ENDED DECEMBER 31st, 1917.

From Passengers.....	\$30,238,986.08
" Freight.....	103,635,794.74
" Mails.....	1,429,404.61
" Sleeping Cars, Express, Telegraph and Miscellaneous.....	17,085,149.52
Total.....	\$152,389,334.95

STATEMENT OF WORKING EXPENSES FOR THE YEAR ENDED DECEMBER 31st, 1917.

Transportation Expenses.....	\$53,029,260.40
Maintenance of Way and Structures.....	17,470,069.17
Maintenance of Equipment.....	23,404,262.77
Traffic Expenses.....	3,084,944.08
Parlor and Sleeping Car Expenses.....	1,006,037.67
Expenses of Lake and River Steamers.....	1,054,683.53
General Expenses.....	5,023,609.14
Commercial Telegraph.....	1,770,449.74
Total.....	\$105,843,316.50

STATEMENT OF EQUIPMENT AT 31st DECEMBER, 1917.

Locomotives.....	2,255
*First and second class Passenger Cars, Baggage Cars and Colonist Sleeping Cars.....	2,191
First class Sleeping, Dining and Café Cars.....	468
Parlor Cars, Official and Paymasters' Cars.....	122
Freight and Cattle Cars (all kinds).....	87,301
Conductors' Vans.....	1,359
Boarding, Tool and Auxiliary Cars and Steam Shovels.....	6,735
*Includes Cars in Line Service as follows:	

ST. JOHN AND BOSTON LINE

2 First Class	} 80.04% owned by other lines.	} 68.33% owned by other lines.
2 First Class		
2 Dining and Smoking		
4 2nd Class		
4 Baggage & Express		
12 Cars		
		14 Cars

TORONTO, HAMILTON AND BUFFALO LINE

10 First Class	} 63.96% owned by other lines.
4 Second Class	
4 Baggage and Express	
1 Baggage and Smoking	
19 Cars	

LAKE AND RIVER STEAMERS

UPPER LAKES

Alberta	Manitoba	Assiniboia
Athabasca		Keweenaw

BRITISH COLUMBIA LAKE AND RIVER

Aberdeen	Kuskanook	Rossland
Bonington	Nelson	Sandon
Castlegar	Moyle	Sicameus
Columbia	Nasookin	Stocan
Hosmer	Naramata	Valhalla
Kaleden	Okanagan	Whatshan
Kokanee	Proctor	Ymir
Kootenay		York

MICHIGAN FERRIES

ONTARIO

DESCRIPTION OF FREIGHT FORWARDED.

	YEARS ENDED DECEMBER 31st		
	1915	1916	1917
Flour.....	8,940,310	11,119,890	13,727,976
Grain.....	219,388,358	256,106,690	213,340,507
Live Stock.....	2,524,603	2,172,437	2,190,596
Lumber.....	2,376,174,667	3,017,964,134	3,178,554,667
Firewood.....	263,384	289,471	295,277
Manufactured Articles.....	6,570,535	8,871,928	10,148,568
All other articles.....	7,367,927	8,487,785	8,788,423

FREIGHT TRAFFIC.

	YEARS ENDED DECEMBER 31st		
	1915	1916	1917
Number of tons carried.....	24,895,106	30,168,798	31,198,685
Number of tons carried one mile.....	10,602,237,949	14,931,739,090	14,882,991,224
Centners per ton per mile.....	0.68 cents	0.65 cents	0.70 cents

PASSENGER TRAFFIC.

	YEARS ENDED DECEMBER 31st		
	1916	1917	
Number of passengers carried.....	15,577,652	15,576,721	
Number of passengers carried one mile.....	1,367,273,140	1,488,974,821	
Centners per passenger per mile.....	1.96 cents	2.03 cents	

TRAIN TRAFFIC STATISTICS FOR TWELVE MONTHS ENDED DECEMBER 31ST, 1917 AND 1916.

EARNINGS OF LAKE AND RIVER STEAMERS NOT INCLUDED IN THIS STATEMENT.

TRAIN MILEAGE.	Year ended		Increase or Decrease.	
	December 31st, 1917.	December 31st, 1916.	Amount or number	Per Cent.
Passenger trains.....	18,093,554	18,669,463	575,909	3.08
Freight ".....	25,182,863	26,162,580	979,717	3.74
Mixed ".....	2,056,414	2,105,496	49,082	2.33
Total trains.....	45,332,831	46,937,539	1,604,708	3.43

CAR MILEAGE.

PASSENGER.	Year ended		Increase or Decrease.	
	December 31st, 1917.	December 31st, 1916.	Amount or number	Per Cent.
Coaches and P. D. and S. cars.....	93,745,444	92,280,927	1,464,517	1.59
Combination cars.....	2,769,677	2,841,521	71,844	2.53
Buggage, Mail and Express cars.....	45,327,370	40,816,347	2,511,023	6.15
Total Passenger cars....	139,842,491	135,938,795	3,903,696	2.87

FREIGHT.	Year ended		Increase or Decrease.	
	December 31st, 1917.	December 31st, 1916.	Amount or number	Per Cent.
Loaded.....	617,479,662	642,075,295	24,595,633	3.83
Empty.....	245,513,721	280,078,704	34,564,983	12.34
Caboose.....	28,211,955	28,799,621	587,666	2.04
Total Freight cars....	891,205,338	950,953,620	59,748,282	6.28

Passenger cars per Traffic Train Mile.....	Year ended		Increase or Decrease.	
	December 31st, 1917.	December 31st, 1916.	Amount or number	Per Cent.
Passenger cars per Traffic Train Mile.....	6.94	6.34	40	6.11
Freight cars per Traffic Train Mile.....	32.71	33.64	92	2.73

PASSENGER TRAFFIC.

	Year ended		Increase or Decrease.	
	December 31st, 1917.	December 31st, 1916.	Amount or number	Per Cent.
Passengers carried (earning revenue).....	15,462,176	15,468,449	6,173	.04
Passengers carried (earning revenue) one mile... per mile of road.....	1,480,023,872	1,358,587,541	121,436,331	8.94
Average journey per passenger.....miles	113,932	104,866	9,066	8.65
Average amount received per passenger.....\$	95.72	87.83	7.89	8.98
Average amount received per passenger mile...cts.	1.93	1.72	.21	12.21
Average number of passengers per train mile....	2.02	1.95	.07	3.59
Average number of passengers per car mile....	73.45	65.40	8.05	12.31
Revenue from passengers per passenger car mile...cts.	15.33	14.28	1.05	7.35
Total passenger train earnings per train mile.....\$	30.98	27.89	3.09	11.08
Total passenger train earnings per mile of road..\$	1.92	1.63	.29	17.79
Total passenger train earnings per mile of road..\$	2,973.92	2,617.25	356.67	13.63

FREIGHT TRAFFIC

	Year ended		Increase or Decrease.	
	December 31st, 1917.	December 31st, 1916.	Amount or number	Per Cent.
Tons of revenue freight carried one mile.....	14,675,266	14,833,064	5,694,798	0.3
Tons non-rev. freight carried one mile.....	1,496,088,000	1,570,474,664	14,286,637	95
Total tons (all classes) freight carried one mile.....	16,174,145,372	16,193,496,707	19,351,435	12
Tons of revenue freight carried one mile per mile of road.....	1,129,700	1,113,334	1,476	.13
Tons of non-rev. freight carried one mile per mile of road.....	115,170	116,580	1,413	1.21
Total tons (all classes) freight carried one mile per mile of road.....	1,245,084	1,249,914	4,818	1.9
Average amount received per ton per mile of revenue freight.....cts.	0.668	0.648	0.020	2.7
Average No. of tons of revenue freight per train mile.....	38.87	19.4	19.43	74
Average No. of tons of non-rev. freight per train mile.....	74.9	53.45	1.50	81
Average No. of tons (all classes) freight per train mile.....	593.78	772.87	70.93	16.6
Average No. of tons of revenue freight per loaded car mile.....	13.77	12.87	70	1.94
Average No. of tons of non-rev. freight per loaded car mile.....	4.	3.5	0.7	98
Average No. of tons (all classes) freight per loaded car mile.....	26.19	25.22	97	1.85
Freight train earnings per loaded car mile...cts.	16.59	14.83	1.76	11.87
Freight train earnings per train mile.....\$	3.76	3.37	39	11.57
Freight train earnings per mile of road.....\$	7,885.40	7,349.25	536.15	7.30

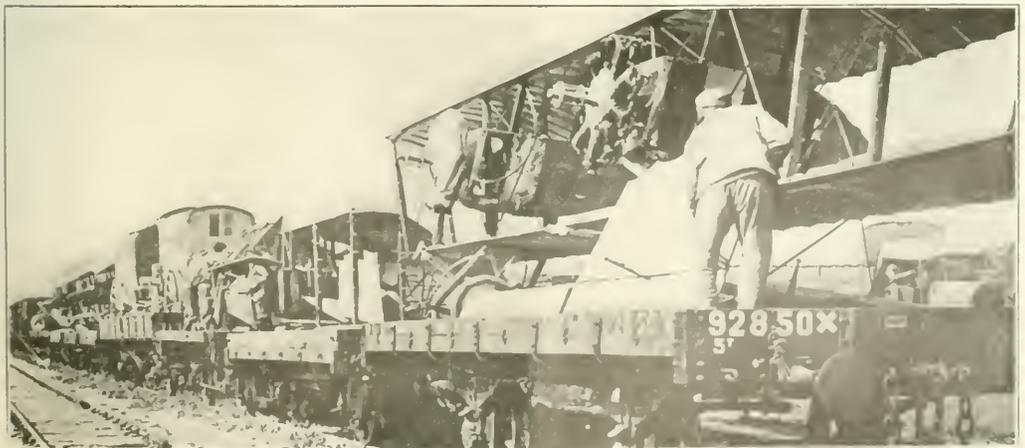
STATEMENT OF CANADIAN PACIFIC RAILWAY PENSION DEPARTMENT TO DECEMBER 31ST, 1917.

Balance to December 31st, 1916.....	\$609,887.95
Amount contributed by Company.....	500,000.00
Amount received as interest.....	37,566.91
Payment of Pension Allowances for year.....	\$1,147,454.76
Balance in Cash and Investments.....	\$890,307.76

NUMBER ON PENSION ROLL AT DECEMBER 31ST, 1917.

Under 60 years of age.....	48
Between 60 and 70 years of age.....	439
Over 70 years of age.....	362
Total.....	849

[Adv.]



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Sending Aeroplanes Back for Repairs

Railway Officers

Executive, Financial, Legal and Accounting

H. G. Strode has been appointed auditor of the Pittsburgh & West Virginia and the West Side Belt, with office at Pittsburgh, Pa., vice **F. J. Brummer**, resigned.

Operating

G. W. Nelson has been appointed superintendent of dining cars of the Northern Pacific, with headquarters at St. Paul, Minn., vice **H. J. Titus**, resigned to go into other business.

E. L. Gamble, general agent of the Western Pacific at Stockton, Cal., was appointed manager, in charge of operation and traffic of the Tidewater Southern, with same headquarters, succeeding **W. C. Peck**, resigned.

A. D. Parsons, assistant superintendent of terminals of the Erie, with office at Jersey City, N. J., has been appointed superintendent of the Wyoming division, with headquarters at Dunmore, Pa., succeeding **J. W. Foote** who is now in the United States service in the engineering department.

F. A. Rutherford, trainmaster of the Grand Trunk, with office at Durand, Mich., has been appointed inspector of transportation, with headquarters at Montreal, Que., and **T. J. Wrennich** has been appointed superintendent of terminals, with office at Black Rock, N. Y., in place of **T. W. Saunders**, resigned to take service with another company.

E. L. Wise, trainmaster of the Louisville & Nashville, has been promoted to assistant superintendent with headquarters at Ravena, Ky.; **J. H. Fish**, assistant trainmaster of the same road at Earlington, has been promoted to trainmaster, succeeding **Mr. Wise**, and **Steve Mothershead**, general yardmaster at Earlington will become assistant trainmaster.

Traffic

William Fitzgerald, assistant general freight agent of the Chesapeake & Ohio, the Chesapeake & Ohio of Indiana and the Chesapeake & Ohio Northern, with office at Chicago, having been transferred to Richmond, Va., in the same position, **H. P. Hathaway** will, in addition to his duties as general agent of the Kanawha Dispatch and the Blue Ridge Dispatch Fast Freight Lines, act as general agent of these companies; effective March 15.

Engineering and Rolling Stock

C. S. Henning has been appointed chief engineer of the New Mexico Central, with office at Santa Fe, N. M.

T. Devaney has been appointed master mechanic of the Toledo, St. Louis & Western, with office at Frankfort, Ind.

W. C. Pembroke, assistant engineer of the Coal & Coke, with office at Elkins, W. Va., has been appointed engineer maintenance of way, vice **W. C. Hawkins**, resigned.

Thos. B. Dickerson has been appointed acting superintendent of shops of the Central of New Jersey, with office at Elizabethport, N. J., vice **G. L. Van Doren**, resigned.

A. R. Eitzen, formerly chief engineer in the bridge department of the Kansas City Terminal, and more recently with the Kansas City Bridge Company, has been appointed bridge engineer of the Missouri, Kansas & Texas, with headquarters at Dallas, Tex.

J. W. Peck, signal supervisor of the Missouri, Kansas & Texas, with headquarters at Waco, Tex., has been appointed general signal inspector, of the Chicago Great Western, with office at Chicago, succeeding **W. J. Mullins**, who has entered government service. **J. A. Murrell**, signal foreman, has been appointed supervisor to succeed **Mr. Peck**.

E. E. Goddard has been appointed supervisor of signals of the St. Louis division, of the Illinois Central, with headquarters at Carbondale, Ill., succeeding **P. G. Pendorf**, who

has resigned to accept a position with the sales department of the Buda Company, with headquarters at Chicago. **A. H. Keller** was appointed supervisor of signals, with headquarters at Champaign, Ill., to succeed **R. J. Frost**, resigned. The above changes were effective March 16.

R. N. Clark, assistant engineer on the Missouri Pacific, has been promoted to assistant engineer in the office of the engineer maintenance of way, at Kansas City, Mo., succeeding **C. A. Hewes**, who becomes assistant engineer of the Kansas City Terminals. **E. H. Hawkins**, assistant engineer of the South Kansas division, with headquarters at Coffeyville, Kan., has been transferred to the North Kansas division, succeeding **Mr. Clark**. **R. H. Hallsted**, assistant engineer of the Kansas City Terminal, becomes general roadmaster of the Omaha division with headquarters at Falls City, Neb., succeeding **C. O. Congdon**. **R. P. Hayes** has been appointed assistant engineer of the Joplin division and **Mr. Freeland** has been appointed assistant engineer of the South Kansas division, succeeding **Mr. Hawkins**.

Purchasing

Thomas Spratt, assistant purchasing agent of the Norfolk & Western, with office at Roanoke, Va., will perform the duties of purchasing agent.

Railway Officers in Government Service

C. A. Lahey, assistant general freight agent of the Chicago, Milwaukee & St. Paul at Chicago, has been appointed assistant director of transportation of the Food Administration, with headquarters at Washington.

F. A. Bushnell, purchasing agent of the Great Northern, has been appointed a member of the western regional purchasing committee, in place of **Ira O. Rhoads**, of the Southern Pacific.

Obituary

W. L. McWhirter, division freight agent of the Atchison, Topeka & Santa Fe, Texas Lines, with headquarters at Fort Worth, Texas, died in that city on January 7.

C. J. Kulp, treasurer of the Lehigh Valley, with office at Philadelphia, Pa., died at his home in that city on March 23 at the age of 55. He was born in Philadelphia, and entered the service of the Lehigh Valley in 1887 as a clerk in the accounting department. In 1910 he became assistant treasurer, and since 1915 had been treasurer of the road.

Francis Fisher Flagg, first vice president of the American Express Company, and president of the National Express company, with office at New York, until his resignation on March 1, 1918, because of ill-health, died on March 26, at his home in Pelham Manor, N. Y., at the age of 67. **Mr. Flagg** was also a Director of the Westcott Express Company.

S. C. Stickney, assistant to vice-president of the Erie, with office at New York, died on February 20, at his home in Englewood, N. J. He was born in 1865, in Minnesota, and began railway work in 1886 as locating engineer on the Chicago, St. Paul & Kansas City, now the Chicago Great Western. From 1894 to 1909, he was general manager of that road, and from September 1905, to March 1909, also second vice-president. He later engaged in special work under the vice-president of the Erie and at the time of his death was assistant to vice-president of that road.

Sir Collingwood Schreiber, for 12 years chief engineer of the department of railways and canals of the Canadian government and for several years before that chief engineer of the Canadian Pacific, died at Ottawa on March 23. He was born in Essex, England, on December 14, 1831. He came to America in 1852, and his first railroad service was as assistant engineer on the Hamilton & Toronto, now a part of the Grand Trunk. This was from 1852 to 1855. In 1860-1862 he was superintending engineer of the Northern Railway, Canada; in 1873 was appointed chief engineer of the Canadian Government Railways, and in 1880 became chief engineer of the Canadian Pacific. From 1893 to 1905 he was deputy minister and chief engineer of the Department of Railways and Canals. He had also served as superintendent of construction on the Grand Trunk Pacific.



FIGHT

OR

BUY BONDS

THIRD
LIBERTY LOAN

Howard Chandler Christy, 1917

EDITORIAL

Railway Age

EDITORIAL

Announcement of the opening of the third Liberty Loan campaign will be found elsewhere in this issue. It is vitally

Third Liberty Loan Campaign

important that the campaign be a striking success in order to encourage and back up our boys on the other side who are rushing into the thick of the fight. It is necessary also in order to discourage and wipe out the insidious German propaganda which is tirelessly at work throughout our nation. That the loan will be a success is assured by the businesslike and thorough way in which our people as a whole are planning for the campaign. One evidence of this may be found in our advertising pages. At a time when advertisers would naturally want to use their space for telling of the advantages of their equipment and devices, they have used this space fully and generously in order to advertise and push the loan. Let each one of us do our full duty in making the campaign a big success.

The present issue of the *Railway Age* is devoted largely to reviewing the developments in the railway and the railway supply field during the first three months of 1918, and is therefore called a "Quarterly Review Number." We have believed that developments are occurring so rapidly that it is worth

The Quarterly Review Number

while to make a survey of them at shorter intervals than has been our custom in the past. But the issue is not devoted entirely to review matter. Rather, it is devoted to an attempt to project the developments of the quarter of a year just closed into the future largely as a means of estimating where prevailing tendencies are carrying us. Both the officers of railways and those of railway supply companies have under present conditions more difficult problems to solve than they ever have had before. Full, frank, fearless discussion of these problems and presentation of the facts bearing upon them is essential to their proper solution; and the reader, whether railway or railway supply man, will, it is believed, find in the present issue many facts and much discussion which will be of interest and value to him.

This week's issue of the *Railway Age* is in two sections. The first section is a quarterly review of affairs in the railway world; the second is a discussion of the effect which the political and economic events of the last few months have had on investment securities.

The Investment Economist Section

While, of course, somewhat the large part of this discussion deals with railway securities, the broad field of corporation, municipal and national investment securities is included in the scope of the paper. The

new section is devoted to the science of the utilization of wealth as capital. The distinction between wealth and capital is that capital is wealth used to produce more wealth. Idle wealth is not capital. There are a number of millions of people in the United States who made the first investment of their lives in one or other of the Liberty Loan offerings. It may well be that the motive leading to this investment on the part of a large number, even a majority of these subscribers was patriotism rather than a desire to save and to utilize their savings as an investment. Nevertheless, whatever the initial motive may have been, the fact is that these people are now investors; they have been given a taste and a new appetite has been created.

While the war lasts, this appetite will be fed almost exclusively by the sale of government bonds. With the end of the war will come a cessation of government offerings, and the stimulus of patriotism as an incentive to investment will be withdrawn. It would be a national calamity, however, if the capacity for saving and investment created under war conditions was allowed to die out in peace times for lack of stimulation. The public's interest in saving and investment must be sustained. It will be the object of the Investment Economist section of the *Railway Age* to help arouse this public interest, to strengthen it and educate it while the war lasts and to try to maintain it after the war ends.

Railroad Supply Industry and the Government

THE RAILROAD SUPPLY INDUSTRY is one of the largest industries in America. It has been built up to its present magnitude to make and furnish equipment, devices and supplies of all kinds to railways. It represents an investment of billions of dollars. The securities of the numerous companies composing it are held by people throughout the United States. It has large and small manufacturing plants scattered all over the country. It is estimated that it normally employs a million and a half men. So large and important an industry is entitled to demand and to receive fair treatment from the government. The public cannot afford to have the government treat it otherwise.

Reports from Washington are arousing great apprehension that the government does not intend to treat the railway supply industry fairly or intelligently or to the best advantage of the government. The Railroad Administration has made the specifications of the locomotives and cars; it is preparing to order wide enough open to give all the manufacturers of the various kinds of specialties with which they are to be equipped a chance to bid for business. That is a fair and sound policy. But, this having been done, the Railroad Administration's purchasing department called the makers of locomotive and car specialties to Washington this

week, and asked them, in bidding for business, to relinquish their patents, to forego their royalties on patented devices, and to lay before it all their cost accounts. The apparent purpose is to force the prices the government must pay down to the lowest possible basis.

Twelve years ago the government passed the Hepburn railroad rate regulation act, and began to pursue the policy of forcing railway rates down to the lowest basis it could without having the courts hold them confiscatory. Everybody knows the results. Railroad credit was destroyed; railroad expansion was stopped; in the midst of the greatest of all wars, transportation facilities have proved entirely inadequate to the country's needs; and because of the government's own stupid, restrictive, destructive policy it has had to take control of railroad operation and guarantee the financial return of the railways for the period of the war.

The railway supply industry has suffered greatly for ten years from the government's restrictive policy in dealing with its market, the railways. Does the government now intend to go still farther, and, by directly attacking the railway supply industry itself, complete the destruction of its prosperity? Is it so well pleased with the results of its regulation of railways that it considers it desirable to apply a like policy to a related industry? Does the public think the government's methods in regulating the railways have conferred such great benefits upon the nation that it will hail with satisfaction the prospect of the prescription of the same medicine for a very important part of the manufacturing industry?

What would the pooling of patents and the renunciation of royalties upon patented devices mean? The railway supply companies always have done business under conditions of intense competition. When, in a highly competitive field, a concern succeeds in developing and securing a substantial market for a patented device, that is an almost infallible sign that the device has merit in proportion, or more than in proportion, to the prices for which it has been sold. If a device has been worth to the railways what it has been sold to them for under private control, it must be worth an equal amount to them under government control. If so, how can the government, under government control of railways, fairly use its monopoly power to beat down the prices of railway supplies? To do so would be to deprive numerous companies of profits to which they are entitled by virtue of the enterprise and the ability which have been shown in their management. How does the government expect supply companies to forego their royalties? The various companies are under contract to pay the royalties to the inventors of the devices; and these contracts can not be abrogated without the consent of the inventors.

The officers of the railways of America deserve the highest praise for the receptiveness they have always shown to new devices the adoption of which would promote the technical development of the railroad machine. But the greater part of the work of originating and developing new and improved devices, whether parts of track, or signalling apparatus, or rolling stock, has been done by the railway supply concerns. They have taken commercial risks in carrying on this work; they have met with innumerable failures as well as successes; and every failure has meant loss of capital to them.

Their only incentive in carrying on this work and taking these risks has been the prospect of profit. To the enterprise and initiative of railway owners and managers, and of railway supply company owners and managers, the American public owes the fact that today our railways are able to handle traffic cheaper, while paying higher wages than any other railways in the world. The partial withdrawal of the incentive of prospective profit has stopped the expansion of our railroads. The withdrawal of the same incentive from the railway supply business will speedily interfere with the technical development of our railroads. Unfair and arbitrary treatment of the supply companies by the government will also speedily affect adversely the welfare of every community in which their plants are located and that of all their employees, as well as of their stockholders. It will be economically harmful as well as morally wrong.

It is hard to believe that Director General McAdoo will finally carry out a policy such as now seems to be contemplated. Such a policy would be highly inconsistent with what he said to George A. Post, president of the Railway Business Association, as reported in the *Railway Age* of March 15, 1918, page 559. The railway supply interests should recognize the fact, however, that it is high time for them to strongly organize to protect their interests. They are engaged in an absolutely legitimate and extremely important business, a business whose efficiency and prosperity is just as important to the nation during the war as that of mining coal, or farming, or operating a railroad. They should go as far as the government can reasonably ask in co-operating with it and subordinating their interests to those of the public, but they should not surrender rights which other essential industries are not being asked to surrender, and the surrender of which might mean not merely temporary adversity for the supply industry, but a permanent loss to the industrial efficiency of the country. They should not, in a moment of panic, give up what the government cannot, without a gross and indefensible abuse of power, exact.

Will Aircraft Conditions Be Repeated on the Railroads?

THE NATION'S AIRCRAFT production program has come in for a great deal of notoriety during the last two weeks because of the disclosures in the Senate relative to the extravagant statements appearing in the captions of some photographs of aircraft production issued by the Committee of Public Information. It is apparent that the results so far obtained in the production of aircraft are exceedingly inadequate. After a year of nominal warfare the net result of all the planning and promises of enormous quantity production is practically nothing. Whatever contributing causes there may be to this situation, it is evident that the scheme of standardization which found expression in the so-called Liberty motor has failed to accomplish the result for which it was adopted, i. e., enormous and rapid production of effective aircraft. Indeed a suspicion is beginning to be voiced that not enough advice was sought from expert air men and too much from engine builders when the standardization scheme was formulated.

The director general of railroads has now had the task of supervising the operation of the railroads of the United States for three months. In that short space he has formulated a plan for an innovation in railroad practice which had never before even been seriously discussed by men in the business—the general standardization of locomotives. The director general, who is also secretary of the treasury and holds several other important offices, is a very capable but a very busy man. It is inconceivable that he can have given more than superficial consideration to some of the many matters of vast import of which he has the duty of final settlement.

The standardization of locomotives is a plan all of the advantages of which appear on a superficial inspection. Indeed, they are readily grasped by the public mind, just as was the standardization of aeroplane motors. But begin to study the whole bearing of such a plan, not on production of locomotives or first cost alone, but on the whole problem of railroad transportation, and the apparent advantages rapidly disappear. The locomotive is no more a machine complete in itself than is an aeroplane motor without the rest of the aeroplane. It is but one part of a vast and complicated instrument with all the other parts of which it must mesh if the whole is to function smoothly and produce the kind of results that ought to be produced now. And on every railroad the relation of all these parts is different. But apparently an attempt is to be made to force the same set of standard locomotives into all of these different machines and make the rest of the parts strain themselves into conforming shape.

It now appears possible that conditions similar to those apparently existing in the case of aircraft production may soon exist in the case of the railroads. One of the great needs of the railroads is locomotives; they need them immediately and they need all and more than they can get—not next year, but before next winter. With space soon to become available in the plants of the builders, the standard locomotive designs are not yet in final shape and today there have been no orders placed for material by the builders for use in building locomotives ordered this year. After all the details for the standard locomotives are finally settled there still remains a large amount of work to be done by the builders before production can begin; there are patterns, templates and formers to be made and castings to be secured, and there is a variety of material to be secured in a market already plentifully affected by priorities. Before production can be started, the builders are confronted with all the preliminary work required on a number of entirely new classes of locomotives equal to the number of standards finally settled upon. From now on every day of delay is piling up a loss of locomotive production which will soon overcome any possible advantage of production offered by the standardization plan. If orders for locomotives of designs already in service on the railroads in greatest need of additional power had been placed as soon as their requirements could have been canvassed, orders for material for much of the year's production might already have been placed and the builders assured of being able to take full advantage of every vacancy in shop space as it occurred.

The country needs this year locomotives to fit local con-

ditions, rather than an enormous production next year of wholesale locomotives which will not be well adapted to conditions anywhere.

Three Months of Government Control

FOR A LITTLE OVER THREE MONTHS the government has been making the most interesting and important experiment with public control of railroads which any government in the world has ever made with public control of any large industry. The general lines along which government control is going to be developed now seem to be pretty clearly defined.

The Railroad Administration in January, the first month of its existence, had unprecedented difficulties to overcome. The railways, and especially the eastern railways, were terribly congested when it took control, and the movement of traffic had been showed down to a portentous degree by government priority and preference orders. There were the uncertainty and confusion unavoidably incidental to any change of such importance; and the weather was as bad as was ever known. In consequence, the railways during the first month of control failed to earn enough to pay their operating expenses and taxes. The eastern lines did not even earn their operating expenses. This is the first time this has occurred since the Interstate Commerce Commission began to compile monthly reports of railway earnings and expenses in July, 1907.

In the matter of weather, the Railroad Administration was as peculiarly favored in February and March as it was disfavored in January. Some of the confusion and uncertainty incidental to the adoption of government control had passed. One of the first acts of the Railroad Administration was to set aside all priority and preference orders, and it adopted vigorously the policy of embargoing traffic which it did not wish to move over certain railways or which it thought it could not move at all. In consequence, the congestion on the eastern lines has been greatly ameliorated. Meantime, however, the car shortage has increased.

The railroad control bill has become a law, establishing a reasonable basis for compensating the companies for the use of their properties.

The Railroad Administration has handled the problem of passenger train service very skilfully thus far. It has reduced passenger train mileage, and at the same time so rearranged schedules as to render it possible for people to travel in reasonable comfort.

The Railroad Administration has dealt fairly and skilfully with the railway labor problem. Its Railroad Wage Commission has not yet made its report but it is understood the result will be advances in the wages of both organized and non-organized employees proportional rather to their needs and deserts than to the amount of fare it may be thought the different classes could put behind their demands. Arrangements are also being made by the creation of permanent conciliation boards to settle all questions regarding wages and conditions of employment as they come up.

The Railroad Administration is adopting, or appears to be adopting some other policies of more dubious character.

In standardizing freight cars it has done good work from the railroad point of view, and at the same time has left the specifications wide enough open to give most supply concerns a chance to bid for business. Its plans for the standardization of locomotives are far more questionable. Freight cars do and must go everywhere and be operated under every variety of conditions. On the other hand, the greatest efficiency in locomotive operation cannot be obtained unless locomotives are designed and built to be operated under special conditions. A locomotive designed and built to be operated everywhere will hardly be a highly efficient machine anywhere. Furthermore, no new type of locomotive ever works well at first. The government, by attempting to standardize locomotives, is making a dangerous experiment.

At the same time it is asking railway supply companies to relinquish their patents and forego royalties on them. There does not seem to be any more reason why the railway supply companies should have such a request made upon them than why any other class of business concerns should be asked to destroy the foundation upon which their business is built.

The director general is creating a new and very highly centralized organization in an effort to bring about the unified operation of all the railways as a single system. He has appointed able and experienced railway men to most of the important posts in his organization. He is, however, carrying centralization so far that he is depriving many important railway officers of initiative, while loading down his regional officers and the members of his staff in Washington with an amount of work which can hardly fail to un-

dermine their efficiency, if not break them down physically.

There is an evident tendency on the part of the director general entirely to sever the railway companies from the physical properties. In circular No. 16, issued on March 28, he orders that the presidents of the railroads shall in future be their operating executives under his direction, and that the chairmen of the boards and the directors shall exercise no functions connected with operation. In circular No. 17, issued on March 30, he directs that expenses incurred for corporate and financial purposes shall not be charged to operating expenses.

These orders raise some most interesting and important questions. Every railway does not have a chairman and also a president. Evidently on roads which do have both, the chairman of the board is to have nothing to say about operation, and is to get his salary, if he gets it at all, out of the company's guaranteed compensation. What about a road whose president performs both corporate and operating functions? Is he going finally to be required to choose whether he will devote himself exclusively to operating the property for the government, or exclusively to performing corporate functions for the company? If the chairmen are to have nothing to say about the operation of the roads, and if many presidents who have performed both corporate and operating functions are to cease to perform operating functions, it is evident that the government is going to lose the services of some of the ablest railway officers and that there is going to be a revolution of the railroad organizations far greater than was anticipated when President Wilson said to Congress, "Nothing will be altered or disturbed which it is not necessary to disturb."



Cent. Army Photo Service

Testing the Mechanism of an Allied Gun

First Three Months of Government Control

Policies Being Developed by Railroad Administration for Welding the Railroads Into a Single System

THE RAILROADS OF THE UNITED STATES have now been operated under the possession and control of the government, and under the administration of William G. McAdoo, as director general of railroads, for three months. During that time many important developments have taken place in the process of unifying and co-ordinating the roads into a single system and while the time has probably been too short to warrant any judgment as to the results obtained, ample opportunity has been afforded by means of the various statements and orders of the director general, and the various measures he has already adopted, for a study in a general way of the policies which he is inaugurating and some of the objects he is seeking to attain.

On the other hand, while a great many things have already been done under government control which could not have been done before and considerable progress has already been made toward substituting a centralized organization for the separate management that formerly existed, it is to be understood that only a beginning has been made, and many and perhaps some of the most important developments of the new regime are still under consideration and have yet to manifest themselves. Mr. McAdoo has already gone far enough to demonstrate that he does not intend to confine himself to mere supervision and a policy of supporting the separate railroad managements with the authority of the government, but he is building up an organization to operate the roads as a single system. While the railroad control law is expressly declared to be emergency legislation enacted to meet conditions growing out of the war, it is evident that the breadth of construction to be placed on such a declaration depends to a considerable degree on the assumption as to the duration of the emergency, and the policies already adopted and put into effect by the railroad administration clearly contemplate much more than a temporary status.

At the outset, after accepting the resignation of the Railroads' War Board, Mr. McAdoo appointed a temporary organization, consisting of five railway officers as advisers and assistants to him, with A. H. Smith in particular charge of operation in eastern territory. Later he effected a permanent organization, which has been described in these columns as it has developed, consisting of directors of divisions of finance and purchases, transportation, traffic, capital expenditures, labor and public service and accounting, a general assistant and a general council, and each of these departments has built up its own organization. Where the war board, in its organization, had divided the country into seven districts Mr. McAdoo created three districts, each under a regional director, and the regional directors have established organizations of their own. Numerous special committees have been appointed to carry on special investigations. In addition a vast amount of information has been called for by means of numerous questionnaires that have been sent out, so that a great deal of detail has been centered in the offices of the railroad administration at Washington. How much of this centralization and detail is attributable to the desire for obtaining information necessary for the inauguration of new policies and to what extent centralization will be made permanent has not yet been indicated.

Separation of Corporate Officers

One of the results of the new regime that has already become evident is a separation between the corporate affairs of the railroads and their operations. Railway officers that

have become members of Mr. McAdoo's organization have severed their connection with their railroads and by an order effective on April 1 the expenses of offices, including salaries, devoted to financial and corporate purposes as distinguished from operating affairs may no longer be paid out of operating revenues, but, to the extent that they are continued, will have to be defrayed by the corporations out of the amount paid to them as compensation by the government.

This is on the theory that the functions heretofore performed by such offices are now taken care of by the railroad administration, as far as their effect on operation is concerned, and that whatever else it is necessary for them to do is for the benefit of the corporation itself and not properly chargeable to operating expenses. This idea has been illustrated by the analogy of a landlord, who, having rented his property, naturally pays his own operating expenses from his rental income.

There have also been persistent reports, as yet entirely without confirmation, that the process of centralization will finally be developed much further, in the effort to reduce "overhead" and that the functions of many general and executive officers will be absorbed in a centralized organization.

After the decision had been reached to take over the railroads under the President's war power and the law of August 29, 1916, it was considered necessary to act at once, both because of the seriousness of the railroad situation existing at that time and because of the opportunity to make the change effective for accounting purposes with the opening of the new year. Although it is understood that the change was contemplated as early as the first part of November, the director general took charge of the railroads with little opportunity for preparation or for the formulation of policies in advance yet with a great many problems pressing for immediate solution.

Mr. McAdoo acted with characteristic promptness in dealing with the emergencies that existed, while perfecting an organization to carry out the purposes for which the roads were taken over. Orders were immediately issued to the railroads to disregard competitive conditions and to move freight by the shortest routes. Drastic reductions were made in passenger service. Demurrage rates were increased to a scale ranging from \$3 to \$10 and instructions were issued to embargo shippers who would not load and unload cars promptly. Embargoes were issued on some of the principal eastern lines against practically all freight except food, fuel and munitions, and to a considerable extent local embargoes were placed on other lines.

For the entire month of January unprecedentedly severe weather was experienced and for a time the activities of the railroad administration and the individual railroad managements were concentrated almost exclusively on keeping the railroads open sufficiently to handle the most essential business. With the improvement of weather conditions there has been an enormous improvement, the most pressing emergencies have been met and congestion on the eastern lines has been relieved to such an extent that operating conditions are now on an approximately normal basis. This improvement has given further opportunity for the development of more permanent policies and the past month has witnessed a considerable development of the permanent organization.

In a general way the objects which Mr. McAdoo has in

mind may perhaps be best explained by his statement before the Senate and House committees in January, during their consideration of the railroad control bill, regarding the reasons which impelled the administration to take over the railroads. Mr. McAdoo said:

Mr. McAdoo's Purpose

"The administration was confronted with the necessity of taking an extraordinary step to solve an extraordinary transportation problem. What I have already said has emphasized some of the controlling needs which could only be met by putting the power of the government back of railroad operations. The absolute co-ordination and, as far as necessary common use of all railroads and their rolling stock regardless of any private interests; the entire disregard of established routes for the movement of traffic when other routes would insure more or quicker service; the necessity for economy in the use of labor and material so as to do all that might be necessary for transportation with the least drain on the country's other demands for labor and material; the need for insuring the supply of capital necessary, notwithstanding the impaired credit of many railroads; the co-ordination of the government demands for priority in shipments—impossible under private railroad management; the absolute necessity for assuring railroad labor that its just demands would be met without necessity for strikes or threats of strikes. All these things and others which I shall not attempt to enumerate made it imperative that the government should, without delay, assume possession and control of the railroads as a war measure. It did this, and thereby brought into existence full governmental power to readjust methods of railroad operations and the currents of railroad traffic absolutely regardless of the interests of any particular railroad company or of any private or selfish interest.

"This extraordinary step being necessary, it was essential that it should be taken in a manner calculated to help rather than to hurt a financial situation of fundamental importance. Such action was calculated to cause the gravest disturbance to the whole financial structure of the country unless unquestioned assurance could be given by the government of an adequate protection to the holders of railroad securities, representing something like \$16,000,000,000 in bonds and stocks. Even in time of peace the public interest would have made it highly important to avoid any such financial disturbance, but in the present war, when success cannot be achieved without the raising of unprecedented amounts of capital, it would have been unthinkable and self-destructive for the government in taking over the railroads to do so in such a way as to disturb rather than reassure the general financial situation."

Car Service

Common use of the rolling stock of the roads was attained to a considerable extent under the direction of the Railroads' War Board, and its subsidiary, the Commission on Car Service, which ordered cars from one road to another in accordance with the demands of traffic. Under government control this process has been carried further. The Commission on Car Service has been reorganized as the Car Service Section of the Transportation Division of the Railroad Administration and has charge of all matters pertaining to car service, including the re-location of freight cars as between individual railroads and regions. Its control over car distribution is more direct than it was before for the reason that there is no longer any incentive to consider the interests of individual roads, and the managements of the individual roads are no longer required to consider the effect on their earnings.

One of the first matters to which Mr. McAdoo directed his attention was the possibility of eliminating unnecessary ton miles by re-routing traffic on the principle that the railroads

are being operated as a national system of transportation. Solicitation was discontinued and in his first general order he declared that all terminals, ports, locomotives, rolling stock and other facilities are to be fully utilized to carry out this purpose without regard to ownership; that the designation of routes by shippers is to be disregarded when speed and efficiency of transportation service may be thus promoted; that contract agreements between carriers must not be permitted to interfere with expeditious movements; and that through routes which have not heretofore been established are to be established and used whenever expedition and efficiency of traffic will thereby be promoted. The purpose has been to avoid as much as possible the use of circuitous routes by which a great deal of freight has been moved as the result of solicitation by individual carriers and at the request of shippers in order to obtain the benefit of differential rates. Railroad officers were requested to make every possible effort to move traffic by the most convenient and expeditious routes, and this policy has been carried out thus far mainly as directed by the regional directors and by the staff of the Railroad Administration as opportunity has presented itself in particular cases.

Re-Routing

However, committees have been appointed by the regional directors to make studies of the possibility of securing the most economical and efficient routing of freight in their territories and a general traffic investigating committee to study and make recommendations on the entire subject has been appointed by Mr. McAdoo, with B. L. Winchell, traffic director of the Union Pacific, as chairman, and George F. Randolph, the commissioner for the lines in Official Classification territory, and T. C. Powell, vice-president of the Southern Railway, as the other members.

It is essential, to secure the best operating results, that traffic shall be sent over the shortest line between the point of origin and the point of destination, provided the short line is not overloaded. If the shortest line is congested, traffic should be routed over the shortest line that is open. The policy of the Railroad Administration is to bring about a distribution of traffic over all lines in proportion to their capacity. The difficulty of effecting a readjustment of the traffic currents has been greatly complicated by the fact that most of the lines in the eastern part of the United States have been carrying nearly their full capacity, and in many cases have been attempting to handle more freight than could be satisfactorily handled and there have been few lines sufficiently open to permit the diversion of a great deal of freight to them from other lines. The committees that have been working on this problem are still engaged in their investigations and have thus far only submitted tentative reports, although something has been accomplished by diverting traffic from circuitous routes into more direct channels.

Capital Expenditures

In order to effect economy in the use of labor and material in view of the demands for them for other purposes than transportation the director general, through the Division of Capital Expenditures, has undertaken a survey of the requirements of the roads in the way of improvements and extensions and the budgets submitted by the roads are being studied to the end that only the most essential work shall be undertaken. Without government control a railroad that was financially able to do so might have expended money, labor and materials on a project fully warranted from its own standpoint but which, from the standpoint of military necessity or of the public interest in general, might better have been used on some other road. Under the policy adopted the Railroad Administration will have the decision as to where the expenditures shall be made.

The policy of the Railroad Administration as to capital

improvements has been outlined in General Order No. 12 issued on March 21. In determining what additions and betterments, including equipment and road extensions, should be treated as necessary, the following principles are to be followed. From the financial standpoint it is highly important to avoid the necessity for raising any new capital which is not absolutely necessary for the protection and development of the required transportation facilities to meet the present and prospective needs of the country's business under war conditions. It is likewise highly important that the available supply of labor and material shall not be absorbed except for the most necessary purposes.

Railroads are also asked to bear in mind that projects which might be regarded as highly meritorious and necessary when viewed from the separate standpoint of a particular company may not be equally meritorious or necessary under existing conditions, when the facilities heretofore subject to the exclusive control of the separate companies are available for common use whenever such common use would promote the movement of traffic.

Robert S. Lovett, formerly chairman of the executive committee of the Union Pacific, has been appointed Director of the Division of Capital Expenditures and has organized a staff of assistants. To him have been referred budgets prepared by the individual railroad companies outlining their ideas as to necessary expenditures for the year. For the eastern district a sub-committee of engineers has been appointed to go over these estimates for the purpose of making recommendations.

General Order No. 12 also provided that the construction of new lines or branches or extensions of existing lines shall not be entered upon or contracted for and that no new locomotives or cars shall be ordered or contracted for without the approval of the director general. Work contracted for or actually commenced prior to January 1, 1918, and unfinished may be continued until further order except in so far as in the judgment of the carrier it may be possible to discontinue or curtail it without substantial loss. Work involving a charge to capital account in excess of \$25,000 shall not be contracted for or commenced unless it conforms to the general policy as to necessity, and unless it has been authorized by the director general. Other work which does not involve charges to capital account in excess of \$25,000 may be contracted for and commenced without approval, provided it conforms to the general policy as to necessity and also falls clearly within the policy of the particular carrier as that policy has been applied in practice during 1916 and 1917. However, a report regarding work involving between \$5,000 and \$25,000 is to be made in duplicate to the director of the division of capital expenditures and to the regional director.

Where minor capital expenditures are needed to establish new connections for the better use of terminals the regional directors have been authorized to endeavor to get some or all of the interested companies to arrange therefor by voluntary action and to refer to him cases of expenditures which cannot be so arranged.

As an example of the policy of the Railroad Administration, the work of track elevation at Indianapolis, which was half completed, was held up until the director general had assigned Interstate Commerce Commissioner Harlan to make a report on it. On the commission's recommendation an order was issued permitting the work to be completed in a modified form. Also the city council of Chicago, which was prepared to recommend track elevation work at Chicago to cost about \$5,000,000, has been requested by the director general to defer further consideration of the work until the conclusion of the war.

Regarding passenger service the policy of the administration is to curtail the number of trains to the minimum necessary to afford ample accommodations for necessary

travel while discouraging unnecessary travel. In England passenger fares were increased 50 per cent to discourage travel. It is understood that Mr. McAdoo felt that a policy of increasing fares would have little effect in this country in discouraging unnecessary travel while in some cases it would impose a hardship on persons obliged to travel and that a more effective plan would be to reduce the service to a degree approaching discomfort. The purpose of reducing passenger service is to conserve the use of fuel, labor, locomotives and shop capacity for freight service but Mr. McAdoo has insisted that due consideration shall be given to the public convenience and, for the purpose of avoiding the local antagonism which might arise if such matters were decided by the railroad managements, he has ordered that questions of train service and similar matters be referred to him for decision. His idea is that policies which substantially affect the character of the service rendered the public or the rights of the public will be more readily accepted if he, as the direct representative of the government, has the deciding voice, than if they are decided upon by railroad men themselves.

Passenger Service

Mr. McAdoo expects that a considerable reduction of train service may be effected without any reduction of the available accommodations for the public by eliminating duplications of service resulting from competition. A rearrangement of the Chicago-St. Louis passenger service was put into effect, reducing the number of trains from 15 to 9 while giving the public approximately the same number of times in the day when trains are available. Studies have also been made of the possibility of similar rearrangement of service between other large cities where the various competing roads have maintained competitive schedules.

Another policy regarding passenger service has already been put into effect by the consolidation of city ticket offices at Washington, D. C., and Atlanta, Ga., thereby effecting a considerable saving in rentals while affording the advantages of a centralized location; and studies are being made of the possibility of making similar changes in other cities.

Priority in Transportation

Co-ordination of the government's demands for priority in transportation which had so much to do with causing the congestion on the eastern roads during the latter part of 1917, was one of the first problems with which the Railroad Administration was called upon to deal. As a first step all priority orders were abolished and a plan was worked out by the Traffic Division by which experienced traffic officers have been placed in the War and Navy departments, the Shipping Board and the Food and Fuel Administrations, reporting to the Traffic Division, for the purpose of co-ordinating the traffic needs of these various departments. A new plan of ordering preferential shipments on government account has also been put into effect, superseding the old "blue tag" system.

Wages and Labor

The policy of the administration regarding wages was made evident within a very short time after the government had taken over the railroads. At that time the brotherhoods representing the firemen and hostlers, the conductors and the trainmen, had pending demands for a considerable increase in wages which had been formally declined by the railroads, who had placed the entire question in the hands of President Wilson. Other classes of employees also had various demands pending and the railroads had made numerous settlements during the year which had to some extent increased the wages of the lower paid classes of employees. However, the cost of living had been steadily increasing and the railroads were having great difficulty in retaining ex-

perienced men in their service in competition with the munitions plants and other industries. Mr. McAdoo, therefore, let it be known that the government intended to increase wages to a point which would represent recognition of the higher cost of necessities and bring about a greater degree of contentment on the part of railway employees, and he appointed a Railroad Wage Commission to investigate the entire subject of railway wages and make a report to him for his action.

In order to obtain the benefit of the effect on the spirit of the employees at a time when most of them were being called upon for special exertion it was promised that any increases awarded would be effective as of January 1. The wage commission held public hearings at which representatives of all classes of employees were given an opportunity to present their requests but the investigation has not been conducted as an arbitration proceeding and boards of statisticians and examiners were appointed to aid the commission in a determination, from a study of the available facts and statistics, of what would be a fair adjustment of wages. The commission has now practically completed its work and will shortly render to Mr. McAdoo a report recommending general increases which will aggregate several hundred million dollars. Pending action on the report of the commission, Mr. McAdoo has told the railroads that there ought to be no radical change in existing practices without submitting the matter to him for approval, and that no interruption of work should be allowed because of any controversies between employers and employees.

Mr. McAdoo has adopted a conciliatory policy toward labor and is apparently endeavoring to iron out some of the causes for friction between the officers and employees. He has appointed a labor representative, W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, as a member of his staff to give special attention to labor problems, and permanent wage boards will be organized to adjust questions affecting labor which may arise after the wage commission has rendered its report. Mr. McAdoo has had frequent conferences with representatives of labor organizations and recently reached an agreement with the officers of the railway employees' department of the American Federation of Labor regarding working conditions in the mechanical department for the purpose of meeting the emergency as to locomotive repairs.

Financial Assistance

The first step toward rendering financial assistance to a railroad was taken on March 27 when the director general, after many conferences, agreed to advance \$43,964,000 to the New York, New Haven & Hartford to protect its maturing note issue. While it is expected that most roads will be able to take care of such requirements it is the intention to give such assistance as may be necessary, either by the purchase of securities by the government, or from the revolving fund consisting of the \$500,000,000 appropriation and any surplus earnings above the guaranteed compensation, which fund is also to be available for expenditures for improvements. It is also contemplated that advances may be made under the terms of the War Finance Corporation bill.

Purchases

As far as purchases of materials, supplies and equipment for the railroads are concerned, the policy of the administration contemplates a considerable degree of centralized supervision but, for the present at least, by no means complete centralization. All purchases of locomotives, cars and rails are to be made directly through the office of the director of purchases and he will be assisted by an advisory committee of three experienced railroad purchasing agents, who will formulate plans for the co-ordination and supervision of rail-

road purchases. There are also three regional purchasing committees which are to give consideration to the opportunities for standardizing and consolidating purchases of every kind that may admit of such treatment, with a view to increasing efficiency and economy.

Most supplies needed for current operations will be purchased, at least for the time being, through the purchasing departments of the respective roads, but all contracts for periods of six months or longer must be approved by the regional committees before completion. Information as to prices paid will be furnished monthly by all roads to the regional committees so that they may be compared and checked and full statistics as to prices will be exchanged between the regional committees and the central committee for comparison and checking. This will naturally tend to promote standardization.

Standardization

Mr. McAdoo believes that he has inaugurated an important reform by the adoption of standard designs for cars and locomotives, which will reduce their first cost and also make it possible to build them more quickly. Very early in his administration he called on committees of car and locomotive builders to submit standard designs and these were later referred to a committee of mechanical officers, appointed by the regional directors, with H. T. Bentley, mechanical assistant in the transportation division as chairman. After revisions suggested by the railroad committee the designs and specifications were approved by the regional directors and by the director general, after which they were turned over to the builders and bids were asked on March 25. It is understood that 100,000 freight cars will be ordered. The locomotive designs are also practically approved and a conference between the central advisory purchasing committee and manufacturers of specialties was held at Washington on Monday of this week.

Considerable apprehension had been aroused among both railroad men and the supply interests during the progress of the work on the standard designs lest the standards adopted should be so rigid as to exclude many patented devices and tend to discourage improvement; but when the car specifications were finally issued they were found to be along broad and rational lines. It is understood that the locomotive designs are equally liberal.

It is also expected that purchases of railway supplies and materials under government control will show a considerable increase over those of recent years, and Mr. McAdoo has indicated that his policy will be to keep the door open for giving full and fair trial to new and improved devices.

Railway Organizations

In General Order No. 6, issued on January 28, the director general ordered that railway operating revenues should not be expended for the payment of persons or agencies constituting associations of carriers unless such association is approved in advance by the director general.

This at once raised a question as to the status of a host of railroad committees and organizations of various kinds, such as the American Railway Association and the various operating associations that report to it, the traffic associations and such organizations as the Railway Mail Pay Committee, the Railway Executives' Advisory Committee and the Bureau of Railway Economics. Many of these bodies applied to the director general for approval, giving a description of their purposes and functions and the amount of their expenses; and the subject was turned over to C. A. Prouty, director of public service and accounting, for investigation. Pending a decision the various organizations were given letters authorizing them to continue until April 30, after which it is expected that some of them will be told that if they are to be continued they will have to be sup-

ported out of corporate funds rather than from operating revenues, while others will be continued and others will be consolidated.

The general policy is that only those associations whose work is considered necessary to the operation of the railroads as a system may continue to have their expenses charged to operating expenses. Order No. 6 also provided that operating revenues shall not be expended for the payment of agents or other persons employed in any way to affect legislation, for the employment of attorneys not actually engaged in the performance of necessary legal work, or for political purposes or to influence any election. In accordance with this order the office of the general counsel of the Railroad Administration has been holding conferences with the representatives of the legal departments of various companies arranging for a readjustment and a considerable reduction of expenses in the legal department. A considerable number of lawyers, whose chief function has been to represent the companies before legislatures and Congress, will be dropped from the payroll.

Rates

One of the principal sources of difference encountered during the consideration of the railroad control bill in Congress was the question as to the power of the President, or rather of the director general acting for him, to make rates.

Mr. McAdoo took the position before the bill was passed that the President undoubtedly had the power to control rates during the time of federal possession, on the theory that the Interstate Commerce Commission had no power to regulate the President in the exercise of his war powers; and that he ought to have the power, but that it ought not to be exercised except in such cases as may be necessary in the public interest. There was much opposition to any curtailment of the powers of the Interstate Commerce Commission and, as the law was finally passed, it authorized the President to initiate rates and to put them into effect, subject to the final authority of the commission, which was required to take into consideration the circumstance of federal control and a certification of the President that higher rates were necessary.

Even this compromise has not entirely satisfied the shippers, because rates initiated by the administration may go into effect at once without a hearing or a suspension and they have been considerably concerned, according to reports, for fear that arbitrary action will be taken. Mr. McAdoo indicated, however, in his testimony before the Congressional committees, his opinion that it would be very unwise for him to undertake to pass upon rate questions except in a general way and that the judgment of the Interstate Commerce Commission ought to prevail except in so far as it might be wise for the President to modify it. It is generally expected that he will consider it necessary to ask for a general increase in rates to meet increased expenses, particularly after the wages are increased, and that he thought the President ought to have full power to make such increases if he considered it necessary, without interference, but that he has no desire to interfere in ordinary rate cases. Speaking before the Senate Committee, Mr. McAdoo said the President ought to have the power, but that the commission ought to hear the cases just as before and that when they have reached a conclusion it ought to be in the form of a recommendation to the President.

During the period before the law was passed, Mr. McAdoo wished to inaugurate several measures requiring tariff changes, and he did so by following the course pursued by the railroads of requesting the commission's permission, which was in every case promptly granted. Since the law was passed the railroads have followed their usual practice of filing fifteenth section applications for permission to

file tariffs of increased rates and the Railroad Administration has not yet attempted to initiate a rate. The committee on Uniform Classification has been directed to submit an early report, but it has already been announced that hearing will be held by the Inter-state Commerce Commission before any action is taken.

Some of the things that have been accomplished under government control which have been more or less agitated in the past but have not been put into effect because of failure to agree or lack of a central authority to put them into effect, have been the higher demurrage rates, which railroads have been agitating for years; a universal interline waybill, which the accounting officers have been urging for many years and which the Railroads' War Board strongly recommended last fall, and uniform rules for packing and marking freight. Railroads at various times have also made unsuccessful efforts toward a curtailment of competitive passenger service such as has been put into effect between Chicago and St. Louis. They have been somewhat more successful in efforts to secure greater economy by joint or centralized ticket offices, but a much greater impetus to this movement has been given by government control.

The standardization of freight cars represents another field in which the Railroad Administration has been able to accomplish in a short time something that railroad men have been working toward for a long time.

Prospects for the Future

The railroads had no more than passed under government control when eager discussion began as to whether they would ever be returned to their owners or to their former status, and the discussion then aroused has continued. Both in the way of criticism and with approval interested men have commented on each succeeding development of the director general's policies with remarks that they did not bear the earmarks of temporary policies. But Mr. McAdoo has not dodged the issue. He has frankly stated the opinion that it is going to be impossible ever to restore precisely the status of the railroads that existed before December 28, 1917.

In explaining his reasons for opposing a definite time limit in the railroad control bill before the House Committee in January, he said: "I believe that a very much larger measure of strong, effective, intelligent government regulation and control of these properties is going to be inevitable in the future, and I favor such control. If it turns out that public operation of railroads in the United States is beneficial to the common interest, to the public interest, I think the people are going to demand that government control be returned upon some terms which Congress must determine at the time and in the light of experience then existing."

During his testimony before the Senate Committee, Mr. McAdoo was asked whether he personally believed in government ownership of railroads.

"I do not," he replied, "or I have not, at least, felt that it was necessary to take the actual ownership of the railroads. I believe that it will be impossible after the return of peace to restore the competitive conditions to the same extent as they existed prior to the outbreak of the war."

"I favor some form of governmental regulation and control of a far stronger, more intelligent and effective character than we have had heretofore, because I am satisfied that a stronger government control will be demanded and will have to be worked out, both in the interest of the public and in the interest of the security-holders of these railroads."

While the President said in his message to Congress on January 4, that "nothing will be disturbed or altered which is not necessary to disturb," Mr. McAdoo made it evident in his testimony on January 23 that he interpreted that language rather broadly. "From the public standpoint it is

necessary," he said, "that government possession and control of railroads shall be employed to remove for the time being competitive practices and wasteful duplication of effort to the end that every energy shall be mobilized upon the production of the greatest amount of transportation with the least expenditure of labor, material and money.

"The result of this process of unification will be that when the war ends the railroads will be, to a large extent, disabled for the immediate resumption of their old competitive status. Shippers and the public generally will be accustomed to new methods of doing business with the railroads. They will find that the old methods under which they have been routing freight and have been doing business will be substantially and perhaps permanently altered."

All this indicates very clearly that Mr. McAdoo is not going to be deterred from putting into effect some policy which he believes will result in an improvement, merely because of any idea that his control of the roads is to be temporary. He interprets the word "temporary" to contemplate a period of time long enough to enable him to manage the railroads as he thinks they ought to be managed; he has confidence in his ability to produce successful results and he hopes that the policies he is putting into effect will be so successful that everybody will want them continued whether or not the period of government control is prolonged beyond the period contemplated in the law.

Perhaps this may be stated by saying that Mr. McAdoo is proceeding on the only safe assumption, that the war is likely to last for a long time. At any rate he has already gone far enough and said enough to give a strong impression that he is not worrying about a time when the government will no longer be in control. He is in control now

and he is directly concerned now with the present problem of winning the war and of so increasing the efficiency of the railroads as to contribute to that result. Possibly he is doing some things that he would not consider necessary if he expected the war to be over in six months, because he does not expect that; and he is trying to do the things which he believes will produce the greatest efficiency in transportation and with the greatest possible economy consistent with that result.

He hopes to be able to effect considerable economies in railroad operation, but he also knows that many factors enter into the situation which are likely to increase expenses, and he considers economy secondary to efficiency. For example, he knows that the report of the Railroad Wage Commission will result in a great increase in expenses by advancing wages, but he considers that higher wages are necessary to promote a better feeling on the part of the employees; are necessary not only to offset in part the increased cost of living, but that they will tend to improve efficiency. Testifying before the House Committee, he said:

"It may be possible, through economies that can be practiced under combined and co-ordinated operation of the railroads of the country, to overcome any advances that may have to be made in wages and in the extra cost of material and supplies, due to the very high prices prevailing throughout the country. Certainly every effort will be made, consistent with good management and with the public interest, to make the roads earn a surplus. Naturally we want to do that, but I have not felt that we ought to rely too much upon that possibility. If that is the situation it will be developed. If it does not develop, we must be prepared to act without reference to it."

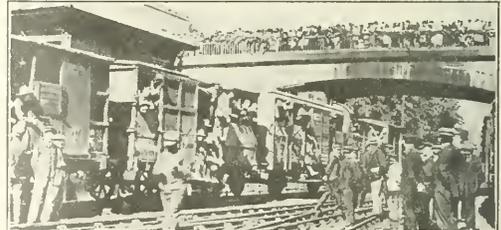
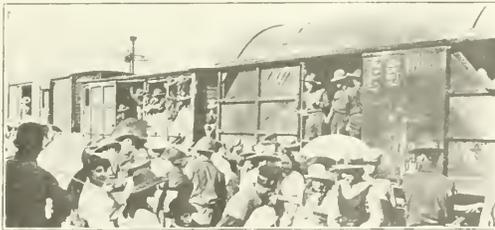


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Our Men Travel in Freight Trains Over There, but the Enthusiastic Welcome Makes Up for It



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The Italians Are Now Mounting Heavy Guns on Barges as Well as Railway Trucks. This Gun Is in Use on the Lower Piave

What Government Ownership Would Mean

Effect on Other Businesses and Persons of Establishing a Gigantic Monopoly. Shall We Prussianize?

By Samuel O. Dunn

RECOGNIZE that all of us ought, while this war lasts, in all our thoughts and acts, to subordinate every other object to the winning of the war. If we do not win, it will make little difference what we think or desire regarding government ownership of railways or any other economic or political question.

But we are not going to lose. Nor are we going to accept a draw. We are going to win so decisively that we shall look back with astonishment to the time when we had our doubts and apprehensions.

In all the affairs of human life there are imponderable as well as ponderable, moral as well as physical, values; and in the long run they are the decisive things. You can't throw the opinion of mankind into a scale and weigh it as you can Hindenburg's sword, but in the long run men's opinion proves weightier than any man's sword. Germany, by the things she is seeking and the methods she is using, has convinced a great majority of mankind that her victory would destroy the liberties and stop the moral and political progress of the human race. Therefore the more victories she wins the more she arouses the fears and opposition of the rest of the world, and the more certain she makes it that she will finally go down in disaster. You remember what Napoleon said of the English. Somebody remarked that they lost many battles. Napoleon replied that was true, but that in every war they always won the last battle. Democracies such as ours and those of England and France, when pitted against a military autocracy such as that of Prussia, are likely to lose the early battles, but it is the last battle which decides, and no man who understands the spirit of the world, and especially that of Italy, France, England and America, doubts on what country's soil the last struggle of this war will be fought, or what nation it will bring to its knees.

When we have won, as win we shall, we shall have the opportunity and duty, in fact be under the necessity, of solving rapidly a number of great problems, and foremost among these will be our railroad problem. We are making a most interesting experiment with government control of railways during the war; we must settle the railroad question soon after it is ended; and, therefore, while we are devoting ourselves primarily to winning the war, we ought to give all the study, all the discussion, to the railway question that we can. "In time of peace prepare for war," said Washington. He might have added, "In time of war prepare for peace." This is especially good advice now, for it is plain to every observing and far-seeing man that the conditions, national and international, which will exist after the war will subject our economic and political institutions to strains different from, but hardly less severe than, those to which they are being subjected by the war. We shall have problems created by the economic and political conflicts of class with class, of section with section, of nation with nation. We shall have problems regarding the production of wealth, regarding its division between capital and labor; problems regarding the assimilation of soldiers into civil life, and of domestic and foreign trade—in brief, problems of peace unprecedented in their number, their complexity and their magnitude. It is so important that we should be studying and thinking about the railway question now because on the way

it is settled will largely depend the success or shall most in solving all our other problems of peace.

Government and Business After the War

Never since the destruction of the ancient regime in France by the Great Revolution have the governments of civilized countries taken such extensive control of business as in this war. Is government intervention in business to continue after the war on anything approaching the present scale? If so, is it going to take the form of ownership and operation of large industries, or of restrictive control of them, or will it take the form of strict control for the protection of the public, supplemented by helpful co-operation in solving business problems?

I believe it is desirable during the war to operate our railways under a single direction, and that to protect investors while this is being done it is necessary to guarantee the financial return of the companies. I do not believe it was necessary or desirable for the government to assume the complete control of operation it has. Now that this has been done, however, it is the duty of every citizen, whether an officer or employee of the railways, or a user of their service, or, like myself, a humble commentator on their affairs, to do all possible to make government control a success.

Last winter, soon after government control was adopted, and the railways were struggling with the largest and most complex traffic, and the most adverse weather conditions ever known, the charge was made and widely circulated that railway officers were "lying down" to discredit government control. I know many of the railway officers of this country, high and low, and I know their attitude and spirit as well as any man living, and the most fitting comment I can make on that charge is that, in the language of Shakespeare, "It is an odious, damned lie; upon my soul, a wicked lie." There may be railway officers and employees who are so selfish or disloyal that they want to see government control fail; but with negligible exceptions they desire, for patriotic reasons, to see it, and are working to make it, a success.

Some people contend that if government control is a success it will afford a conclusive argument for government ownership. It is impossible to accept that view. The results of operation of the railways under government control in war should be better than the results of government operation probably could be in peace. The officers and employees are inspired by more patriotic zeal than they would be in peace, and the Railroad Administration probably will not be subjected to the political and other vitiating influences that it would be in peace. Therefore, the results of government control cannot afford a basis for a rational argument for government ownership.

Effect of Government Ownership on Other Industries

If government ownership of railways should be adopted the railways would not be the only class of concerns directly and indirectly affected. No argument can be made for government ownership of them which cannot be made with equal force for government ownership of telegraphs, telephones, local public utilities, coal mines, lake and ocean shipping, and many other lines of industry. If by adopting government ownership of railways, we break down the dam which

*An address delivered before the Buffalo Club, Buffalo, N. Y. on March 30.

holds back the rising tide of radicalism, the country will be fortunate if it is not speedily overwhelmed with a flood of socialistic measures which will revolutionize our economic and industrial system. The railways constitute in value one-twelfth of all the property in this country. If the public could be convinced they should be taken over, what argument could be effectively made against government acquisition of other large classes of property whose purchase and management would present problems much less complex and difficult?

Even though state socialism should be carried only as far as the ownership and management of the railways, the effects would be felt by every kind of business concern and every class of our people. The railways are the largest consumers of coal, of lumber and of iron and steel. They are among the largest advertisers in the newspapers and magazines. Since government control was adopted, many of those who produce and sell to the railways have become aroused to the fact that that control has given the government a power almost of life and death over their businesses. When a large number of concerns are buying things, and a large number are selling them, there is competition on both sides. When one concern is doing all the buying and many are competing in selling, all the advantages in the negotiations are on one side. The situation which has developed under government control has caused great anxiety among concerns having billions of invested capital and hundreds of thousands of employees which have been established and built up to produce and sell goods to railways. They have become aware that a permanent government monopoly of railroads would have a meaning and an effect for them which had never entered the minds of most of them before.

A Gigantic Government Monopoly?

On the other side are the patrons of the railways, the traveling and the shipping public. Under government ownership they also would have to do business with a single gigantic railroad monopoly. Now, most of us believe that there has been too much of certain kinds of competition between railways, and that it has resulted in wastes and other evils. Many, in fact, believe that the system of railroad regulation and management which prevailed before the war was extremely deficient, and that if the railways are to be returned to the operation of private companies both our system of ownership and our system of regulation should be changed. But there are few who, as patrons of the roads, can contemplate with equanimity the prospect of their being welded permanently into a single great monopoly owned and managed by the government.

What effective means of protecting their rights and legitimate interests would those who sell goods to the railways and those who buy transportation from them have if this great monopoly were disposed to abuse its power? None, except that of resorting to political action of some kind. What means would railway employees have of protecting themselves if this great monopoly should be disposed to abuse its power? None, apparently, except strikes or political action of some kind.

Looking at the matter from the standpoint of the public as a whole, it is evident that the main thing it wants from railways is transportation service adequate to move the available traffic satisfactorily and to develop the resources of the country. The nation has suffered recently from inadequate service; and the losses it has incurred as a result have exceeded what a higher scale of freight rates would have cost it over a long period of years.

No system of railways can be said to be a success which does not maintain a fair and reasonable relationship between the rates it charges and the service it renders to its patrons, the wages it pays to its employees and the return which it earns for its owners. This is true whether the railways are owned by private companies or by a government.

Now, what one thing is absolutely essential to enable a railway system to render good and adequate service, to make reasonable rates, to pay reasonable wages and to earn a fair return? The answer, of course, is far-sighted, enterprising and efficient management. But it is contended government ownership would possess some advantages which private ownership cannot have. The government, it has been argued, could raise at 3 per cent all the capital required to buy the railways and increase their facilities. Facts recently have exploded this theory. The government since we entered the war has not raised one-fourth as much capital as would be required to buy the railways, but already it is preparing to float a large loan at 4¼ per cent, and it would have to pay more if the people were not impelled by patriotism to make it loans at an artificially low rate. There is not, as some seem to think, an unlimited supply of 3 per cent, or even 4 per cent, capital. Most capital in this country prefers investment in speculative enterprises offering a chance of large returns to investments offering a certain but low return.

Good Management Absolutely Essential

It is questionable whether even before the war our government could have raised enough capital to buy the railways for less than 4½ per cent. On this basis the saving made by substituting the government's credit for that of private companies would have been small. Furthermore, for some years the prevailing rate of interest probably will be high, and for the government to acquire the railways soon after the war would be to saddle itself with inflated fixed charges for many years to come.

Again, it is said the government could operate the railways as a single system and avoid the wastes incidental to competition. But it is extremely doubtful if centralized management of the railways as a single huge monopoly in time of peace would have any advantages. Our railway system includes 260,000 miles of line. This is five times more mileage than there is in any other country. It is one-third the mileage of the entire globe. Perhaps the present system of centralized control will point the way, but the problem of organizing and managing such an immense mileage operating over such a vast area as a single unit so as to get good results seems almost insoluble. Even under government ownership it probably would be necessary, in order to get the best results, to divide this system into several parts and operate them almost independently. If you should divide our railways into ten units of equal mileage, each unit would have more mileage than the railways of France, or those of Great Britain and Ireland, or those of Prussia. If you should divide them into five units of equal mileage each unit would have more mileage than the railways of any entire country except the United States. Even under the most skillful and energetic management possible all the benefits gained by complete consolidation of our railways probably would be more than nullified by disadvantages inevitably arising from the unwieldy magnitude of the undertaking.

Furthermore, whatever rate might be paid for capital, and whatever might be the advantages of consolidation, there is no adequate substitute, in the railroad or any other business, for far-seeing, enterprising and efficient management. A weak and short-sighted management will always fail to profit by its advantages, and at the same time will fail to increase economy and efficiency in many directions in which a strong management would increase them. After all, therefore, the vital question is whether private management, if given a fair chance by government regulation, probably would be more or less far-seeing, enterprising and efficient than government management. If private management, if given a fair chance by regulation, would be the more efficient, the American public's duty to itself is to preserve private management and cause government regulation to give it a fair chance.

Recent experience has demonstrated that the transportation

facilities of this country have become inadequate. They are insufficient satisfactorily to move the available traffic, especially in eastern territory, despite the fact that in eastern territory the capacity of the railways in proportion to area and population is larger than anywhere else in the world. There have been no such congestions in the south and west as in the east; but even in those territories there is need of much additional mileage to enable them to support a larger population and to develop their natural resources. Both the intensive and the extensive development of the railways has greatly declined. A few years ago the average annual investment in them was about \$750,000,000. Before the war began it had declined to \$310,000,000. In 1916 it was only \$280,000,000. This decline of railway investment is the main cause of our present transportation plight.

Would Government Management Be Efficient?

The public must consider whether the expansion of our railway facilities is more likely to be adequate, and to be secured with reasonable economy, under private or under government management. There are certain incontrovertible facts which bear upon this question. One is that until the present restrictive policy of regulation was adopted the facilities of our railways were relatively greater, and were being increased faster, than those of any other railways in the world. Prior to the war our railways had almost six times as much freight carrying capacity in proportion to our population as those of Germany; and the railways of Germany had the greatest freight-carrying capacity in proportion to population of any system of government railways in the world. Our freight-carrying capacity was 8,662 tons per 10,000 inhabitants; that of Germany about 1,500 tons. We had car shortages, it is true; but they had relatively worse ones in Germany. Our railways actually moved almost five times as much freight traffic in proportion to our population as did those of Germany.

Not only have our railways, under private ownership, furnished larger facilities in proportion to population than those of other countries, but they have furnished them more economically. Some people charge that our railways are over-capitalized. Some individual companies are, but the average capitalization of all, which is about \$66,500 a mile, is lower than the average cost of construction or capitalization of any other important system, government or private. The railways of Germany, most of which are government owned, have cost \$120,000 a mile. Those of New South Wales, Australia, which always have been owned by the government, which have been built and developed in a new country, and which have nowhere near the capacity per mile that ours have, have cost \$90,000 a mile.

When we turn to the operating results of our railways, to the rates they have made and to the wages they have paid, we find similar facts. Their average wage in 1913 was higher than that in any other country, except one of the Australian states. Between 1913 and 1916 the average railway wage in this country increased from \$757 to \$869; probably at present it is at least \$900, and increases now in contemplation probably will advance it to \$1,100. The average wage in Germany in 1913, the latest year for which the information is available, was \$409.

Similarly as to rates. Our average freight rate per ton per mile in 1913, 7.29 mills, was the lowest in any country except in India, where the wages paid are measured in cents, not dollars. The only European country in which the average was less than 12 mills was France, and most of the railways of France are privately managed. The average in Germany was 12½ mills. The answer is often made, when the average rate of Germany is compared with that of the United States, that the average haul is shorter there than here; and, of course, you always have two terminal expenses, whatever the length of the haul. Those who make

this answer overlook the important fact that the very high wages paid in this country enter into terminal expenses as well as road expenses; and that, therefore, assuming that the same number of men are employed, it costs more in wages to operate one terminal in this country than to operate two in Germany.

Why Has Railway Development Stopped?

Until recent years, in spite of the high wages they paid, the low rates they charged and the service they provided, the managements of our railways were able to attract enough capital into the business to go on increasing their facilities. Why has the development of facilities been almost stopped? There have been various causes, but the main one has been punitive and restrictive regulation. In 1916 when there was a sudden abnormal increase in business, the railways earned a large net return, but the tendency of net return for a long period had been downward, and this tendency was renewed at an accelerated pace in 1917. To return the railways to their owners after the war subject to the kind of regulation which has prevailed would be disastrous to both the companies and the country. Private ownership and management cannot be made a success from the standpoint either of the owners of the railways or of the public unless the owners and managers are given incentives and opportunities to increase the facilities of the railroads and to operate them efficiently.

Suppose, however, that our policy of regulation should be so altered as to afford reasonable incentives to investment and to efficient management. Would private management under such a policy probably be better or worse for the public than government management? There is nothing in the experience of our own or any other country on which to base a rational argument that government ownership and management would produce better results for the public than private ownership and management, under sane and fair regulation.

Even if you exclude our railways from consideration a comparison of the results of private and government management in other countries argues strongly in favor of private management. Most of the railways of Germany are state managed, while most of those of France are privately managed. On any fair basis of comparison the private railways of France can be shown to be more efficiently operated than the state railways of Germany. Australia and Canada are the two greatest English-speaking possessions of the British Empire. In Australia government management has prevailed, while in Canada private management has predominated. The private railways of Canada have made a record of efficient operation which far surpasses the record of any of the state railways of Australia.

It is only reasonable to assume that if private ownership and management are retained in this country, and our policy of regulation is so altered as to make investment in railways attractive, and to give the managements reasonable freedom of initiative and action, the expansion of railway facilities will be revived on a large scale, and the results will be as efficiently operated as ever. On the other hand, if government ownership is adopted, doubtless the government will recognize the need for investing large sums in new facilities. But will these facilities be provided with the wisdom and economy they would be under private management? Private management would, of course, aim to provide them where the new investment would earn the largest return, and that would be where there was the largest available or prospective traffic to be handled or developed, and where therefore, the facilities were most needed. Is there not very great danger that, under government management, the places where the additional capital would be invested would be determined not by business but by political considerations? We have had a wealth of experience with expenditures for rivers and harbors, public buildings, and army and navy posts. No-

body would contend that the expenditures have been made regardless of political considerations and where they would do the most good.

Why Government Management Would Be Inefficient

Again, what reason is there for believing that under government management the railways would be operated with as much efficiency and economy as under private management? The efficiency with which any business is conducted depends mainly on the extent to which able men are attracted into it, are given positions whose importance is in proportion to their fitness, and are afforded incentives to do the best work of which they are capable. The railways of this country have almost two million employees and about twenty thousand officers. The officers get only $3\frac{1}{2}$ per cent of the billion and a half dollars paid in salaries and wages, while the employees get the other $96\frac{1}{2}$ per cent. But the efficiency with which the railways will be operated in future will depend mainly on the men who are put in those twenty thousand offices and on the incentives and opportunity they are given to organize and direct to the best of their ability the work of the two million employees.

Does any man familiar with the facts have any doubt as to whether, on the whole, the policy followed by the railways or that followed by our government departments has been better adapted to securing and putting into official positions the men who are the best fitted to fill them? We have heard much recently about the alleged fancy salaries paid by the railways. As a matter of fact, the highest salaries paid by the railways are small compared with the incomes derived by many successful men from other lines of business and professional activity. It goes without saying, however, that under government ownership the salaries of the higher officers would be sharply reduced. Would the abolition of all the larger prizes in railway service increase the attractiveness of that service to men of ability and ambition? Excepting cabinet offices, with the great honor attaching to them, do we find many able and ambitious men struggling to secure appointments to offices in the government service, with the small salaries they pay? We do not; and if we adopt government ownership we shall see an exodus of men of ability out of the railroad business, rather than into it.

Even if men of ambition and ability did seek appointment and advancement solely on the ground of merit, they would not secure them. In all the government departments, except the army and navy, appointments and promotions to important offices are determined by politics, not by fitness. Government control of the railways as a measure of war has not resulted and probably will not result in political appointments, but that it would in time of peace all our experience indicates.

An answer often made to such arguments is that the post-office department is efficiently managed. Where is the evidence? The postal department keeps its books so that nobody can tell what is the total cost of rendering its service, and it shows far less ability to meet new and difficult conditions than concerns under private management. I have spent the last five months in Washington. The great changes which have taken place there have imposed heavy new burdens on railway service, on telephone service and on postal service. Both the railway and the telephone service have met the new conditions far better than the postal service. The paper of which I am editor is printed in New York. I have never had a serious delay in getting a long distance call through to New York, and the railways run trains between New York and Washington in five hours, but recently it has been taking six days for the postal department to get the *Railway Age* from the postoffice in New York to our office in Washington. The first-class mail service, as well as the local service in Washington, have become so unreliable as almost to justify the charge that they have

broken down. Congress is considering turning the telephone service in Washington over to the postal department. The postal service is so much worse than the telephone service that the proposal to turn the telephone service over to the postal department sounds like irony.

If, as seems certain, there would be under government ownership a deterioration of the official personnel of the railways and an impairment of the incentives of the officials to energetic and efficient work, the inevitable result would be a decline of the efficiency of management and operation. The adoption of improved machinery and better methods of operation, the increases in the amount of traffic handled per car, per train, per mile of track, and per employee, which have been the outstanding features of our railway operation, would be arrested. It was the large economies due to these things which long made it possible for our railways to pay ever increasing wages without advancing rates.

The Certainty of Political Interference

If there should be under government ownership a decline in the efficiency of management and operation, somebody would have to pay the bill. It would have to be paid either by railway employees in lower wages, or by travelers and shippers in higher rates, or by the public in taxes to defray a railway deficit. Who would determine what the wages, the rates and the taxes should be? It would have to be done by government officials, and in the last resort by Congress. But Congress is a political body. Inevitably, under normal conditions, it is influenced chiefly by political considerations. And so the unavoidable outcome would be that under government ownership in time of peace we should have the questions of what expenditures the railways should make for improvements and where they should be made, of the wages and conditions of work of their employees, of the appointments and promotions of their officers, of the freight and passenger rates they should charge, of who should pay the taxes to meet a railway deficit, if there was one, thrown into the maelstrom of politics. I do not say that any man or class of men would purposely throw these questions into politics. I simply say that under a democratic government such as ours, they inevitably would get into politics whether anybody wanted them to or not, and even though most people tried to prevent it.

The railways of this country employ one and three-quarter million men, to whom in 1916 they paid almost a billion and a half in wages; and an increase of \$350,000,000 in wages is now under consideration. The railways, under normal conditions, spend over a billion dollars annually for fuel, equipment and supplies, and the concerns which sell them fuel, equipment and supplies employ many hundreds of thousands of men. The effect which the introduction of politics into the management of the railways would have upon their efficiency would be bad enough for the country. How much worse for the country might be the throwing into politics of the governmental power to employ, promote or discharge millions of men, and to spend billions of dollars. You may say the government in carrying on the war is employing literally millions of men and spending billions of money. But the conditions of war, the motives and influences by which people are directed and controlled in time of war, are not those of peace.

Shall We Prussianize Our Government?

You frequently encounter the argument that Germany has made a success of government ownership of railways, and that we should adopt it and could make a success of it because Germany has. If you bar Germany from the discussion, the advocate of government ownership is rendered unable to find anywhere upon earth a country in which government ownership has had results affording any reasonable basis for contending that government management has been

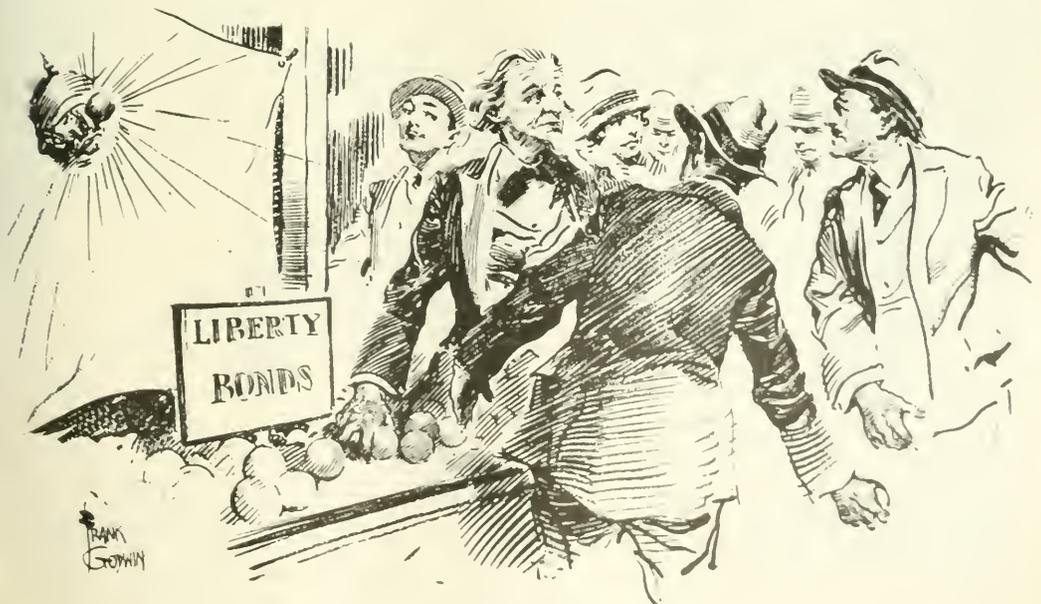
efficient. The argument from the experience of Germany proves too much. Accepting it at its full face value, what it proves is not that government management can be made a success everywhere, but that it can be made a success under an autocratic government. Now, doubtless by Prussianizing our government, we could fit it to do many things which it is not fit to do now. The characteristics of Prussia in the management of railways are the same as its characteristics in the management of many other things. The Prussian Minister of Public Works, who is the manager of the railways, is appointed by the Kaiser and is absolutely beyond the reach of public opinion or of Parliament. The Prussian Government forbids its railway employees to belong to labor unions, and arbitrarily keeps wages low and freight rates high to get a large revenue for its military purposes. It treats the railways as primarily a part of its war machine and applies to their employees a military discipline. For obvious reasons there are no strikes or threats of strikes over there.

Do we want to Prussianize our government to fit it for Prussianizing our railways? I have never heard anybody say so. But if we are not going to Prussianize our government, we cannot Prussianize our railways, and if we are not going to Prussianize our railways, arguments drawn from the experience of Germany with government ownership have no place in the discussion of that subject in this country.

Private ownership of railways is a democratic policy. Government ownership is an undemocratic policy. In every leading country which is fighting under the leadership of the Kaiser—Germany, Austria-Hungary, Bulgaria, Turkey—government ownership prevails. In almost every leading country which is fighting against the Kaiser, including the United States, England, France and Canada, private ownership is preponderant. The natural policy for an autocratic state is to prevent its citizens from doing anything which the state can do. The appropriate policy for a democratic state is to do nothing which its citizens can do as well as

or better than the state. If, as we are invited to do, we are going to embark upon a policy of state socialism in imitation of Germany, then let us set up an autocratic government in place of our democratic government so that we can get the efficiency in our government necessary to enable it to manage our socialistic projects efficiently. If we are not going to set up an efficient autocracy, then let us leave our business enterprises in the hands of private concerns which can and will manage them efficiently.

Surely the fact is not without significance that the most autocratic government in the world has made the greatest success of government management of railways, and that the failure of government management in other countries has been almost in proportion to the degree of Democracy of their governments. One may sincerely and ardently believe that democracy is the best form of government to secure to the citizen the inalienable rights to life, liberty and the pursuit of happiness, and be willing to fight for that belief; one may have confidence that democracy can succeed in so regulating the relations between business concerns and the public as well as between individuals and individual as to protect the rights and further the interests of all; and in spite of all this one may be convinced that so far as democratic government is as yet developed in most parts of the world, it is not a good form of government for managing commercial enterprises. Many go much further and fear that under government ownership in this country politics would so corrupt the railroads and the railroads would so corrupt the continuance in this country of private corrupt politics as not only to destroy the efficiency of the railroads, but as to destroy democratic government itself. I ask you, is it worth while to take the enormous risks involved in a change to government ownership when past experience justifies the belief that under a wise and just system ownership and management will continue to result in the provision of the most ample facilities and in the most efficient management of railways that can be found in the world?



NEXT!



The Best Cure for Such Bad Dreams Is to Wake Up and Buy Liberty Bonds

Every Railroad Officer a Liberty Bond Salesman

Three Regional Committees of Railway Presidents
to Assist in Third Campaign

WITH AN ENTHUSIASM, if possible matching that reflected 3,000 miles overseas from our boys now hurrying to take their part in the pending counter drive against the Hun—with a solemn determination to show themselves worthy of those railway engineers who were with the British armies in Picardy—the supervising officers of the railways of this country are waiting the opportunity to subscribe for Liberty Bonds and the signal to begin the drive for subscriptions among the men in their shops and offices.

Railway officers have a three-fold duty in a Liberty Bond campaign—to subscribe themselves, to encourage their employees and friends to subscribe and to vie with the honor that has come to our railwaymen overseas.

Just what plans the railroad Liberty Loan campaign is to follow are not yet definite. To encourage railway officers

subscriptions may begin not later than three months from now in which even the ten months shall date from the time payments shall begin on the new subscription.

When the Third Liberty Loan Campaign begins the railways of this country are going to be even better organized than ever to assist their employees to subscribe for bonds. One committee in the first two campaigns succeeded with the co-operation of the railway officers and employees the country over in raising \$56,000,000—20 million in the first campaign and 36 million in the second. This time there will be not one committee but three committees—one for each railway regional district.

The committee in the eastern district will be headed by F. D. Underwood, president of the Erie, and will consist, in addition to the chairman, of Frank Trumbull, chairman of the Chesapeake & Ohio; E. E. Loomis, president of the Lehigh Valley; L. F. Loree, president of the Delaware & Hudson; Howard Elliott, chairman of the committee on inter-corporate relations of the New Haven, and J. B. Dennis, of Blair & Co., bankers of New York. The committee has been appointed only a few days at this writing and its plans have not yet reached concrete form. But it is significant that the committee is getting on the job early in the game, much earlier in fact than the committee was able to in the first two campaigns.

Similarly there is a committee for the western regional district with office in Chicago and one for the southern district, the headquarters of which are in Atlanta, Ga.

R. H. Aishton, regional director of the western railroads, has appointed a standing committee of presidents of western lines as his Liberty Loan Committee as follows: Chairman, W. G. Bied, president of the Chicago & Alton; J. E. Gorman, president of the Chicago, Rock Island & Pacific; H. E. Byram, president of the Chicago, Milwaukee & St. Paul; H. G. Hetzler, president of the Chicago & Western Indiana; C. H. Markham, president of the Illinois Central; A. M. Schoyer, resident vice-president, of the Pennsylvania Lines; C. G. Burnham, executive vice-president of the Chicago, Burlington & Quincy.

C. H. Markham, regional director of the Southern railroads, is sending out two special war relief trains, leaving Atlanta at 7:30 a. m., April 6, on a tour to last twenty-seven days. One train will cover central and eastern Tennessee, all of Georgia and a large part of Florida. The second train will cover portions of central Tennessee, all of Alabama, southern Mississippi and southern Louisiana. Each train will carry ten American artillery officers accompanied by French and Canadian soldiers and officers and Liberty Loan speakers.



"COME ACROSS OR THE KAISER WILL!"

and employees to subscribe to the Third Liberty Loan, Director-General McAdoo has issued a circular authorizing carriers to take such amount of bonds as may be necessary to care for such subscriptions and to use current operating revenues as far as necessary in paying for such bonds. In paying for such bonds officers and employees may be permitted to pay in installments covering a period not exceeding ten months. In case they have not completed payments on prior subscriptions and in order to avoid making payments on both subscriptions at the same time, payments on new

NIPPON YUSEN KAISHA TO BRAVE U-BOATS.—Merchants in Japan who are engaged in trade with France and Italy will be glad to learn, says the Japan Advertiser, that the Nippon Yusen has decided to brave the submarines and revive its direct line between Yokohama and Marseilles, which has been suspended for some time because of U-boats' activity in the Mediterranean. The Nippon Yusen Kaisha recently decided to start a line between Yokohama and Port Said, with the object of helping trade between Japan and France. Owing to the submarine dangers, the company proposed to dispatch steamers only as far as Port Said. But now the company has put on a connecting steamer and will land cargo at Marseilles.

The World Market for American Railway Supplies

Like England, France, Japan and Germany We Must Prepare
Now for This After-the-War Business

By A. Stephens

GOING AFTER THE FOREIGN MARKET in railroad supplies is like buying Liberty Bonds—good business and at the same time a patriotic duty. The business is there and our railway supply manufacturers will be missing the chance of a lifetime for themselves and will fail to do their duty by their country if they do not make the most of it. The foreign market offers new and profitable business and the present moment is the time to lay our plans. England, France and even Germany, despite their tremendous efforts in the war, already realize the necessity of preparing for the war after the war—the battle of trade that will begin with the treaty of peace—and are making most extensive plans to that end. The most progressive manufacturers in this country are doing likewise. It is just as much our duty to prepare for this great expansion in trade as it is theirs.

As Manuel Gonzales, a foreign trade authority puts it, "Because they can get it is the reason why our railway supply manufacturers will seek export trade. Coupled with the fact that foreign business is just as profitable as domestic business this is certainly a good enough reason for an American business man at any time. Yet if this opportunity of profit did not exist many sound reasons point to the conclusion that the American manufacturer should develop the foreign market as a patriotic duty to his country."

No Mystery in Foreign Trade

There is no mystery about the profitable business to be secured in the foreign field. If we will consider the rest of the world merely an extension of the territory of the United States, stretching north, south, east and west and then realize that much of this territory is suffering from a very acute shortage of railroad supplies there would be no difficulty in projecting the mind over the imaginary boundary. The fact that there are seas to cross, new languages to learn, new customs to study and new competitors to fight obscures the opportunity, it is true. Yet these conditions are merely human conditions to meet and overcome by ordinary human effort. Fundamentally they are not different from the conditions we meet every day. They are simply new conditions and offer perplexities because they are strange. At the same time the facts point to conclusions that are sure.

A World Famine in Railroad Supplies

Readers of the *Railway Age* know that the world is facing nothing less than a severe famine in railway supplies today. In many localities the famine already exists, the result either of diversion of equipment and manufacturing capacity to the needs of war or of the lack of shipping, depending upon whether the country is a manufacturing or an importing nation. Spain's railways are in fearful shape; Mexico's lines are worse. The statement is made as to South Africa that a large percentage of the locomotives are laid up for lack of materials and repair parts. The railways of South America are similarly suffering severely. Even Japan in its advantageous position has had to offer a bonus to manufacturers to hurry the construction of freight cars. Railway development in China has been brought almost to a complete standstill and China has only 6,000 miles of railway to serve nearly 400,000,000 people. Even England and

France are suffering, although the needs of war have compelled a continued high efficiency of railway operation behind the fighting fronts.

Trains in all these countries are still running and commerce has not been brought to a stop by any means, but one can realize what this means to the countries that will have the facilities for manufacturing railway equipment on a large scale after the war. The real significance of the world shortage of railroad supplies is for "after the war" business. That practically the whole world is looking to us for relief is not so important as that it still must look to us for much of its supplies after the war is over. While present conditions forbid a great development of export, excepting, of course, on allied government orders, it is evident that the great rehabilitation of the "run down" railroad systems of the world will have to come largely from the greatest source of supply. The manufacturing capacity of those who will be our competitors is not sufficient to meet the demand.

Germany as Railroad Supply Exporter

The dearth of railway supplies is perhaps the most pronounced in enemy countries. Germany was a great factor in the export of nearly all kinds of railway supplies, particularly locomotives, before the war, but in the judgment of our leading business men Germany has received a set back that will almost nullify her efforts for many years after the war. Outside of military roads the railway situation in Germany must be desperate. Because of the chaotic condition of Germany's railroad industry it took nine months to get the captured supplies out of Rumania. For the same reason wheat is rotting in improvised warehouses in Russia, while children are dying of malnutrition in Berlin and Vienna. As the war goes on this shortage in the Teutonic countries will doubtless become more acute.

In fact, Germany's weakest spot today is her railway rolling stock, according to Maurice Davies writing in the *Echo de Paris*. Every locomotive of hers our airmen destroy, he says, is a vital injury to her, because she cannot replace them. He quotes the statement of a German general who said Germany could always manufacture sufficient munitions but, if she must go under it would be due to lack of railway material.

When peace arrives a bankrupt Germany will face the prospect of rebuilding her wornout railways before seeking export in an unfriendly world.

Despite these paralyzing conditions Germany is expected to make efforts to regain her foreign trade that are unprecedented in any scheme of national trade development hitherto attempted. Isaac F. Marcossan said recently:

"Germany today has secret hoards of raw material wherever it has been possible to mobilize them. The moment the war is over she is going to be a going business concern. She is a going concern in Spain today. If you could slip off the roofs of 150 warehouses in Spain you would find them packed to the doors with the oil and copper and all the other resources with which to do business, everything which Germany has mobilized in Spain as she has been mobilizing in this country from the day the war began."

Belgium's great manufacturing capacity in industrial railroad cars unfortunately has been practically wiped out. Belgium's chances of coming back are infinitely less than

Germany's. She will enter the calculation only as an importer of railroad supplies from Great Britain, the United States or other countries of the allied group.

France Will Import Railway Supplies

France was not one of the greatest competitors in railway export before the war. Afterwards she will have her hands full at home. In fact, the members of the French Purchasing Commission now in this country expect that they will continue to buy large amounts of American railroad supplies after the war. Captain Raymond Michel, head of the railroad department of the French Commission said recently:

"The salesman of American railroad supplies will have no difficulty in getting orders in France after the war. He may have difficulty in filling them because we shall be in the market for nearly everything used on a railroad. The American manufacturer who will establish a branch plant in France and do business on a French basis will stand a particularly good opportunity of getting a large amount of business. The French government and French business men will encourage such enterprises." The export efforts of the French will be in other things than railway supplies.

These conditions are expected to eliminate much of the international competition in selling to the railroad market of the world. The United States, and Great Britain should be the principal factors and Japan and Germany lesser factors in the after the war scramble for railroad business.

England Our Biggest Competitor

Britain will be our great competitor, not only because of what her manufacturers could turn out before the war, but also because of what she may be able to produce as the result of her great plans to transform war industries into peace industries. Britain was never a great producer of railroad cars, but she has been one of the largest exporters of locomotives, rails and other heavy materials.

On the basis of before the war manufacturing capacity the entire output of the British railway supply industry for one year's time would be required to provide for the immediate wants of the railroads of India alone. British efforts will be great but cannot be expected to rise to filling all the accumulated needs of her colonies and her home railways.

Japan Another Competitor

Japan is and will be another real competitor. Japan's activity in railroad supplies will be felt principally in the Far East. Her resources in coal and iron and manufacturing capacity before the war permitted Japan to export one-third of her production of railway supplies. The railroad supply industry in Japan has expanded considerably during the war, but it is still too small to offer serious competition in all parts of the world. In the course of time Chinese coal and iron mines and Chinese steel mills may be developed to the point of furnishing Japan with the materials to become a great factor in producing railway supplies.

We Have Greatest Manufacturing Capacity

Of all nations, the United States will have the greatest manufacturing capacity, the greatest resources in raw materials and probably the greatest surplus of investing capital. Our car manufacturing capacity is 350,000 per annum, something like 150,000 in excess of normal domestic production. We can easily deliver abroad 3,000 locomotives annually and supply the domestic market at the same time. In rails, car wheels, axles, sheets and plates, structural steel, parts and specialties we have a capacity that is vastly beyond our own requirements in ordinary times and which no other nation approaches. The market open for our manufacturers will include nearly the whole world.

Our financial condition is perhaps the heart of our future export situation. Investing capital is the first requirement

of railroad construction in new countries. The United States has the money now and should have a reserved, strong position at the end of the war.

Will Capture the World Car Market

"Provided we come out of the war in strong financial condition and provided Germany comes out with increased strength broken the American railroad car manufacturer expect to capture the market." This opinion was expressed by one of our greatest car manufacturers who has had years of experience in selling in foreign countries. Manufacturers of most other railroad supplies are not in such strong positions as the car manufacturers, but their thoughts are running in the same direction though they cannot expect to dominate the foreign field as the car manufacturer may.

American Investments Bring Export Business

The financial side of the development of our export business in railroad supplies is as interesting as it is important. Almost invariably a foreign railway buys its materials from that country whose investors supplied the capital for its construction. The investors in European countries, and particularly the Germans, took great care, however, to guarantee the continuance of this railway supply business. The English investors, for instance, sent over British engineers and operating men to run their railways and the latter brought with them a familiarity with British standards and equipment which resulted in their purchasing that kind of equipment from home in England. The Germans usually embodied in their loans a strict proviso that all materials and supplies for the construction and equipment of the railroad should be purchased of German interests. In this way they tied up the investment forever and a day and made every mark invested in a railway abroad show a quick and continued return in the sale of railway supplies. The plight of many of these German built railways today is evident. Several lines in South America and some in China are bound hand and foot, and it is not unlikely that some of the contracts at least will have to be broken.

Our own export and financial interests have adopted this method in a somewhat different form to a number of projects, many of which are now held up by the war. In our case, however, the practice seems to depend on the specifications—they are so made that only an American firm can fill them to advantage.

Our great financial institutions have put their shoulder to the wheel in promoting export by the investment of American capital. A leading investment banker said recently: "Americans have shown a new interest in investing in American built foreign railroads. We believe that when the time comes, they will put their money into railroads in South America or China, etc., just as readily as they will into a promising industrial in Ohio."

Although we cannot let the money go out of the country at this time, tentative contracts for financing and building railroads in nearly all parts of the world have been entered into by various large American interests. Construction work awaits only the signing of the treaty of peace. As far as anyone can see into the future projected American built railroads are certainties in South America, Africa, China, Central America and Mexico and, if conditions permit, in Russia and Siberia.

To leave the realm of practical certainties and contemplate what are only strong possibilities, there are several large American projects that appeal powerfully to the imagination.

One group of our financiers and business men is looking forward to the construction of the railroad that will link the Americas North, Central and South, with continuous standard gauge lines. This road would utilize existing lines for most of the way. It would doubtless be in operation today

if it were not for the difference in gage on many of the railroads to the south of us.

Hitherto Africa has been the domain of the English, French, German or Belgian railroad promoter, but today some American built and owned standard gage mileage is assured and more projected.

A plan to connect the French railway system that goes southward from the Mediterranean with an American railroad that will continue it to the Atlantic coast in Liberia is another dream that is near to being a reality.

In China our railroad builders are prepared to build 2,600 miles of standard American railroad. They are already looking forward to the day when American built mileage will handle much of the passenger and freight traffic in some of the richest provinces of a country that supports 400,000,000 people.

The importance of these American projects is the business it guarantees in the future for American railway supply manufacturers. The American built railroads in foreign lands will supply a large part of our export market in railroad materials and equipment.

Now the Time to Prepare

The export houses and investment firms realize one thing more than anything else and that is that now is the time to lay the plans for export trade after the war. We are fighting a war that affects the prosperity as well as the political security of the American nation. England and France thus far have been far more heavily engaged than we, but they are making tremendous plans for their export business after the war. It is to our unending advantage that our war preparations will also be of value for the preparations for export trade. The exports of railway supplies that we have been making to the warring nations have brought us in contact with the foreign ways of doing business, and no one doubts that our railway engineers in France will return with ideas that will prove of great advantage from the standpoint of export trade and our commercial dealings with our friends overseas or in the other parts of the world. The shipping program has perhaps even a greater advantage, for if there is one thing that has handicapped our export trade hitherto it has been the lack of shipping under the American flag or over trade routes that were typically American. After the war we are still going to be able to use the ships that during the war will be used to carry our men and supplies to France.

Ships Are Half the Battle

"Shipping is half the battle at any time in securing export trade" is the way a large exporter of American made railway supplies put it recently. This concern had just lost a large Argentine order for locomotive tires because the freight rate from London to Buenos Ayres was \$20 less per ton than the rate from New York. The reason was not that the English had established unjustly discriminatory rates. It was for no other reason than that the main trade routes of the world converge at London and Liverpool and because the route from London to Argentine had far more shipping than that from New York to the Argentine ports.

What are some of the great export plans that our allies are already at work on? Great Britain and her dominions and colonies are working out a plan of great trade routes, joining all parts of the empire with direct trunk lines whereby the great volume of tonnage will provide the lowest rates, thereby protecting the British shipper as effectively as high import and export preferential tariffs. The Dominion's Royal Commission is working out this protective measure in a broad and impressive manner. The February issue of *The Americas* says:

"If the idea is carried out, we will see in the future, a great empire that, instead of using political power in the

form of restraint of commerce for national purposes, will use its wealth as a great business corporation would in building up a great mechanical plant for the use of its commerce with efficiencies so great that its economies will be irresistible. The master builders of England's great shipyards have contributed their expert advice to the commission, and in one of its recent reports it is shown in tabular form how the cost per ton of freight transportation can be cut to a fraction of the tramp steamer's cost by the use of immense vessels, of steam or motor type, that the commission recommends. The future may see these ships running regularly, with reasonable variations from one route to another on lines stretching out from London to the Far East by way of the Cape of Good Hope, on fast mail and freight lines involving a transfer to rail on the imperial line from London to Halifax or Quebec, thence by rail to Vancouver, thence by great steamer again to Honolulu, Sydney or to Hongkong. Or it may be along a third projected all-sea route via London, Liverpool, Halifax, Bermuda, Kingston, Panama, Tahiti, Auckland and Sydney, with alternates to Singapore and Hongkong. These will be the heavy 'trunk lines' to the Far East, with others through the Suez Canal to India and Hongkong."

This plan includes a reorganization of rates of English and colonial and Dominion railways for the benefit of the importer and the exporter. German railroads by means of government support give generous rebates to exporters and to importers of raw materials to be exported after manufacture.

The English system similarly will include both the railways and steamships and reduce all transportation rates to both exporter and importer.

Great Britain's Big Plans

Development of shipping is only part of the program of the Dominion's Royal Commission which is working to unify the efforts of the empire. Other important measures are:

1. An empire policy of preference for British industry in the supply of raw materials of which the empire has a monopoly or dominant position.
2. The establishment by government ownership or subsidy of several great steamship lines connecting the ports of the empire and an inter-imperial scheme of deep-harbor development to accommodate the ships, 660 ft. long, and 38 ft. draught, calculated to have the ultimate practical economies of freight transportation. This would make tariff discrimination unessential.
3. Government control of at least one independent telegraph and cable line connecting all parts of the empire.
4. An English national and British imperial policy of preferential employment of British capital and British institutions in the development of empire resources including the encouragement of home establishments for the primary treatment and manufacture of Dominion ores, materials, etc.
5. The foundation of the British Trade Corporation is not only to assist in the general expansion of British commerce, but to work out the financial phases of inter-imperial developments.

These are only a few planks of the broad platform of the British trade battle that will begin with the treaty of peace. Most of the measures which the British have set out to accomplish are already largely worked out. Other plans that cannot be put into operation at this time have been thoroughly mapped out and are ready to be put in operation on very short notice.

Foreign Agents Active Everywhere

England and France are not only doing now all they can to prepare for future foreign business but also are maintaining as great an export trade as is possible without reducing their efforts in the war. England's preparations for future

export business are being carried out on a scale hitherto unequalled by any country. All of her industries are being organized for bringing the whole national resources—manufacturing and financial to bear on the export field as soon as the war ends. England is a practical foreign trade country and her preparations are based on experience. Like Germany, she believes in the potency of the man on the ground. Her commercial agents swarm in all the great capitals and centers of the world. New York is full of them. The part the French will play is a minor one indeed compared to the English, but France also is active.

The British preparations are literally an economic mobilization of the resources of the whole empire. The parliament of Great Britain in January, 1916, debated a resolution:

RESOLVED, That with a view to increasing the power of the Allies in the prosecution of the war his Majesty's Government should enter into immediate consultation with the governments of the Dominions in order with their aid to bring the whole economic strength of the Empire into co-operation with our Allies in a policy directed against the enemy.

Bodes Ill for German Trade

This policy has since been worked out with a thoroughness that bodes ill for Germany's foreign trade aspirations. All of the Allies have entered heart and soul into this preparation. The United States is a great asset to this program. The primary purpose at present is to break down the Germanic commercial organization and influence in all parts of the world and to shut off every form of aid to Germany.

The inauguration of this policy in Britain was the beginning of a world-wide movement including the United States, in which German firms have been black-listed, German trade boycotted, exports restricted by license, the sale of raw products controlled, and coal refused for ships that were indirectly aiding Germany.

In British colonies and dominions this policy has resulted in the cancellation by law of contracts with Germans, the expulsion of all resident and even naturalized Germans from all public trade bodies, the closing of telegraphs and mails and the working out of a world-wide boycott that effected not only the German mercantile establishments, but also neutral concerns that maintained close business relations with them.

The control of raw material is the most vital power in the hands of Great Britain in carrying on a war against German commercial aggression. Joined with the United States the entente Allied group could exert such a control over raw materials, shipping, trade routes, etc., that it is difficult to see how the Central Powers could maintain their existence as powerful industrial countries in a trade war after the war.

Eighty-seven British Reconstruction Commissions

All told 87 commissions and committees are working under the direction of the British Ministry of Reconstruction for the regeneration of British industry. This vast scheme includes provision for every conceivable phase of commercial activity. To determine what steps should be taken to recover home and foreign trade lost during the war and to secure new markets is part of the objective of one of these commissions of which the prime minister is chairman. Devising ways and means whereby the sources of supply within the empire can be prevented from falling under foreign control, is another duty of the same commission.

The commission on trade relations after the war is actively taking measures for the promotion of British trade and with equal enthusiasm is devising means for the prevention of the resumption of Germany's policy of peaceful penetration.

Methods whereby the endless munitions factories can be adapted to industrial purposes is an activity of the commission in the engineering trades. Seeking new industries to

be adopted is another duty of this commission. How the machinery may be adapted to other uses and the suitability of the labor of existing munitions factories for other industrial work will be shown. In each case, this commission will show whether skilled or unskilled labor is needed, and if female labor can be used.

Other preparations dealing with finance, demobilization of the army, food-stuffs, control of raw materials, etc., etc., are organized under these commissions with a searching viewpoint of leaving nothing undone.

Japan Has Great Plans

What Britain is prepared to do in foreign trade has a parallel on a lesser scale in what the Japanese will do and to a considerable extent are doing now. Japanese manufactured goods are pouring out from the island empire in unprecedented volume to new markets in all parts of the world. Our Pacific Coast merchants are buying textiles and jewelry, novelties, light metal goods, etc., from Japan because our own manufacturers cannot meet the Japanese prices. Japanese goods of all kinds are being sold in great quantities in South America, Australia, Africa, India and even compete with British goods in England itself.

Japan is a formidable competitor in the export of railway supplies to the Far East. Her manufacturing capacity is not sufficient to endanger the development of American or British railway exports, but possibilities of Japanese development of these resources are great. The vast Chinese iron and coal mines are being organized under her direction. Grown enormously rich by the war Japan is preparing to father the industrial development of China. Her first activities will be railroad and mining development. She will manufacture much of the finished products at home. Her domestic railway supply manufacturing industry had a capacity of one-third in excess of her own needs at the beginning of the war but it has been greatly expanded. Japan hopes to get the raw materials such as iron and steel, sheets and plates, structural steel from the United States until she can develop Chinese iron and steel resources sufficiently to meet her needs. The whole world is preparing for a new industrial era, and Spain and Australia are striving for locomotive building capacity, Chile and Brazil are building railroad shops. Italy is looking forward to the end of the war as the time when she will harness her water power to a reorganized and electrified system of railroads when machinery will be manufactured in hydro-electrical driven plants. Brazil is pushing the application of pulverized fuel for locomotives and industrial plants because that will make available the large deposits of lignite for industrial purposes. Siberia is awakening to her needs of transportation and manufacturing. Wherever we look we see a world full of new ideas getting ready for an era of industrial development. Everywhere railroads will play the first part in this great development, because transportation is the forerunner of all material progress.

Our Own Part in This Expansion

Our railroad supply manufacturers will play a big part in this reconstruction. Much business will come to them almost without their seeking, but with so many competing interests this first rush of business is likely to be transitory unless we are prepared to give service as well as products.

The American made car, the American made locomotive and other American railroad supplies are well suited to the needs of many countries. Large unit equipment is the kind that will probably be used in future railroad construction in most of the large continental countries of Australia, Africa, South America and Asia, because the grades, long hauls and materials to be handled make for conditions similar to those in the United States for which this equipment was evolved. European equipment is generally designed for short trips. Speedy delivery in small lots is more important than large

carrying capacity. Therefore, Europe is handicapped, at the start, at least as far as competition with us is concerned, in the attempt to sell its kind of equipment in the great continental areas.

For these much of our equipment can be sold just as it is for foreign use. On the other hand foreigners have many preferences that are founded on conditions peculiar to their own countries. It is to the credit of our railway supply manufacturers that they have keenly realized this fact. They have in many cases shown the engineers on the foreign railways that many American practices could be adapted most advantageously to their problem and many cars and locomotives are going abroad with American ideas and devices on them that should be well received. On the other hand, the American manufacturers have apparently been most careful not to overstep the line. The American Car & Foundry Company is very careful not to try to run counter to any of the natural preferences of the foreign purchaser. In supplying passenger cars to Italian railroads this company recommended that the cars should be built on the compartment system rather than the American seat arrangement although the Italians had asked for cars built entirely on the American system. The American company knew that the compartment arrangement was better suited to Italian needs and wanted to avoid a come-back.

Perhaps the most notable question that has come up has been that of journal box lubrication. We have supplied American M. C. B. journal boxes on an order for Italian locomotives. The Russian cars were built very largely to M. C. B. standards and had M. C. B. journal boxes even on a large proportion of the four-wheel cars. We have supplied large eight-wheel cars with M. C. B. journal boxes to companies in France. The French use a scheme of journal box lubrication in which they have a felt pad. American railway supply companies have essayed to show the French mechanical officers the advantages of our M. C. B. lubrication, but American railroad engineers now in France have conceived a great admiration for the French felt pad arrangement. When these railroad engineers come back it is even predicted that they will make recommendations that this method be considered for adoption in this country. However, true this prediction may prove, the point is that both sides are learning with open minds. The education that will result for us, whatever the outcome, will prove of untold advantage in the trade campaign later on.

There are thus many instances in which the preferences of the foreign buyer should be followed and others where the efforts of our supply trade should be to sell its own designs.

Thinking Financially in Dollars

The purpose of this article is not so much to describe the methods of getting export business as to show that the business is there and can be had by practical business methods, and that to go after it is so important that it can be said to be a patriotic duty.

Despite the scarcity of ships much of this business is available today. This is evident from the monthly reports of railway supplies from several countries, including the United States. No matter how scarce shipping is, it is necessary to keep commerce moving on the ocean routes and railroad supplies are a necessary part of this traffic.

That the development of export is for the best interests of the country is evident when we look ahead to the end of the war. Then is when our present preparations will show a dividend. Development of our export trade is developing the resources of the country to be utilized in time of war. In times of peace export trade in railway supplies will serve to balance the volume of production of our supply factories. When bad times exist in the United States the demand for railway material is likely to be particularly brisk in South Africa, Italy or the Far East. Economists say that when the

United States develops an export trade that sizes up to the immensity of her resources, bad times or boom times will no longer exist. An even measure of prosperity will be our constant condition. Export trade is already bringing the American in contact with other people with a consequent breaking down of old prejudices and the establishment of new friendships and also a broadening of the culture hitherto provincial.

The Latin is beginning to think financially in terms of dollars and he is looking to America to get the dollars for financing railway developments of his country. Export trade is needed to fill the ships that will travel abroad from the Atlantic and Pacific or Gulf ports to all parts of the world, so that by establishing a great volume of shipping to and from the United States we all may benefit by the cheapening of rates. This means the end of the Chinese wall of high freight rates that has cut us off from a full realization of our opportunity as a great industrial country. What Great Britain would be without ships is as easy to imagine as what the United States should be with an adequate merchant marine and a volume of export trade in proportion to our great resources and our national traits of initiative and business talent.

That the position of the United States is such that our preparations are sure to result in a great development of our export business is the opinion of Burwell S. Cutler, chief of the Bureau of Foreign and Domestic Commerce, who voiced this opinion recently by saying: "I, myself, have supreme faith in the genius of our commercial public to use good common sense in the contemplation of after-the-war trade. You can not make me believe that the sturdy figures who have in the last 50 years won a place for us as one of the three or four greatest world powers will ever be stamped into fear or uncertainty on account of what competition will do. When reconstruction is actually at hand, the American business man will find perfectly normal ways of holding his own in every market of the world without recourse to any selfish national schemes designed to hoodwink our commercial brethren abroad. Indeed, it may be assumed that our trouble will be one chiefly of satisfying the tremendous demand for our goods both at home and abroad."



"ACH, THEY'VE GOT OUR RANGE AGAIN"

Why Locomotives Should Not Be Standardized

There Can Be No Justification Either in Time or Money
for the Standard Locomotives

THESE ARE SO MANY REASONS against the standardization of locomotives for the railways of the United States that it is hard to understand why so much consideration is being given by the Railway Administration to this particular phase of railway operation. Unlike cars, locomotives are built to meet specific operating and physical conditions. Upon the size and design of the locomotive depends to a very great degree the efficiency of railroad operation. A design adapted to the physical and traffic conditions of one road, or even to one division of a road,

of the same design are built than the cost per locomotive when the same number of locomotives are built to the same general weight, but of different designs, provided that in both cases all of the designs are new. It is, however, a grave question whether locomotives of a new design, of a number which will probably be built this year, can be built any cheaper than locomotives of existing designs for which all the manufacturing equipment has been provided. In building any new design of locomotives, such as the new standard locomotives, there will be a large expense for the time taken to develop the designs, for making new drawings, patterns, templates and jigs, and other manufacturing equipment which is necessary to the construction of any locomotive. Prices for such locomotives must in all fairness to the builder, include the extra cost occasioned by developing the new design. Were locomotives of existing designs built, this extra cost would not have to be considered, as it has already been absorbed by the first locomotives built to those designs.

First Cost

There is another point concerning which but little has been said and which will add a considerable amount to the first cost of the standard locomotives. The following argu-

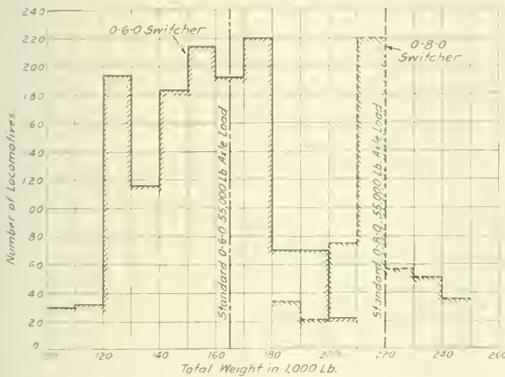


Fig. 1—Number of Six and Eight-Wheel Switchers Ordered During the Past Five Years According to the Weights

may be unsuited to the conditions of another road, or another division of the same road. To effect greater increases in the efficiency and economy of operation, the railroads have given much study to the proper characteristics of the locomotives to be used, and to upset such carefully laid plans by the introduction of standard locomotives, which at best must be of a compromise design and can only be made to meet average conditions, is a decided step backward.

There is ample justification for the standardization of freight cars. Due to the extent to which such cars are interchanged between roads and because of the fact that such a large amount of repairs are made on foreign lines, it is entirely proper that a certain degree of standardization obtain in order that these repairs may be made promptly and that the repaired parts be interchangeable, so that the number of such repair parts to be carried in stock may be maintained at a minimum. This, the chief argument in favor of standard cars, does not apply to locomotives. Locomotives have not and should not to any great extent be interchanged between roads if the best results in train operation are to obtain. The experience of the past few months with locomotives that have already been interchanged will show clearly the inexpediency of such practice.

There are six distinct problems that must be considered carefully in the discussion of standard locomotives today. They are first cost, increased locomotive production, operating efficiency, development in design, locomotive repairs, and the expediency of such an experiment in time of war.

It is, of course, an indisputable fact that the cost per locomotive will be less when a large number of locomotives

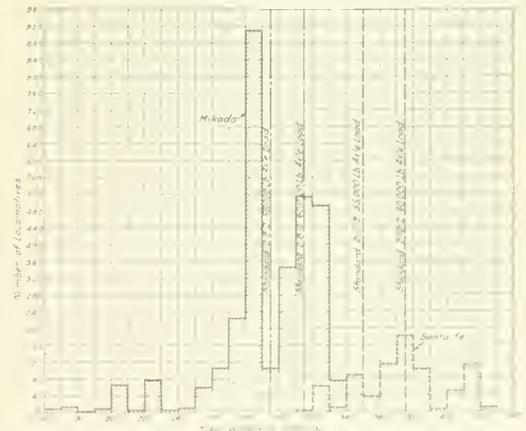


Fig. 2—Number of Mikado and Santa Fe Type Locomotives Ordered During the Past Five Years

ment is based on what is believed to be the government's plans, namely, that 12 designs are to be built, having approximately the following total weights:

Six-wheel switcher	1,000	
Eight-wheel switcher	875	
Passenger	75,000 lb. axle load	1,000
Passenger	60,000 lb. axle load	1,000
Mikado	125,000 lb. axle load	1,000
Mikado	100,000 lb. axle load	1,000
Mikado	75,000 lb. axle load	1,000
Mikado	50,000 lb. axle load	1,000
Santa Fe type	125,000 lb. axle load	1,000
Santa Fe type	100,000 lb. axle load	1,000
Santa Fe type	75,000 lb. axle load	1,000
Santa Fe type	50,000 lb. axle load	1,000
Total		12,000

The manner in which the first ten locomotives will fit into the requirements of the country is well illustrated in Figs. 1, 2 and 3. Fig. 1 shows the number of locomotives ordered during the past five years, by weights, for the six-

wheel and eight-wheel switchers. Heavy vertical lines are drawn at points representing the approximate weights of the standard switchers. The same is shown for the Pacific and Mountain types in Fig. 2, and for the Mikado and Santa Fe types in Fig. 3. From these charts it will be seen that if the government builds only those standard locomotives

would not be required for these locomotives. If the work of all of these 367 locomotives were concentrated at one point, this would undoubtedly be true, but these locomotives were purchased for use in various parts of the country and they were not built as heavy as the standard locomotives, as the conditions did not require locomotives of such capacity.

This same line of argument can be applied in the case of all the other types to the extent that it will be safe to say that millions will have to be spent for excess locomotive material if the standard locomotives obtain. It is hardly conceivable that any savings that could be made in manufacture, could be enough to counteract these additional costs.

Increased Production by Standardization

As an abstract proposition, the output of any plant can be increased if the work done in that plant is systematized to the extent that it produces but one product year in and year out. In the case of locomotive construction, standardization will to some extent aid in reducing the time taken for making the various parts after the program gets thoroughly started. But will this mean increased locomotive production? The foundation upon which the locomotive builder's plants and the locomotive repair shops is based is the number of pits, or the erecting shop space. In other words, the erecting shop is the neck of the bottle in locomotive construction. The various manufacturing departments have been designed and arranged to keep the erecting shop working to full capacity. The question then is, how much can the erecting shop forces speed up their work if they have large numbers of one design to assemble rather than small numbers of different designs. Men in authority have expressed the opinion that this would have but little effect on increased output, but that it may have some.

With conditions as they exist today, however, the inauguration of standard locomotives at this time bids fair to interfere greatly with the output of locomotives this year. About the time the Railroad Administration decided to investigate the problem of standard locomotives, the railways were forbidden to place orders for new locomotives. Instructions were given the builders to place existing domestic orders ahead of all foreign orders. As the matter stands today, the builders due to lack of orders and the fact that the work on foreign locomotives has been held up, have open space beginning in June or July. Unless orders are placed immediately, the materials cannot be assembled or made ready for erection by that time. It has been estimated by those who know that from the first of April every day's delay in placing orders for locomotives means a decrease of about ten locomotives in the year's output.

It has been said by some that deliveries of the standard locomotive can be made within two months after designs have been definitely determined upon. Such a statement represents the utmost optimism. It is difficult to see how with all the detail work that must be done in connection with any new design, together with the condition of the material market today, the innumerable details can be designed, the patterns, jigs, templates and castings made, machine work done and the locomotive erected in two months. Others say that this can be done in three months, but even that is optimistic. Until such time as the standard designs can be determined upon, and this by no means should be done in a hurry, the locomotive builders should be kept working to capacity, if necessary by orders from the individual lines.

The business of the railroad is transportation. Its measure of efficiency is the cost for transportation per ton-mile. It was the aim of every road to bring this cost per ton-mile to a minimum. The locomotive plays a very important part in reducing this cost. The many different conditions surrounding railroad operation make it necessary carefully to design the hauling unit if the different conditions are to be met economically. A locomotive usually operates over a distance of not more than 150 miles. There are probably

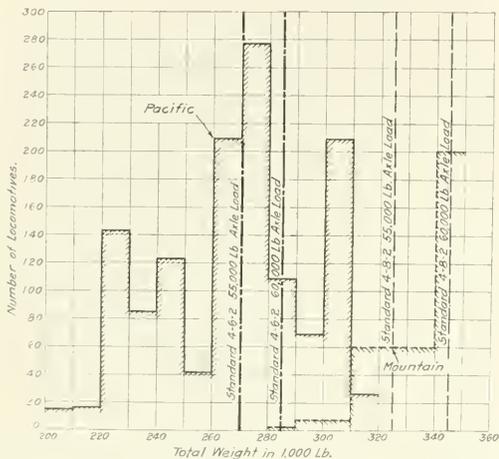


Fig. 3—Number of Pacific and Mountain Type Locomotives Ordered During the Past Five Years

which it is now considering, many roads will be furnished, if the same requirements obtain as in the past, with power that is either too heavy for its demands, or of a more complicated construction. For instance, those roads that could economically use Pacific type locomotives weighing less than 270,000 lb.—and as the curves show there will be quite a number—will be obliged to use a heavier locomotive. Those roads that have found it desirable to use Pacific type locomotives weighing over 300,000 lb. will either have to take the standard Pacific weighing 295,000 lb., which will be deficient in tractive effort, or take the more complicated design of the 325,000-lb. Mountain type.

The first cost of the locomotives will from such an analysis appear to be greater inasmuch as heavier and more complicated locomotives will be required for services in which locomotives of less weight could be used. For instance, last year there were 367 Mikado type locomotives ordered, each of which had a total weight below the 295,000 lb. standard. The sum total weight of these locomotives was in the neighborhood of 97,000,000 lb. If the same requirements obtain this year, and there is no question but what they will, the need for the 367 locomotives would undoubtedly be filled by 367 standard locomotives which would have a sum total weight of about 108,000,000 lb. In other words, about 10,000,000 lb. of locomotive material—1,000,000 being subtracted for water in the boiler—would be required to fill these requirements under the standardization program. Taking a conservative cost of locomotives at the present time as 15 cents per pound, in this particular case the increase in first cost, due to the fact that standard locomotives are being used, would amount to \$1,500,000. There is no question but what last year's requirements will be doubled this year and it can safely be said that the loss in first cost of the lighter Mikado types will easily reach \$3,000,000, if they are to be supplied by the standard locomotive. This does not take into consideration requirements for Consolidation locomotives which will still further increase this sum.

It may be argued that on account of the increase in tractive effort, an equivalent number of standard locomotives

2,000 such engine divisions throughout the country. Many of these, of course, are similar in nature, but each with its physical limitations and its traffic conditions must be given careful study that the most economical method be followed in getting the trains over the road. Water and fuel conditions affect the detail design of the power to be used.

Operating Efficiency

It would be folly to place powerful locomotives on single track lines whose sidings would not permit the length of a train that could be hauled by the locomotive. It would be a waste of money to sacrifice the high wheel engine of the plain for the low wheel engine of the mountains, simply for the sake of standardization. Considerable money has been spent to strengthen tracks and bridges for the purpose of using more powerful locomotives which have wheel loads heavier than those contemplated by the government. It would be impractical for the sake of standardization not to take advantage of these improvements by using the heavier axle load locomotives which can be operated more economically. There are many, many cases where locomotives of special design, built to meet the special requirements of division or road, have made possible a material decrease in operating costs. To upset such carefully laid plans by requiring the use of a locomotive which must of necessity be a compromise design, removes the incentive for further study along these lines, and increases the operating costs.

It has been said that many roads today are operating locomotives of similar design, the only difference being in some minor detail which was more or less a hobby of the chief mechanical officer. In such instances there is no question but that the same design of locomotive could be used on such roads, but there are many other instances where the operating conditions are so different that to insist upon the use of standard locomotives would be to give the operating men inadequate tools with which to do their work.

Development in Locomotive Design

With the fixing of any standards there cannot help but be a feeling that it is hopeless to further improve "our power." The quotations are used advisedly, for there is nothing so close to the heart of a railroad mechanical man as the locomotives he has under his jurisdiction. He is constantly seeking to further improve their efficiency and capacity, and make them operate better and do more work. This, of course, results in a number of idiosyncrasies and whimsical things which find their way on locomotives throughout the country, but be that as it may, the careful study and interest that has been taken in the locomotive by the men that operate it, has made it as efficient as it is today. By standardizing, the initiative for further improvements and betterments is removed from these men. It is no longer "their" locomotive, but "something somebody has designed who does not know our conditions."

This psychological view of the situation is one that enters into the problem of standard locomotives to a large extent. There is hardly a railroad mechanical man who does not think his power is better than that of his neighbor. It is this attraction in the railroad game that keeps the men on the job at, in many cases, ridiculously low wages. It is these men who from their practical experience in handling the locomotives, provide their roads with power which on other roads would not make nearly as good showing.

The railway supply concerns have been a great factor in developing the locomotive to its present standing. This industry has devoted large sums of money to development work and has among its organization the experts in their respective lines. The country cannot afford to standardize locomotives to the extent that any incentive for these companies to still further improve their products be removed. In most cases, a new device that is developed is experimented upon on locomotives of roads that had the conviction of its

merit and the courage to try it. This has been necessary in order that the device be properly developed. Such practices should not be discontinued even though all the railroads are compelled to purchase none but standard locomotives. If it is, the development work which has done so much for locomotives during the past five years will be greatly handicapped. Further, after such experiments have been made and proven practical, experiments should be continued on a larger scale, such as by equipping new locomotives for perhaps one road with the device that it may be still further developed. To equip any large quantities of locomotives, such as would undoubtedly be ordered if the standard locomotives are to obtain, would be perhaps impractical on account of the extent to which the particular device in question has been developed. To this end, therefore, it is highly desirable to permit the roads for which locomotives are to be purchased by the government to specify the appliances to be used on those locomotives.

Naturally, if development is to continue along these lines as it has in the past, standardization should not be carried beyond the basic locomotive design. While it is understood that the plans and specifications are about to be submitted by the government, it is not known just the extent to which the standardization has been carried. If the same policy is to be followed as was followed in the development of the designs for standard cars, there need be no fear for any serious restrictions on this point. If by standardization any incentive is removed from either the railroad men or the railway supply men, future development will suffer.

It is hard to believe that good designs of a set of locomotives which are so radically new, could be developed in the time allotted to the designing committee by the Railroad Administration. The problem is such an all-important one and bears such a vital relation to the future efficiency of our railroads that it is deserving of the most careful attention and painstaking investigation. According to report, as soon as the designs have been completed and approved, large orders will be placed immediately. If by any chance a mistake has been made in any design, the effect on the railroads would be that many times worse.

Locomotive Repairs

The railroads have in the past standardized to a certain extent the various details of their locomotives in order that repairs may be easily made and that the amount of material to be carried in stock may be reduced to a minimum. Almost every road has what is called standard practices, which are described both by drawings and instructions in *folio* form, in order that the standards of repairs will be the same in all of the main shops and engine-houses. Their locomotives are built to meet these detail standards. Special tools, dies, patterns, templates, jigs, etc., have been developed to meet these standards so that repairs may be made at less cost.

With the introduction of standard locomotives, these standard practices would have to be revised to a very large extent. New facilities for making repairs would have to be created and the foremen and men in the shops would be obliged to readjust themselves to many little detail changes that would be found in the standard locomotives, all of which would materially interfere with the output of the shops and create a confusion that the country could ill afford to experience at this time. This matter is a tremendously important one and must be given very careful thought. The railway shops of today, taking the country over, are wholly inadequate for handling the repair work on the locomotives the roads now have. There is hardly a road in the eastern territory but that will own up to a deficiency in this respect. The shop and terminal facilities for maintaining locomotives have not kept pace with the improvements to the locomotives. To overtax these shops further by calling upon them to repair locomotives with which they are not familiar and for which they have not the proper facilities

will greatly increase the burden of the already overtaxed facilities. An excellent illustration of the difficulties that will be found in the repairing of the standard locomotives may be found in any railway shop that is now called upon to repair locomotives for other roads.

The fact that any standard locomotive would be a foreign locomotive to all roads makes the problem increasingly serious. Furthermore, as was pointed out above, in a large number of cases heavier locomotives will be provided for certain work which was done before with smaller power. This again will increase the difficulties in making repairs. With the introduction of any large number of heavy locomotives on the railways must come a material improvement in the shop facilities. Some roads have adopted larger power without increasing their facilities and are well able to testify exactly what this means in decreased shop output and inefficiently maintained power. While, of course, the repairs to the standard locomotives do not loom up as being a vital question in the immediate future, it must be remembered that it is a question which will have to be met about a year hence. The lack of repair facilities during the past winter was responsible to some extent for the deficiency in motive power. With a design of locomotive which is new to all of the roads demanding repairs a year from now, which perhaps might be a more critical period than the present, it behooves every one who has to do with the establishing of the standard locomotives, to give this matter the most careful thought.

Regardless of the arguments against the standardization of locomotives as an abstract proposition, and assuming for the moment that there are certain substantial benefits to be obtained by standardizing locomotives which make it expedient at least to build from 4,000 to 5,000 of them, should we undertake such a gigantic experiment at this time when the country is at war? There can be only two logical reasons for building standard locomotives as a war measure. The first is an increase in the production of new locomotives,

and the second is a reduction in the cost of locomotives. The answer to the first question may be found in the section discussing the production. The answer to the second question is found in the section discussing the first cost. The condition in the locomotive market today is such that the very consideration of standard locomotives is in danger of decreasing the output of the builders for the year. In the matter of first cost it is shown that money will be wasted, because the locomotives will be provided that are heavier than necessary and, therefore, more expensive. Added to this, the increased cost of operation of the locomotives and the increased cost that must arise from their repair would make it appear that the introduction of standard locomotives at any time would result in a net loss rather than a saving.

Conclusions

It would be far from constructive if this article should close without offering some suggestions as to what can be done to do what the government is evidently trying to do by the inauguration of standard locomotives, namely, improving the motive power situation the country over. The motive power situation of the railroads of this country can be improved; (1), by properly maintaining the locomotives that are in service at the present time and bringing them up to serviceable condition; (2), by increasing their capacity by the addition of devices, which have been found to increase the service and give more power to the locomotives; (3), by improving engine terminals in order that locomotives may be turned more promptly than they are now; (4), by properly loading locomotives to their full capacity; (5), by properly dispatching locomotives over the road; (6), by giving the railroads locomotives best suited to their conditions and which may be easily repaired by them; (7), by giving priority orders so that the builders may obtain material for new locomotives; and (8), by placing orders for locomotives immediately.

Signal Department Encounters New Problems

Shortage of Labor and Delayed Deliveries of Materials Hinder Work. Outlook Good for Much New Work

AT THE PRESENT TIME the signal field is quiet. This condition is a result of the uncertainty regarding railway affairs, although this uncertainty is disappearing rapidly and the outlook for the signal department organizations and work is decidedly bright. As the director general expects to spend from one to two billion dollars on the railroads this year, it is to be expected that the signal departments of the country will come in for their share of this expenditure. The location, class and kind of work will depend upon the necessity for the protection and development of facilities to meet the country's present and expected needs under war conditions. Another consideration that will also govern will be the needs of the lines under unified operation rather than their needs as individual carriers.

The greatest opportunity in the history of American railways is presented to the signal engineers of the country today to demonstrate the value of signals in the movement of the heavy war-time traffic. The future progress in the signal field very largely depends on the manner in which the present situation is handled by signal officers. It is logical to assume that an optimistic view is warranted when it is considered that no other class of work can be installed in as short a length of time, with less expense and with less labor, which will increase the traffic capacity of existing tracks to an equal extent.

The construction work that has been carried on during

the last three months has been mainly that which had been started prior to January 1. Very little new work has been contracted for or authorized this year. General order No. 12, issued by the director general, will be the guide in determining the kind of signal as well as other work which should be installed. The work which should be undertaken first is that in connection with unsignaled lines which have reached their maximum track capacity and over which it is necessary to move still more traffic. The importance of the installation of interlocking plants should also not be overlooked, as material savings may be effected at a large number of busy points by the elimination of stops by heavy trains, facilitating train movement and preventing considerable wear and tear on rolling stock.

Possibilities for economy in the handling of traffic should be considered very thoroughly and where it is found that an installation of signals will better conditions materially, even though the track capacity has not been reached, it is important that such installations be made. While work which has been under way for some time has been hampered by the delay in receipt of materials, this is a problem which can and no doubt will be remedied by the priorities board. Construction work can also be greatly facilitated by the ordering of material, where practicable, a year or two in advance.

Some of the work now under way, nearing completion,

or contemplated, is referred to below. While it is not complete for the country, it is indicative of the class and character of work which will undoubtedly be undertaken in connection with new programs.

Work Now Under Way

The *Alabama &icksburg* is just completing automatic block signals on 11 miles of road, with the expectation of putting them in service within 60 days. The management proposes to install automatic signals on 11 miles additional, but has taken no action thus far except to recommend this improvement to the director general.

The *Atchison, Topeka & Santa Fe* is to install mechanical interlockings at Atchison, Kan., orders for which were recently noticed.

The *Atlantic Coast Line* has authority outstanding for the construction of a mechanical interlocking plant near Marion, S. C., with six levers of the cabin door lock type; one at the Roanoke river draw with a five lever mechanical machine, and one at Orient, Fla., with a nine lever mechanical machine of the cabin door lock type.

The *Boston & Maine* has completed one interlocking plant during the past three months. Plans are ready for the early installation of a number of other interlockings, and also some semi-automatic signals at entrances to yards; also several "automatic flagmen" for highway crossings; but the difficulties of the manufacturers in securing raw material and the impossibility of agreeing on prices except where the contracts can be closed at once, have greatly enhanced costs, delays and other difficulties.

The *Boston Elevated*, in connection with its extension northward to Everett, Mass., 3 miles, is installing 14 automatic block signals and is making extensive changes and additions to its interlocking at Sullivan square, Boston, where the new extension leaves the existing line. Light signals are used throughout this improvement.

On the *Buffalo, Rochester & Pittsburgh* work has progressed on interlockings at C. & M. Junction, Pa., and at Brockwayville, Pa., since January 1, and on the installation of signals on the second track between Marion Center, Pa., and Home. This work will all be completed in the near future.

During the past three months the *Baltimore & Ohio* has completed two temporary interlocking plants at Annapolis Junction, Md., which were needed in connection with the movement of traffic to and from Camp Meade; a 48-lever interlocking at the west end of the Magnolia cutoff; the changing of the signals on a single track line to double track for about 23 miles in Indiana, including interlocking at a passing track at Bremen and automatic signals between Hamilton, Ohio, and Toledo, on the Toledo division, sufficient to provide continuous automatic block signal operation from Cincinnati to South Lima, 150 miles, with the exception of one short section in Dayton. At Bremen, Ind., take-siding indicators and leave siding indicators have been provided, both of which are controlled from LaPaz Junction. Every effort is being made to complete extensive additions to the automatic signals between Cumberland, Md., and Connellsville, Pa., between Willard, Ohio, and Greenwich, and between Willard and Attica; but the progress of this work has been hampered by the scarcity of labor and by slow delivery of material.

On the *Chicago, Burlington & Quincy* 47 miles of double track automatic signals between Mt. Pleasant, Iowa, and Ottumwa, which have been under construction for some time, are now approximately 90 per cent completed. A number of interlocking plants on this road are also being repaired or rebuilt and are about ready to go into service again.

The *Eric* has completed automatic block signals on 35 miles of double track line from Lomax, Ind., to Griffith during the past three months. It is also hoped to start work

during the present month on an extensive interlocking plant at Salamanca, N. Y., and at three other large plants.

The *Grand Trunk* is installing automatic block signals on its line in Maine, about 30 miles, single track. High cost of materials and shortage of labor have thus far prevented the completion of further plans.

The *Great Northern*, as noted in the *Railway Age* of February 8, is to install automatic block signals on its line in Montana, 31 miles, and in Minnesota, 11 miles.

The *Illinois Central* has been building automatic signals on 198 miles of single track and 12 miles of double track which will be put in service about July 1. An electric interlocking plant at a junction with the Michigan Central at Pullman Junction, Chicago, will be ready for service about April 20, while an interlocking plant at Baton Rouge, La., will be completed about the middle of the summer.

The *Jacksonville Terminal Company*, Jacksonville, Fla., has ordered material for two interlockings, tower 1, and tower 2, at its new terminal.

The *Lehigh Valley* has ordered a 38-lever interlocking for Easton, Pa.

The *Louisville & Nashville* is making extensive additions to its electric interlocking plants at Louisville, Ky., and Amqui, Tenn.

The *Missouri, Kansas & Texas* has ordered materials for an interlocking plant, 12 levers, at Clinton, Mo.

The *New York Municipal Railways* has substantially completed all of the signaling in the Broadway subway, Manhattan, and across the Manhattan bridge between 42nd street and the Brooklyn end of the bridge.

The *New York, New Haven & Hartford* has under construction about 80 miles of automatic block signalling, of which a small part is four-track line and the rest two-track; and in addition has prepared plans for about 72 miles additional; but in the present situation as to scarcity of help and delays in delivery of raw and manufactured material, no definite calculations can be made as to when this work can be completed. The additional lines included in the budget since the report made in January are those from Boston Switch, near Providence, R. I., to Readville, Mass., from Devon, Conn., northward to Waterbury Conn.; and from Hopewell, N. Y., to West Pawling, N. Y. The extensive improvements in existing interlocking plants, reported in January, are still under construction, rather slow progress being made.

In connection with passing sidings on the main line between New Haven, Conn., and Boston, Mass., 157 miles, operated by the controlled manual block system, about 25 outlying switches are to be provided with low-voltage switch movements, and operated and controlled from towers usually about one mile from the switches. These switches will be provided with home signals.

The *Norfolk & Western* has completed the installation of automatic signals between East Radford, Va., and Atkins, a distance of about 88 miles, during the first part of 1918. It is expected that automatic signals will also be completed between Atkins and Bristol during the next few months. The following work was also completed in 1917: installation of automatic signals between Northampton, W. Va., and Fort Gay for the purpose of converting the present blocks from two miles to one mile in length; installation of automatic signals in connection with the operation of the electrification from East Vienna, W. Va., to Farm and Wilcox; installation of double track in North yard, approximately 4 miles. Addition to the interlocking plant at Glen Jean, Ohio, to take care of the C. & O. N. connection.

The *Norfolk, Chesapeake & St. James* is engaged on the construction of the large electro pneumatic interlocking plants at Norfolk, noted in our Annual Review Number of January 4, but material is being received so slowly that only a small part of workmen can be kept busy.

The *Pennsylvania* has been able to complete some of the

work started in 1917 and in 1916, notwithstanding the generally slow receipt of material. This includes the Woodlands Tower interlocking on the Philadelphia Terminal division and an 8-lever mechanical plant at Phelps Junction, N. Y., on the Elmira division. Automatic signals of the position-light type are now in service between Rahway and South Elizabeth, Sunbury and Selinsgrove Junction, Schuylkill River bridge and North Philadelphia. The Chestnut Hill branch installation is coincident with the extension of the electric train service on that portion of the system and carries with it the building of a new electro-mechanical style P-4 U. S. & S. Co. interlocking at Chestnut Hill. This plant will have eight electric and four mechanical levers. Thirty miles of position-light automatic signals on the N. Y. P. & N. are about ready to go into service. In addition to the above work, a number of changes have been made in existing installations and plants.

The *Pennsylvania Lines West of Pittsburgh* will install a mechanical interlocking, 35 levers, at Boone, Ind.

On the *Philadelphia & Reading* construction will soon start on an A. C. signal installation between Delaware river bridge and Hillman, Pa. An extension of the present signal system to Bound Brook Junction, N. J., an addition of 12.6 miles of four track road is also contemplated. Construction will soon be started on five new interlocking plants, while changes or additions will be made to the present plants at five other points.

The *St. Louis-San Francisco* has ordered a mechanical interlocking, 35 working levers, to be installed at Durant, Okla.

The *Southern Railway (C. N. O. & T. P.)* has ordered, as noticed in the *Railway Age* February 8, automatic block signals for its lines in Kentucky and Tennessee, 46 miles, to take the place of automatic signals of earlier types.

The *Washington, Baltimore & Annapolis* is to install automatic block signals on 14 miles of its (electric) line, double-track, to accommodate the increased traffic due to the establishment of Camp Meade.

General Maintenance Conditions

During the past three months the railroads of the United States have passed through one of the worst winters in their history, marked by extreme cold weather over the greater part of the country and by very heavy snowfalls through the middle west. In spite of the combination of the extreme weather and the heavy transportation requirements the signal property at the close of winter was normal in practically all cases. This condition is the result primarily of the fact that maintenance work is taken care of during the summer and the late fall in order to get all signal apparatus in shape so that the least amount of work will be required during the winter months. The needs for the present year are with very few exceptions practically the same as have confronted the railroads in previous years at this time and no extraordinary measures should be necessary to maintain the signals in proper condition. The maintenance programs on a large number of the roads are practically up to schedule owing to the fact that safety in signal operation depends primarily upon such care, and this work can not be deferred.

The extent of the maintenance work to be undertaken during the present year necessarily depends upon the attitude which the government will take toward such work, this attitude no doubt conforming to such recommendations as may be made through the regional directors to the director general. Some roads are making requests for their regular maintenance appropriations and are outlining their work accordingly until such time as definite information may be obtained as to whether the appropriations will be authorized. Other signal department organizations, while submitting their regular maintenance programs for the coming year and asking for appropriations to cover, find that these are be-

ing restricted to a certain extent by the officers on their roads. In general, plans are being made to carry on the maintenance work as it has been handled heretofore.

The worst condition encountered during the past three months was in connection with the operation of interlocking plants. The main trouble experienced was in keeping the plants cleared of snow and ice and open for operation. This condition was brought about by the lack of labor more than any other one contributing cause, although even with this shortage of labor the signal departments generally were able to keep interlocking open ahead of any necessary traffic moves that were to be made over them. Some of the roads utilized their construction forces on interlocking plants during this period, while waiting for necessary materials to arrive to continue work which was under way.

Material Situation

While the material situation confronting the signal departments of the country looks bad, the prospects are bright for an early solution of this trouble. On a number of roads new work has been suffering for a lack of material, and maintenance work has also been interfered with to a certain extent. Some roads have had material ordered for over a year which they have not yet received. Other roads report no great difficulty with delayed material as they have anticipated their wants as much as a year and a half or two years ahead and as a consequence have been able to keep the work moving. The troubles encountered in securing material are due primarily to three conditions, the difficulty the manufacturers are encountering in obtaining raw materials, the labor situation and the effect of priority orders. While the situation at present is bad, the future may be considered as bright since the government can arrange for manufacturers to obtain the raw materials necessary, and the priority orders can be used to the advantage instead of to the detriment of this class of work.

Labor Situation

The signal department, in common with other branches of railway service, is hard hit by the shortage of experienced men. For the class and nature of work the labor turnover is entirely too great. Maintenance work is beginning to suffer on many roads. The new men coming into the service often regard the work as temporary until something better offers. It is impossible to get such men enthusiastic over their work and unless they are enthusiastic and interested, the work suffers. It has been found necessary in some cases to lengthen the territories of the maintainers in order to put an experienced man over each section, giving him inexperienced men as helpers and lampmen. It has been found necessary on some roads to conduct an educational campaign among the new men entering employment, this taking the form of lessons and practical questions which may be considered as part of their regular work.

Federal Valuation

During the past three months the work carried on by the government in the valuation of signals and interlocking has been mostly in the southern part of the country where the average mileage of line inventoried per month is greater than that covered in the north. This is because signaling on the southern lines is not as heavy as that on the trunk lines in the central west and the east. The railroads are now confronted with a lack of men in the valuation department and the work is handicapped accordingly. Unless it is intended to place final figures of value on the railways on which inventories have been made, many railway men consider it advisable under present conditions to postpone such work, employing the men engaged on valuation in other capacities more essential to the winning of the war.



Sir Wm. Mackenzie



John J. Shaughnessy

Executive Committee of Canadian Railways' War Board



A. H. Smith



J. C. Ketchum

Brain-Racking Problems for Canadian Roads

Winter of Unparalleled Severity; Shortage of Equipment;
Unprecedented Business

By J. L. Payne

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TRAFFIC AT ALL TIMES being the reflection of commerce, it is not surprising that the railways of Canada throughout the year 1917, and down to the end of March, enjoyed uninterrupted, though qualified, prosperity. Their gross earnings for the past 15 months have been unprecedented as to volume, which is another way of saying that freight tonnage has been moved on a steadily rising scale. The official statistics are not yet available, and it would be unsafe to speculate in terms of dollars as to what has been won by way of net operating revenue; but it is unnecessary to have definite figures in hand in order to forecast a decline in the final credit balance. Railways have no occult nor other means of working miracles, and therefore, while business has been exceedingly active, profits have been undoubtedly reduced by conditions. There was no escape from the stern forces which have operated to make the movement of traffic unusually difficult and costly.

The winter of 1917-18 was unparalleled in severity, from the railway standpoint. We have had cold dips in the

past. They are inseparable from our northern climate. But we have never had such prolonged periods of low temperature. It was peculiarly difficult to maintain a free movement of trains under such circumstances. Even though the over-worked boiler was willing to keep up an adequate supply of steam against an abnormal condensing pressure from without, the human factor at all times has its limitations. Men could not do their full part in such a struggle against paralyzing cold. The fall of snow has also been above the average, but not seriously beyond it. Drifting gave more trouble than mere depth of snow. Long spells of intense cold, however, created the most serious obstacle to comfortable and satisfactory operating conditions. Nature was in a hostile mood, and made the railways pay her price

Shortage of Equipment

Trying as was the cold, deep as were the drifts, chilled as were the men who carried on the freight, there was another adverse force against which courage, endurance and skill



J. H. Walsby



Sir George Burd



C. E. Smith



H. W. Blair

Members of Administration Committee of the Canadian Railways' War Board

were unavailing. There were not enough locomotives and cars in the Dominion to meet the demands upon the railways. In mathematics three will not go twice into five. In the railway realm an equally inexorable law prevails. It was impossible to make three cars serve where four were imperatively needed; and that about sums up the situation during the past 15 months. In 1914 the railways of Canada made a very substantial addition to equipment, following the prosperous year 1913. Then came the most severe pinch of adversity within two decades, without any reference whatever to the war. It all happened before the mad dog of Europe broke loose. The year 1915 brought the reverse pretty well up to the magnitude of a disaster. The war did that; and, of course, it would have been madness under such circumstances to add to rolling stock. In 1916 gross earnings went over the top, and in 1917 created an entirely new and conspicuous peak. More earnings meant more tons, more train miles, more everything. They sent out their own S. O. S. for more motive power and for more cars; but the most insistent call for help could not be answered in 1917. The war glutton was gobbling everything in sight.

The equipment situation at this time of writing presents the following equation: With nearly 30 per cent more tonnage to be moved there are actually fewer locomotives and cars with which to move it. The answer should be, "It cannot be done." Nevertheless it is being done; but it is being done under conditions which give a pungent meaning to the term "qualified prosperity" with which the cursory review opens. It is being done under a terrific and perilous strain on every department of operation. Embargoes were almost constant throughout the long winter. The repair shops were despair shops; for the problem of keeping enough wheels on the tracks seemed at all times beyond human capacity. The situation, however, gave vital meaning to the familiar saying: "You never know what you can do until you've got to do it." Efficient co-ordination of all departments accomplished what would have been impossible on the part of any single department. All the courage of the country had not gone overseas, and there ought to be a barrel of military crosses somewhere for the men who helped out by increasing the trainload and carload, as well as for the other fellows who did wonderful things in the shops, in the car distribution offices and in every branch of the service. The railways certainly did their bit, and what they did bore its relationship to the war in only minor degree to what was being done in Flanders and France.

No Relief in Sight

Whether or not the extreme pressure will relax is a matter of sheer conjecture at this moment. During the past three months the weekly traffic returns do not show the 1917 bulge; but they are nevertheless in advance of the corresponding period. The coal situation and the priority claims of war shipments have eased up; but both suggest abundant cause for anxiety in the outlook. Experience is a stern teacher, and the railways quite naturally feel compelled to make large plans for the possible demands of next winter, plus the prospect of a larger movement of food for export. At this juncture commerce, which creates traffic, is exceedingly active and gives no indication of a let up. Taken altogether, either a prolongation of the war or the coming of peace will keep the railway offices occupied with brain-racking problems. Happily, there are big men on the job.

Within the past month effect has been given by the Railway Commission to the appeal of the railways for higher transportation rates. While the advance is nominally 15 per cent in freight and passenger tolls, the former are subject to qualifications which bring the increase down to practically 12½ per cent. For example, wheat in the West

will pay but 10 per cent more, while coal between the Niagara frontier and Toronto will pay about 27 per cent more. This long-deferred concession was given in the face of determined opposition, chiefly from the West, and that opposition had really a single aspect. It was directed almost wholly against the Canadian Pacific; for the sufficient reason that the position of practically every other road was undeniably in the nature of distress. The Canadian Pacific stood out alone as an abundantly prosperous system, and there was a positive feeling against giving it higher rates. Yet the dissidents were impotent against the obvious question from the commission: "How can we help the struggling roads without at the same time increasing the earnings of the Canadian Pacific?" To meet that question there was put up to the commissioners a greater variety of impracticable suggestions than is usual in a railway rates case. As a matter of fact, no sound answer was possible. Some way had to be found of satisfying public feeling while permitting all lines to share in the increase of rates.

Special Taxes for Canadian Pacific

The way out was found in imposing special taxes on the Canadian Pacific in the following measure: One-half of its net earnings from railway operation in excess of 7 per cent on its common stock, after paying fixed charges, appropriation for pension fund and dividends on preferred stock; and income tax on the company's special income, inclusive of all its income except earnings from railway operations, under the Income War Tax Act. It is also provided that the total amount to be paid by the company each year shall not be less than (1) its net earnings in such year from railway operations, and from special income, in excess of 10 per cent of its common stock, after paying fixed charges, appropriations for pensions and dividends on preferred stock, up to \$7,000,000, or (2) the amount by which its net earnings from railway operations exceed the net earnings from railway operations for the fiscal year ended December 31, 1917, due to the increase in freight and passenger rates, just allowed.

This action must be accepted as indicating the situation which has been created by the exigencies of war. Those who are gifted with a spirit of divination may see a great deal more in it than that. To say the least, we are all living in grave times.

Getting Practical Results

Turning to the activities of the Canadian Railway Association for National Defence, it may be said that a vast amount of useful, necessary and effective work has been done. This is not essentially a body created by government and operating under government control. It is rather a voluntary association, organized by the railways and having powers from within itself; yet it has the direct approval and co-operation of government, and lacks little which wholly official control could give. In some respects it is able to do what government could not very well do. Under its comprehensive name are grouped a Special Committee on War and National Defence, an Administrative Committee, a Commission on Car Service, a Committee on Passenger Transportation, a Committee on Tariffs and Statistics and a Committee on Materials and Supplies. As the work of the Association is of considerable interest to American railways a summary may be given of what has been accomplished during the recent months:

1. Great assistance has been given to shippers in the handling of freight traffic during a season of such unprecedented severity as to cause persistent hindrances.

2. The construction of freight cars in Canada was imperilled because of the inability of manufacturers to obtain materials from the southern states on account of embargoes. Arrangements were made with the regional directors of the

United States Railroad Administration whereby the acceptance of such consignments was brought about.

3. The diversion of freight has given great relief to congested lines, facilitated the movement of foodstuffs to the seaboard and saved much delay to vessels. The handling of troops was improved by the same process.

4. The net balance against Canada on freight car exchange with the United States has been decreased from 22,219 on December 15 last to 16,058.

5. The average load per car has been bettered. As compared with January of last year the carload to St. John, New Brunswick, was this year raised from 26.4 to 32.3 tons. The saving was equal to 1,313 cars, 7,300 tons of coal, and a month's time of eleven locomotives.

Snappy Bulletin

As a result of what this association has done, it is now a common thing to see a Canadian Pacific locomotive on the Grand Trunk or any other line. The bulletin which is periodically sent out contains a good deal of snappy and appealing matter, as the following excerpts will show:

"The average freight car, carrying your goods, Mr. Canadian shipper, goes only half-filled—this is a fact, government statistics show that Canadian cars are loaded to an average of only 46 per cent of their weight-carrying capacity. You may perhaps be loading a little better than that average. You may think it is 'nobody's funeral but your own,' since you pay the railways the legal rate and should be allowed to waste space if you like. But the fact is that all Canada is vitally concerned with your treatment of the freight car."

"Attention of the shipping public is directed to changes ordered by the War Board in methods of loading l. c. l. (less than carload lot) freight. The custom which prevailed until recently was to load a car for, say, 'Xboro and

points east'. This car might contain freight even for St. B—, at the far end of that line. The shed was 'pulled' probably every day. The car for Xboro 'and points east' reached Xboro, we will say, in 24 hours. It was placed at the freight shed. The goods for Xboro were unloaded and car forwarded in possibly 24 hours after its arrival. The car proceeded then to Yville Junction. Here it lost another 24 hours in switching and unloading. This process was repeated at perhaps another point between Yville Jct. and St. B—. The car reached St. B— in five days instead of two. The cargo for St. B— in the meantime had been subjected to the usual strain of over-much shunting and switching. The car had lost three days' working time.

"The new method was put in force in December. The sheds may not be 'pulled' as often. The cars are now held long enough to obtain a full cargo for some definite point. Each car then proceeds to its destination, is unloaded at one time, and is released within 24 hours of its arrival! The time it lost waiting for a full load at the point of shipment is much less than it previously would have occupied in being switched to the freight sheds at several terminals. This economizes the time of the car, saves time for the l. c. l. shipper, and reduces the wear and tear on his shipment.

"In November, before the new system was put into general effect, 34,829 cars of l. c. l. freight were loaded at points loading five cars and upwards of such freight per day. The average weight of the contents of a car was then 11,442 lb. The change in methods brought into effect in December increased the average load per car to 12,407 lb. A gain of 965 lb. per car. There were in this month, 29,647 cars loaded at points, such as the above. Had the same average per car obtained in December as in November, 32,149 cars would have been required. Therefore 2,502 cars were saved by the better handling of the cars."

Severe Winter Hampers Railway Operation

Unprecedented Season of Storms Complicates Transportation Under Government Control

THE GOVERNMENT had scarcely assumed control of the railroads when a succession of record breaking snow storms and a protracted period of extreme cold created unprecedented operating difficulties in the larger part of the country. Most of this extreme weather was experienced in January, which was a most unusual month in many ways. Statistics recorded at Chicago show that 40.9 in. of snow, or four more inches than falls in an average winter, fell in that city in January, 1918. The mean temperature for the month was 13.3 deg. F., as compared with an average of all records in January of 23.7 deg. Only once during the month did the thermometer rise above freezing. The "snow map" of the country on the first of February showed that only a little strip of the lower Atlantic coast, Florida, the shores of the Gulf of Mexico, and a thin strip west of the Cascade mountains on the Pacific coast were free from snow. Miami, Fla., had snow for the first time on record and Houston, Tex., for the first time in 23 years; in New Orleans, La., the thermometer fell as low as 16 deg.

A Succession of Severe Storms

The first severe storm swept over the Central West and passed on east, beginning on the evening of January 5. This storm was accompanied by a snowfall of 15 in. and by a gale which at times registered a velocity of 55 miles an

hour. The storm was confined to a zone with a width of about 100 miles of Chicago and paralyzed transportation in that territory for from 24 to 48 hours. The railroads had hardly cleared the rails and yards of snow when a second storm passed through the same section of the country and swept on through the eastern states. It started on Friday evening, January 11, and while not accompanied by as heavy a snow fall—the maximum being eight inches and in many localities not exceeding three in.—it was of longer duration and driven by a gale as severe, if not worse, than that which accompanied the first storm. This second blizzard practically stopped the wheels of the railroads in the territory affected, on the 12th and 13th, but passenger service began to be resumed on something approaching normal schedules on January 14. The first break in Chicago's isolation from the East came when the Twentieth Century on the New York Central arrived at 10 a. m. January 13, a little over 24 hours late. The New York Chicago Limited of the Baltimore & Ohio, due at 9 a. m. on the 13th, arrived at 1:30 p. m. on the 14th. The Manhattan Limited and the Mercantile Express on the Pennsylvania, due in Chicago on the afternoon of the 12th, did not reach their destination until January 14.

The two remaining storms were more severe in the East than in the West. Although a blizzard which threatened to

rival those earlier in the month struck the Central West on January 26, it practically disappeared on the following day and had no ill effects on transportation other than delaying the arrival of trains in Chicago from one to six hours and causing the annulment of a number of trains scheduled to leave that city. Farther east the storm proved far more serious in its results. The new snowfall and low temperature neutralized all the gains made by the operating departments following the previous storms. Throughout eastern territory freight traffic was generally suspended and passenger trains were many hours late. The Pennsylvania Railroad on the 28th found itself in the most difficult position in many years. Passenger trains were stalled all along the line between Philadelphia, Pa., and Pittsburgh, and even at Broad street station, Philadelphia, train movements were seriously hampered by a shortage of men to keep the switches in working order.

In Kentucky and throughout a large area tributary to the Ohio river floods and floating ice did extensive damage at this time. In eastern Kentucky a number of railroad bridges were carried away. On the Pocahontas division of the Norfolk & Western traffic was suspended because of washouts. Considerable sections of other roads in that territory were also closed to traffic for similar reasons.

The last serious storm of the winter started on February 3 and continued until February 6. Freight traffic had to be suspended on the New York Central main line west of Albany and the difficulties on the other trunk lines were almost as severe. On the morning of February 5, A. H. Smith, regional director of eastern railroads, reported that the weather was seriously impeding operations all the way from Albany, N. Y., to Elkhart, Ind. (101 miles east of Chicago). Data gathered at his office on the same day indicated a reduction of freight tonnage, because of severe weather conditions, of from 20 to 50 per cent throughout the entire eastern district. The Lake Shore Limited of the New York Central, which was due to arrive in New York on February 4, was stalled in a drift for 24 hours. Throughout New England high winds frustrated all attempts to keep tracks open, and practically all freight trains that started out were held up in snow. The snow was so hard and packed so solid that a number of serious derailments of plows, locomotives and cars further impeded operations. In northwestern New York six to eight inches of new snow had fallen by February 6, with the result that no freight trains operated in that section. In the coal regions of Pennsylvania cuts were blocked with drifts 16 to 20 ft. deep.

Emergency Measures to Remove the Snow

The heavy snowfalls and high winds and the almost incessant cold between storms made the clearing of tracks and yards a most difficult problem. Railroads throughout the territory most seriously affected withdrew large numbers of their employees from their regular work for "shovel" service when occasion demanded. In some instances the shutting down of industrial plants on account of the snow blockade made large forces of men available for work on the railroads. Some of these industries voluntarily loaned men to the carriers for snow work.

In Chicago the railways recruited a large share of their men from freight handlers, office clerks and draftsmen, many of whom could not be employed at their regular work on account of the suspension of traffic. In the East similar classes of employees were used. The Pennsylvania Railroad, which had unusual difficulties to overcome in the Allegheny mountains, drafted large numbers of shop employees for snow shoveling. Between December 20 and January 21, the men of the Altoona (Pa.) shops spent 9,225 ten-hour days in snow-shoveling and switch-clearing. On the Bellwood division, a shop force of only 259 spent 11,000 hours in shoveling snow during the same period.

The problem of removing snow and ice was one of large scope in Chicago, the country's largest railroad center. Aside from the men recruited from their own forces or loaned to them by industries, the roads had to secure additional forces from regular employment agencies, free labor agencies, or direct from the streets and lodging houses. To encourage men to offer their services for this work, arrangements were made to pay them daily, a measure which seriously complicated time-keeping and accounting. On account of the severity of the weather and the arduousness of the work it was necessary to feed the men one or more meals a day and to supply them with hot coffee at frequent intervals. Some lines were able to billet their men at nearby restaurants or boarding houses, while others ran special trains with sandwiches and coffee to the men at intervals.

The supervision of the snow removal work in the Chicago terminals constituted an administrative problem of no mean proportions. In this connection the Baltimore & Ohio Chicago Terminal improvised a most interesting organization. Men experienced in fighting snow were placed in charge of various sections of the terminals and were made responsible for the progress of the work of restoring the tracks to operation. An intelligence bureau was established in the office of the district engineer where telephone connections were available to all parts of the terminals. To facilitate this work all the telephones in this office were assembled on a single table where a staff of men received and answered calls while the information given and received was recorded on an improvised chart. By this method the needs of the men engaged in removing the snow were taken care of expeditiously.

Most of the snow was handled by shovels, although snow plows were used on the main tracks and locomotive cranes with clam-shell buckets were employed to a limited extent for excavating snow and for unloading snow from cars.

By no means all the difficulties arising during the winter were snow troubles. The freezing of coal in cars and of the lubrication in the journal boxes, frozen switches and frozen ash pans, the wear and tear on locomotives and cars because of the unyielding character of the frozen roadbed, the freezing of air hose, hot boxes due to the stripping off of journal boxes by snow and ice, broken rails, frozen signals and signal wires, the failure of interlocking plants—all these were factors contributing to the trials of the roads during the protracted period of severe weather.

In spite of the unprecedented difficulties developed during the winter, the loyal and indefatigable efforts of railroad officers and employees kept traffic moving as much as possible and enabled the government to suspend its coalless holidays several weeks before it was at first thought feasible.

The government could not have taken over the railroads at any better time to learn at first hand the difficulties of operation confronting the roads during the periods of extreme weather. Director General McAdoo, however, took a philosophic view of the situation and labored as determinedly as the operating executives under him to meet the difficulties as they arose. Preliminary reports from 172 of the 196 large roads in the country show a deficit in railway operating income for January of \$2,227,000 as compared with earnings in January of last year. To the discerning observer, these figures neither prove the superiority of government operation or private ownership, but simply indicate that the railroads passed through a most unprecedented winter, one which would slow up the wheels of transportation under any form of operation.

SCRAP IRON EXPORT has been prohibited entirely by the Canadian Government with a view to conserving in Canada the limited supplies of iron and steel raw material easily convertible for manufacturing purposes. The United States prohibited export of scrap iron some time ago.

Railroads Need Large Quantities of Material

Exercise of Priority Orders Should Afford the Carriers
Maintenance Supplies in Adequate Amounts

IT IS MAINTAINED BY SOME that the production of pig iron and steel ingots in this country exceeds the capacity of existing shops and factories to convert the plain materials into finished products, and further that there is no occasion for an increase in the production of the completed articles because the railroads are now taxed to the utmost in transporting the present output. Such a broad statement is, of course, subject to controversy and may be seriously questioned as applied to certain areas, but taking the country as a whole, it probably represents as nearly an accurate statement as can be hazarded on any question subject to such serious complications. If we are to assume from this that the railroads represent the crux of the situation, there can be no question but that the government, in making every effort to increase the production of war materials and domestic necessities, will see that they do not want for equipment and materials required to attain and maintain a maximum transportation capacity.

The procuring and distribution of rails to the various carriers is now definitely in the hands of the director-general. The purchasing section of the Division of Finances and Purchases under the general supervision of John Skelton Williams, will not only purchase and distribute rails, but also ties and lumber on those roads which do not traverse timber country in which they can purchase these materials locally. While rails, ties and lumber represent large items in the railroad purchases, both from the standpoint of the quantity of materials and the money value involved, there are still larger amounts of other materials which will be purchased by the railroads through their regular purchasing departments subject to the approval of the regional purchasing committees. Such purchases will no doubt also receive whatever priority ratings are necessary to insure reasonable deliveries in all cases where the supplies are necessary for the expeditious conduct of the transportation business.

Iron and Steel

The production of iron and steel in the United States has increased remarkably since the outbreak of the European war, so that the output of this country is now about 50,000,000 tons per annum, or fully one-half of the total production of the world. This represents an increase of 25 per cent in production in the past two years. However, the severe winter just past imposed such enormous obstacles, largely through the curtailment of fuel and ore supplies, that the production was seriously reduced during the winter months, particularly in January, when pig iron production aggregated only 2,403,000 tons as compared to 3,198,000 tons for November. In all there has been a set back of 1,500,000 to 2,000,000 tons at the beginning of this year, which has had a marked influence on the program outlined for the production of all finished materials in which iron or steel are used, and undoubtedly this accounts for some of the irregularities in production schedules now being experienced.

As this great industry is probably more closely allied than any other with the conduct of the war, it was the first to be considered in plans for price fixing. After three years of almost continuous advances from month to month, prices were established for pig iron, bars, plates and shapes on September 24, 1917. Other prices have been established from time to time but it was not until late in December that any items of vital concern to the railroads were affected. At that time

prices were established for angle bars, track bolts and spikes, rolled steel tie plates and a number of items of scrap sold by railroads. All of the prices established are materially lower than those in effect some months previous. The President has just approved the recommendations of the price fixing committee for a reduction of \$1 in the prices of basic pig iron and scrap steel, these prices and those previously established to remain in effect until July 1, 1918.

The unprecedented prices attained before they were fixed were largely caused by the keen competition between the buyers for the limited amounts of products which the manufacturers had to sell. This competition has now been virtually done away with through the institution of the priority orders, and it is in the iron and steel industry more than in any other that resort must be had to this means of securing deliveries.

Rails

The history of rail purchases by the railroads during the last four years is of unusual interest. Following the lean year of 1914 when rail orders amounted to only about 1,000,000 tons, the revival of business late in 1915 caused rail orders to increase to about 2,200,000. During 1916 the business of the steel industry grew so rapidly from month to month that it became apparent that there would be serious delays in deliveries. Many of the roads placed orders for dates much farther in advance than had ever been done before, and as a result nearly 4,000,000 tons of rails were ordered in 1916, most of the roads arranging not only for their 1917 requirements, but for their needs for the year following. In 1917 the remaining requirements for 1918 were placed, but when some of the roads attempted to place orders for rails for 1919 delivery the mills declined to take them. The result was that practically no rail orders were placed after May, 1917, and the total domestic orders during the entire year aggregated less than 1,000,000 tons.

In April, 1916, after almost 15 years of fixed prices for steel rails, the quotations were advanced from \$28 and \$30 per gross ton for Bessemer and open hearth rails respectively to \$33 and \$35. In November of that year the second raise brought the prices to \$38 and \$40 respectively, and these were maintained as the nominal prices all through 1917. However, these prices have meant little or nothing since early last year and the few orders that were taken from time to time during the later months were placed at considerable premiums over these nominal figures.

Since the first of the year there has been a tendency to drop the old nominal prices and higher figures are being quoted, but owing to the limited number of orders placed there is no definite price for standard rails today. Inability to buy new rails has sent the roads into the market for re-layer and re-rolling rails, with the result that the prices of these have attained unusual heights.

The real problem at the present time lies not in the placing of new orders for rails, but in securing the delivery of rails ordered 12 to 18 months ago. Because of the necessity of rolling rounds for shells and structural material for ships, the mills are now rolling rails to less than one-third of normal capacity and for this reason are far behind their schedules. The rail laying season is at hand and the roads have not received their allotments. Clearly the situation is one for the Railroad Administration to handle. The subject is now under consideration, for the various roads have already been asked to report on their minimum requirements in rails

for the coming year, and presumably arrangements will be made to supply them with this most necessary material.

Structural Steel

On account of the high price of structural steel the roads have avoided the construction of new steel bridges wherever possible during the last two years. For the most part, the bridge shops have not been working to capacity, since the high prices have deterred all classes of builders or have caused them to divert their activities to forms of structures not requiring steel. There are, of course, cases where the use of structural steel has been imperative and the mills have not been so congested but that the structural shops could secure the necessary plain material. With the inception of the ship building campaign the bridge shops have been recruited in the fabrication of parts for standard steel ships, but even with this additional business the shops are not working to more than 75 per cent of capacity at the present time and new business taken in February amounted to only 55 per cent of capacity. They are therefore in a position to take any reasonable amount of domestic work offered them, provided the necessary priority orders can be obtained to secure the plain material, where prompt delivery is required. According to an opinion expressed recently by the officer of one of the large fabricating companies, the shops of the Middle West can take at least 100,000 tons of domestic construction work during the coming season.

Lumber

Like the steel industry, the lumber business has been occupied extensively with war contracts. During the first nine months of our participation in the War, the southern pine manufacturers supplied 750,000,000 ft. b. m. of lumber to the government, a large part of which was used in building the cantonments. These mills are now engaged in filling an order for 365,000,000 ft. b. m. for the wooden ship building program, and up to March 1 had delivered 240,000,000 ft. b. m. of this total. When these amounts are compared with 12,226,000,000 ft. b. m. cut in the United States in 1917, and 12,749,000,000 ft. b. m. cut in 1916, it is seen that the consumption of wood is largely affected by other influences than government requirements. It is true that owing to the large sized pieces used in ship construction, it was necessary to place prohibitions on the use for other than government work of southern pine 12 in. by 12 in. in section or larger, and of Douglas fir timber 12 in. or more on one face. These restrictions have naturally influenced the supply of posts, caps and stringers for use in railway trestles, but owing to the progress which has been made on the government work, and the movement toward the use of built-up or laminated timbers some of these restrictions on the use of large sizes have been modified.

Building work for other than government purposes has decreased materially since our entrance into the War. This has tended to reduce the use of the smaller size timbers with the result that there is a good supply of this class of material available. Lumber manufacturers and others have been more or less exercised by the movement on foot in some quarters to discourage if not prohibit all building work unnecessary for the prosecution of the war, and it is pointed out that the building operations in the United States for 1917 aggregated somewhere in the neighborhood of \$3,000,000,000 worth of work, whereas government building operations during the past year amounted to only \$300,000,000, or one-tenth of the total activity. Whether or not any steps are taken to restrict building operations, the present indications in the lumber market are that there will be a plentiful supply of this building material for all anticipated requirements.

As mentioned above the Railway Administration has notified the railroads that it will purchase ties for the roads in all cases where the latter are unable to secure them locally

along their own lines at prices equal or less than were paid last year. This order has the effect of restricting the roads to the purchase of ties from the small producer who cuts them on his own wood lot. The production of ties during the last year has decreased materially; enlistments and the draft seem to have caused a material reduction in the number of men engaged in this industry as small producers. As a result many of the railways' the purchasers have had to go much further afield in securing their requirements than was the case in years past. There is also much doubt as to whether the railroads will be able to obtain ties at the same prices that were paid last year.

The large producer who must now deal largely with the Railroad Administration has also been hampered by a shortage of labor and a decided increase in the cost of operation through higher costs of tools and equipment and the scarcity of horses and mules with which to move the ties. In at least a few instances the tie operators have been diverted to lumbering on a small scale since it was found profitable to cut tie logs into certain small sizes of lumber.

Concrete Materials

No more favorable market for the buyer is available at the present time than that of concrete materials. Decreased building operations has curtailed the demand for these materials to a considerable extent. Production has been affected to some extent by a shortage of labor and materials and the shortage of cars needed for delivery. The latter has been the most serious problem, particularly during the winter months when embargoes were issued at different times against the use of open top cars for the handling of sand, stone and gravel. In the case of cement there is a greater argument than ever before for the use of bulk material since the high price of cotton makes the use of cement sacks much more expensive than during normal times. While subject to increases in manufacturing costs encountered in all work carried on in this country the advances in the price of cement have been moderate, and following a reduction of about 10 cents per barrel taking place last summer the price of cement has been practically stationary.

Conclusions

Purchases of supplies and materials for the railroads involving the steel market will in most cases require the use of priority orders which, because of the urgent needs of the railroads, ought to be forthcoming. As regards lumber and concrete materials the problem is largely one of the cars necessary for delivery, for the supply of these materials is adequate for any reasonable needs. The situation as regards rails and ties and to a certain extent regarding lumber is now in the hands of the Railway Administration, and involves an apportionment of the available supply, taking into account the relative needs of the railroads, the War Department and the ship building program.

AN ENGLISH RAILWAY'S WAR RELIEF SERVICE.—Of the staff of the Great Eastern Railway 8,800, or 25 per cent, have joined the colors, of whom 671 have been killed and 470 have been discharged and have re-entered the company's service. At the annual meeting of the company the chairman said that much useful work had been done in assisting those who had been discharged from the army to obtain their proper pensions and gratuities, and what was, perhaps, more important still, no dependents of those who are serving with the colors are allowed to get out of touch with the railway. The services of the company's war relief committee were always freely at the disposal of the dependents in any troubles and difficulties which arose, and in regard to which, in the ordinary way, they would depend on their husbands and relatives.

Improve the Equipment of the Railway Shops

Earning Power of Modern Locomotives Is Limited Greatly
by the Lack of Repair Facilities

By H. L. Burrhus

“**Y**ES, we do need a new planer, and, if we could get one, we would save our company more than \$10 a day in machine work alone,” said a machine shop foreman on a busy Eastern road.

“Why don't you speak to your master mechanic about your conditions and have him make a requisition for a new machine?” he was asked.

“I have done so already, but the machine tool builders are so tied up with Government work, they wouldn't even listen to a request from our railroad for a new tool,” replied the machine shop foreman.

“You are entirely mistaken about the delivery conditions of the machine tool builders, as many of the largest companies are prepared right now to make deliveries in from 60 days to seven months of such standard tools as planers, lathes, shapers, slotters, drill presses, etc.,” he was told.

“Well, granting that the machine tool builders might be able to build us a machine, the ‘old man’ (meaning the master mechanic) wouldn't take any action right now, for you know we are under government control, and he is not just sure where we stand,” continued the foreman.

“To answer this objection,” replied the questioner, “let me ask you to imagine that you own a house and lot. You want to sell, but just because you expect to get the property off your hands soon, will you stand idly by while the house goes to ruin, or will you make such improvements as will tend to increase the value of that property? Bringing the argument back to our subject, don't you believe that a railroad property whose equipment is modern and kept up in good shape will bring a better return than a property that is far inadequate for its needs? Irrespective of whether or not you expect to soon turn your property over to the government, you should not leave any stone unturned to bring your shop up to the most efficient and economical condition.”

“Well, so far you have gotten the best of the argument,” answered the foreman, “but here is one objection you cannot get around. Everything is so high right now that it would be madness to purchase any machine tools at their present high prices. We have gotten along so far without the planer, and, until machine tool prices come down to a reasonable figure, I would not like to be the one responsible for making requests for new machine tool equipment.”

Easy to Answer

“That was the first objection I expected you to make, and it is the easiest one for me to answer,” was the quick reply. “While it is admitted that machine tool prices have advanced considerably, have you overlooked the fact that your own labor has also advanced in cost—in many cases proportionately more than the advance in machine tools? Where you formerly could figure an approximate saving of 20 per cent on the investment of a new machine tool, you are now able to easily show this saving to be from 25 per cent to 30 per cent under the new prices, because of the many wage increases you have granted your workmen. And here is another item you have overlooked—the value of a locomotive service day now, as compared with a service day several years ago.

“Today the locomotives are so much larger that, when idle, a large sum of invested money is tied up. There was a time when an idle locomotive represented only about 25 or 30 cars,

but today one of our modern engines is capable of hauling 100 cars. So, you see, an engine waiting for repairs also means 100 cars standing still, while, in turn, perhaps affects the working of some big factory which is depending on that freight. You have admitted there are several jobs which require two days to machine with your present equipment, while with modern equipment you could turn the work out of your department in five hours, thus giving your company the services of a high-power locomotive for one and one-half days which is now unnecessarily lost. How many of these additional service days do you think it would take to buy one or two modern machines?”

This is a typical condition on many railroads today, for the maintaining of power is the keynote of successful transportation. New locomotives will not altogether solve the problem, as in a short time even new locomotives will require attention, and unless proper facilities are provided, the cost of upkeep and the revenue loss of locomotives out of service will be excessively high.

There is a big opportunity right now for the purchase of machine tools. Whether the railroads will look the issue squarely in the face and take immediate steps to protect their interests is a question. While there are many large modern up-to-date shops and terminals, it is a fact that the majority of shops and terminals are small and inadequately equipped. This has never been so well illustrated as during the past winter. On some roads the roundhouses were so small that it was impossible to get the engines in the house and shut the doors. This meant that the locomotives had to stand outside, where it was impossible for the workmen to give them proper attention, and where it was a very easy matter to freeze up. Even where the engines were pushed partly into the roundhouse, working conditions were such that the locomotives soon showed what attention they received by their performance on the divisions.

Inadequate Machine Tool Equipment

And just as true as these roundhouse conditions is that of the machine tool equipment. Machine tools were old or in many cases the size of the jobs has far outgrown their capacities. Yet the railroads hesitate to purchase. The requests made by the machine shop foreman—the fellows on the job—are side-tracked on one excuse or another and no attention or thought given to the steady daily loss from this department.

Many railroads—in fact, all railroads—keep accurate records of coal consumption, lubrication and many other items of daily use, yet overlook the one big item of machine shop output. We are all guilty of looking upon the machine shop foreman as a “kicker” or upon a machine tool salesman as a person who is simply trying to get our money. Yet the machine tool salesman is many times the good Samaritan in disguise.

The recommendations and purchase of machine tools on the railroads should be handled and should receive the same attention as in privately owned factories. How often we pick up a magazine and read of some factory that has installed a modern machine to speed up its output or to produce mechanically a job that was formerly done by hand, but where, due to the shortage of help, it was necessary to install a machine. Then compare these conditions by visit-

ing a railroad shop in almost any part of the country and notice three or four husky men pounding a piece of iron into shape in the blacksmith shop, where a power operated hammer would do the trick in much less time; notice boiler-makers driving rivets by hand or putting in staybolts by hand—all jobs of frequent occurrence and which can be handled much quicker and better by power tools; and in the machine department there are so many comparisons it is a hard matter to select any one.

However, let us look at just this one case. During one of the cold spells this past winter, when engines were so scarce, a big, high-power locomotive reached a certain roundhouse at seven o'clock in the morning with a loose piston head. Outside of this one job the engine could have been turned and despatched by nine o'clock, but it was necessary to make a new piston head. By eight o'clock the machine department had started to machine the new head, but due to antiquated machine equipment, the new head was not completed and ready for application until after seven o'clock that night, with the result that it was necessary to work men at overtime rates to complete the job, besides unnecessarily holding an engine which could have been earning money. All this delay and increased costs were directly traceable to inefficient machine tool equipment, for a modern machine could have completed that head in five hours less time, which would have saved the overtime rates paid the workmen and would also have given these five hours to the locomotive for revenue service, instead of a dead loss standing in the roundhouse.

The necessity of machine tool purchases is obvious, and the only question is whether the railroads will take steps to build up their equipment or whether they will allow conditions to exist as at present and then, over night, try to make all the corrections at once.

We are just emerging from a hard winter, and with our past experiences fresh in mind, now is the logical time not only to lay plans to prevent a recurrence, but also to take immediate action. It is so easy to offer the old excuse that roads have gotten along so far without making purchases, and they can still get along. But every day's delay means that much more loss and confusion eventually.

Not an Unusual Case

As conclusive proof of the fallacy of new equipment solving transportation problems altogether, let us look at the results on one road which secured 50 new heavy type locomotives, but paid no attention to providing proper housing or machine tool equipment to keep these engines in repair. For a time there was no shortage of power, but eventually one could find locomotives in the roundhouse tied up for poor tire flanges, but no machine on hand to turn the tires. Or it was a broken guide bar, or side rod or driving box; however, there was no machine tool equipment to make emergency repairs, and the engines had to wait that much longer while these parts were made up at some other shop and shipped in by way of the congested freight route, in one specific case taking over two weeks for a repair part to be received.

As to just what tools are required for immediate use it is hard to make up a satisfactory list. Planers, shapers, lathes, drill presses, etc., are in many cases so old and unfit for use that it would appear as if some shops ought to put in a complete new equipment. Then again it is not necessary to purchase new tools altogether, for the roads are, in some rare cases, in a position to help themselves upon the introduction of heavy power, as proven by one road. In this case it was found that there was not a lathe on the road with a bed of sufficient length to enable the turning of extended piston rods used on the new locomotives. This matter was easily taken care of by making and applying extensions on one lathe at each terminal. On another road, after it had been

decided to apply cylinder bushings in all cylinders, it was found that there was not a lathe of sufficient swing to permit the turning of the bushing to fit the cylinders. In this case the raising of the head and tailstock on filler blocks was a very unsatisfactory arrangement, for the lathes so equipped were not rigged enough to do efficient work, and every bushing turned really cost three times as much as it should.

Poor Tools Cause Waste of Fuel

Another road made a big campaign on coal saving, but lost sight entirely of its greatest waste. In this case, the equipment for machining piston heads was very poor, and piston heads were changed only as a last resort, which meant that the amount of steam wasted by small heads really amounted to a big waste in the coal pile and in the efficiency of the engines.

As before stated, the comparatively few large modern shops are quite well equipped with modern machinery, but the innumerable medium sized shops and roundhouses are, as a rule, very much in need of new machine tools. To keep down the percentage of power under repairs for more than 12 hours means quick and accurate machine work. To purchase needed tools for this will require the investment of a large sum of money, but there is no investment more profitable right now for any railroad than to put in new machine tool equipment.

The effect on the workmen is important, for good workmen often get disgusted and quit because of poor machine equipment. A good workman has pride in his work and his ability to produce, but when you tie his hands by giving him a machine to run that was built before the Civil War, he will soon throw up the sponge and leave.

The Value of Good Tools

In conclusion let us quote the stand taken by one successful master mechanic who realizes the value of good machine tool equipment. He said: "We speak of the work of a locomotive in terms of horsepower, yet some people abuse their power worse than they would a horse. They let their engines stand outdoors in all kinds of weather and feed them sawdust, yet expect a full horse-power return. Now, common sense tells us that no horse would stand these conditions, so why expect it from a locomotive? I want my locomotives under cover and fed with the best materials possible, together with good workmanship. To get good workmanship, you must have good tools, and I have been here 23 years, and so far have not been refused a single item I have put on my requisition. And as to my costs, you can see we have the best of everything; our shop is modern and our power up in A-No. 1 condition, yet my cost per locomotive-mile is not more than, or is lower than, that of neighboring roads. When we start a locomotive from the roundhouse, we know it will give perfect service, for we give it good attention. I figure our success is due to good materials, good machine tool equipment and good workmanship."

It might be well to draw attention to the fact that right now is the logical time to place machine tool requisitions because of the valuation work which is being so extensively carried on. This work has developed some interesting data as to the age of various machine tool installations, and officials who have occasion to check up the findings of their various valuation committees will be astonished to learn how antiquated and inefficient their machine tool installations are. Brought face to face with the facts that shops are trying efficiently and economically to maintain modern power with machinery that is 30, 40 or 50 years old is sufficient reason for the immediate purchase of modern machine tools. It may be a question of borrowing money to make purchases, but money cannot be expended to any better advantage than to protect efficient and economical locomotive service with efficient and economical machine tools.

The Assistance Available for the Exporter

A Government Bureau, Export Associations, Commission Houses and Banks All Want to Help Him

WHEN ONCE THE RAILWAY SUPPLY MANUFACTURER has been converted to the idea of export trade the first question he will ask himself is "What steps should I take to secure and maintain an export business?"

The agencies that stand prepared to help the exporter, experienced or new to the export field, are legion. There is the government's very efficient Bureau of Foreign and Domestic Commerce. There are several export associations such as the American Manufacturers' Export Association, as well as a number of other bodies such as the National Association of Manufacturers, or the Philadelphia Commercial Museum which have extensive export departments.

There are likewise a large number of export or commission houses many of them with very extensive financial backing which are prepared to advise the manufacturer or practically handle for him his export business in a particular country or perhaps throughout the world.

The banks also have been leaders in American export activities. A number of them, as will be noted later, have built up important export service departments and are in a position to advise and to extend the financial credit necessary.

And last, but not least, there are today in this country several purchasing commissions whose offices have been buying war necessities for their governments, or who are keeping in touch with the American market with a view to

making large purchases here as soon as material and shipping space can be secured.

One export authority stated to a *Railway Age* representative that there were three ways in which an American manufacturer unacquainted with export trade might go about establishing a foreign trade.

First, and for many manufacturers best, he said, the manufacturer should go himself or send a competent man to the countries he wishes to do business with. This representative should investigate and study conditions, possibly try to secure orders and establish agencies.

Second, if the manufacturer cannot send a competent representative he can efficiently build up a foreign trade through a good commission house or reliable export firm. In such case, of course, he should deal only with well-known houses. Most of them have offices in New York. They know their markets thoroughly and if treated generously will build up an export trade for the manufacturer, handling his missionary work, the placing of the orders, the shipments and the financing.

The third way to build up an export trade is by advertising and circular matter. This method is slower but will achieve results. It is usually advisable to start an export business through circular matter and advertising so that when representatives are sent out they will have less missionary work to do.

Bureau of Foreign Commerce

Railway supply manufacturers have not begun to realize the services that are available to them practically free of cost through the Bureau of Foreign and Domestic Commerce. The Bureau is doing a big work and with the present growing interest in export trade its value to American industry will be better understood and its services utilized to a greater extent.

Burwell S. Cutler, chief of the Bureau, made the statement at a meeting in Boston last week that as a trade promoting agency the bureau was equal, if not superior, to the corresponding organizations in foreign governments, the truth of which statement, he added, has been conceded by foreign officials themselves. Those railway supply manufacturers who have seen Frank Rhea's report on markets for American railway materials in Australia and New Zealand, or the abstract of his conclusions in a recent issue of the *Railway Age*, have come to realize the value of the Bureau and will bear out Mr. Cutler's remarks.

The Bureau of Foreign and Domestic Commerce is charged by law with the duty of "developing the various manufacturing industries of the United States and markets for their products at home and abroad, by gathering and publishing useful information, or by any other available method."

The bureau is a clearing house for commercial information of all kinds, and has a well-organized and efficient system for its collection and distribution.

Consular Service

There are three principal sources through which the bureau secures foreign trade information—through the consular service, through commercial agents and through commercial attachés.

The United States Government maintains abroad nearly 300 consular offices and in addition many agencies. These consular officers furnish the bureau a great fund of information relating to the trade of their districts, including annual reviews of commerce, special reports called for by the Department of Commerce, lists of importers, notices of bids for contract work, requests of merchants to be placed in communication with American exporters, etc.

Commercial Agents

Most of the commercial agents are taken from active work in some particular industry or some special branch of commerce and are experts in their respective lines. They travel widely and make reports as to methods of manufacture and special requirements in the lines that they are investigating.

Commercial Attachés

While stationed at one post like the consular officer, the commercial attaché is free to travel within the field to which he is assigned. He has but one function—the facilitation of commerce between the United States and the country to which he is assigned. Each attaché speaks the language of the country in which he is located and is thoroughly conversant with its commercial usages.

In addition, the bureau receives numerous official and other publications from foreign countries, which are utilized in answering requests for information. It also avails itself of trade journals published in this country and of the assistance of commercial organizations.

But the method of making this information available is as important as its gathering. Most important of the publications of the bureau is the daily *Commerce Reports*,

These contain articles submitted by consular officers and commercial agents of the Department of Commerce and trade information through other sources. It is the organ through which current information on foreign trade matters is distributed to American business men. It is sold by the superintendent of documents, Government Printing Office, Washington, D. C., for \$2.50 per year. (Subscriptions will also be received at the district offices.) The annual reports of consular officers, formerly published in this daily journal are now issued as supplements to it and are mailed to all subscribers to Commerce Reports.

Daily Commerce Reports

Not the least important section in Commerce Reports is the trade opportunity service. Announcements of specific opportunities for the sale of American goods abroad are published in Commerce Reports. The names and addresses of the foreign importers desiring the goods are not given in these announcements, but are furnished to bona fide American firms upon application to the bureau at Washington, or to any of the district offices.

In applying for such names and addresses the inquirer need refer only to the number of the announcement as published in the Daily. A separate application on the firm's letterhead should be made for each "opportunity" desired.

When the confidential information furnished regarding an opportunity for sales in foreign countries is too detailed to be given in a "trade opportunity" announcement, it is embodied in a confidential bulletin or circular, which is sent to firms that are listed in the trade index files maintained by the bureau and its district offices.

There are also many other publications of the bureau but

those of most interest to railway supply men are the special bulletins, of which Frank Rhea's report on railway supplies in Australia is typical. These bulletins are issued from time to time on all kinds of commodities, but it is of great interest to railway supply men to know that in addition to Mr. Rhea's first report, another will soon follow on markets for American railway materials, equipment and supplies in China and Japan.

Use the Bureau

No railway supply man who is going after foreign trade can neglect the opportunities offered him by the Bureau of Foreign and Domestic Commerce. As Mr. Cutler says:

"Exporters should learn to utilize more fully the economic laboratory which the bureau has built up during the last six years. If used continuously, the public will acquire habits of scientific precision, which will prove a surer means to successful foreign trade than any other. It isn't enough to be satisfied with casual applications for data from the bureau. Requests for information should automatically renew themselves, so that the exporter is currently informed on the slightest change which affects his business abroad. If German efficiency comes from any one thing, it is just that habit of laboratory thoroughness.

"You may look upon your Bureau of Foreign and Domestic Commerce as the headquarters for American business. Our success will be proportionate only to the use which you make of us, and I may state confidently that the Department of Commerce will receive from Congress funds and authority to exercise its functions up to the limit of your requirements so long as you let them be known with the positive voice of people who have the right to command us."

The Philadelphia Commercial Museum

The Philadelphia Commercial Museum is more or less typical of a number of large and efficient agencies assisting in foreign trade, including the Pan-American Union at Washington which has proved itself of particular service to exporters to South and Central America; the National Association of Manufacturers, the American Manufacturers' Export Association, and to a lesser degree, the Chicago Association of Commerce, the Business Men's League of St. Louis, etc.

The Commercial Museum's efforts in foreign trade are centered in its foreign trade bureau. This bureau publishes a foreign trade paper, Commercial America, a Spanish edition of which is sent to South America. In addition it supplies the following services to its members:

Compiles lists of established business houses in foreign countries.

Translates business correspondence.

Publishes a weekly export bulletin, containing inquiries from foreign firms, general export news, changes in tariff, trade mark and patent laws, travelers' regulations, business suggestions and trade openings, a schedule of steamship sailings for the month, etc.

Offers assistance in securing selling representatives in foreign countries.

Replies to inquiries about foreign firms.

Answers special commercial inquiries for information covering such subjects as consular invoices, regulations, duties, and more general matters such as the character and possibilities of particular markets and the development of business in any foreign country.

Circulates among foreign buyers typewritten and printed lists of members, etc.

Assists in the collection of accounts.

National Foreign Trade Council

The National Foreign Trade Council will hold its fourth annual convention in Cincinnati, April 18 to 20. At this convention there will be brought together the leaders in thought in the foreign trade activities of the nation and questions will be brought up of vital interest to the manufacturer or exporter. A considerable number of supply men are planning to attend the meeting, and they may later obtain a copy of the proceedings of the meeting from the secretary, L. K. Davis, 1 Hanover square, New York.

The Commission Houses

It is through the commission house or export firm that most manufacturers of railway supplies will probably find it most advisable to carry on their direct export activities. As would naturally have been expected from our vastly increased export trade of late, the commission houses have seen a tremendous development within the last two or three years. New companies have been organized and have at-

tained an enormous growth in a space of only a few months.

The commission houses and export firms are of many kinds and carry on their businesses in different ways. Some with powerful financial backing are able to conduct a combined import and export business in all kinds of commodities with almost the entire world for their bailiwick, combining in many cases with their extensive corps of foreign

representatives, a financial or even a shipping service that proves of great advantage to their clients. Other export firms specialize on particular countries or markets and offer to the exporter the services of a trained corps of experts with special knowledge of markets and conditions in their special fields. There are further a number of companies that specialize in certain commodities such as steel or railway supplies, having the advantage of a corps of engineers versed not only in the conditions in their markets but with a detailed knowledge of the steel or railway supply industry. The manufacturer of a particular commodity may find it to his advantage to tie up with one or with another kind of export houses, depending upon the market he desires to cultivate, his product or his organization. Many manufacturers who have a well organized export department of their own and with representatives abroad often find it to their advantage to secure also the assistance available through an export firm.

Typical, more or less, of a considerable number of the export houses that are in a position to be of service to the railway supply manufacturer are three export organizations connected with the American International Corporation.

American International Corporation

This corporation was organized in 1915 to develop international trade, American enterprises—both domestic and foreign—and to promote organizations of mutual advantage to American bankers, business men and engineers.

Among the important undertakings since its organization, the corporation has formed several exporting companies, of which three are of particular interest to the manufacturer

of railway material and supplies. The Allied Machinery Company of America was organized to export machine tools; the Allied Construction Machinery Corporation to export construction machinery; and the American International Steel Corporation to export iron and steel, and iron and steel products—including locomotives, cars, and railway supplies.

These three companies have formed large foreign distributing organizations which include executives, salesmen, and demonstrators of ability. Offices have been opened in the principal markets of Europe, and the companies are extending eventually to cover every important market of the world.

One of the interesting features of these organizations is their affiliation with the American International Corporation. This connection is necessarily of distinct advantage because of that corporation's world-wide activities in financing, managing, trading, and construction and engineering work.

Like other exporting companies, they render such service to the manufacturer of American products as the assumption of exchange liabilities, insurance risks, and the negotiations for shipping space, as well as making shipping collections and obtaining the export licenses necessary under the present national emergency. They are also in a position to extend credits to customers abroad.

With a view to showing even more definitely what the export firm can do to help the railway supply manufacturer obtain and conduct his export trade, the *Railway Age* reproduces on another page an article on "How the Export Houses Help in Foreign Trade."

The Export Services of the Banks

They say that trade follows the flag—they ought to add also that it follows the banking facilities. When one realizes how far reaching are the plans now being made to further export business by some of America's leading banking houses, he begins to see in a clearer light how favorably the bankers and the progressive business men in general of this nation look on foreign trade. It has been generally conceded that England, Germany, France and Japan had as one of their best weapons in foreign trade their efficient foreign banking systems and the means for financing long term credits. The American bankers today are fast putting themselves in as favorable a position in foreign trade as the banks in Europe and the interest that is being manifested by them in this matter augurs well for our future position in export trade.

The expansion "foreignwards" of American banking has accompanied an increase in our foreign commerce, including both imports and exports, from \$3,902,900,051 in 1914 to the huge total of \$9,183,712,931 in 1917, an increase that in three short years has made us the greatest exporting nation in the world. One cannot yet say that American bankers the country over have taken the keen interest in export trade that should be commensurate with this expansion but such powerful financial houses can be named as the National Bank of Commerce in New York, the National City Bank and its affiliate the International Banking Corporation, the Guaranty Trust Company, New York; the Irving National Bank of New York, the Chase National Bank of New York, the Mercantile Bank of the Americas, the American Foreign Banking Corporation, the National Shawmut Bank of Boston, the First National Bank of Boston, the Hibernia Bank & Trust Company of New Orleans, the recently organized Foreign Trade Banking Corporation, etc.

These banks are leaving no stone unturned to emphasize

to their clients the advantages of foreign trade; they have established foreign trade service departments to advise and assist their customers and they stand ready with the capital to arm the exporter who goes forth in quest of foreign business.

What can these banks do to assist the exporter?

National Bank of Commerce

"The National Bank of Commerce in New York," said an officer of that bank, "established its foreign department many years ago. During the course of years connections have been established with practically all the leading banks throughout the world, many of them government institutions. By adopting the policy of establishing connections with the leading banks of the various countries, the bank's clients receive service in the form of close co-operation with large local banks that are thoroughly conversant with local conditions.

"Until the outbreak of the war in August, 1914, New York was the financial center of the world for exporters and importers. The war caused a disastrous disruption of foreign trade, with heavy fluctuations in all foreign economies. The American dollar was practically the only means of exchange. The dollar letter of credit was issued and gradually a dollar exchange market developed throughout the world. The National Bank of Commerce in New York has played a large part in the stabilization of dollar exchange. Its foreign department has been organized on a view to the offering of personal service of all kinds to importers and exporters. It is prepared to assist new markets to exporters and to provide adequate facilities for the development of such markets. It draws from its foreign affiliations lists of reliable merchants and firms among its customers who have not deemed it advisable to send a representative abroad. It secures information regarding their

prospective customers, suggests the terms under which shipments should be made, assists in the details of actual shipment and forwards and collects their drafts through its foreign correspondents.

"The relations with correspondents abroad permit the bank to offer to its customers a wide range of facilities, among which may be enumerated the transfer of funds abroad by cable or check, purchase and sale of securities, negotiations of drafts or checks on foreign banks, firms or individuals, etc. A method which the foreign department of the National Bank of Commerce in New York has developed with especial success is that by which the foreign importer instructs his bank to open letters of credit through its New York correspondent in favor of the American exporter. The latter presents his documents and payment of the amount prescribed in the credit is made to him. In making these payments an attitude as liberal as possible, consistent with interests of the bank's foreign correspondents under whose instruction it acts, has been adopted. To the traveller overseas the National Bank of Commerce in New York offers travelers' checks which may be exchanged for local currency in all foreign countries, or travelers' letters of credit, which can be cashed at the many offices of the various correspondents throughout the world. If he is a commercial traveler the bank can furnish him with letters of introduction to the leading correspondents in the cities he intends to visit, can make arrangements with the correspondents to put him in touch with the leading merchants in his line, and furnish him with credit reports regarding his prospective customers."

National City Bank

The National City Bank has done more in foreign branch banks than most of the other banks. It now has branches which do a regular deposit banking business in 13 foreign cities and its affiliated institution, the International Banking Corporation, does what is better known as exchange banking in something like 18 cities, principally situated in the Far East. The branches of the National City Bank are located at Havana; Santiago de Cuba; Caracas, Venezuela; Bahia, Rio de Janeiro, Sao Paulo, and Santos, Brazil; Montevideo, Paraguay; Buenos Aires, Argentina; Valparaiso, Chile; Genoa, Italy, and Petrograd and Moscow, Russia. It also has representatives in London, Copenhagen and Milan. The International Banking Corporation, in addition to its offices in New York and San Francisco, has four branches in the West Indies, and at Panama and Colon in the Canal Zone; Medellin, Colombia; Bombay and Calcutta, India; Singapore, Borneo; Batavia, Java; Manila and Cebu in the Philippine Islands; Kobe and Yokohama in Japan; and Peking, Tientsin, Shanghai, Hankow, Canton and Hongkong in China.

When asked to explain what services the National City Bank could render to an exporter of railway supplies, a representative of the bank's foreign trade division said:

"The National City Bank of New York is ready to be of service to manufacturers of railway material and equipment, and to engineering and construction enterprises, in handling foreign business and contracts. The bank's foreign branches are in close business touch with foreign interests where they are located.

"The bank is able, after conference with manufacturers here, in order to have a comprehensive enough grasp of the details of their production, plans and policies to enable our managers and commercial representatives abroad to discuss the affair intelligently, to obtain preliminary information for them, and get them in touch with foreign possibilities.

"Any large financing that would be required for increase of manufacturing, or long-term credit arrangements in the case of large foreign contracts or semi-public works, would be matters for special negotiations, as every manufacturer knows. The commercial financing of the business would

be easily handled in the foreign division of The National City Bank of New York. The bank's organization is so extensive, handling the immense volume of foreign business as it does, that it has special machinery ready for the many variations of foreign business conditions, extraordinary or accidental, that have in the past made the handling of foreign business settlements through banks that were not equipped for it the occasion of American manufacturers' keeping away from export and import business. The bank has direct sources of credit information. It handles all foreign business either completely through its own organization, with the obvious advantages of safety, secrecy and care, or through its direct correspondents.

"The National City Bank of New York commands the facilities for the most economical financing of sound foreign business transactions, no matter how big. Based, of course, upon negotiations by which manufacturers would establish their credit, the bank is able to arrange the financing of shipments on terms to fit the conditions of the business, whether by loans, discounting of individual bills, or re-financing by means of acceptances, according to the circumstances of the individual manufacturer's affairs and the transactions concerned. In business as extensive as that of selling railway materials, equipment, or construction abroad, the organization represented in the foreign division of the National City Bank of New York would probably be of more than ordinary assistance, since the bank is in a position to open foreign deposit accounts for the receipt of foreign payments, thus avoiding the cost and uncertainty of many exchange transactions. In other words, through the National City Bank of New York's world-wide banking organization, such big exportation as is involved in foreign business in railway materials would be carried on with the banking transactions hardly more intricate than in the case of extensive business inside the United States."

Foreign Trade Banks

A bank that is organized to take charge of a manufacturer's foreign trade and handle it entirely without assistance from the manufacturer is a new development for America, but is an old idea to many business men in foreign countries. The foreign trade banks of Germany are credited with being one of the most active agencies in securing the great volume of export business that that country enjoyed before the war.

Such a bank is the Mercantile Bank of the Americas organized about two years ago and now having headquarters at 38 Pine street, New York, with branches all over the world. The American Foreign Banking Corporation of 56 Wall street, is another trade bank that was organized recently and the Canadians have also formed at least one bank of this kind.

The secret of the strength of the trade bank is that it has a world-wide organization with branches and agencies in all parts of the world. The men in these branches and agencies are seasoned business men and capable of undertaking almost any kind of business transaction in the interest of the clients of the bank. They make reports of all kinds, ranging from the financial standing of a single foreign dealer to the trend of business in a whole country or the state of a given industry, and can give expert advice on the prospects of success for a projected foreign railroad, etc. This service is maintained for the benefit of the clients of the bank and in addition the client has the opportunity of consulting the staff of the bank at the American headquarters. The home staff includes an adequate number of men who have had extensive experience in doing export business and who are well acquainted with conditions in foreign countries. A little of the time of such men is worth a great deal to the manufacturer who is trying to organize an export branch to his business. In fact concerns with years of experience in dealing

with foreign markets do not hesitate to consult the foreign trade banks when in need of information.

Mercantile Bank of the Americas

The Mercantile Bank of the Americas was organized by Brown Bros. & Co., J. W. Seligman & Co., and the Guaranty Trust Company of New York and is closely connected with the National Shawmut Bank of Boston, the Anglo London, Paris National Bank of San Francisco and the Ibernia Bank & Trust Company of New Orleans.

In reply to a question as to what service the bank offered to the exporter, Mr. Van Deusan of the bank said:

"We have organized especially to finance export orders. Where the foreign customer wants long credits we will finance the transaction. We give the American manufacturer cash as soon as the goods are shipped and the customer has accepted the shipment. This is done by cable so that the manufacturer is paid almost immediately after shipping his goods. This is called financing acceptances.

"If a manufacturer with an attractive export proposition does not want to go after export business we will do it for him. All he needs to do is make his product, pack it, as we direct him, address it and load it onto a freight car at his factory.

"When a manufacturer wants to develop an export business, but does not know how to go about it, we will show him. We are creating branches and connections in all countries in order to give a complete service to clients. We will help a manufacturer find customers, establish his connections, tell him where his market is, and make up for his deficiencies as an exporter in any respect.

"We have one branch in Paris and in Barcelona; one branch in Lima, Peru, and ten agents in other Peruvian cities; one branch in Ecuador and agents in six cities of Ecuador; seven agents in Colombia; four banking connections in Chile, Venezuela, Costa Rica, Salvador, Guatemala and Honduras; one branch in Brazil and close banking connections in Bolivia. Other branches and agencies will be established as rapidly as there is need for them."

American Foreign Banking Corporation

The American Foreign Banking Corporation was organized for the same purposes as the Mercantile Bank of the Americas. The directors of the American Foreign Banking Corporation are the presidents of the following: Chase National Bank, New York; Trust Company of Cuba, Havana; Essex County National Bank, Newark; Corn Exchange National Bank, Chicago; Fifth-Third National Bank of Cincinnati; Canal Bank & Trust Company, New Orleans; First & Security National Bank, Minneapolis; National Bank of Commerce, St. Louis; Philadelphia National Bank; First National Bank of Cleveland; Merchants' National Bank, Boston; First National Bank, Milwaukee; Merchants-Mechanics First National Bank of Baltimore.

The Foreign Trade Banking Corporation is a very recent development, the announcement of its organization having been made only a week ago. The bank is a discount

bank and the first of the kind to be organized in the United States. Its president is George A. Gaston, head of Gaston, Williams & Wigmore, Inc., and its managing director is Max May, until recently vice-president and manager of the foreign exchange department of the Guaranty Trust Company.

Foreign Trade Banking Corporation

In stating the purpose of the bank the announcement said:

"The company will be operated along the same lines as similar institutions have been conducted for years in England and France and which have done so much toward building up the large and profitable overseas patronage of those countries prior to the war. Comparatively little was known of trade acceptance in this country before the war, but during the last two or three years its importance and value in international business relations have become widely recognized, and it is now one of the most popular and helpful financial instruments. On the surface it appears strange that a banking institution of this kind has not been organized in this country earlier. There are a considerable number of them operating in London, and in addition to being highly profitable to their owners they have proved of great assistance to all parties concerned—the buyer and seller as well as regular banking institutions, through creating a larger volume of remunerative business for them."

George A. Gaston, the president, said in commenting on the new bank: "We hear much these days about rendering service for the purpose of fixing up and holding our foreign patronage. Most of this propaganda consists of statements relative to proper packing and other features—important, but matters of detail. Of greatest importance is the matter of credit to help us achieve this most desirable result. What this country needs to maintain its recently won supremacy as an exporter is adequate shipping facilities and a more elastic credit system. It appears now that in the future we will have less trouble about overseas shipping, so the matter resolves itself more or less down to one of credits and proper or beneficial financing. The new discount company will not accept deposits like banks, nor transact a general banking business. In other words, it will not compete in any way with the established banking institutions. Naturally enough a great amount of educational work must be done among the banking institutions generally throughout the country, so they will understand fully the value of trade acceptances. Such knowledge will enable them to render a real and constructive service to their own patrons.

"Beyond dispute the establishment of the Federal Reserve Bank was the most progressive step taken by this country in many years. It has proved a great boon to the industrial and commercial life of the country, and while it gives needed elasticity to the country's banking capacity through its discounts of commercial paper, it maintains direct relations only with banks. Our rediscount bank will offer rediscount facilities to banks, and will go even a step further by extending service to firms and individuals."

The Visiting Purchasing Commissions

So many railway supply men are already familiar with the foreign railroad purchasing commissions that are now in this country that but a few words concerning them will suffice.

The commissions have been here not only to place orders for much needed railway supplies for their country's railroads, but to inspect the material ordered, to assist and superintend its shipping and in some cases to keep in touch with the market here with a view to placing orders for requirements after the war. The personnel of the commissions

consists as a rule of important railway government officials.

The Japanese Commission has been in New York with headquarters at 17 Madison avenue. Akio Kasama, secretary of the Imperial Government Railways who has been in charge since Dr. Shima left for Japan last December is, however, also about to leave for Japan.

Captain Raymond Michel, a distinguished French officer, is in charge of the railroad department of the French High Commission.

The purchasing board of the railroads of Italy is headed

by V. Pizzorno, president of the Italian State Railways' Commission of Inspection at 291 Broadway, New York. A. Palanca, at 291 Broadway, is head of the Italian Ministry of Shipping. General Tozzi of the Italian Military Commission in the Metropolitan building, New York, is also interested in the buying of railway supplies.

Russia

The Russian Mission of Ways of Communications has offices in New York and in Washington, D. C. It consists of Professor G. Lomonosoff, Count S. I. Shulenberg, Alphonse I. Lipetz, and M. N. Groten. Professor Lomonosoff is president of the commission with headquarters in New York. He is a member of the council of engineers of the Russian Ministry of Ways of Communications in Petrograd. Mr. Lipetz, head of the locomotive department of the Russian Mission and formerly an important officer of the Russian Government Railways is responsible for the design of the Russian Decapod locomotive built in this country as described in the *Railway Age Gazette* of October 12, 1917. Mr. Groten is chief of the car department of the Russian Mission of Ways of Communication and is responsible for the design of the Russian railroad cars built in this country. The mission has a large staff of engineers and inspectors who have been in charge of the construction in this country.

Netherlands

The government of the Netherlands has a purchasing office for the East Indian possessions in the Whitehall building, New York. This office has been purchasing railway supplies which have been shipped from Pacific Coast ports. As an indication of what the future policy of the Hollanders will be in regard to the purchase of railway supplies in this country a member of this commission said:

"After the war Holland will make every effort to continue to buy supplies in the United States. They will do this regardless of the price of supplies, because it is not desirable for Holland to let either England or Germany continue to sell them all their supplies. Holland does not build railway supplies and formerly bought almost wholly in England and Germany. By buying at least part of our supplies in the United States we shall prevent either Germany or Great Britain from getting too great an interest in the business of our Colonial possessions."

French High Commission

The New York offices of the French High Commission which occupy two floors of the American Express building at 65 Broadway, present a scene of intense office activity. Speed and brevity are the order of the day, although all proceedings are tempered by delightful French courtesy.

Selling to railroad commissions forms a practically new experience to railroad supply concerns, and certainly not an undesirable method of securing foreign business. By coming to this country and doing business here with many American concerns the commissions have gone a great way in bridging the gulf between their and our methods of doing business. Although the commissions may be discontinued after the war, their coming will at least have been a great boon to the supply industry. In numerous cases American specialties have been purchased, and the American supply concerns have secured a foothold in the foreign market.

\$54,000,000 W. S. S. IN MARCH.—Sales of War Savings and Thrift Stamps in March were \$54,000,000, and brought the total receipts from that source in the four months since the War Savings campaign started to \$128,000,000. Officials estimated, however, that actual sales, some of which have not been reported, have been about \$150,000,000.

Canadian Engineers in France of Stern Stuff

"THE MEN WHO DRIVE the big mogul engines of Canada's ocean-to-ocean trains across the prairies and through the mountains are made of stern stuff and have nerves as steady as the steel roads they travel. You meet many of them here at the war."

So writes Roland Hill, from war correspondents' headquarters in France, regarding the operations of the Canadian railway troops. The story was received by the Canadian Militia Department and published in press despatches.

"There is the story of one of these engineers—in charge, too, of a 'built-in-Canada' engine—whose great hospital train had just completed lading at a siding when the Huns opened deliberate fire on the casualty clearing station. They said it was a reprisal for the 'bombing of German hospitals' by British airmen (British airmen, of course do not bomb hospitals). The track ahead had been hit but not broken by the shells which were ranging closer to the hospital with every shot. Without hesitation the Canadian engineer piloted his train safely over the damaged track to a clear line ahead and hundreds of helpless wounded were carried to safety. If the engine had ditched it meant certain destruction for the train.

Aid Salvage Corps

"Another driver, who had charge of a Canadian construction train at Gouzeaucourt when the Huns broke through after Cambrai, stayed with full steam up until all possible men and material had been loaded, and although the enemy were actually on the track behind him, tore down the grade to a safe siding well behind the new British line.

"The Canadian railway troops in their spare time have been assisting the hard-worked salvage corps. After Passchendaele they collected thousands of pounds' worth of British and German shells and hauled them back to the rear on their now famous light railways. Late one afternoon one large dump caught fire through spontaneous combustion or perhaps a defective shell, and in the first explosion half a score of men were wounded. A young Canadian engineer, a sergeant, who in peaceful days used to drive the Canadian Pacific Imperial Limited from Moose Jaw to the west, in spite of the bursting ammunition backed his little engine into the middle of the dump where the fire was blazing most fiercely. He connected up a hose with his main steam pipe and for half an hour pumped a stream into the burning mass, finally getting the fire under control. His little engine was pitted with shrapnel holes and his own escape was nothing short of miraculous. Several of the flying fragments tore his clothes. His example rallied other men and the fire was subdued before very great damage had been done.

"There was two hundred thousand dollars' worth of British shells in that dump. We couldn't stand by and see that go up," he explained afterwards.

"And when the dump was safe he and his companions gathered the wounded into empty dinky cars and rushed them back along the little steel line to the safety of a dressing station."

EMPLOYMENT FOR ENGLAND'S DISABLED RAILWAYMEN.—Speaking at the annual meeting of the Lancashire & Yorkshire Railway, on February 13, Sir George Armytage, the chairman, said with reference to those members of the company's staff who were crippled while serving their country: "These men, I need hardly say, receive the most sympathetic treatment, and every endeavor is made, in accordance with the terms of our promise, to reinstate those concerned in their former positions, and in any case every effort is made to find employment for them."

The Locomotive Repair Shop Situation

The Railways Need Increased Facilities for Maintaining Power;
Labor Must Give Its Best

TAking the country as a whole the railroads are deficient in repair shop capacity and facilities. It is here that the government can, during its control of the railways, make the greatest showing in improvements to railway equipment. The lack of proper facilities for making both general and running repairs to locomotives was responsible to a large extent for the condition of the motive power last winter. While it was not the sole cause, it contributed very largely to the conditions. Some prominent men in the railway mechanical field have made the statement that it is not new locomotives the country needs, but properly repaired and well maintained locomotives. Facilities must be provided for this purpose. However, very few roads have made anywhere near in proportion the improvements in their shops that they have in their locomotives. Heavy power has been purchased with no provision for properly handling the repairs. This has not only made it necessary to hold these large locomotives with their proportionately increasing earning capacity out of service longer than should be necessary, but it has made it impossible to maintain them properly. The old saying, "a stitch in time saves nine," applies most aptly to repairing the large locomotives. Let them begin to pound or have excessive wear in their running parts and they soon hammer themselves to pieces.

What is needed most, particularly in the east, and far more than standard locomotives, is increased shop facilities for maintaining the power which has and will in the next few years be called upon to do a greater amount of work than ever before in the history of the country. Back shops are needed with adequate crane service and machine tool equipment for handling the heavy repairs. Improved terminal facilities are required that the light running repairs may be properly made. One road owning over 2,000 locomotives estimates that its repair facilities can only be brought up to the proper standard by an expenditure of over \$10,000,000. Another road located in the east operating about 1,500 locomotives has only repair facilities for 750 and these are old shops with inadequate facilities. So great is the demand that one road is planning to equip various buildings with temporary facilities for repairing the lighter class of power, such as switch engines, and keep the larger shops free to handle repairs to the heavier power.

Those roads, which, because of lack of proper back shop facilities, followed the practice of making most of the light repairs in the engine houses, suffered greatly during the extremely cold winter because of this fact, their roundhouses being crowded with locomotives under repair and no house room being available for making the running repairs to the road locomotives. This necessitated keeping them outside where it was impossible for the men to do efficient work and where it was impossible to prevent locomotives freezing.

The motive power of the country, taken as a whole, is perhaps in worse condition than it has ever been before. It has been estimated that during the next seven months 60 per cent of the power must pass through the back shops for repairs, if the railroads are going into the next winter in proper shape. This means that almost heroic work must be done. Facilities should be improved to better meet the demands. Extensions to roundhouses which will permit more locomotives being taken under cover during the winter months will be money well invested. Additional inspection pits, strategically located, will contribute toward prompt repairs. A well designed and modern asphalt with adequate facilities for removing the cinders is important. A study

should be made immediately of the conditions as they exist and improvements made where they will do the most good.

It is useless still further to overcrowd our shops and engine terminals with new locomotives unless provision is provided to take care of them. It may be possible to build during the next few months a well equipped, modern shop at some centralized point in the east to provide facilities for repairing locomotives for those roads whose repair facilities are so greatly overtaxed. No stone should be left unturned which will lead toward improved shop conditions that the roads may better maintain their power.

Repairing Locomotives in Foreign Shops

At the present time about 225 locomotives have been sent to those roads which are in a position to handle repairs to other than their own locomotives. It is a question as to how far such practice should be followed. In no case should a road be asked to sacrifice repairs to its own equipment for the purpose of helping out other roads, as the difficulties encountered in repairing locomotives of a design different from those of the roads to which they are sent make this practice costly both in time and money. Wherever this is done, the repairing road finds it necessary to obtain most of the repair parts from the owning road. The practices followed in the general details of construction are usually different and considerable time is required for the repairing forces to acquaint themselves with the peculiarities of the foreign locomotives.

The following while not strictly up to date will give some idea of the extent to which locomotives have been sent to foreign roads for repair since January 1.

A. T. & S. F.	8	M. P.	13
A. & N. M.	1	M. St. P. S. S. M.	1
A. C. L.	2	M. K. & T.	1
B. & O.	3	N. Y. C.	3
B. & O. C. T.	2	N. Y. C.	10
B. R. & P.	1	N. Y. O. & W.	3
Belt Ry. of Chi.	1	N. C. & St. I.	4
C. R. I. & P.	7	N. & W.	2
C. & W. C.	1	N. M. N. H. & H.	3
C. C. & St. L.	21	P. M. & O.	5
C. & N. W.	7	P. L. W.	1
C. B. & Q.	13	P. & I. E.	7
C. St. P. M. & O.	2	Pacific	2
C. G. W.	2	Pennsylvania (W. St.)	8
C. M. & St. P.	4	St. L. S. F. & T.	2
Cent. of Ga.	5	St. L. & S. F.	4
C. N.	1	St. Louis S. W.	1
C. & A.	1	St. Paul	1
D. L. & W.	5	St. P. & N. E.	1
D. S. S. & A.	1	Union Pacif.	1
E. J. & E.	1	Virginia	1
Grand Trunk	1	Total	122
G. C. L.	1	Am. L. C.	1
G. M. & N.	1	3. I. V.	1
H. C. S.	1	R. I. W.	1
I. & N.	1	Total	15
J. V.	1		
M. & St. L.	1		

Of this number 26 have been repaired and returned to the owning road.

When this practice was first started locomotives were sent indiscriminately throughout the country. It was discovered that some eastern locomotives were being sent to repair points 2,000 miles away. This, of course, was entirely impractical and with a concentration of such work in the hands of the Manager of the Locomotive Shop such occurrences need not now exist. It is the plan of Mr. McManamy and a most logical one too, to systematize repairs to foreign locomotives that one shop will handle only repairs for one road besides itself. Great care must be exercised in making inspection of locomotives that are sent to other roads for repairs, so that a full complement of repair parts will accompany the locomotives to the shop. Occasions have been found

where the work has been materially delayed because the more rigid inspection made when the locomotive was stripped, developed the need for repairs that were not reported. As the workmen in the repair shops become accustomed to the requirements of the road for which they are making repairs, the difficulties and delays will be reduced. In some cases it has been found necessary to send inspectors with full sets of detail prints and standard practices of the home road to the shops at which the locomotives are to be repaired. These inspectors should work with the shop forces and be given definite gangs, so that the workmen may be educated in the requirements of the owning roads, and these gangs should be kept solely on this work. They will soon become accustomed to the road's requirements and will be able to make the repairs with less confusion in the shop.

Cases have been reported of locomotives being sent as far west as Parsons, Kan.; Brainerd, Minn., and Ogden, Utah, to be repaired, all these locomotives coming from eastern roads. It would be far better practice to "step" the repairs westward, than to require the locomotives to travel such great distances for repairs.

Repairing locomotives in foreign shops is at best only a makeshift proposition and should not be done except in case of absolute necessity because of the hardships it will impose upon the repairing roads and the increased length of time a locomotive will have to be held out of service from the home road. If it is possible to increase the repair facilities of the owning road, this should be done by all means, as a great deal of confusion will be eliminated and there will be a net gain in locomotives repaired throughout the country.

The Labor Situation

Perhaps the greatest trial the railway mechanical officers have borne during the past year has been the difficulty of securing a sufficient amount of efficient shop mechanics and labor. Because of the extreme demand for mechanics of all kinds by the navy yards, munition works and on account of the draft, the railway shops throughout the country have been sorely hit. While it is true that the larger roads, taken as a whole, have about eight per cent more men working on locomotive repairs than last year, a large number of the men employed represent a class of labor that is unfamiliar with railway shop practice. This is particularly true in the East. It has been necessary to educate these men and generally speaking they have not been able to do the work efficiently. The labor situation, however, is becoming more stabilized and with the promise of consideration being given the workmen by the Railroad Wage Commission, the men have been more willing to remain on the job.

Due to the law of supply and demand, the railroads have been forced to increase the wages to the men in order to hold them. With these increases in wages, however, it has been increasingly difficult to keep the men from laying off. To overcome this situation one road has granted a bonus of one minute per hour to men who have not absented themselves from work during the week. The matter of absentees is an important one and every possible attempt should be made to appeal to the patriotic duty of the men to remain at work. It is no longer necessary for each one in this country to do his "bit," *but each one of us must do all that is possible to the limit of physical endurance.* The men must be made to realize the seriousness of the situation. They must be made to feel that the government is depending upon them to provide the railways with adequate power.

It is necessary, if the roads are to go into the next winter in good condition, for labor to give its full time. In fact, the matter is so tremendously important that the Manager of the Locomotive Section of the Railroad Administration has issued orders to increase the working hours of railway shops, where necessary, for making proper repairs to the locomotives, to 70 hours a week. Some roads have done

this; others have not. The success with which this order can be met depends a great deal upon the manner in which it is handled. One road on which it was attempted to put this order into effect, issued a notice to the men an hour or two before closing time, requiring the men to start that night on the 70-hour schedule. This was manifestly unfair to the men, and as might be expected, was met with a great deal of opposition. After two days' trial the plan was considered a failure and discontinued. A representative of the Railroad Administration, however, consulted the representatives of the shop men and even addressed the men en masse. After explaining to them the necessity for the overtime and the importance of properly repairing the locomotives, the system was again scheduled to go into effect a few days later with lasting results. To obtain the 70 hours a week, some shops are operating 10 hours a day for the entire seven days. Other shops are working 14 hours on Monday, Tuesday and Thursday, 10 hours on Wednesday and Friday and nine hours on Saturday, leaving Sunday free for the workmen.

Labor Must Do Its Part

Some shops are arranging to provide for the increased output where men can be obtained, by working night shifts. This, of course, is a desirable thing to do where possible. In every case, however, all shops, regardless of the condition of the motive power on their particular road, should increase the working hours in order that they may lend assistance to roads whose repair facilities may not be sufficient to meet their needs. It is a time for the closest co-operation and every assistance must be given to the weaker roads.

Labor must be ready to do its part in this gigantic world struggle. Those roads that have become strongly unionized are bound hand and foot by agreements with organized labor, which make it practically impossible for overtime to be obtained without greatly increasing the cost of labor. One labor agreement which was put into effect the middle of last year, which is distinctly unfair to the railroads and may be justly termed unpatriotic at the present time, reads as follows: "Overtime shall be paid for at the rate of time and one-half for all service after the hours in force (eight-hour day) up to the end of the first hour immediately following the shift upon which employed. If required to work after the first hour immediately following the shift upon which employed, five hours will be allowed for 3 hours and 20 minutes, or less service." Here the road, if it attempts to even work a 10-hour day, is required to pay for 14½ hours, and this contract was made while our nation was at war. This same contract also reads: "When vacancies occur in foreman or gang boss positions, men from the class represented in this agreement will be given preference in promotion, seniority, character and ability to govern." This rule certainly removes the incentive for good work and it makes it practically impossible to secure the best supervision. Whether or not the Railroad Wage Commission will permit such agreements to exist, remains to be seen, but in view of the necessity of the government for this class of labor, it seems hardly possible that even the government will permit such absurd labor contracts.

Throughout the past winter labor has been subjected to very trying circumstances. Due to the lack of adequate facilities, much of the repair work had to be done outdoors, which during the exceptionally cold winter made it a physical impossibility to have the work done properly. Even inside in some places, with the average arrangements for heating roundhouses, it was not possible for a man to perform an efficient day's work. In addition to this there were natural losses of efficiency because of many of the men laying off on account of sickness due to the extreme weather conditions.

Laborers in the mechanical department have been ex-

tremely difficult to obtain. This has been felt more in the south, where negro labor obtains, than ever before on account of the increase in laborers' wages paid by industries and the fact that a large number of negroes were brought north to fill in the gaps there.

Throughout the winter extreme difficulty has been experienced in maintaining proper roundhouse forces. The conditions have been so trying that it has been almost impossible to get the men to stick and the percentage of absentees mounted to a very large figure—for some roads at some periods during the winter, being as high as 40 and 50 per cent. The asphalt men were particularly hard hit and it was not an uncommon occurrence for a whole asphalt crew to quit in the middle of the night or during the day through some of the extremely cold weather. This all makes necessary the provision of adequate facilities for handling this class of work in order that it can be done with a minimum of discomfort to the men.

The discipline maintained at some of the shops has, on account of the difficulty that has occurred in keeping the men at work, been allowed to sag. This is disastrous in any organization and will do more to decrease the efficiency of the shop than most any other one thing. The class of supervision obtaining is generally responsible for such conditions. The supervising officers must insist upon proper respect and hold the men strictly to their tasks.

The Labor Shortage in the Maintenance Department

A Resume of Possible Sources of Supply and of Means of Reducing the Demand for Men

THE AMOUNT OF WORK which the railways can do this year depends directly on the quantity of labor which can be secured. The supply of materials of certain kinds is inadequate, but priority regulations can be so administered as to meet the most pressing needs. However, there are no priorities as to labor. The shortage is universal. Industries are working with only partial effectiveness because of a lack of men. The shipyards are handicapped for the same reason. It is not therefore surprising that the roads, which employ normally about 450,000 men in maintenance of way work, are short from 10 to 50 per cent of their forces, depending on localities. Not only are the railways facing a shortage of track and other maintenance labor now but this condition will continue. The problem is therefore to prepare for the future as well as for the present and to adopt those measures which will be of most lasting benefit.

The causes of the labor shortage are those common to all industries—a demand far exceeding the supply, supplemented by the withdrawal from productive work of large numbers of men for military activities. The result has been a general moving up into the better paying trades of the men formerly classed as unskilled laborers, leaving these ranks most depleted. In those industries employing skilled mechanics such shortages as have existed have been caused by increased demands for men more than by desertions to other work, while in maintenance of way work the reverse has been true and it has been impossible to retain even normal forces.

The shortage varies widely from one locality to another. It is least evident in the agricultural communities and those removed from industrial activities. In such places it has generally been possible to maintain normal forces and in some instances to recruit floating gangs for service in districts less fortunately placed. The greatest difficulty is being encountered in the industrial centers in the east where men cannot be held in the face of the high wages offered by industries. In many such places the forces have been so de-

pleted that it has been impossible to do more than patrol the tracks and do the most urgent repair work, postponing all other work.

It has been found necessary throughout almost the entire country, and particularly where the labor turnover has been very large, to increase the number of foremen or supervising officers in the shops. The class of labor now being obtained is such that unless adequate supervision is provided, either through gang foremen or demonstrators, it will take a long time to bring the quality of work up to the proper grade. Some roads have complained of the difficulty of obtaining competent foremen and of even retaining the foremen in their positions. In a very large number of cases, the difficulty thus encountered is due to the fact that the supervising officers have not been granted an increase in wages in proportion to the mechanics or men working under them. It is impossible to expect a man, undoubtedly a good mechanic, who is capable of holding the position of foreman, to give his best work and remain satisfied when the men under him are receiving more in wages than he obtains in salary. Some roads have been quick to recognize this and have granted the supervising officers increases of even a larger per cent than was given the men. Such roads have had no difficulty in retaining the foremen and they have been willing to work as never before to pull their road-out of a serious situation. Full cognizance must be given to this condition and it must be remembered that labor or workmen without a competent leader will never give maximum output.

With the shortage over the country becoming steadily more acute, little hope can be held out for relief this summer. Instead, with the speeding up of the ship building program and with the continued withdrawal of men for military service, the shortage may be expected to become more acute. The problem confronting railway men is that of developing new sources of supply of labor and of using the men available more efficiently to increase the unit output of work per man.

Increasing Sources of Supply

For many years track forces have been recruited largely from the immigrants coming from Europe, but with the outbreak of the war in 1914 this source was closed. As a matter of fact the number who have returned to Europe since August, 1914, has greatly exceeded that of men entering the United States, so that the net result has been a severe drain on the labor supply of the country. No relief can be expected from this source until the close of the war.

The next most inviting source of labor is Mexico. Up to a year ago Mexicans were coming into this country in increasing numbers and were the main reliance of the roads in the Southwest, but with the imposition of a head tax, and a literacy test by our government in legislation which became effective on May 1, 1917, this source of labor was shut off, for almost none of the Mexicans can pass these requirements. It is understood that large numbers of Mexicans are willing to work in the United States if it were made possible for them to do so, but in spite of the urgent need for them, the government has taken no step publicly to bring them in.

Many railway men have urged that the restrictions against the importation of Chinese labor be raised for the period of the war. Large numbers of men can be secured in China of a class which makes good workmen. England

has transported over 150,000 across Canada to France, where they are employed in civilian work in the interior. China possesses a surplus of labor sufficient for our needs. However, public sentiment, particularly in the western states, is so strong against Oriental labor that there is little hope of securing relief from this source.

The most promising field for the importation of labor is Porto Rico. Investigations of the United States department of labor have shown a large surplus there and statements have been made from time to time that as many as 100,000 to 150,000 men would be brought into this country in the near future. As early as last fall it was announced that plans had been perfected to bring these men in but so far none have arrived. If they are secured, these men will necessarily be distributed mainly in the south where climatic conditions approach those to which the men are accustomed. It is doubtful if any noticeable relief will be secured from this source in the north.

It would seem therefore that no great relief can be expected from outside the United States except in so far as help may be secured from Porto Rico. Within our own borders much comment has been made regarding the employment of women in the maintenance of way department. Some roads have hired considerable numbers for a short time but in general they have not proved successful. While they can be employed in clerical positions they will not offer any material relief in the general run of maintenance of way work.

A greater benefit can be secured through the recruiting of boys 16 to 18 years of age for track work. While the agitation for the enlistment of boys in farm work will draw many in this direction this year, a number of boys of high school age are to be found in almost every village for whom railroad work holds a fascination. By taking the proper measures, many of these boys can be recruited for maintenance work, either as members of regular gangs or in gangs by themselves. One eastern road which gave this subject special attention last spring, sent its supervisors to speak before the older boys of the high schools in the towns along its line, pointing out the advantages of track work during the summer. As a result as many as 150 boys were employed on single divisions. These boys were organized into separate gangs and were assigned to ditching and similar work, but in general were kept off the track itself. In this way it was possible to keep the men working on the track and still to complete much of the other work. If this plan were developed throughout the country it would mean a considerable addition to the available track forces of the country.

Working Conditions

In general maintenance forces are recruited by the individual roads through their foremen locally and through labor agents in the larger centers who are either directly in the employ of the roads or work on a fee basis. This year the government has stated that it is prepared to secure the men desired by the roads through its national and the state agencies with which it is affiliated. It has intimated further in some instances that it is prepared to supplant the organizations maintained by the roads in previous years to secure men. Railway officers are inclined to look at this suggestion with some apprehension, for in spite of frequent assertions to the contrary the government-operated labor bureaus have not shown any marked ability to supply experienced railway labor in the past. Railway men will welcome any help which the government-operated bureaus can render them this year but it would appear highly advisable to retain those methods in use previously until the ability of the government to provide the desired men has been demonstrated.

One wasteful practice incident to the present methods of hiring men for which a practical remedy has not yet been secured is that resulting from shipping labor long distances.

As long as this practice is followed, certain classes of men will continue to hire out for work far removed from the point of employment. The waste of time and of transportation in hauling large numbers of men across the country in this way is great. At the same time, it cannot be eliminated entirely for it is necessary to take the men from their headquarters to the site of the work if the work is to be done. Any proposal to prohibit the shipment of men to work will create a hardship on the job away from the city which it will be difficult if not impossible to overcome.

The wage question assumed a prominent place in all studies of the labor situation last year and it will be even more important this year. It is to be expected that wages will rise in any period of labor shortage. It is also the experience that this rise is facilitated in every such period by the bidding of one road against another, the only effect of which is to increase the cost to all, without benefiting any one, as few new men are drawn into the work. To overcome this practice there is a feeling among many railway men at the present time that, as the roads are now operated under a common control, a uniform rate should be paid on all roads, at least in a common territory. This will effectively stop all bidding of one road against another with its resulting demoralization. However, once established, the tendency will be to standardize this wage over too wide an area and to place too great an impediment to its change, with the result that authority will have been taken from local officers to make changes on their own initiative to meet local conditions quickly as they arrive. While it is not desirable for one road to compete with another for men, particularly under present conditions, each road must compete with the farmers and the industries along its lines for men. Any regulation which removes from the men on the local road the authority to meet this competition gives all the advantage to the industry with the result that the roads will be more seriously handicapped than before.

Conserving Men

With the scarcity of men, which is certain to prevail this year, it is to be expected that they will be harder to hold on the work than ever and that the turnover will be higher even than last year. Men will leave on the least complaint, or on no complaint at all. High wages foster rather than arrest such tendencies, for those men whose sole ambition is to earn a stake will get it quicker and therefore work a shorter time.

A feature which will be given greater prominence than previously will be the provision of more comfortable housing facilities and more attention to boarding. A great improvement has been made in the character of many of the camps, but these modern camps are still so few as to constitute the exception. When the men have the power of selection as they have this year, it is to be expected that they will prefer to work at those places where modern conveniences are provided and will refuse to stay at other camps. This will lead to the more general installation of modern conveniences, first at those points where labor is most difficult to hold and then to points of less difficulty.

With the lack of an adequate supply of labor this year there will need to be more supervision to get the best results from that which is available. Division engineers, supervisors and foremen will need to employ their men so as to get the most work from them and create the least lost motion. This should be planned well in advance and every opportunity taken to secure the most efficiency from the forces.

Of equal or greater importance is the necessity of substituting mechanical equipment for men wherever possible. The maintenance of way department has been very backward in this work and as a result railway men and manufacturers alike have made little progress in the development of labor saving equipment. It is true that the motor cars and

certain other devices have come into general use but these are exceptions to the general practice. Now when labor cannot be secured, there is a great demand for machinery which will do the work of men and this year will probably see the introduction of many new devices. In the meantime it is important that equipment be used in place of men wherever possible, even where there is no reduction in the cost of doing the work, although in nearly all cases the adoption of mechanical equipment is accompanied by a decrease in the cost of doing work.

Conclusions

In brief, the supply of men is insufficient for this year's demands. No help can be expected from European immi-

gration. Men are available in Mexico, but the immigration restrictions prevent those who are willing to come from entering this country. China has a surplus of labor but the sentiment in the west will not permit any letting down of the bars against their entrance. Some relief may be secured from Porto Rico. However, the most ready means of assistance lies in the employment of boys in the work for which they are best suited. With the inadequate forces under the most favorable conditions railway men can also conserve their own interests by providing such arrangements for the care of the men as will tend to hold them on their work. Material relief can also be secured through the adoption of labor saving equipment wherever it can be adapted to the work in hand.

How the Export Houses Help in Foreign Trade

The Reliable Export Firms Can Offer Many Advantages to the Railway Supply Manufacturer

By Homer C. Johnstone

Manager Steel & Railway Supply Department, Gaston, Williams and Wigmore, Inc.

THE WRITER HAS BEEN REQUESTED to outline the advantages presented to the manufacturers of railway supplies for extending their business into foreign countries through the aid of the reliable export firms of this country.

The first question that confronts the manufacturer, and it is a serious one, is how to introduce his goods to foreign markets. There are several ways. The first that suggests itself is to place advertisements in foreign papers, in the language of the country, setting forth the desirability of his particular product. This necessitates considerable initial expense and the results obtained by manufacturers who have tried this method have been very unsatisfactory, for they find that, even though the advertisement arouses interest in the product advertised, by the time a letter of inquiry, written in the language of the country and necessitating translation, is received here and replied to, several months have elapsed and the interest of the inquirer has waned. Even should an inquiry develop into an order, the manufacturer is generally unacquainted with the methods of packing goods for foreign shipment, with the ways and means of getting steamship space at a rate on which he can count and with money values in foreign countries. Also, he is handicapped in ascertaining the credit of the concern to which he is shipping, in consequence of which he is left with an indefinite idea as to the actual sum of money he will make on the transaction, if it goes through, and is, therefore, compelled to demand money deposited in a bank in this country to make safe the financial end.

All of this process covers a long period, if it is done by writing, and costs a good deal of money if done by cable, making the transaction unsatisfactory in the long run and very slow in operation.

There is another method which has been tried without showing returns for the expenditure involved. This has been to send a special man to a certain country. He calls upon the trade and immediately finds himself handicapped if he does not speak the language of the country. While he may take a small initial order, he is very soon forgotten when he goes away, as is also his product. The writer has known firms to spend a good many thousands of dollars in endeavoring to introduce their products in this way and, after several years, find the returns but a small fraction of the money expended.

The modern export company of today, with its organizations in various trade centers of the different countries, offers to the manufacturer the following facilities:

Offices equipped, generally, with an American manager having under him salesmen of the country in which the office is located, and, therefore, speaking the language. These salesmen go out and call upon the trade, having lists of various customers in the various lines. They, of course, by their frequent calls, have become acquainted with the trade and are able to present to customers, in an intelligent manner, the advantages of the product they wish to introduce. If the product is a specialty, they have to depend upon the information they have received from the manufacturer, through the home office, catalogues and other literature. Should the device be so special that it needs a man from its own factory to introduce it, this man could be sent over, accompany the salesman who speaks the language and introduce the product in that way. When he left, the salesman would have absorbed sufficient information to carry on the campaign in the future.

These foreign offices of the large export companies handle a great deal of material and advertise in the countries in which they are located, so they become a sort of center for inquiries regarding American products. Also, the export companies handle imports and are, therefore, buying and trading with the various merchants abroad, which keeps them in closer touch. They are able to make a price, expressed in the money of the country, and the purchaser knows exactly what the material is going to cost when it arrives. Buyers in foreign countries, in ordinary times, are loth to pay for material until it has been delivered. This facility the foreign office of the export company can extend to them because of its acquaintance with the financial standing of concerns abroad.

Starting a Foreign Trade

The modus operandi of starting a foreign trade through one of these export companies would be as follows:

The manufacturer would first get in communication with the export company and state the country or countries in which he desires to introduce his product. If the export company is not versed in the appliances of a similar nature or design used in the country or countries in which it is to be introduced, it can, by correspondence with headquarters

in those countries, have the situation canvassed and, in a month or so, furnish the manufacturer with an intelligent statement as to the possibility of placing his product on the foreign markets. After this information is obtained, if it is still desirable to acquire the business, the manufacturer can, through the export company, send abroad a letter, written by his expert and descriptive enough to give the salesman on the other side a working knowledge. Then, the salesman of the export company abroad can start his campaign. On the orders which might result from this, the export company will buy the material direct from the manufacturer and take all the risk of shipping and safe arrival of the material, as well as the risk of the credit. The manufacturer will get his money at the mill, and know exactly what profit he will make in each instance. He will, therefore, save a large expense in advertising abroad and in the cost of sending representatives to canvass the foreign market.

The exporters or, as some firms call themselves, international traders, who have these foreign offices fully equipped for handling export and import trade, offer facilities along the line above mentioned that have never before been presented to the people of any country. The volume of their business enables them to obtain these various offices, and the salesmen in connection therewith, at a minimum expense compared with that which any single company, regardless of its size, could do in handling only one product. The cost to the manufacturer in introducing his product to the foreign trade is, therefore, very small.

The writer knows of one manufacturing concern in the West which spent a number of years and a good deal of money, advertising abroad in an effort to introduce its machine. The only result was a casual letter, in some foreign language. When the letter had been translated and answered, in 99 cases out of 100, nothing further was ever heard from it. After a number of years, therefore, they had sold a few machines. Then they went to an international trading company and, as a result, their descriptive matter (including a letter sufficient to acquaint the foreign offices with the advantage of the product to be introduced) went to every office of the trading company abroad, immediately, from Tokyo to Capetown and from Rome to Valparaiso.

Accordingly, 14 offices, distributed all over the world, right away took up the pushing of this machine and the result has been a large number of cabled inquiries and of letters asking about the machine, its price, terms, etc. In a few months, therefore, this manufacturer has had an introduction to the world that he could not have acquired through any other source or means.

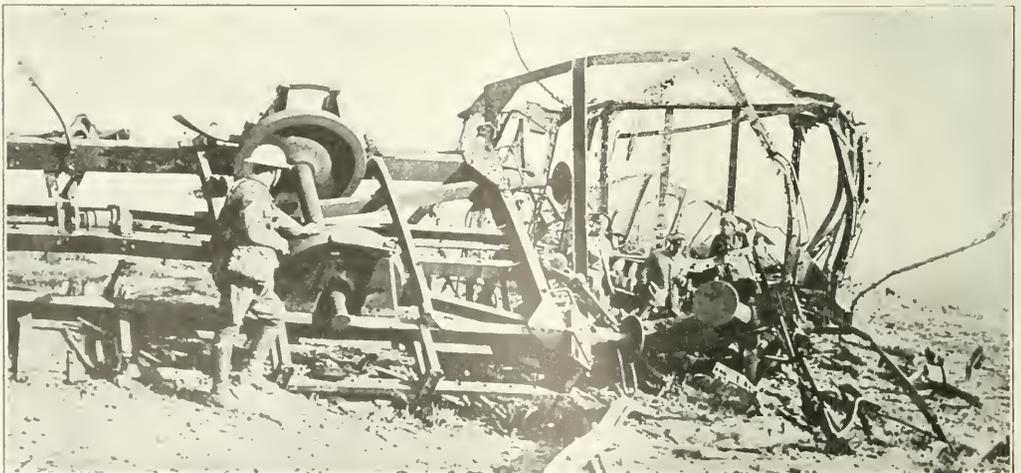
We have known of manufacturers, who have either paid the entire expense of a man to cover a country, or a considerable part of it, and allowed the man to carry several other accounts, endeavoring to market their railway equipment in a country that had no cars on which the equipment could be used, under any circumstances, and the net result of their ventures was simply a large expense account.

If the manufacturer of railway supplies in this country will co-operate with the large, reliable merchants who are able to offer these facilities, it will simply be a question of time when these concerns can afford to establish specialty men on railway equipment in a large number of their offices abroad and the interests of the manufacturer would be taken care of just as carefully as they are in his various offices in this country.

Keep in mind that the magnitude of the business of these international merchants enables them to handle a product on a very small percentage of profit, probably less than a manufacturer might pay in extra freight and handling charges, being unaccustomed to the shipping proposition, to say nothing of the losses that would come to the manufacturer from credits which he would have to give abroad, in ordinary times.

The position at the present time, because of shortage of shipping and abnormal conditions all over the world is, of course, exceptional and what the writer has said is not applicable to a crucial time like the present in the same proportion to which it would apply under normal conditions. However, now is the time for a manufacturer to lay his plans to obtain information and to get in touch with the foreign situation so that, when ordinary business methods are again assumed, foreign trade will have a foundation laid. Of course, after the start, the future of the product depends upon its own intrinsic worth, as well as the manner in which it is kept before the eyes of the consumer.

* * * * *



Designs of the United States Standard Cars

Simple Construction, Interchangeable Parts and Use of Pressed Steel Noteworthy Features

IN THE *RAILWAY AGE* for March 29, the specifications for the United States standard box cars were published on page 785. The principal drawings of these standard cars have been reproduced and are shown in the following pages. From a study of these drawings in connection with the specifications, it is quite apparent that the government's standardization committee has provided some cars which no railroad need fear to operate. The designs are simple and strong.

Every attention has been made to make as many parts of

sills, are made up of 9-in., 17.44-lb. shipbuilding channels. In the open-top cars a 13.2-lb. bull angle is used on practically all the designs. The draft sill arrangement is identical, with the exception of some details, to all cars, and a standard distance of 127 7/8 in. is maintained between the center sills.

In addition to this, detail parts have been made of the same designs where it has been possible to do so, among which may be mentioned the body center plate, body side bearing, front draft lug, striking plate, coupler yoke key and

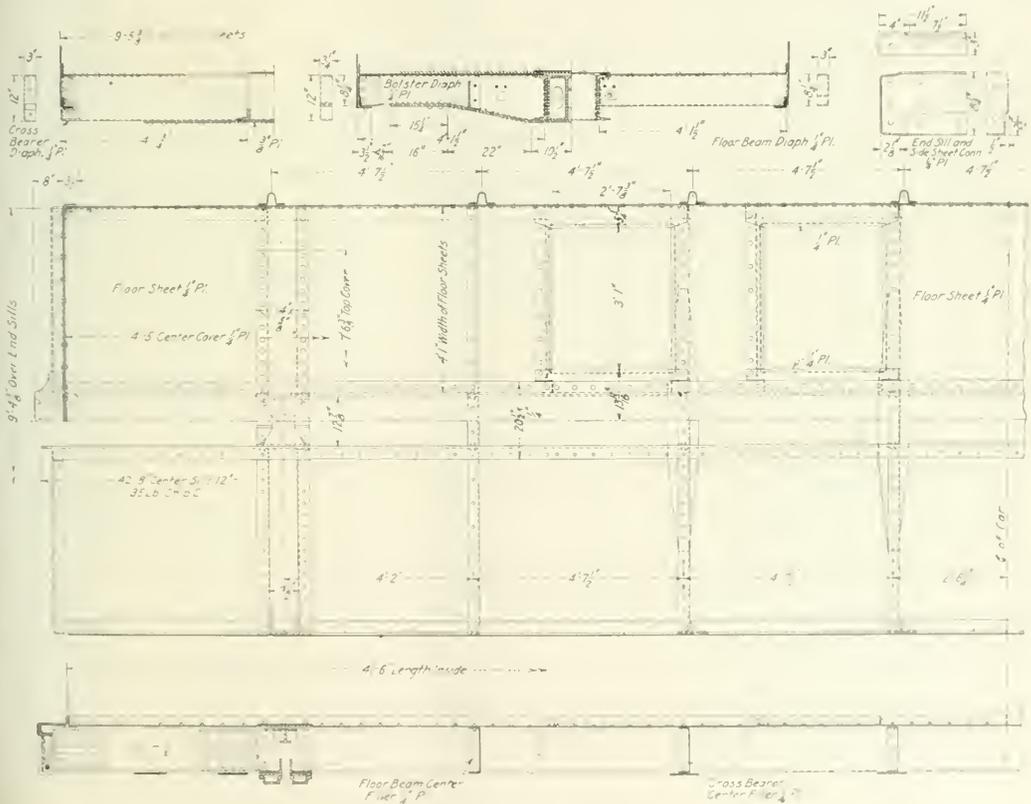


Fig. 1—Underframe for the Standard 50-Ton Steel Gondola Car

the cars as possible adaptable to more than one design, in order to reduce the number of dies, patterns, etc., the builders must make in constructing the cars. It is noteworthy the amount of pressed steel shapes that have been used in the designs and the small amount of commercial shapes. Where commercial shapes have been used, however, a strenuous attempt has been made to use the same shapes. For instance, the 12-in., 35-lb. channels are used to a large extent for the center sills. The end sills, and in some cases side

cotter, coupler carrying iron and ladder frame and iron irons. These are common to all of the designs. There are also other parts which are common to more than one design. For instance, one design of body bolster, center plate, rear draft lug and draft sill is used for the 40- and 50-ton single sheathed box cars, the 50-ton steel gondola and the 50-ton composite gondola. The trucks are similar in construction and have a center plate and center plate support common to all three. The limiting dimensions for brake beams is also

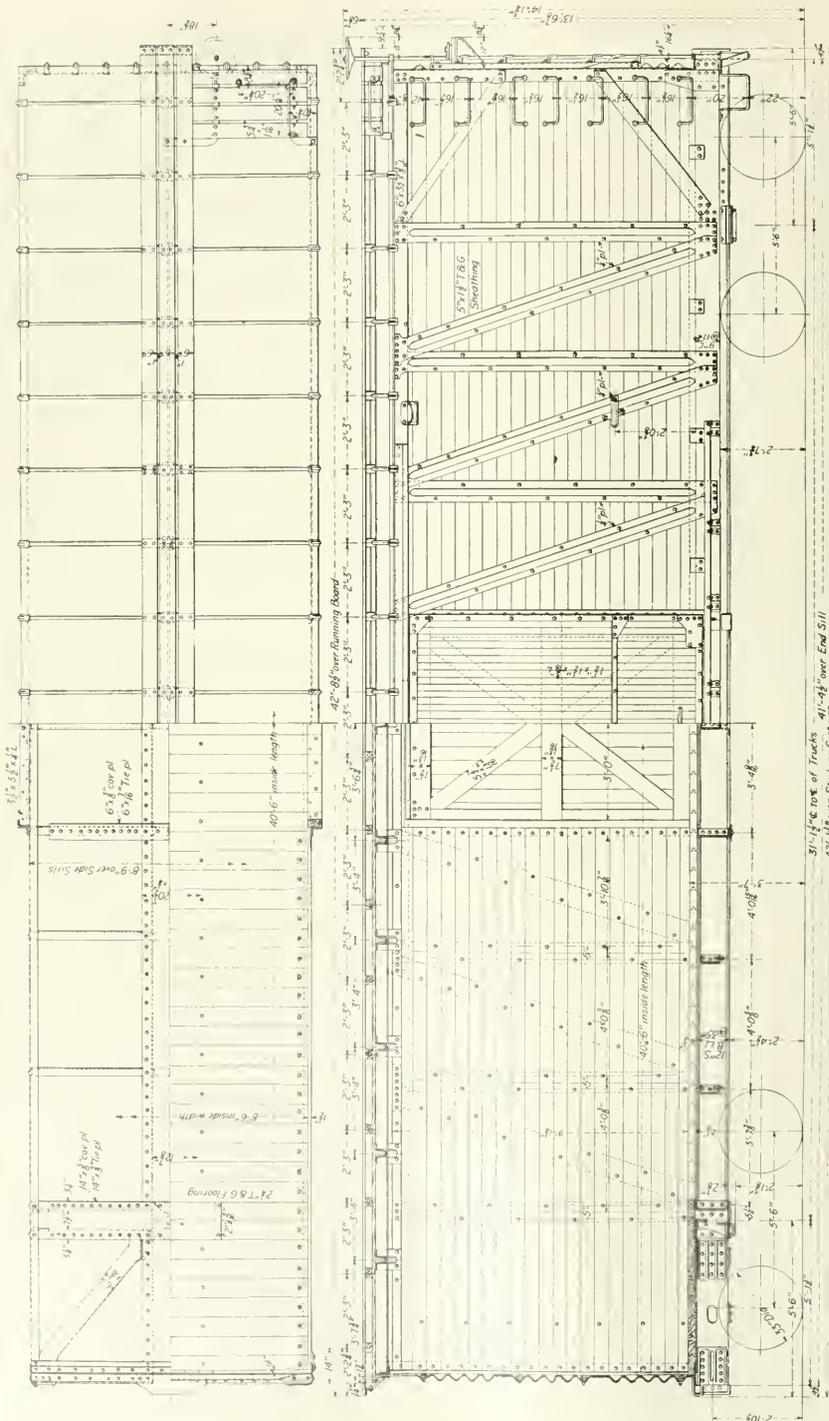


Fig. 6—General Plan for the Standard 40- and 50-Ton Steel Frame, Single Sheathed Box Car

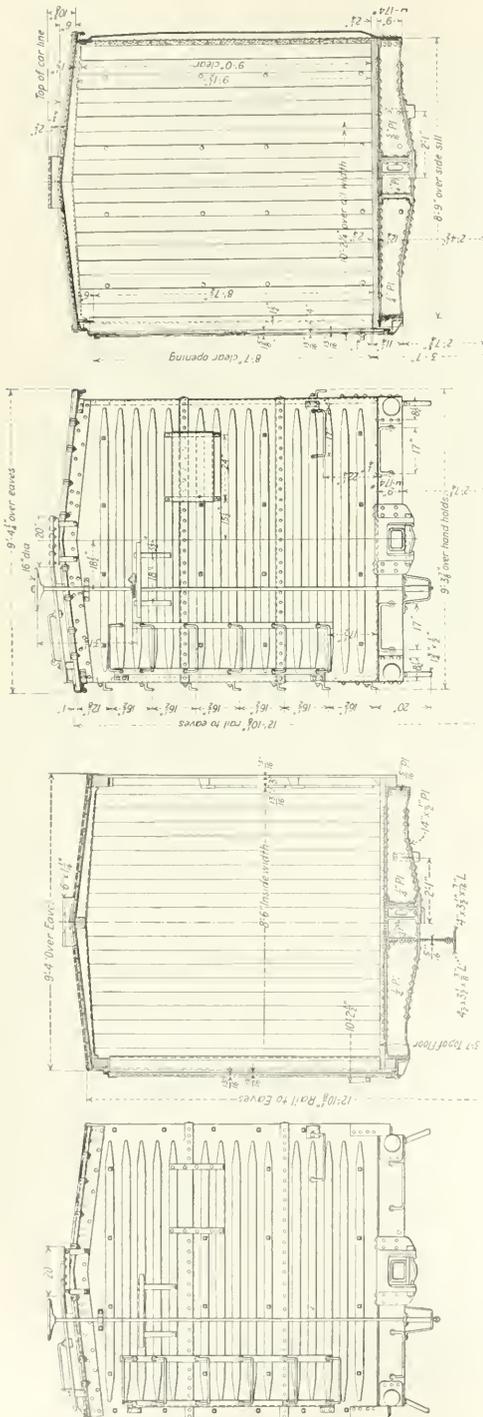


Fig. 8—Sections of the 40- and 50-Ton Single Sheathed Box Car

Fig. 9—Sections of the 40-Ton Double Sheathed Box Car

mated weight of 49,500 lb. It is to be built entirely of steel and is provided with drop ends. The general plan of this car is shown in Fig. 4, and the underframe is shown in Fig. 5.

This car has a center sill of the fish-belly type, being 2 ft. 6 in. deep at the center. The center sill girder has a 3/8-in. web plate with a top flange angle 4 in. by 3 1/2 by 3/8 in., bottom flange angles on each side of the webs 4 in. by 3 1/2 in. by 7/16 in. and a top cover plate 21 in. wide by 1 1/4 in. thick. The crossbearers are 1/4-in. pressed steel diaphragms 16 1/8 in. deep at the center, reinforced at the bottom by a 6-in. by 3/8-in. cover plate which passes through the web of the center sill. The body bolsters are of the same general construction as those used on the other gondola cars, having 5/8-in. top and bottom cover plates. The bottom side angle used in this design is 4 in. by 3 1/2 in. by 1/2 in., and the same bulb angle is used at the top of the sides. The side, end and door sheets of the car are 1/4 in. thick. There are 12 pressed steel stakes on each side of the car made from 5/16-in. plate.

Box Cars

The designs include a 40-ton steel underframe, double sheathed box car and a 40- and 50-ton single sheathed box car, and are illustrated in Figs. 6, 7, 8, 9, 10 and 11. The 40- and 50-ton steel frame cars have identical body construction, the only difference being in the trucks. There are certain details in the construction of the bodies of the double-sheathed and single-sheathed cars which are the same in both. Steel ends are specified for all box cars, and these may be either of the Murphy, vertically corrugated or the plain steel end type. Outside steel roofs are required, which may be either of the Murphy, Hutchins or Chicago-Cleveland type. In many cases the same steel pressings and commercial shapes are common to both types of cars. A brief description of these cars follows:

Forty-Ton Double Sheathed Box Car.—This design has an estimated weight of 44,000 lb. The underframe has a center sill of the fish-belly type, which is 2 ft. 2 in. deep at the center. It is made up of 5/16-in. web plates, with a top 4-in. by 3 1/2-in. by 5/16-in. angle and a bottom 4-in. by 3 1/2-in. by 3/8-in. angle on the outside and a 4-in. by 3 1/2-in. by 7/16-in. angle on the inside of the web plate. There is a top cover plate 20 1/2 in. wide by 1/4 in. thick. There are two crossbearers made up of 1/4-in. pressed steel diaphragms, having a top cover plate 6 in. by 7/16 in. and a bottom cover plate which extends through the webs of the sills, of 6-in. by 3/8-in. plate. The body bolsters are built up of 1/4-in. pressed steel diaphragms and have top and bottom cover plates 14 in. by 1/2 in., which extend almost out to the side sills. The side and end sills are 9-in. shipbuilding channels, which are used so commonly throughout the design of these cars. The end sills are made from the standard 9-in. shipbuilding channels. There is a diagonal brace extending from the junction of the center sill with the body bolster to the corners made of 5/16-in. plate. A 6-in. by 1/4-in. plate extends between the body bolsters and the end sill midway between the center sills and the side sills to further reinforce the ends. These are riveted to the diagonal brace mentioned above.

The superstructure of the car is of standard double sheathed construction, with 3 1/2-in. by 3-in. posts and 5-in. by 3-in. braces. The side posts are reinforced by the 3-in. 4-lb. channel, which fits over the post, being bolted to it, and by a 5/8-in. tie rod which extends between the side plate and the side sill. The last intermediate side post is tied to the corner post by 5/8-in. rods at the upper belt rail. The brace and side post pocket casting of the same post is tied to the end of the car by a diagonal tie rod 1 1/8 in. in diameter. The side plates are 6 3/4 in. by 3 1/2 in.

The doors are made up of 7 1/2-in. by 13/16-in. transverse

and vertical framing, with 5½-in. by 13 16-in. diagonal braces. They are of the underhung type. A 1½-in. by 1½-in. by 13 16-in. angle is placed on the outside for additional stiffness.

Forty and Fifty-Ton Single Sheathed Box Cars.—These cars weigh 44,000 lb., the same as the double sheathed car. In common with the double sheathed car, they have the underhung door and the same draft sills. The center sills are

12-in. ship-building channels. These cars have two cross-bearers made up of ¼-in. pressed steel diaphragms with a 6-in. by 3 8-in. top cover plate and a 6-in. by 7 16-in. bottom cover plate. The bolsters are made up of 15 16-in. pressed steel diaphragms with a 14-in. by 3 8-in. top and bottom cover plate. The side sills and end sills are 9-in. shipbuilding channels.

The side posts and braces are of pressed steel U-sections,

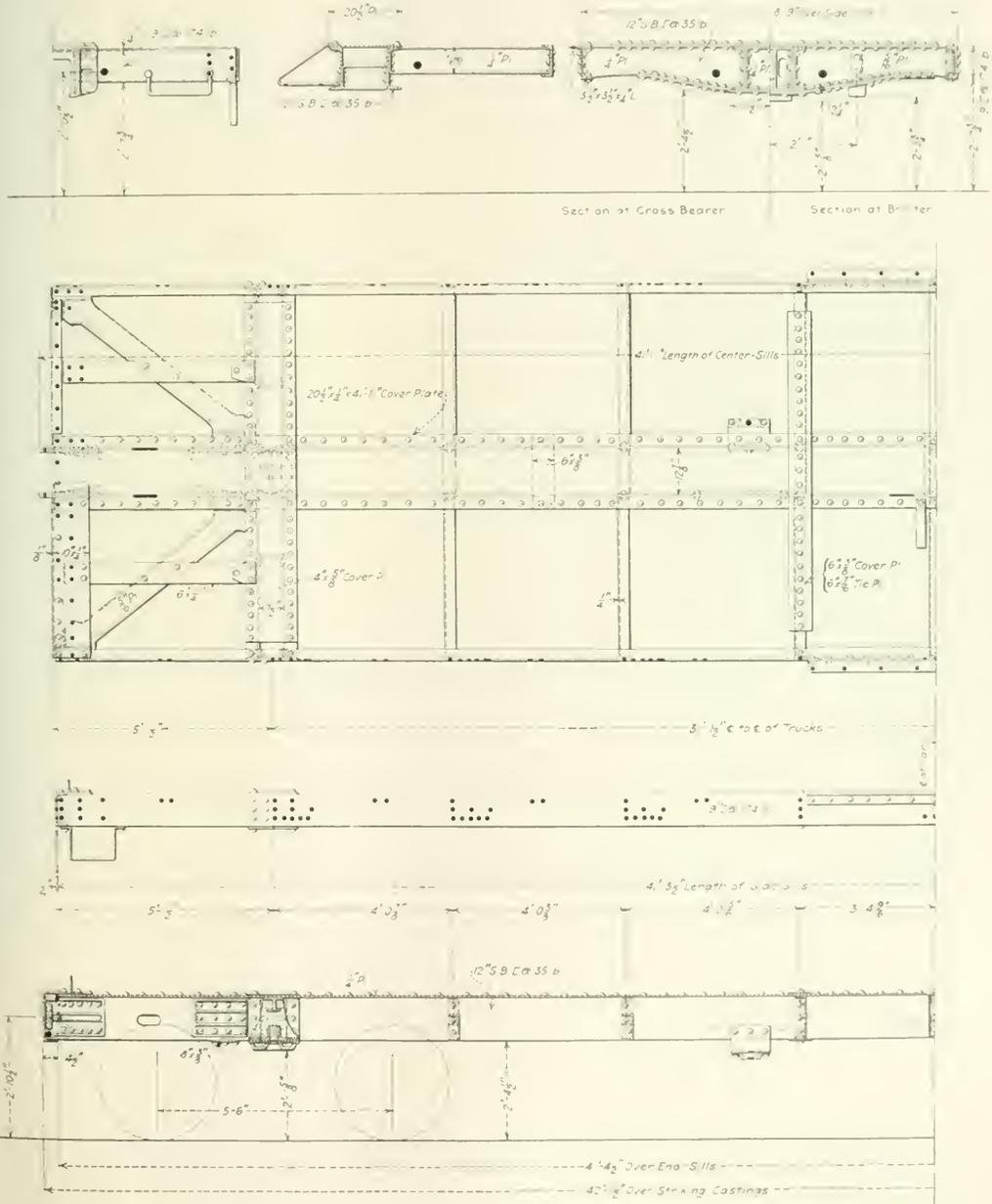


Fig. 10—Underframe of the 40- and 50-Ton Standard Single Sheathed Box Car

made from $\frac{1}{4}$ -in. plate. These are riveted to the side sill and to a 6-in. by $3\frac{1}{2}$ -in. by $\frac{3}{8}$ -in. angle, which forms the side plate. The sheathing used for these cars is 5-in. wide by $1\frac{1}{2}$ in. thick. The roof construction is the same in general as that of the double sheathed car. The carlines are made of $5/32$ -in. open hearth steel pressed to a U-shape, $4\frac{1}{2}$ in. deep.

Hopper Cars

Two designs of all-steel hopper cars have been made, one of 55 tons capacity, which has a double hopper bottom, and one of 70 tons capacity, having a triple hopper bottom. The 55-ton car is to be carried on the standard 50-ton truck, which is designed to carry an overload equivalent to this rating. The elevation and sections of the 55-ton car are shown in

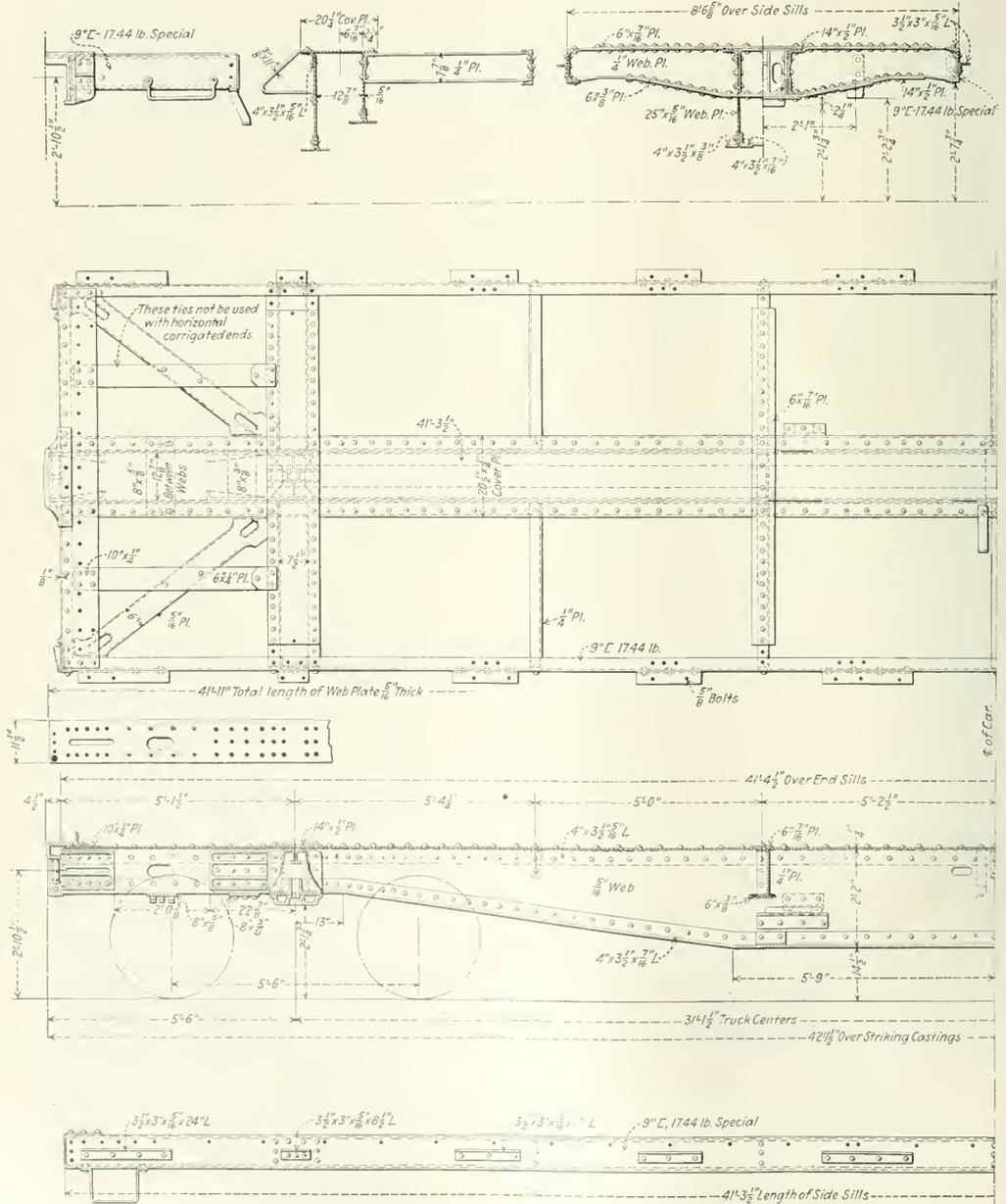


Fig. 11—Underframe of the Standard 40-Ton Double Sheathed Box Car

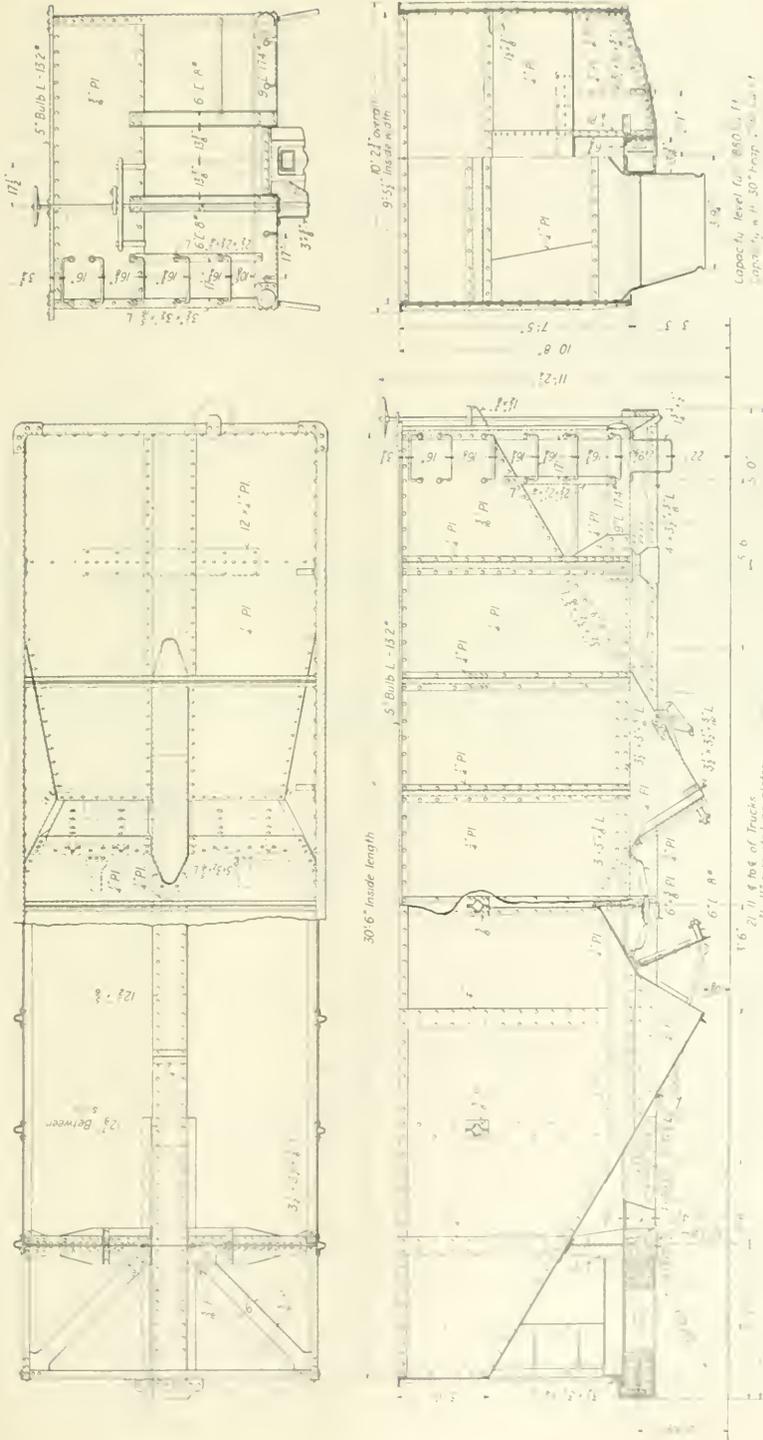


Fig. 12—General Plan of the Standard 55-Ton Hopper Car

Fig. 12, and those for the 70-ton car are shown in Figs. 13 and 14. As in the gondolas, there are many parts of these cars, particularly in the door operating mechanism, that are common to both. A brief description of these designs follows:

Fifty-five-Ton Hopper.—This car has an estimated weight

with reinforcing plates $\frac{3}{8}$ -in. thick and bottom angles $3\frac{1}{2}$ -in. by $3\frac{1}{2}$ -in. by $\frac{3}{8}$ -in. There is a bottom cover plate 14 in. wide of $\frac{1}{2}$ -in. plate. The end sills are 9-in. ship-building channels. The standard 5-in. bulb angle is used at the top of the sides and ends. There are six side stakes of U-section pressed from $\frac{3}{4}$ -in. plate. The side end and

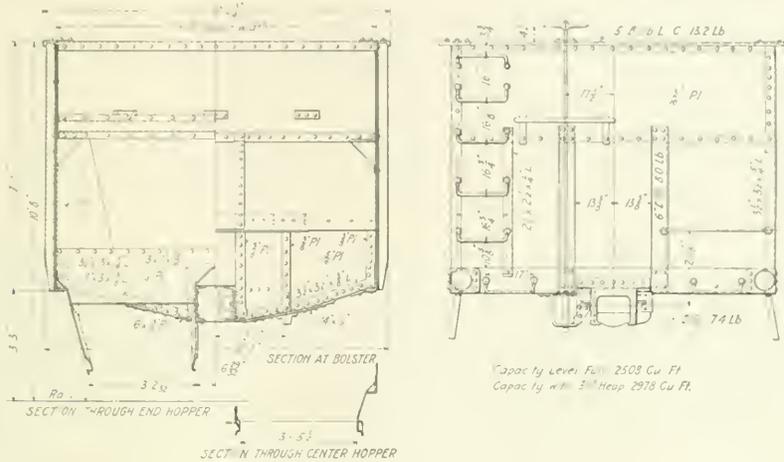


Fig. 14—Sections of the Standard 70-Ton Hopper Car

of 40,000 lb. It has the 12-in. channel center sills, which are reinforced at the ends by a 4-in. by $3\frac{1}{2}$ -in. by $3\frac{3}{8}$ -in. angle. The center sills cover plate is $12\frac{1}{2}$ in. wide by 15 $\frac{1}{16}$ in. thick. The body bolster is built up of a 5 $\frac{1}{16}$ -in. plate.

floor plates are $\frac{3}{4}$ in. thick, with the exception of the last panel at the sides and the top panel on the ends, which is $3\frac{1}{16}$ in. thick. Two 6-in., 8-lb. channels form the end posts. *Seventy-Ton Hopper Car.*—This car has an estimated

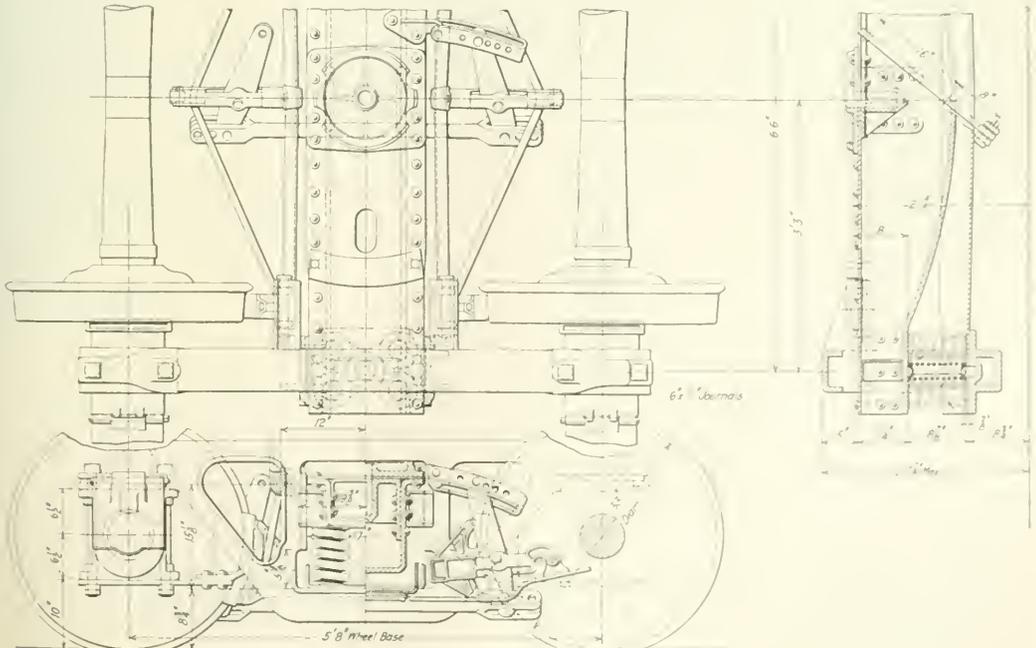


Fig. 15—General Plan of the Standard 70-Ton Truck

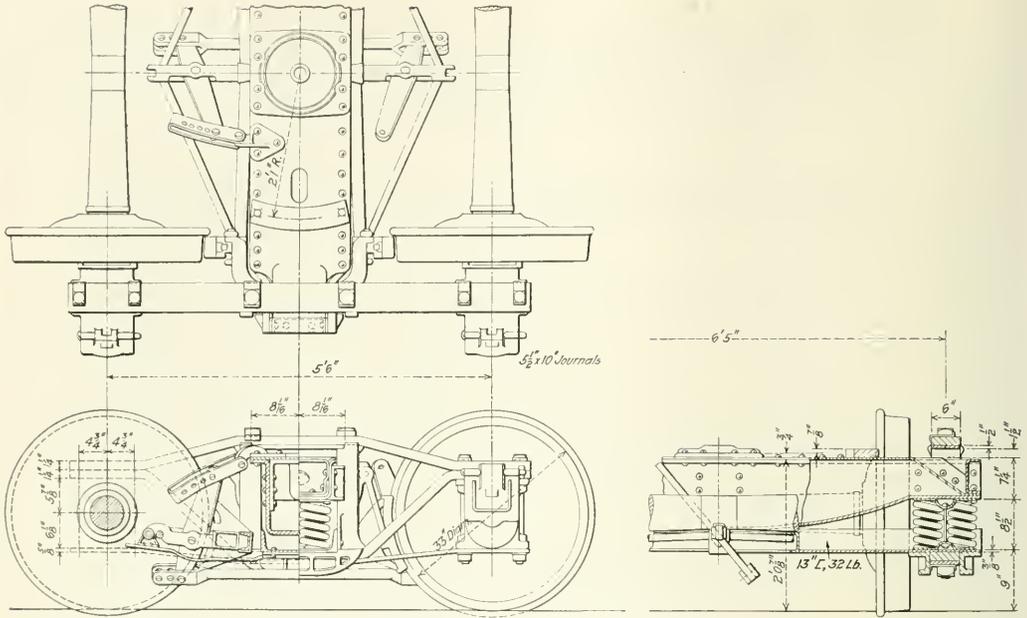


Fig. 16—General Plan of the Standard 50-Ton Truck

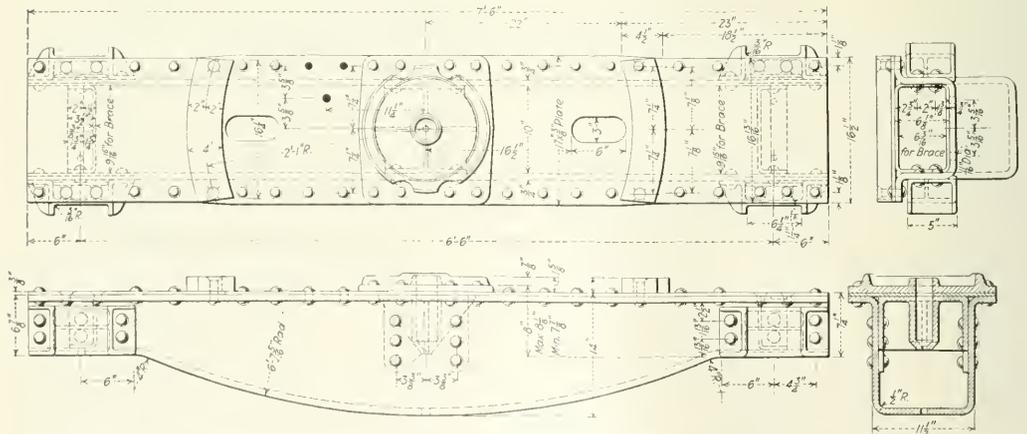


Fig. 17—Pressed Steel Bolster for the Standard 70-Ton Truck

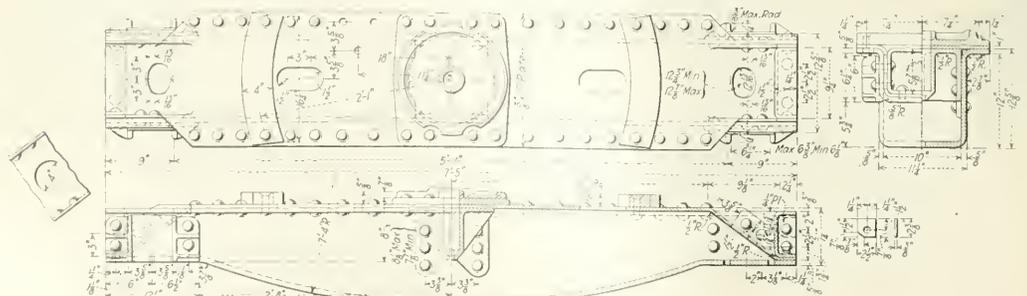


Fig. 18—Pressed Steel Bolster for the Standard 50-Ton Truck

The Powerful Foreign Trade Combinations of Europe

We Must Form Combines of Equal Fighting Power to Maintain Our Export Trade After the War

By P. Harvey Middleton

Executive Assistant, Railway Business Association

IF YOU CAN IMAGINE a squad of recruits, responding patriotically to their country's call for foreign service, paying for their equipment and training out of their own pockets, studying their equipment without any aid from the government except a correspondence course of instruction, and then, without any company or battalion drill, being sent to the front with the plaudits and best wishes of their country, and with the warning that if they ever drill or fight, as a co-ordinated army, or in any way, except as unrelated individuals, they will be liable to court-martial and public punishment upon their return, you have a very good idea of what your predicament is now."

That was how a New York lawyer described the present position of American exporters under the existing anti-trust laws. He might have gone still further with his striking analogy, and depicted what actually happens when our soldier of commerce practises the role of individual fighter against the "mass formations" of Europe. One man with a machine gun in No Man's Land can tear tragic gaps in the onrushing hordes, but one American railway supply manufacturer competing in foreign markets with a German cartel or a French comptoir has as much chance of capturing a profitable order as a snowball has of remaining five minutes in the ultimate destination of the Kaiser.

Half the trade of the world has, during the war, been cut loose from its Old World moorings, and has drifted to the new. Do you think that the eighteen billions of dollars invested by the British in foreign countries, the eight billions of dollars of French foreign investments, or the nine billions of Germany, will let it remain here without a mighty struggle? Not on your life. Signs multiply that the bitterest commercial fight in the history of the world will follow the war, and if Americans are to have a sporting chance they will need all the powers provided in the Webb-Pomerene bill permitting combinations in export trade—a measure which may be signed by President Wilson before this goes to press.

Germany Already Making Plans to Regain Her Foreign Trade

If you think for a moment that the Germans will be so crippled at the close of hostilities that they will be unable to turn their attention to reknitting the rents which have been torn by American and British manufacturers in the foreign trade net of the German Empire, ponder for a moment over the fact that there has just been launched in Hamburg the Corporation for the Promotion of German Foreign Trade, with an initial capital of \$5,000,000, for the purpose of exploring foreign markets and building new foreign railways. The *Kölnische Zeitung* gives the following summary of this Association's plans:

"This great new concern is to occupy itself exclusively with the development of German overseas trade. Important export houses, manufacturing corporations, shipping lines, and banks in Hamburg and all the other commercial and industrial centres of the Empire will be interested. The company is to serve as an active and efficient axis, round which all Germany's efforts to reknit her old relations and establish new ones will revolve. It is not to be a bank in the ordinary sense or an export bank. It will, on the contrary, refrain from banking operations of the usual sort.

It will act primarily as a syndicate for exploring foreign markets, and when advantageous opportunities present themselves will fulfill the functions of a financial promoting company. It will take up, on behalf of all German interests concerned, promising projects abroad, such as waterworks construction and operation, railway building, harbor and dock works, and transactions of similar magnitude. These the company will not only promote and carry out, but if necessary provide the money for. The initial capital of \$5,000,000 is wholly provisional. It will be multiplied many times over as required."

But perhaps you are deluding yourself with the belief that Germany won't have any ships, that we have captured all their big ones, and that embargoes have prevented their getting the materials to replace them. Wrong again. The *Berlin Tageblatt* publishes details of the development of the German shipbuilding yards, showing that in 1916 and 1917 all the private yards, except some of the largest, like the Vulkan concern, increased their capital. Blohm & Voss of Hamburg raised their capital from \$3,000,000 to \$5,000,000, and the Howaldt yards at Kiel raised theirs from \$1,000,000 to \$2,500,000. In other respects the German concerns have anticipated the needs for the reconstruction of the German merchant marine. The Hamburg American Line and the Allgemeine Electricitäts Gesellschaft have founded the new Hamburg Shipbuilding Company, and among the new establishments and projects are two at Lubeck, one at Hamburg, several at Stettin and Emden, and one at Tönning.

At the Vulkan yards near Bremen the Hamburg American line recently launched a 16,000-ton steel vessel, christened Rhineland, which is the largest ship ever laid down in Germany for purely freight carrying purposes. The German press acclaims the launching not only as a sign of Germany's determination to make her presence felt in world trade after the war, but because, despite the strain imposed on her industries for purely war purposes, her shipyards are able to turn out this "record-breaking" merchantman. The Hamburg American Line's 50,000-ton sister ship of the Vaterland, the Bismarck, has been completed, and this same line is credited with having at least one other giant and a flock of two-score or more medium and small-calibered ships built and building. The North German Lloyd has completed a 35,000-ton express steamer, the Hindenburg, and is pushing work on an ambitious building program.

The German Cartel

Do you know what a cartel is? It is the application of brute force to commercial enterprise. The concerns entering it renounce a part of their industrial and commercial autonomy in order to secure the advantages of cohesion. The cartel differs from the American trust in that it allows the individual enterprises attached to it to remain independent, and restricts itself to enforcing certain controlling principles in regard to production, prices, and competition. It aims at removing conflicts and losses resulting from ruinous competition and lack of organization. A uniform system of cost accounting and standardization of products eliminates waste. Only the strongest cartels undertake to influence foreign business, maintaining a firm export policy and exporting at

lower prices than are charged home customers, finding foreign markets an excellent outlet for excess production.

The Stahlwerksverband or steel syndicate is, next to the coal syndicate, the leading German cartel. It monopolizes the production and distribution of steel in Germany. At the time of its foundation in 1904 it had a total output of 7,900,000 metric tons. Its products include rails, ties, fish-plates, spikes, bedplates, structural steel, railroad axles, and steel forgings. The administration of the syndicate is vested in a general assembly of all the members, a supervisory council, and managing directors. The stock is exclusively in the hands of the owners of the steel works, and may be transferred only with the consent of the general assembly. Each member has one vote in the assembly for every 10,000 tons quota of production.

The Germans, through the Stahlwerksverband, are formidable competitors, not only because of the advantages of export bounties and freight rebates, but because they keep in close touch with the requirements of foreign markets through effective and expensive representation on the ground, and because the syndicate backs up the credits granted by individual manufacturers to secure initial business. This cartel believes in dumping in order to keep its plants working without interruption at maximum capacity. It controls over 90 per cent of the production in Germany of steel products. Before the war this cartel had an annual turnover of \$238,000,000, and held down English steel production by delivering steel billets in England at lower prices than the English could produce steel. In 1914 steel bars were offered in New Orleans at 80 per cent below the lowest figure at which an American firm could manufacture them.

This steel cartel controls the sale of its products by merchants in Germany, Austria, Switzerland, Belgium, and France. It has been aptly termed a giant octopus, whose eyes are at Bremen, at Dusseldorf and at Berlin, with tentacles, armed with innumerable suckers, reaching out to Asia Minor, by way of Constantinople, threatening London through Rotterdam and Antwerp, stretching across Switzerland into Italy, extending over the Atlantic and South America, embracing Chile, spreading out over Brazil, Argentina, and Mexico, and in another direction to the Indian Ocean and the China seas, and fixing themselves firmly on the Far Eastern strands.

There are other German organizations for securing foreign trade in railway supplies. The Orenstein Koppel Aktien Gesellschaft represents a syndicate of producers of Decauville (narrow gage) railway materials. This combination has practically stamped out the French and Belgian competition which formerly controlled the supply to Turkey. The Verband Deutscher Waggon Fabrikanten controls 90 per cent of the total German production of railway cars.

The Association of German Machine Tool Manufacturers has made a study of export trade with special reference to the competition of American manufacturers, whom they have actively opposed. The German Electrical Manufacturers Association has made a special study of tariffs and commercial treaties, and secured many changes in both for the benefit of German exporters of electrical equipment. It keeps its members informed of new street railway and power plant projects in other countries, and suggests valuable foreign connections. German business men have realized the great importance of commercial treaties and there is a special organization for this particular purpose—the Commercial Treaty Association (Handel-vertrags-verein) with 9,000 members and 150 affiliated associations. Electrical equipment is controlled by two powerful syndicates, the Allgemeine Elektrizitäts Gesellschaft, and the Siemens-Schukert.

Great Britain's Commercial Counteroffensive

The British are preparing a commercial counteroffensive which will make things interesting for the Germans in the

foreign field. They have formed the British Trade Corporation, with a capital of \$50,000,000, which will devote its energies to expanding the trade of the British Empire in every part of the world, and will grant loans to exporters with more distant maturities than the banks can offer. The British Manufacturers Corporation was also formed recently with a thousand members, each subscribing from \$500 to \$1,000 annually, and will employ high grade men as resident representatives in all foreign countries, whose business it will be to find and appoint local selling agents for individual firms, to look out for new trade openings, to report on the general reputation of prospective customers, and generally superintend the business interests of all firms in the organization. Then there is the newly created British Commercial Intelligence Department, with 738 officials in the London office and a multitude of assistants in the principal centres of the world. All this army of officials is in constant contact with the British Government, and all are contributing to make British commerce a greater world power than ever.

Here, too, we find special organizations of railway supply manufacturers, such as the North British Locomotive Company, Ltd., capitalized at \$9,000,000, a combination of eight plants which handles nearly the whole private production of British locomotives. As the British railway companies build and repair most of their own rolling stock, this company is engaged almost entirely in export trade. Another amalgamation is the Metropolitan Carriage Wagon & Finance Company, a combine of five companies making rolling stock for export. This company also has a capital of \$9,000,000, and owns a blast furnace and steel-smelting concern, enabling the company to make its own axles and tires. There is known to be a very close and monopolistic combination among British firms manufacturing cables for street railways, and other British railway equipment industries are understood to have a complete understanding as to many important trade policies. Practically all the rail manufacturers of Great Britain belong to the British Rail Makers' Association which enjoys almost a monopoly in colonial markets and in those countries in which a great deal of railway construction is carried out with British capital.

The French Comptoirs

In France there are various "comptoirs" or central selling organizations, such as the Comptoir for the Exportation of Metallurgical Products, which exports rails and their accessories, ties, girders, and channels. All business is secured by means of established agencies in various cities, such as Buenos Aires and Rio de Janeiro. Each agency is placed in charge of a large exhibit of samples, consisting of cross-section cuttings of various sizes of rails, beams and channels, mounted on a wooden frame, and each agency has advertising matter for distribution at the expense of the Comptoir. The sales are made by the comptoir outright to the agency, which finds the customers and carries the accounts in the district allotted to it. Business is conducted on a purely commission basis. The comptoir takes all the export output of its members for sale abroad and reimburses them when payment has been made by the customer. Brazil, Argentina, and China have been the principal fields of operation of this combine, and in six years the exports of the products in which it is interested increased from 40,000 to 200,000 tons. There are also axle and car spring comptoirs.

There is a French association of manufacturers of locomotives which fixes the price on the various types, orders being apportioned among all the manufacturers in proportion to their output. The association has had a successful career for ten years. There is also a railway materials syndicate which is one of the principal constituents of the central organization of the metal industries, Union des Industries Metallurgiques et Minières.

In Egypt, China and Japan export combinations of Ger-

man and British engineering concerns have fought each other tooth and nail for the profitable business of those countries—how profitable may be gathered from the fact that in three years engineering contracts valued at \$450,000,000 were obtained in the Chinese market. The report of the Federal Trade Commission on Co-operation in American Export Trade, published in 1916, points out that in the Chinese market it would be difficult for a single firm manufacturing machinery or railway supplies to represent itself. It states that one German organization embraced 47 engineering firms, besides Krupps, two shipping houses, one marine insurance company, one life insurance company, and one fire and building insurance firm. It had branches with one or more Chinese-speaking Germans in charge at all important Chinese cities.

The Enormous Markets in China

While American and British competitors were endeavoring to sell their products individually the Germans began by saving the Chinese trouble. Thus, if there was a mining venture, the representative of the allied German manufacturers would go to the local governors or parties interested and offer to take the whole job, i.e. sink the shafts, develop the mines, put in all the equipment, build the railways or boat lines, erect power plants and equip them, put up workmen's dwellings and finance the undertaking. Such an organization could sell a Chinaman a five-cent handsaw or develop an entire province.

In 1915 the Anglo-Chinese Engineers' Association was formed for the purpose of securing an outlet for British machinery and engineering supplies of all descriptions. It is strictly a non-competing group of 75 concerns making machinery, railway supplies, engineering material and tools. Each of these firms was required to take stock in the combine, the value of which was determined in each instance by the ratio that the line bore to the whole of the imports of machinery and engineering supplies to China in any one average year. Each of the firms was bound to an agreement to work in unison with other members of the combine in the case of contracts for combined plant, and no firm was accepted for more than two lines of its manufactures, and no two firms in the combination were accepted for similar plants. For instance, if A. B. is represented by the combine for textile machinery, no other house will be represented for this line. The organization has branch houses in charge of Chinese-speaking European assistants at selected ports and industrial centres, with a managing director in Peking. In large cities such as Peking, Hankow and Canton, there are competent mechanical engineers with Chinese experience, while the selling staff includes men with intimate knowledge of the localities in which they are used.

The United States Must Make Similar Plans

American manufacturers and exporters of blast furnace and rolling mill products have expressed themselves to the Federal Trade Commission generally in favor of some further measure of co-operation among themselves for the export trade than at present exists. Three of the largest of such manufacturers have stated their conviction that their export trade would be increased if they could join with all, or a large part, of the other independent producers in a company organized along similar lines to those of the United States Steel Products Company, and empowered to fix prices. Another concern which favors a voluntary export combination or association in its line advocated that activities should be confined strictly to joint selling.

Among the advantages which were hoped for from such increased co-operation is a broader market, which would stabilize prices, keep the furnaces and mills in more continuous operation, and by running the plants at capacity lessen overhead expenses. Lower selling costs could also be expected through the greater economies resulting from a common

selling organization. By such an organization the smaller producers in the United States believe they could materially extend their export trade.

At the Fourth National Foreign Trade Convention, held in Pittsburgh in January, 1917, several methods were suggested for co-operation in foreign trade by a committee which included E. P. Thomas, president of the United States Steel Products Company, and Charles M. Muchnic, vice-president of the American Locomotive Sales Corporation. These plans were predicated on the passing of the Webb bill. One plan was for a group of large manufacturers closely identified making kindred but generally non-competing products. A general fund was to be formed and shares issued to each manufacturer in proportion to his contribution. There was to be a selling organization which would consolidate all existing foreign agencies of the members and would assume credit risks. Such an organization could secure ocean transportation to best advantage and undertake with the aid of experts all the miscellaneous details connected with export business.

Another plan was for five or ten concerns making allied products to get together, each company subscribing from \$2,000 to \$4,000 for initial expenses. A manager would be hired who would familiarize himself with territories and decide upon the best markets in which to commence operations. Each concern would consign its goods at lowest export prices, payment to be made as received from the purchaser. After three or four years the capital could be increased and the consignment accounts cut out. Another plan was for a number of manufacturers to divide the expense of sending a competent man to investigate certain markets and then either to raise capital among themselves or interest a responsible commission house with foreign connections to put in a local stock of goods.

At the Fifth National Foreign Trade Convention to be held in Cincinnati on April 18, 19 and 20, the subject of combinations in foreign trade will be again discussed, one of the speakers being George H. Charl's, vice-president of the American Rolling Mill Company, of Middletown, Ohio, who has recently returned from a trip to England and South America.

"There is only one avenue to success," says Mr. Charl's, "and that lies in co-operation; if possible, the forming of syndicates equally as strong and well organized as those of our foreign competitors. Under present conditions, if 20 steel companies are persuaded to go after export business in Brazil, at least 20 men must be sent to that country. If 20 countries offer a field, at least 400 men must be sent abroad, and they will have to compete with one another. If 20 steel companies co-operate under the provisions of the Webb bill, one man can accomplish the result of 20. In the name of pure economy and self-defence we cannot safely pursue any other course. The same plan will permit the joint co-operative advertising of all members."

It has been suggested by an American consul that an association of American manufacturers of non-competing articles could profitably form an organization, dividing the expenses and being represented in Shanghai, Hankow and possibly other places in China. As a list of manufacturers upon which to form the basis he suggests the following: Railway locomotives, railway rolling stock, electrical supplies, flour-mill machinery, oil-mill machinery, coal-mining machinery, iron-mining machinery, motor cars, motor engines, structural steel material, heating plants, plumbing, arsenal equipment, rolling-mill machinery, cotton-mill machinery, and desiccated-egg mills.

The cost of maintaining offices in Hankow—the Pittsburgh of China—for such an association of manufacturers would be something like the following: Local manager, \$5,000; office rent, \$1,440; clerical and Chinese staff, \$4,000; other office expenditure, \$400. The total expense might be \$1,000 per month. An office could be run on less, but this is con-

sidered conservative for efficiency. The maintenance of an office in Shanghai would cost more. But even should the cost be double this amount, it will fall very lightly upon each individual member of the association of manufacturers.

There are many ways in which money might be lent with perfect safety to assist in developing Chinese industry and extending American sales. An association of manufacturers on the spot would be able to determine which would be safe and which would best develop the American export trade. The first year would not be profitable, but this association would build up a reputation for American interests and would receive many inquiries that at present do not reach American manufacturers or exporters.

We Cannot Sit by Placidity

One thing is certain: we cannot sit by placidly while our industrial strongholds are assaulted by the long-range guns of London, Paris and Berlin. The European international trader will "come back" after the war with a wallop which will be felt from Berlin to Peking, from London to Cairo, and from Paris to Timbuctoo. Every market between the Mexican border and the Land of Fire will be invaded. Well drilled emissaries speaking the languages of the countries to

which they are accredited will be sent to secure the highly remunerative engineering contracts of the Far East. The European will "dig in" for a throat-cutting trade war, armed with all the weapons developed by the German cartel, the French comptoir and the British monopoly in half a century of foreign trading. Unless America develops combinations of manufacturers of real fighting power, and is ready to invest money in the construction of railroads and other public utilities, it will be hard indeed to dislodge competitors so firmly entrenched.

Secretary William C. Redfield, of the Department of Commerce, summed up the situation when he said: "We have learned the lesson that our factories are so large that their output at full time is greater than America's markets can continuously and regularly absorb. We know now that if we run full time all the time, we must do it by reason of the orders we take from lands beyond the sea. To do less than that means homes in America in which the husbands are without work; it means factories that are shut down part of the time. And because the markets of the world are greater and steadier than the markets of any one country can be, and because we are strong, we are going to go out into the markets of the world and get our share."

Railroad Construction as Affected by the War

Review of the Situation and Discussion of Relative Importance of Different Classes of Work

ONE OF THE MOST IMPORTANT PROBLEMS which the railways of the country are facing now is the decision regarding the extent to which construction work shall be carried on during the war. There now exists a need for more improvement work than can possibly be completed under the existing conditions, and the problem resolves itself into the selection of that work which by its nature will bring the most immediate relief. This consists primarily in the amplification of existing facilities and the indications are that work of this character will be carried on to as great an extent as the supply of labor and materials will permit. While the construction of extensions and new lines can and doubtless will be curtailed it is probable that the total expenditures this year for railroad construction and improvement will exceed those of any recent year.

For the past three years new construction work has been relatively light, particularly with reference to new lines, terminals and other projects of an extensive character. This has resulted primarily from the uncertainty regarding the future of the railways and a lack of capital to carry on the work rather than from the fact that railway construction had outstripped the industrial development of the country. Also the labor shortage and the increased costs of both labor and materials since 1914 have contributed to this inactivity.

During 1917 the situation became acute and many of the roads found it impossible to complete their programs, even for improvements of a lesser nature. Work of all kinds was delayed through priority orders and the scarcity of labor and at the close of the year it was the common experience of roads in the territories where the conditions were especially adverse that a considerable proportion of the year's program of improvements was incomplete. In particular instances more than 50 per cent of the work planned for 1917 was not finished. With the additional traffic that the roads will be called upon to bear this year the situation is serious and demands special study in order that advantage may be taken of all opportunities to improve operating conditions and to provide the necessary facilities. Also for this same

reason special care should be exercised in grading, selecting and concentrating on the most essential work.

Under normal conditions railroad construction work may be divided into two general classes: *extensive* development or the building of new lines and extensions, and *intensive* development or the improvement of existing facilities. This last class may also be divided into (1) the amplification of existing facilities by the enlargement of yards and terminals, the building of additional tracks or shop facilities, the installation of signals, etc., and, (2) the construction of new passenger stations, grade separation projects and other work of similar character which add little or nothing to the capacity or economy of operation of a road. While the same general division may be made, in times such as the present, there should be the further division of projects into those essential and non-essential to the prosecution of the war.

Under normal conditions new lines or extensions are constructed to reach traffic centers already served by other roads or to open up new territory not yet provided with railway facilities. Under the present scheme of non-competitive operation of the railways there is no good business reason for building new lines to points where adequate service is already provided. On the other hand it has been demonstrated that railroad construction into new territories is essential to the development of the country. Eventually the work of building new lines or extensions into territory without railway facilities will have to be done. The postponement of such construction only adds to the burden to be borne after the war and the advantage gained by deferring the work, thus making the capital, money and labor it would require available for other purposes is only temporary. Under the existing conditions this temporary advantage should be considered in so far as new projects are concerned. It may also be advisable in some cases to discontinue construction projects of this character that are already under way. On the other hand the work may be so far advanced that it may be more economical to complete the work than to drop it and leave idle the investment made. As an example

of work of this character may be cited certain extensions now under construction by the Santa Fe in the Southwest.

Construction work of any character at the present time brings the builder in direct competition with the government for materials and labor needed in the prosecution of war work. It also requires money needed for the purposes of the government. However, in favor of much of the railway construction work should be weighed the importance of adequate transportation facilities to the industries and the country at large. This applies particularly to the intensive development of facilities in so far as these improvements will facilitate the operation of the roads and increase their capacity. This includes the amplification of yard and terminal facilities, additional signals, engine house facilities and similar work. The importance of work of this character to our economic, industrial and military welfare was demonstrated last winter more fully than ever before when the slowing up in the operation of the roads through the combination of inadequate yards and terminals to handle the unprecedented traffic and extreme weather conditions was reflected in the very general retardation of industrial activities and in delay in shipment of food and supplies to our army in France and to the Allies. Such work should without question be carried on to the greatest possible extent.

In contrast with this, much work such as the building of new passenger stations, the separation of grades and other projects of a similar character which may be entirely justifiable under normal conditions, must now be classed as non-essential. When at all possible the starting of new projects of this character should be avoided, although where such work is already under way and may have progressed to such a state that to abandon operation would be an economic waste it should be completed.

This suggests that the construction program for an individual road for this year should give preference to work that will provide increases to existing facilities, followed by the work now under way which may not be considered essential but which may be more costly to discontinue than to complete. Where new lines or extensions are included in the program the justification of their construction at present should lie in the extent to which they are essential to the economic welfare of the country as a whole and not in any advantage that might accrue to the particular road. In general all work of this character must be considered secondary in importance to that outlined by the government as essential to the operation of the roads as a single system.

This unified control brings in a new class of work to be done, for a particular road or roads may be ordered to build certain facilities which under normal conditions would not be justifiable. As an example, it may and will become advisable in many instances to provide interchange facilities or inter-line connections which may simplify the operation of the roads as a system for which there would be little or no occasion under individual operation. Railway construction work for the near future will consist largely of improvement to amplify existing facilities. Particular attention will be paid to increased facilities for the care of motive power and additional and lengthened passing tracks, more signals, and in fact all work which will facilitate and lessen the cost of the operation of the existing properties. That work already under way which in the full sense of the word must be classed as unessential, will be completed is indicated by the announcement that the grade separation project of the Indianapolis Union railway at Indianapolis, Ind., will be completed. Conversely the order of the director-general that certain grade separation projects in the city of Chicago should not be started is indicative of the trend concerning work of this character which has not been begun.

These conclusions are supported to a certain extent by the recent order of the director-general with reference to all railroad work involving charges to capital account.

Government Supervision of Improvements

As director of the recently created Division of Capital Expenditures of the Railroad Administration, R. S. Lovett will receive and pass upon the reports made by the railroads as to their budgets of necessary expenditures for improvements. It has been ordered that the following rules be observed for work involving charges to capital account:

First: In determining what additions and betterments, including equipment, and what road extensions should be treated as necessary, and what work already entered upon should be suspended, please be guided by the following general principles:

(a) From the financial standpoint it is highly important to avoid the necessity for raising any new capital which is not absolutely necessary for the protection and development of the required transportation facilities to meet the present and prospective needs of the country's business under war conditions. From the standpoint of the available supply of labor and material it is likewise highly important that this supply shall not be absorbed except for the necessary purposes mentioned in the preceding sentence.

(b) Please also bear in mind that it may frequently happen that projects which might be regarded as highly meritorious and necessary when viewed from the separate standpoint of a particular control of the railroads generally, and therefore when the facilities heretofore subject to the exclusive control of the separate companies are now available for common use, whenever such common use will promote the movement of traffic.

Second: The construction of new lines or branches or extensions of existing lines shall not be entered upon or contracted for without the director-general's approval.

Fourth: Work contracted for or actually commenced prior to January 1, 1918, and unfinished, may be continued until further order, except in so far as in the judgment of the carrier concerned it may be possible to discontinue or curtail it without substantial loss, in order to conform to the general principles outlined in paragraph First hereof.

Fifth: Other work which does not involve charges to capital account in excess of \$25,000 may be contracted for and commended without approval of the director-general provided that:

(a) it conforms to the policy outlined in paragraph "First" hereof; that

(b) it also falls clearly within the policy of the particular carrier as that policy has been applied in practice during the two calendar years 1916 and 1917; and that

(c) a report giving a brief description of each project in particular company, may not be equally meritorious or necessary under existing conditions, when the government has possession involving not less than \$5,000 nor more than \$25,000 chargeable to capital account and showing also the amount chargeable to operating expenses, shall be made in duplicate to the director of the division of capital expenditures at Washington and the regional director for the district within ten days after the work shall be contracted for or commended.

Sixth: No work involving a charge to capital account and in excess of \$25,000 shall be contracted for or commenced subsequent to January 1, 1918, unless

(a) it conforms to the policy outlined in paragraph "First" hereof, and unless

(b) it be authorized by the director-general.

Seventh: The director of the division of capital expenditures is authorized to prescribe such forms, require such reports and issue such regulations and instructions as may be necessary to carry out this Order.

In the eastern territory where the congestion was most severe last winter a committee of engineers consisting of Francis Lee Stuart, former chief engineer of the Baltimore & Ohio (chairman), A. C. Shand, chief engineer of the Pennsylvania Railroad, and H. A. Lane, chief engineer of the Baltimore & Ohio, has been appointed and attached to the regional directors' staff. The duties of this committee are to review the budgets submitted by the roads in this territory, separating the essential work from the unessential and grading the various projects in the order of their importance. The findings of this committee are submitted through the regional director to the director of the division of capital expenditures for final action.



Railroad Y. M. C. A. Building at Anchorage, Alaska

Remarkable Progress Being Made by R. R. Y. M. C. A.

Regular Program Not Only Extended and Intensified, But
Doing a Big Service in War Work

By John F. Moore

General Secretary, Railroad Department, International Committee of Young Men's Christian Association.

THE RAILROAD YOUNG MEN'S CHRISTIAN ASSOCIATION, in operation for less than half a century, now has 270 branches established on the railroads which control 80 per cent of the total mileage of North America.

These associations operate upon a co-operative basis. Railroad managements and employees meet in their rooms upon a common platform. As a rule railroad corporations make reasonable monthly appropriations toward maintaining the associations, such appropriations being supplemented by membership dues and other revenues from the men.

Not many years ago approximately 70 per cent of all moneys expended in the conduct of these associations came as contributions from railroad companies and the remainder from the membership. This percentage has steadily changed in recent years until last year, out of every dollar expended approximately 65 per cent came from the men and not to exceed 35 per cent from corporations.

New Buildings

During 1917 new buildings and extensive additions were numerous. Among the former were those at Wilcoe, W. Va.; Bellmead, Texas; Benwood, W. Va.; Youngwood, Pa.; Groveland, N. Y.; Newell, Pa.; Brewster, Ohio; Gillen, Mich.; Turcott, Canada; Urbana, Ill.; Corbin, Ky.; Sharonville, Ohio; Segundo, Colo.; and Sunrise, Wyoming.

During the year many buildings completed in other days became inadequate, because of the ever-increasing demands made upon them, necessitating large and important additions. Among such associations were: Douglas, Arizona; Pocatello, Ida.; Chicago Junction, O.; Shenandoah, Va.; Handley, W. Va.; Bridgeport, Ontario; Haselton, O.; Two Harbors, Minn.; Parsons, Kan.; Rochester, N. Y.; and Binghamton, N. Y.

The above are partial lists of buildings and additions definitely opened during 1917. In addition to these, new structures are already assured during 1918 and 1919 at Lexington, Ky.; Pine Valley and Cleveland, Ohio; Bellwood, Pa.; Brownsville Junction, Maine; Pen Argyl, Pa.; Knoxville, Tenn.; Channing, Mich.; Clifton Forge, Va.; Hulbert, Ark.; Lamberts Point, Va.; Glassport, Pa.; and Cane Fork, W. Va., while at Fort Worth, Texas, \$40,000 has been raised toward an association building without any corporation gifts thus far; and at Kansas City four lots valued at \$50,000 have been set aside by the Terminal Company as site for a railroad Association building.

This significant list of new buildings and enlargements either recently completed, now under construction, or definitely assured for the early future, indicates the degree in which the Railroad Association has by its work won the confidence of railroad administrations and railroad men alike. It is significant that, after being under close scrutiny for nearly half a century, appropriations from corporations and gifts from friends mounting into hundreds of thousands of dollars should be made for its extension.

In the early days the Railroad Association confined itself largely, though never exclusively, to men in train service, and this field continues to constitute its largest single field of operation. Nevertheless, with the years the scope of its endeavor has constantly been extended, until now its work is adapted to meet the requirements of all railroad men. In fact, it has within its membership thousands of men related to affiliated interests; as for example, express company and mail service employees.

In addition to opening new buildings, the work of the Railroad Department of the Young Men's Christian Association

ciation has within the past year been intensively developed along the following lines:

Street Car Employees

Street Railway Young Men's Christian Associations are now in successful operation in a number of cities, more especially in the South, and it is planned that after the war an experienced traveling secretary will be assigned to devote his entire time to the development of this interesting field.

A new association of this character was recently organized at Norfolk, Va., in a building leased for that purpose by the Virginia Railway & Power Company.

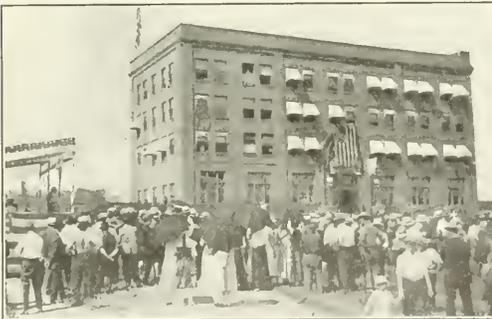
Colored Railroad Employees

An investigation was recently made by one of the colored secretaries of the International Committee into the condition of colored employees on a great railroad system. A detailed report was submitted, looking to further co-operation by this organization in the solution of this difficult problem.

A small building was opened during the year at Chicago Junction for the exclusive use of colored railroad employees, and several associations are now experimenting along this line.

Women Railroad Employees

The question of how to be of service to the women employees on railroads has been given consideration, and experiments have been made. A number of associations have made special membership rates for such employees and have established special privileges for them. For example, at Albany, N. Y., educational classes and practical talks are being conducted for young women studying railway telegraphy, while at Brewster, Ohio, an annex association build-



Opening of New Railroad Y. M. C. A. Building at Brewster, Ohio

ing has been erected for the exclusive use of women railway employees, the wife of the secretary of the Railroad Association acting as matron.

Boys of Railway Communities

It is increasingly recognized that many railroad associations, without impairment of service for railroad men, might render an inestimable contribution to the whole life of railway communities by relating themselves to the life of boys in railroad homes. It is clearly recognized that any work of this character needs to be conducted with the utmost caution, so as not to conflict with the rights and privileges of railroad men.

An experienced railroad secretary of the International Committee recently made a careful study of this question and his report made clear the fact that the Railroad Asso-

ciation has a rare opportunity, by helping the sons of railroad men, to assist in tiding them over the critical period of boyhood and ushering them safely into strong, useful manhood.

Sixty-one railroad associations now do work of this character, and no fewer than 22 of that number have on their employed force secretaries giving their entire time to this definite work.

Railroad Men in Other Lands

The work of the Railroad Association in America has attracted attention in other countries, with the result that similar related organizations are now in successful operation in India, Japan, Korea and Manchuria, while an experienced American secretary is in China studying the language, so as to be equipped to promote this movement among the railroads of the great eastern republic.

In a recent address to a group of men at the Bankers' Club



Railroad Y. M. C. A. Building at Chicago Junction for Colored Employees

in New York City, Major General Hibiki, of Japan, a member of the Railroad Committee of the National Council of Young Men's Christian Associations of that country, made the following statement:

"I bring greetings from the Japanese Railroad Young Men's Christian Associations to the secretaries and members of the American organization.

"Our Japanese Railroad Association was organized after studying your work in America 14 years ago. We have now more than 30,000 out of the 100,000 railroad workers in Japan as members of our Japanese Railroad Association, and our National Secretary, Mr. Masutomi, is with me in this country, studying your work and aiming to secure your co-operation in its further extension."

At Jamalpur, in India, the association furnishes an illustration of how a railway community may be served on an adequate scale. The building is furnished by the East Indian Railway and operated by the Young Men's Christian Association. How the life of the community—physical, mental, and moral—is stimulated, is indicated by the following quotation from a recent report of the secretary:

"The four football fields, cricket ground, golf course, rifle range, tennis courts, bowling green (lighted by electricity), swimming pool, reading room and library of 1,500 volumes are mostly in frequent use and perform a distinct social work in bringing together the members on terms of good fellowship. First-class bioscope shows are held every week in our fine Y. M. C. A. auditorium, and I am about to start a series of weekly or fortnightly popular lectures, generally illustrated, on various topics of interest, scientific and scenic. Y. M. C. A. socials and teas are occasionally held, and we have band con-

certs twice a month. Nearly all the Europeans of Jamalpur belong to the association, and we give some of its privileges to even the youngest Boy Scouts."

Conduct of Campaigns

In these stirring days when governments are emphasizing the value of campaigns as a safe and sane method for stimulating interest and securing results, the Railroad Department has continuously conducted, in all parts of Canada and the United States, thrift, safety first, temperance, first aid and health campaigns among railroad men and their families.

On one important system a campaign to encourage apprentice boys in railroad shops to clean living proved most beneficial. Carefully selected lecturers visited important shop centers, specially prepared literature was freely distributed, and scientific charts were exhibited, all with most satisfactory results.

Growth of Membership

Near the close of 1916 a ten-day national membership campaign resulted in securing over 38,000 new members for



A Japanese Railroad Y. M. C. A. Secretary

the Railroad Young Men's Christian Association, although how far these men would renew memberships after the enthusiasm of the national campaign had passed was a question difficult to answer until submitted to test. The test has been made and most successfully met; a few instances will illustrate the manner in which railroad men have responded to the call for renewal.

At Jersey City the Railroad Association, which in 1916 secured 789 new members in ten days, secured 1,051 renewals and new members in ten days in 1917. At Clifton Forge, Va., where nearly 1,000 new members were secured a year ago, 1,100 new members were secured in a single day in November, 1917. At Louisville, Ky., three of the 678 new members secured in 1916 secured 672 new members themselves in the campaign of 1917.

The Pueblo, Colorado, association caught the conquering

spirit of the Rockies and secured more men than in the year preceding.

The Work in a Nutshell

The following brief summary of facts suggests the history and status of the Railroad Department of the Young Men's Christian Association:

First. The first railroad association was organized in Cleveland in 1872.

Second. At present there are 270 railroad associations in operation in Canada and the United States, and at least 15 additional new associations assured of organization during 1918.

Third. This organization has been extended until there are now railroad associations located in many parts of the world.

Fourth. The present membership is approximately 125,000. Annual dues vary from \$3 to \$10, depending upon location and advantages offered. Added charges are made for dormitory and other special privileges. Wherever equipment is adequate and buildings not overcrowded by members, privileges are open to all railroad men.

Fifth. Membership is open to all self-respecting railroad men, irrespective of creed, position, or nationality. Each local association is conducted by a committee of management, composed of men from the membership. As a rule, these committees have on them both local railroad officials and men from the rank and file.

The work of the railroad association is supervised in part by the International Railroad secretaries, who devote their entire time to this work and in part by supervising state railroad secretaries, who are definitely assigned to this specific task.

Seventh. More than 600 trained railroad secretaries devote their entire time to promoting the physical, mental, social, moral, and religious welfare of railway men. These secretaries have been carefully selected; some among them have had four years of preparatory technical training in association colleges, and nearly all take yearly special training at some one of the six summer schools conducted for railroad secretaries.

Eighth. The work of the railroad association is four-fold in character, social, physical, mental, and moral. To these ends it maintains reading rooms, libraries, educational classes, practical talks, baths, gymnasium, outdoor and indoor athletics, entertainments, socials, games, correspondence facilities, non-sectarian religious services (attendance optional), dormitories, restaurants, and lunch rooms, and also promotes campaigns along the line of first aid, safety first, thrift, temperance, health, etc.

Ninth. The 270 railroad associations already organized operate in a variety of types of buildings and with varying degrees of equipment, ranging from the splendid home of the association for New York Central and New Haven employees in New York City, to the cars set apart as a temporary and inadequate association plant at some remote railway terminal.

Tenth. Buildings operated by the railroad association are sometimes owned by that organization, sometimes owned jointly by railroad association and railroad corporation, and in still other instances, owned by the railroad company and leased or given to the association for operation.

Eleventh. The approximate value of property now owned by the Railroad Young Men's Christian Association exceeds \$4,000,000, while the value of property owned by railroad companies and leased or given to associations for operation is even larger.

Twelfth. In 1917 North American railroads appropriated toward the maintenance of railroad associations approximately \$350,000. In the same year receipts from membership fees exceeded \$400,000 while large additional sums

were secured from use of special privileges such as dormitory, games, etc.

Effect of Government Control of Railroads

The question as to how far, if at all, government control may affect the future of the Railroad Young Men's Christian Association has arisen in some quarters. However, assurance has already been received from the government that the work of this organization will continue as heretofore and it is confidently believed that the status of the association will remain unimpaired, for the following, among many reasons:

First. The Interstate Commerce Commission has made definite allowance for expenditures by railroads for the organization, equipment, and conduct of Railroad Young Men's Christian Associations.

Second. In the history of railroad receiverships receivers have almost without exception continued association appropriations as necessary and legitimate items of expenditure.

Third. On the only government-owned railroad in the United States, that in Alaska, a Railroad Association has been conducting successful work, with an appropriation from the government toward its maintenance.

Fourth. A successful experience of more than 40 years has adequately demonstrated that the Railroad Young Men's Christian Association is not a thing apart from, but an integral and essential factor in, the successful operation of a railroad.

Fifth. The Railroad Association is the only organization of its character known, with international relationships; a trained personnel; a proven power of adaptation; a scientific and comprehensive program of work; and a practically unbroken record of striking accomplishments.

The religious basis and motive of the Young Men's Christian Association is the secret of the great strength of the organization; for, because of it, men of high gifts enter its secretarial service and it gives to the movement a cohesion and permanence that enables it to continue unshaken through the vicissitudes of the years.

War Work of R. R. Y. M. C. A.

The great world war brought to the Railroad Association new and unexpected responsibilities. It was called upon to enter new and vital fields and responded promptly.

The War Work Council of the Young Men's Christian Association organized a Bureau of Transportation, with special relation to soldiers and sailors in transit on land and sea. This bureau instinctively turned to the Railroad Association for leadership and co-operation.

When the first quota of the new National Army was summoned from home to cantonment, the railroads were called upon to undertake a difficult task and, in a manner challenging admiration, carried hundreds of thousands of these new soldiers with a minimum of friction and slight impairment of regular service.

When it was learned these embryo soldiers were to be moved, Railroad Associations promptly made arrangements to have their secretaries accompany them from their homes on their journey to khaki and camp, and on more than 800 trains representatives of Railroad Associations were at work. These secretaries passed through the trains, telling the boys about the camps to which they were assigned and also of the huts of the Young Men's Christian Association and the Knights of Columbus, reminding them also of the fine work of the Young Men's Hebrew Association. The men in each car were told that they would be made welcome by all these agencies that were working as one and that they would find in the association and other huts a friendly greeting and a sure cure for homesickness and blues.

The value of this service is indicated in hundreds of letters that have been sent to the International office in New

York City. One such letter, written by H. O. Williams, an International Railroad Secretary, who recently accompanied one of these trains, is typical of all:

It was like any one of the great number of selective draft troop trains that the Railroad Y. M. C. A. secretaries have accompanied to cantonments the past fall and winter. This one left Long Island City one bleak, raw, snowy winter morning with twelve cars well crowded with mothers' boys, many of whom were leaving home for the first time to meet the call of our government as soldiers of the American flag.

With two associates I went through the train, telling the boys about the value of the Army "Y" and how large an opportunity at Yaphank awaited them and of the benefits and blessings they would receive. After an informal talk of a few minutes in each of the dozen cars, I went back to the forward end of the train in order to have interviews with a number of these young men. Before the journey was ended I sat down and talked with twelve or fifteen of them. The first was a representative of the gas house gang and was already prepared to fight the Germans single-handed. He embraced me affectionately and was insistent that I should share the contents of a bottle he had with him. After a heated argument, I convinced him that it would be better if I did not share in his conviviality, and so he played the part alone. He promised, however, that this would be his last drink, no matter whether the government interfered with him or not.

In the second car I saw a young Jewish boy, possibly twenty-one or twenty-two years of age, sitting alone, his lip trembling, and the tears coursing down his cheeks. I sat down with him and he told me that he was a young musician, a pianist, and had been giving concerts in New York City. He was glad to be called to the colors and the only reason he hated to go was because he would have no opportunity to play the piano, or, as he said, to live with his music. When I assured him that he would find a piano in every Army Y. M. C. A. bungalow in the cantonments, his face brightened and he said, "It's all right if I can have my piano and an opportunity once in a while to touch it up a bit."

In another car, I noticed a fine, red-checked, bright-eyed, clear-faced young fellow sitting alone, and when I sat down with him he told me that he was the most prominent real estate man north of 110th street in the city of New York. He had made a large income for several years, had left his mother and sister in good circumstances, and was ready to do his part. He only hoped he would pass the final physical examination, but was a little worried for fear some slight heart trouble might cause his rejection after reaching camp. He had known something of the work of the Association in Harlem and appreciated its advantages and benefits.

A young fellow with whom I sat said, "I am going to send the folder you handed me to my parents, because it portrays the comprehensive work of the Association. I am a traveling man and have been on the road for the last seven or eight years, representing one of the largest linen houses in New York City. I have been a member of the Association for all that time and in many cities have taken advantage of the privileges offered. My parents live in San Francisco and I have often written them about the great blessings and benefits that have come to me through the Associations which I have visited in my territory. As soon as I reach camp and have an opportunity to tie up to one of the Associations there, I shall do so and do anything I am asked to help promote the work."

Another had been a policeman in the 22d Street District in this city; had already received his discharge from the army after six years of service; had served three years on the police force; and had just been enrolled in the selective draft. He knew the work of the New York City branches and was enthusiastic about its benefits and ready to co-operate in the camp.

With the exception of the first car there was no drinking on the train. The young fellows were resolute, determined, hope-

ful, and ready to do their part in winning this war for freedom and the perpetuation of Democracy.

Under the direction of the Bureau of Transportation, secretaries also accompany trains of uniformed men as they journey from camp to camp or from camp to port of embarkation, and conducts work at ports of embarkation, such as Hoboken and Newport News and at great transfer centers such as St. Louis and Chicago.

It does not require much exercise of imagination to recognize the value of service such as this to the sorely pressed railroads, to the men themselves in a difficult and trying hour of their lives, and to the country now at war. Many railroad officials have frankly expressed their cordial appreciation of the aid these secretaries have given in helping to keep men contented and busy during long hours in transit and so helping to reduce to a minimum that spirit of restlessness which, unemployed, might easily develop trouble, embarrassment, and delay.

Railroad Secretaries at the Front

The Railroad Association, alive, as ever, to its responsibility for railroad men here at home, has not only thus manifested its power of adaptation in the manner in which it has entered the field of service among men in transit here at home, but is also proving equal to a call made upon it by railroad engineers overseas.

Thousands of American railroad men are now at the front and the difficulty of working among these men, scattered, as in many instances they are, seemed for a time almost insuperable. Progress, however, is being made rapidly, as is indicated in the following letter recently received from France:

I am pleased to report that since January 1st there have been special and interesting developments in connection with our service for men engaged in railway construction and operation. Although several of these regiments are broken up into small units of one or two companies each, the Association is now working with approximately 75 per cent of the men in this branch of service in France and in another 30 or 40 days our work will be practically upon a 100 per cent basis in this matter.

For one regiment which is intact we have provided a splendid double hut, with full equipment. Our service to most of the other railway regiments is now being carried on in canvas buildings with demountable frames, so that we may move quickly as companies or regiments move.

We are also serving the engineer units attached to the larger commands. One of the railroad secretaries reaching here recently has been assigned to service with a railway regiment recruited from the west and now engaged in railroad operation in a most interesting section immediately back of the French lines.

Among the experienced railroad secretaries already selected for this service and now in France working among railroad men are the following: F. G. Smith, A. B. Adams, B. T. Stone, S. L. Thomas, W. J. Tubbs, E. Dow Bancroft, W. A. Cochran, C. C. Kent, R. R. Jenkins, E. F. Gailey, Roland Swift, Fred T. Harshaw, W. L. McKinley, George E. Burgess, Sydney Morse, C. B. Flagg.

A letter from a railroad man at the front to W. N. Northcott, associate secretary of the Transportation Bureau of the War Work Council, illustrates the appreciation of what the Association is doing for men on or near the battle line:

The Thirteenth Engineers are doing some great work here behind the French lines and all of the boys have their heart and soul connected with the work. We are the only regiment of engineers attached to the French and we have sure picked up the French method of railroading very fast. Their method is very different, it is odd. The hook and eye couplers as we call it, which it is. We have one of the Chicago Y. M. C. A. secretaries with us now, and he is sure a live wire. He has not

been with us very long, but has made a great impression on the boys already and is sure to make a great success with us and we all look toward you to use your influence to keep him with us, as he is just the man we have wanted since the Y. M. C. A. has been with us in France. His name is R. R. Jenkins. He is from some railroad junction near Chicago, the name of which was changed to Willard. I just was visiting him in his room and he is a very pleasant man to talk to and seems well satisfied here with the boys. He has already proved his worth to his regiment.

In Conclusion

The Railroad Young Men's Christian Association is a great and growing organization, although it makes no idle claim to perfection. Those most familiar with its activities are most conscious of its occasional failures. Nevertheless when its history and accomplishment are fairly judged, it stands out as the most successful organization of its character that the world has known.

Its failures have been due to the human equation, but although occasional men have not been equal to their great responsibility, the high purpose, the unselfish devotion, and the fine organization of the Railroad Association have ever carried it onward.

Less than fifty years ago a small group of railroad men met at Cleveland to organize the first Railroad Young Men's Christian Association. Today, within the life span of men who were active then, these associations have become located on practically all of the great railroads of North America while outposts are established in distant lands and on the islands of the sea.

Its membership grows constantly; its leadership increases in numbers, experience, and efficiency; its property holdings are considerable; its motive is unselfish; its sympathies are broad and practical; and in what has been accomplished already in these relatively few years there is abundant promise that the Association stands upon the threshold of larger opportunity and more striking achievement.



"To Make the World Safe for Democracy—This Thing Must Be Crushed"—President Wilson

The Future of the Federal Valuation Work

The Shortage of Engineers, Government Control and Decision Not to Report Final Value Introduce Uncertainties

ONE OF THE FIRST QUESTIONS which was raised when the government took over the railroads concerned the effect of this action on the federal valuation work. This question still continues to be raised and still remains unanswered. The future of the valuation work therefore remains a matter of conjecture, although certain tendencies are becoming evident. It is to be expected that a definite statement will soon be made by the Railroad Administration outlining its attitude towards this work.

The federal valuation work has now been in progress for five years, the bill providing for it having been signed on March 1, 1913. The remainder of that year was spent in organizing forces and preparing plans and it was early in 1914 before the government undertook field work actively. Since that time the roadway and track parties have inventoried over 150,000 miles of line, or 60 per cent of the mileage of the country. Approximately 53,000 miles of line was covered in the year ending September 30, 1917. Based on this progress the Interstate Commerce Commission estimated in its last annual report that the engineering forces should practically complete the field work during 1919 and should finish this and the office work during 1920. It was also stated that the work of the land and accounting sections should be completed at the same time.

Less progress has been made in completing the reports on individual properties. Tentative valuations have been served on several of the smaller carriers and hearings have been held on these reports but no final figures have been turned over to the commission by the Division of Valuation as its conclusions regarding the value of those properties or of any portions of them. In fact, it developed a year ago that the Division of Valuation now interprets the law as not requiring it to determine a final and complete valuation of any property but only to report to the Interstate Commerce Commission on the various elements of value. The announcement of this attitude which, in the opinion of the director as well as most railway men, does not comply with the intent of those who prepared the bill and supported its passage through Congress, has caused many railway men to lose interest in the work and to raise serious doubts regarding the value of the results which will be secured.

While railway men in general did not oppose the passage of the valuation law actively few of them received it with any degree of enthusiasm. With certain exceptions, the general feeling has prevailed that the results to be secured would not be commensurate with the heavy expenditure involved and that the main benefit to the roads would be the indirect one of quieting the harangue of the agitators regarding over-valuation. In spite of skepticism regarding the value of the work the roads have co-operated consistently in its prosecution, both in their individual capacities and through the Presidents' Conference Committee, which was organized to harmonize the conflicting ideas of the roads and to provide a common agency to represent the roads as a whole in negotiations with the government.

With the entrance of the United States into the war a year ago, a new question was raised regarding the valuation work—whether it should be classed as essential or non-essential to the winning of the war. The valuation work is requiring a large force of men, almost all of whom are technically-trained engineers and most of whom are of military age. The Division of Valuation employs over 1,500 men. The roads in the eastern group alone employ an equal num-

ber. On this basis over 5,000 engineers are now employed in valuation work by the government and by the roads.

This large force is engaged in valuation work at a time when there is an acute shortage of engineers throughout the country. The intricate science into which warfare has developed has created a heavy demand for engineers and they have been called into military service in larger numbers than in any previous conflict. Many railway organizations have been very seriously depleted in this way and in numerous instances valuation forces have been almost entirely wiped out by enlistment and conscription. In order to meet the demands of the government for men it has been necessary to transfer engineers from maintenance and construction, frequently to the serious detriment and delay of work under way. It was a common experience last year for work to be held up pending the completion of plans, delayed by a shortage of draftsmen, while on at least one western system contractors were delayed in many instances because of the inability of the engineers on the road to set the necessary stakes. Under such conditions it is not surprising that there has been a strong feeling that this work, which demands so many engineers, should be called off for the duration of the war in order that these men may be employed in the routine maintenance and improvement work which is so necessary to the operation of the railroads at the present time.

The feeling that the valuation work should be discontinued during the war has not risen solely because of the shortage of men, for there has been a further feeling that in view of the government's plea for economy in expenditures it was unwise to continue work for which the annual government expenditure is \$3,500,000, and for which the railways must spend probably \$5,000,000 more. The position now taken by certain officers of the Division of Valuation that the railways should not be concerned with the expense of this work as the government is now paying the railways' share of the cost through its guarantee of earnings is not a reply to this criticism for if the work is to be continued the money must be spent and if the government pays for it it must come out of the same treasury that is financing the war.

The feeling that the valuation work should be classed as non-essential prompted the introduction of a bill into Congress recently calling for the discontinuance of this work. It has also led the directors of the Philadelphia Bourse to adopt and forward to Washington vigorous resolutions asking that Congress repeal the law and requesting early action on the bill now before Congress.

With the taking over of the railways by the government on December 28, still another element was introduced into this problem. Regardless of the attitude of the Railroad Administration toward government ownership, the assumption of direct control of the operation of the roads by the director general has brought government ownership more directly before the people. For this reason some railway men who have been lukewarm regarding valuation work previously, now feel that a complete inventory of their properties will be important in the event that the government takes over the roads permanently. This has led to agitation in some quarters for the continuance of the work, at least to the point that the inventory of the physical property should be completed.

Up to the present time the administration and the Division of Valuation have announced no change in the program of work and it is being continued just as before government

control became a reality. The director general has appointed the director of the Division of Valuation as a member of his immediate staff, which may have no significance whatever, but which may also be taken to indicate a close affiliation between the Railway Administration and the valuation work

which will insure its continuance until completion. The question will undoubtedly come up for final decision before Congress when the appropriation for the coming year is passed upon this spring. In the mean time the division is proceeding with its authority to complete the work.

The Railway Supply Field—Prospects for 1918

Realization That Railroads Are Our Third Line of Defence in Transportation Means Much to Manufacturers

THE RAILWAY SUPPLY FIELD enjoyed in the year ended December 31, 1917, one of the most prosperous in its history, as has been evidenced by the recently issued annual reports which have shown the greatest earnings, for many companies, for any year in their entire history. There is prospect of a large business the rest of 1918, although its profitableness will depend on the price policy of the Railroad Administration.

Thus far this year the orders for cars and locomotives have been few, but the car and locomotive plants have been able to continue at work, under severe difficulties from the standpoint of labor and materials, it is true, on railway equipment orders placed many months ago or on guns, shells or other material for the government. Now there are soon about to be added to this business, large orders for cars and locomotives for the government, and conditions will be further improved by the priority that will be given to material for these orders for the very reason that they are on government work.

If there were nothing else in the situation that should lend optimism to the supply field there is the fact that at last the government has seen the urgent necessity of providing at once for the needs of our American railroad system.

This brings up the interesting question of what is likely further to develop along this line in the future.

"It has become perfectly evident to all observers," says an editorial in last week's Coal Age, "that the capacity of the nation for production of war material is enormously greater than its capacity for shipping it to Europe, and that we must at once not only balance this production, but slow it down in order to prevent such a choking of our eastern ports as may produce an impossible condition. The answer comes that if we are making too much war material we had better turn some of our activities into the manufacture of articles of peace. Immediately we run into the financial situation, which now seems to hamper seriously new undertakings.

"It would seem that the claim of the railroads that they need \$1,000,000,000 worth of improvements should at this juncture be considered. Here is one organization now devoted exclusively to the service of the community, which, being under the control of the Federal Government, can be financed directly by that government, and there would seem no reason why the production programs of war material should not be limited, and a certain amount of the energy now being expended in that direction turned at once toward the improvement of our transportation facilities."

No less important than munitions and supplies in this war is transportation at the front, behind the lines, on the sea or behind the seaboard at home. It is a very apt cartoon that recently appeared in some of the metropolitan newspapers showing a camel heavily laden with munitions of war essaying to go through a wall the entrance through which, representing the shipping, was only large enough to permit the passage of its head and neck. The same analogy might be well applied, although in a smaller measure, to the railroad situation

Railroad men recognized it years ago, but it has been only recently that the authorities at Washington have seen it. For months last year our car and locomotive plants were turning out cars and locomotives for Russia and France and for our own military forces in France, while engines that were urgently needed for our own railroads at home were held up until in the heart of winter it developed that for lack of boats we could not ship all the material that was ready, overseas, while the American railroads themselves were crippled for want of cars and motive power. This, we are all agreed, must not happen again. We must take no further chances with our railroads. Germany today is tremendously handi-

EARNINGS OF REPRESENTATIVE COMPANIES—1917 AND 1916

	1917	1916
American Steel Foundries		
Gross earnings	\$49,169,584	\$31,361,006
Net income	5,531,839	3,418,057
Total surplus	6,429,228	3,651,670
Baldwin Locomotive Works		
Gross earnings	98,263,865	59,219,057
Net income	8,305,722	2,619,466
Total surplus	15,855,346	8,949,624
Bethlehem Steel Corporation		
Gross earnings	298,929,531	216,384,556
Net income	27,370,737	43,593,968
Total surplus	28,513,615	44,370,198
American Locomotive Company (semi-annual report)		
Gross earnings	35,559,136	37,863,594
Net income	6,010,009	5,453,334
Total surplus		
Pressed Steel Car Company		
Gross earnings	44,034,843	31,202,646
Net income	2,139,308	2,751,152
Total surplus		10,217,069
New York Air Brake Company		
Gross earnings	6,577,038	4,451,133
Net income	1,878,876	8,114,962
Total surplus	6,076,416	8,607,501
Railway Steel Spring Company		
Gross earnings	1,085,714	1,000,400
Net income	476,484	717,286
Total surplus	6,077,811	6,042
Republic Iron & Steel Company		
Gross earnings	78,314,611	58,844,118
Net income	6,716,533	15,647,490
Total surplus	7,475,737	18,127,888
United States Steel Corporation		
Gross earnings	187,000,571	128,473,770
Net income	22,000,000	11,311,730
Total surplus	31,180,984	38,000,000

capped for lack of cars or locomotives. In fact, one French authority, who is quoted elsewhere in this issue, says that one of the best things the allied armies could do would be to destroy German locomotives, for they cannot be replaced. There is no reason why we should ever reach a serious condition such as that.

No one doubts that the first thing we must do, however is to do our utmost to provide material for the new ships. They are our first line of defence in transportation. The railways now being used behind the lines in France, by the soldiers of England, France and the United States make up the second line, while the railways here at home supply the third. All must be in first-class condition to guarantee a

steady stream of munitions, supplies and men to France. We can neglect none of them.

The supply field naturally wants to see the railways of this country kept in first class condition,—it is the railway supply business that our manufacturing companies are most familiar with and best equipped to handle. Presumably they will be guaranteed a continuation and possibly an extension of this part of their activities during the coming months.

There has been a very evident change in the railway supply field, a tendency towards diversification, and a very healthy broadening of interests. The average railway supply company not so many years ago specialized on railway supplies alone and perhaps on a single line of products. Today the fact is the reverse. On the one hand, some companies have expanded into other lines of endeavor, and several of the most successful companies have also added many other and rather dissimilar lines of railway specialties. On the other hand, there have been many outside companies, new to the field, who have realized the immense possibilities attendant upon the sale of supplies to railways.

We can omit guns, shells and other war material as special war-time factors, although a very large number of companies in the supply field are now engaged in their production. But we can notice that the Baldwin Locomotive Works, some time since, bought the Southwark Foundry & Machine Company to add to its line gasoline engines and similar products; that the American Car & Foundry Company has so diversified its work that now it is in a very advantageous position when it comes to handling an enormous order for shrapnel helmets; that the Locomotive Superheater Company is building up a large business in marine superheaters; that the Chicago Railway Equipment Company has so diversified its work that now 70 per cent of its business is in other than railway specialties. And last, but by no means least, there is the steel industry which at one time supplied over 40 per cent of its products to the railways and now supplies nearer 10 per cent. The peculiar buying methods of the railways, be it repeated, are not the only reason for such diversification, but they are a big reason, particularly since regulation tightened down too much to permit of the extent of progress and expansion that was necessary to the railway industry.

On the other hand, there are other companies which have taken on railways as additional customers. Among such companies can be instanced the Barrett Company, the Carborundum Company, the Norton Company, the H. W. Johns-Manville Company, a number of paint concerns, several belting manufacturers and an exceptionally large number of machine tool builders, all companies which have realized the immense possibilities of selling to an industry that purchases a billion dollars' worth of goods a year, but all of them companies whose industry was already diversified before they entered the railway supply field.

The pending Government orders for cars and locomotives will naturally have a tremendous influence in the railway supply field, as has been discussed previously in this paper. But they will by no means take up all the country's capacity for an extended period of time, nor will they change seriously the tendencies that are mentioned above.

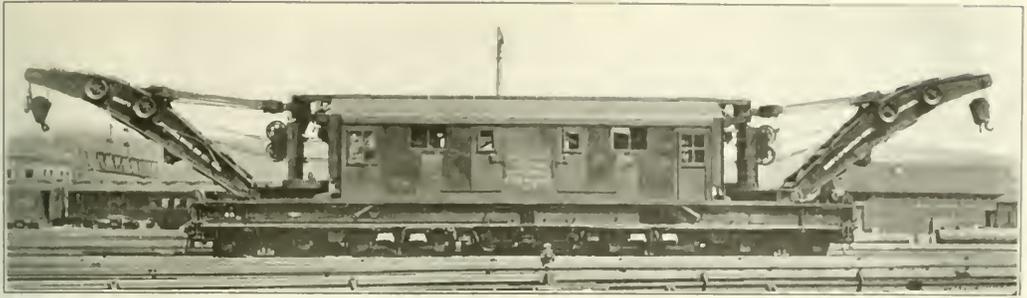
Now what is the ultimate answer? What is going to be done when the orders for the government are completed and after the Kaiser's defeat makes no longer necessary the continued manufacture of guns and shells? There are two answers: (1) A continued diversification to take care of the natural expansion that cannot be utilized by the demands for railway supplies at home. (2) Export trade. Both are necessary, one as much as the other. Diversification because it will help to produce economies. A foundry, a forge shop or a machine shop can be used for other things besides the manufacture of railway material, and particularly may it be so used to take up the slack in

railway demands. Export trade, because diversification alone will not suffice and because it, too, will help to take up the slack in domestic railway demands.

But there is far more to the export proposition than that, and any manufacturer must fully realize this condition before he can ever hope for a continued and successful export business. The point, in short, is that there will be a tremendous opportunity for American railway supply houses in export trade. For many years after the war there will be but two countries in the world which can hope to secure an

THE CAR AND LOCOMOTIVE ORDERS OF THREE MONTHS		
LOCOMOTIVES (DOMESTIC)		
Canadian Government Rys.....	6	0-6-0
Chesapeake & Ohio.....	4	Ten-wheel
Delaware River Steel Company...	15	2-6-2
Grand Trunk.....	10	Ten-wheel
Locking Valley.....	25	Switching
Hudson Coal Company.....	20	2-6-2
Illinois Central.....	1	Four-wheel
Long Island.....	4	Santa Fe
Maine Central.....	4	0-8-0
Miami Conservancy District, O.....	8	Ten-wheel
Minneapolis & St. Louis.....	4	0-6-0
Missouri, Kansas & Texas.....	3	Four-wheel
Philadelphia & Reading.....	10	Four-wheel
	15	Mikado
	5	Pacific
	25	Mikado
	15	.....
		Co. shops
LOCOMOTIVES		
During the three months specifications were determined on orders received by the American Locomotive Company some months ago for the following locomotives:		
Central Vermont.....	5	Mikado
Delaware & Hudson.....	20	Consolidation
Delaware, Lackawanna & Western.....	15	Mikado
Long Island.....	6	0-8-0
Portland Terminal.....	2	0-6-0
Western Pacific.....	5	Mikado
LOCOMOTIVES (FOR EXPORT)		
Chilean State Rys.....	20	Mikado
Rhodesian Rys.....	9	Mountain
South African Rys.....	20	Mountain
South Manchurian Rys.....	25	Mikado
FREIGHT CARS		
Brier Hill Iron & Steel Co.....	40	Hopper
	10	Gondola
	25	General service
Butterworth-Judson Company.....	75	Box
Canadian Government Rys.....	5,000	Tank
	450	Ballast
	300	Stock
	750	Flat
	650	Coal
	1,000	Box
Chicago, Milwaukee & St. Paul.....	5,000	.....
DuPont de Nemours & Co., E. I.....	35	Flat
	14	Box
	4	Shell
Kansas City Structural Steel Co.....	100	Tank
LaBelle Iron Works.....	5	Tank
Penn American Refining Company.....	8	Tank
Phoenix Cotton Oil Company.....	8	Tank
Republic Iron & Steel Company.....	200	Coke
United Gas Improvement Company.....	3	Tank
United States Government.....	950	Box
(for France)	500	Gondola
	250	Box
	500	Box
	200	Box
	750	Gondola
	250	Refrigerator
	100	Box
	500	Gondola
	375	Gondola
	200	Box
FREIGHT CARS (FOR EXPORT)		
Colombian Northern.....	6	Gondola
Guantanamo & Western.....	25	Box
PASSENGER CARS		
Canadian Government Rys.....	7	Dining
	14	Sleeping
Duluth & Iron Range.....	5	Coaches
Colombian Northern.....	2	3rd class
		Pullman
		Pullman
		Pullman
		Am. C. & F.

extensive export trade in railway supplies—England and the United States. The wise American railway supply manufacturer, or at least he who did not have a large business in foreign lands before the war, is already beginning to realize that there is a tremendous opportunity in export trade, that will help take up his increased capacity and will yield him profitable returns; and the wisest manufacturers among them all are those who are now making their plans and getting in the missionary work in favor of American equipment and American standards.



Double-End Electric Crane Locomotive on Trolley or Rail

Electric Equipment for Steam Railroads

Difficult Operating Problems Are Solved by Electric Trucks,
Electric Locomotives, and Electric Welding

LIKE ALL OTHERS in the steam railroad field, electrical men are extremely busy. The present crisis is affording them the opportunity to prove that much electrical equipment is prerequisite for efficient operation. The branches of the electrical field which are now demanding particular attention are shop power and light, handling of freight in terminals, heavy electric traction, and electric arc welding. Car lighting and headlights are subjects which are also demanding recognition. The incandescent lamp has become the standard for locomotive headlights and the greater number of railroads are replacing all other forms of light for coaches with electric light as rapidly as circumstances permit.

Shop Power and Light

The electric motor has long since proved to be the best sort of power for driving machine tools in the railroad shops. At present, repair shops and repairmen for the electric motor equipment are at a premium. This has led in a number of cases to the demand for portable motors to take the place of those in trouble until they can be repaired. These motors employ belts or flexible coupling drive and so far as developed are limited to 15 h. p.

It is generally accepted that anti-friction bearings are the best preventative for motor trouble and their use has simplified maintenance. Attention to lubrication twice a year will suffice to keep them in good condition.

The car repair shop shown in the illustration presents an example of working conditions which can be obtained with proper illumination. Much is being said, and in good cause, about lighting curtailment, but this should be applied to the shop with discretion. It has been shown in a number of cases that burning more light may actually effect a saving of coal. With good light the workman can perform a given piece of work in much less time than he could if the light were inadequate; the motor used to drive the tool which he is working with is used for a shorter period of time and the power consumption of the motor is relatively large as compared with that of the light.

Electric Trucks

The handling of freight in terminals has been the cause of more difficulty than has the shipping of freight over the road. The use of electric trucks has served greatly to reduce the congestion in terminals. A large eastern road reports it would be impossible to handle the transfers of

material in the terminal with hand-trucks, even though a sufficient number of trucks and men were available. The reason for this is that the greater amount of space required is not available.

Electric Traction

Those roads with electrified sections have a great advantage, for with electric locomotives as against steam locomotives, almost twice as many cars can be handled over a given amount of track. There are at present four new types of electric locomotives under construction; two of these are being built by the General Electric Company for the Chicago, Milwaukee & St. Paul and the New York Central. The other two are being built by the Westinghouse Electric & Manufacturing Company, for the Chicago, Milwaukee



A Well Lighted Shop

& St. Paul and the New York, New Haven & Hartford. These four locomotives were described in the *Railway Age*, March 22, 1918.

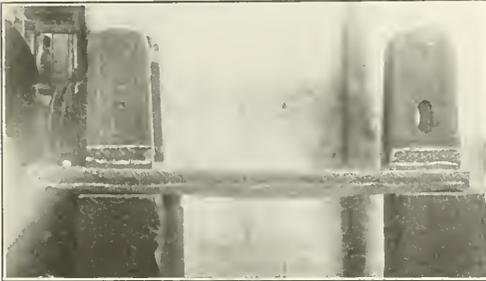
Some interesting information pertaining to maintenance and operating costs was contained in the last annual report of the Norfolk & Western. The average maintenance cost

—including repairs, retirements and depreciation—per 1000 ton-miles for steam locomotives was 32 cents, while that for electric locomotives was only 10 cents. The following statement was contained in the report pertaining to operating costs: "The cost of freight movement in the electric zone in the month of October, 1917, when the conditions were normal, was 26 per cent less than if steam power alone had been used."

Electric Arc Welding

Welding is now demanding more attention than any other branch of the electrical field. It is used effectively on steel and cast-iron, and experiments on other metals, such as bell metal, have proven that the use of arc welding is not limited to iron and steel. Its use on railroads is being steadily extended.

In the locomotive repair shop, arc-welding is used for



Worn Cross-head Guide Built Up by the Metal Electrode Process of Arc Welding

making almost every kind of repair. Broken locomotive frames are repaired quickly, and with little cost; cracked and broken cylinders are repaired without removing the cylinders from the locomotives; broken fireboxes are repaired; flue sheets are welded into boilers without the use

of rivets, and it has become quite common practice to weld the flues to the sheet at the fire-box end of the boilers. The cross-head guide illustrated was worn down until practically useless, and then built up by the metal electrode process. After it has been machined it will be put into service again. This practice is not limited to flat surfaces only but applies



Electric Trucks Can Operate In and Out of Box Cars

equally well to cylindrical forms, which are in need of bushing. Extensive tests have shown that it is possible to make a weld stronger than the original metal. This statement is true for cast-iron as well as for steel.

The savings made possible by the use of electric arc-welding are apparent to anyone who has seen it in use. The superintendent of a large eastern shop recently said that by the use of improved shop methods and electric arc-welding, they had been able to maintain total operating costs constant in spite of the tremendous increases in cost of labor and material.



Central News Photo Service.

Helping a Railroad Out of Its Difficulties

The Shifting of Motive Power From Road to Road

The Practice Leads to Many Difficulties, Some of Which May Be Overcome; Should Be Curtailed

THE PLAN OF TRANSFERRING LOCOMOTIVES from those roads having a surplus of power to those suffering seriously from traffic congestion and power shortage was first considered by the Railroads' War Board. Under the direction of that body, arrangements were made in December for the transfer of 100 locomotives from 20 railroads in the west to a number of eastern lines, the transfer to be carried out through the St. Louis and Chicago gateways. Since the control of the operation of the railroads has been taken over by the President, the application of the plan has been somewhat extended by Director General McAdoo, not without numerous difficulties, but in the main with success, when considered as an emergency measure.

At the present time there are more than 40 railroads in the United States using from one to 75 borrowed locomotives each, which are being paid for on the rental basis of \$50 a day. All of these locomotives, however, were not borrowed directly from other railroads. About 200 of them are either Consolidation type locomotives of the design built for our army in France or the Russian Decapod type, some 200 of which are reported as being converted to standard gage by the use of wide tires, and loaned to the railroads by the United States Government. There is also an increasing output of new locomotives delivered on domestic orders, all of which are being taken from the builders and placed in service wherever the greatest needs exist, irrespective of ownership. As announced early in February, this practice was to be followed for the entire output of the builders during January, February and March, amounting in all to about 700 locomotives. It is estimated that about 600 foreign engines from all sources were being operated on April 1.

Locomotives Do Best at Home

Much that has been said about this subject indicates very clearly that to the lay mind any locomotive is a good locomotive anywhere—just as good in California as in Maine. But to those who have directly to do with the operation and maintenance of locomotives they come to be considered almost as much a part of the fixed transportation plant as yards and roundhouses. Whole systems of repair practice and shop organization grow up around the types of locomotives and even details of construction which become more or less standardized on each railroad. Smokebox design and adjustment and grate design are influenced by the characteristics of the fuel in the districts in which locomotives regularly operate. If such locomotives are suddenly replaced by others developed under other conditions, neither the locomotives nor the organizations handling them fit and a considerable amount of adjustment of both is required.

The movement of traffic is of greater importance, however, than either convenience of operation or the greatest efficiency of maintenance. Under the conditions which have been faced by many of the railroads during the past winter it has been imperative that they secure all the motive power that could possibly be made available. In such a situation, on the principle that half a loaf is better than none, railroad men have been willing and even eager to secure locomotives of almost any type from any available source.

Unnecessary Confusion

As the situation stands at the present time, there is apparent a lack of co-ordination in the distribution of the borrowed locomotives which should be remedied. Indeed, the practice of transferring locomotives has now reached a point

where there is danger of its being carried to extremes. The railroads operating locomotives foreign to their own line, and hence most affected by the practice, are those in the eastern and southern sections of the country and a few in the southwest. Some of these railroads are operating a miscellaneous collection of one or two locomotives received from each of several other railroads. Conversely, locomotives of the loaning roads are being scattered one or two in a place, when they might better be kept together. There are cases where railroads are receiving foreign locomotives to make up their own shortage of power and are having their own new power scattered about on other railroads. It is possible that there are cases in which each one of these conditions may be justified, but the unhindered practice of such methods is laying the foundation for a tangle later on when the need for repair parts becomes urgent, which will not only be exceedingly annoying, but expensive as well.

Even under the best of conditions there are many difficulties incident to the transfer of locomotives to foreign lines. One of the difficulties is to secure proper material from the owning road with which to make essential running repairs. The most common instance of this is the failure to secure grates, a part of the locomotive very frequently requiring renewals. There are instances where locomotives have been held out of service for as much as 10 days by the borrowing road awaiting grate bars, which had to be secured from the owners. In one case, after the locomotive had been held for some time awaiting material, the defective grates were patched up and the locomotives sent back to the owning road. In another case, the borrowing road, in order to protect itself against such delays, ordered sufficient material from the owning road to seriously cripple the latter's store stock of this material.

All of these difficulties present themselves at the outset of the transfer and, as such transfers are only resorted to as emergency measures, will probably never be wholly eliminated during the comparatively short periods in which the locomotives remain away from home. If the borrowing road is using locomotives from several different railroads, instead of securing them all from one line, it is evident that the difficulties of the situation are multiplied. On the other hand, if the locomotives of the loaning road are scattered over a number of other lines, instead of being kept together on one road, the difficulty of providing the necessary stock for running repairs to protect the borrowing roads is materially increased.

In considering the transfer of locomotives from one railroad to another, the fact should not be overlooked that there is always a tendency for borrowed power to run down. This does not imply any lack of conscientious attention on the part of the officers or men of the borrowing road, it is due to the difficulty of securing needed repair parts and material which must come from the owner, and also to the fact that frequently such locomotives are not adapted to the regular routine methods of handling its own power in force on the borrowing road. In such a case it is a natural consequence that the more popular home locomotives and, therefore, those considered the best, can be kept in service longer with running repairs before requiring a trip to the back shop.

Clearance limitations should never be overlooked when transferring locomotives from one road to another. Some instances which have occurred during the past winter indicate that this important matter has not always received the attention it should. In one such case the clearance limita-

tions on the borrowing road were such that after receiving locomotives from another line, it was found impossible to operate them except in a restricted territory only 50 miles in length. In another similar case it was found that Russian locomotives would not clear a viaduct on the line of the railroad on which they were placed in service, this fact only being determined after the locomotives were placed in service.

Keep the Transfers Within Reasonable Limits

It is evident, therefore, that the practice of transferring locomotives should have rather narrow limitations. One of the first and most important considerations to make the plan successful is to keep the locomotives near the home road, preferably on a line directly connecting with the home road, and on a division directly adjoining the home road connection. If this practice were strictly followed, the difficulty of securing repair parts and necessary material for the maintenance of the locomotives would be very much reduced. Long delays incident to the transportation of the material long distances would be eliminated.

Every effort should be made to keep together the locomotives of each loaning railroad, and, on the other hand, to give each railroad borrowing locomotives, those from as few lending roads as the available number of locomotives which can be spared by the latter roads will permit. This will materially simplify the problem of furnishing and securing material for running repairs and will save what otherwise is more than likely to become a very confused situation; furthermore, it will conserve material stocks. It takes but a very small amount more of stock to protect ten or a dozen locomotives than it does to protect one or two. Obviously, therefore, if a railroad has 10 or 12 of its locomotives loaned, and these engines are in service on a half a dozen other railroads, the calls upon its store stock by the borrowing railroads for material to protect themselves will be much more burdensome than if all of these locomotives were in service on one line and one division.

Finally, one of the most important limitations which should be placed upon this practice is the length of time the locomotives remain away from the home roads. In an emergency the practice can only be adopted as a temporary expedient to effect an improved distribution of motive power until a more permanent equalization can be effected. Every effort should be bent to the end that the locomotives now being used on foreign lines be returned home at the earliest possible moment. With the contemplated control of the placing of orders for the various railroads, or of the distribution of new motive power, the need for the general shifting of motive power from one railroad to another should be past before the advent of another winter. Not unlike the more fixed facilities of the railroads, the locomotive performs its best service on its home system—even within the narrow limits of its own division and in the hands of its own crew. Unlike the car, which is at home anywhere, for best results the locomotive should be maintained as a permanent facility.

Provide Central Direction

In order that the least difficulty should arise from the maintenance and operation of the borrowed locomotives and later from the transfer of these locomotives back to the home roads, all of the details should be co-ordinated in the hands of a single agency. The agency best adapted to handle this situation and the one to which it most logically belongs, is the Locomotive Section of the Railway Administration. The information in the hands of the Manager of the Locomotive Section and his facilities for securing such additional information as may be required, are such that he should be in a position to give each factor entering into every case which presents itself its due weight. Each case may then be settled in its proper relation to all other cases now existing or which may arise. Only in this way may the confusion now evident gradually be eliminated and, what is of equal importance, may the locomotive be directed toward the home roads just as rapidly as conditions will permit.

Railroads Need Better Machine Tool Equipment

Must Not Postpone Ordering; Builders Offer Fairly
Good Deliveries In Most Cases

DURING THE YEARS immediately preceding the outbreak of the European war, the railroads of the United States spent approximately \$12,000,000 annually for shop machinery and tools. In the year 1914 there was a serious falling off in the net operating revenue of the roads, and as a result the expenditures were reduced wherever possible. Consequently only \$9,000,000 was spent for machinery and tools during 1915. Throughout the past two years there has been an unusually strong demand for machine tools for war work and the railroads have confined their purchases principally to tools which were urgently needed. Although no general statistics are available, it is safe to say that the expenditures for tools have been even smaller during the past two years than in 1915. With the great advance in prices, a given expenditure of course represents a much smaller amount of shop equipment. Taking this into account and considering also that the roads are handling far more traffic than ever before, it is quite evident that they are in need of a large number of machine tools at present.

Although there has been no reduction in the prices of machine tools, other changes have taken place which should not be overlooked when considering the advisability of making purchases. The past year has brought large wage increases to all classes of mechanics. While in 1915 the total

compensation paid by the roads to mechanics, helpers and apprentices was over \$90,000,000, for the present year it will probably be 40 per cent higher, or about \$125,000,000. There are but few methods that can be used to offset this increase. One that deserves attention is the use of improved machine tools to increase the output per man. Suppose only 2 per cent more output could be secured by providing better tools. Figuring interest and depreciation at the rate of 12 per cent annually this saving would justify the expenditure of more than \$20,000,000. All who are familiar with shop conditions will agree that with improved equipment much greater economics could be effected. Aside from the direct saving in labor there would be opportunities for increasing the efficiency of operation by reducing delays and making it possible to get more service from equipment.

During the past winter it was impossible to care for equipment properly at some points, due largely to the inadequacy of the roundhouse facilities. The machine tool equipment of engine terminals is usually made up of tools that have outlived their usefulness in the shop and should have been sent to the scrap pile instead of to the roundhouse, where minutes lost in doing machine work may result in costly delays.

The need of first-class tool equipment in roundhouses has been recognized for some time. One superintendent of mo-

tive power recently stated that he thought with the large locomotives now in use requiring frequent heavy work, every roundhouse should have a few pits equipped for handling heavy repairs in order that the heavy roundhouse jobs could be taken care of promptly. The necessity for keeping down the expenditures has prevented roads from buying the equipment they have required in the engine houses. Better facilities at these points will help to prevent such costly congestion as occurred last winter, and should certainly be provided.

Although the machine tools most urgently needed are those required for roundhouse work, many shops should have additions for their equipment, or replacements for obsolete tools. There are wide variations in the conditions on different roads. Some have followed a consistent policy of buying shop machinery regularly as additional rolling stock was secured. On other roads the repair facilities are not sufficient to take care of the equipment under the present conditions. It is, of course, advisable to have all locomotives repaired on the home road if possible. While it may not be feasible to build additional shops at this time, the capacity of existing shops is usually limited, not by the number of pits but by the machine facilities and in most cases a few tools, judiciously chosen, will make it possible to increase the output considerably.

The question of providing good repair facilities is of such importance that it should receive first consideration when ordering tools. Under the present conditions, however, the reclamation of materials offers such unusual opportunities for reducing expenses that it may be found advisable to include a considerable amount of machinery in the tool program for such work. As specific instances of equipment that is being reclaimed to good advantage at this time flues, rails and bar iron may be mentioned.

Granting that the roads need a great many machine tools at this time, the question of their ability to secure them naturally suggests itself. There seems to be a general opinion among railroad men that tools of all classes are hard to get and deliveries are very slow. While it is true that in the past there have been delays in securing tools, the situation has improved and reasonable deliveries are now being promised on practically all types of machines.

Before going into the subject more in detail, it may be well to give a short account of the work of the machine tool section of the War Industries Board. Although an advisory body without executive authority, the board has done much good in directing the manufacture and distribution of machine tools. A schedule of production was secured from every shop and from the data furnished it was determined whether the production of various machines was greater or less than the demand. This made it possible to commandeer tools with the minimum of inconvenience to private industries. The requirements of munition plants are being estimated and a reserve of tools set up for such work. Companies which formerly did not manufacture machine tools have been induced to enter the field, thus increasing the production of machines that were badly needed. By preventing speculation in machine tools the board has helped to keep the prices on a reasonable basis. While there has been some costly duplication of facilities, the production and the demand have been controlled as much as possible and the conditions are fast becoming normal.

The commandeering of tools for government work has not interfered with the delivery of tools to railroads to any great extent. Since the roads are now under government control they will probably be given preference in arranging for priority of orders. Some of the tools which the railroads use in large number can now be delivered from stock, and nearly all can be secured within six months from the date ordered. In fact the only classes of equipment on which deliveries are much slower than usual are the extremely heavy tools and special equipment of which small numbers are built.

Information received from the manufacturers of tools indicates that the conditions as regards deliveries are at the present time about as follows:

Good Deliveries in Most Cases

Lathes: A few of the smaller sizes can be delivered from from stock. On the larger sizes deliveries vary from two to seven months depending on the swing and length of bed. It is almost impossible to secure wheel lathes, as plants equipped to manufacture large tools are devoting all their time to working on government orders.

Turret lathes: All sizes and types can be furnished in from two to five months' time.

Boring mills: With the exception of the larger sizes used for tires and wheel centers, deliveries can be secured in from two to three months. The larger machines are not available at this time and probably cannot be secured for some time to come.

Planers: No class of equipment has been more in demand than large planers. The urgent need for these tools for war work has led to the introduction of a new type of machine which has a concrete base. The medium and smaller sizes can be secured in from four to twelve months, however.

Milling machines: Deliveries of the ordinary sizes of plain and universal milling machines can be made within six to twelve months, while for heavy milling machines the time is somewhat longer.

Shapers: Deliveries vary from four to eight months.

Drill presses: Sizes up to six feet can be secured in from three to eight months; on radial drill presses and on the other types the time required is even shorter.

Cylindrical and surface grinding machines: Small stocks of some sizes are on hand and other machines can be supplied in from two to eight months.

Portable tools: All types and sizes can be furnished within two months from the date ordered.

Electric welding equipment: Deliveries can be made in from one to three months.

Electric motors: All sizes required for driving machine tools can be furnished within two months.

Blacksmith and boiler shop equipment: Steam and power hammers can be supplied in from two to four months, forging machines in six months and bolt machinery in three to five months. Deliveries of punches and shears can be made within one month; flangers are available within four months.

Wood working machinery: Deliveries are practically normal, one to three months being required to fill orders depending on the type of machine wanted.

From the data given above it is evident that while some difficulty might be experienced in securing complete equipment for new shops owing to the great demand for certain types of machines, the ordinary requirements can be met with but little delay. Machine tool prices are stable and there is no longer any thought of postponing buying in anticipation of a possible decrease in prices. The railroads have everything to lose and nothing to gain if they restrict their orders for machine tools. With labor costs continually rising, they have every inducement for replacing the old equipment with modern machine tools. The roads must operate at the highest efficiency in order to handle the present enormous traffic. Better shop equipment will help them to realize that aim. Their purchases in the past three years have been entirely inadequate, but this year the roads should make up for it and should place larger orders for machine tools than during any previous year.

A BRIDGE TO CONNECT EUROPE WITH ASIA.—According to the *Vossische Zeitung* the Turkish government has introduced in the Chamber a bill asking for a credit for the examination of the question of the construction of a bridge or tunnel connecting Europe with Asia.



New York Is Urgently Recommended for a Free Port District.

Is the Supply Field Interested in "Free Ports"?

Apparently the Idea Will Have No Advantages for the
Manufacturers of Railway Materials

By E. S. Swazey

THE QUESTION OF THE DESIRABILITY for the United States of free ports—districts set outside of the jurisdiction of the customs into which foreign merchandise may be brought for storing, handling, manufacture and re-export—has been the subject of more or less discussion, particularly during the last few months. The United States Tariff Commission has conducted hearings in several cities for the purpose of finding out how useful these free ports would be in developing our foreign commerce; and legislation has been introduced in Congress providing for free ports.

The interest of railwaymen centers largely in the part that these free ports would play in the whole problem of port development, particularly at New York.

It is, however, not probable that free ports would prove of any special assistance to the manufacturer of railway equipment and supplies, for the reason that his raw materials are entirely domestic. They might, on the other hand, even prove to his disadvantage, by way of being of greater assistance to the foreign manufacturer of these products in facilitating his sales to, for example, the Latin American countries.

The free port problem is, nevertheless, one of fundamental interest to those whose attention is turning to foreign trade and one about which far too little is known as to its practical adaptability to existing and probable future conditions in this country. The very fact that the minds of the leaders in the railway supply field are turning to a discussion of the new problems of the day is the best reason why a discussion of the arguments for and against the free port should be of interest to railway supply men.

Definition

A free port has been defined as a district in or adjacent to a port, within which the customs authorities do not enter but confine their activities to guarding its boundaries and imposing the usual formalities and charges upon all goods which leave it for the interior. It is designed to counteract the restrictive effects of customs supervision and at the same time retain all the protective and revenue-producing features of the tariff system. It usually consists of a large district, isolated from the remainder of the port by natural or artificial barriers, equipped with wharves, warehouses, industrial loca-

tions and mechanical devices for the economical handling and transportation of merchandise. It is a district which all ships, irrespective of flag or cargo, may enter and depart from unmolested and where all sorts of activity in commerce and industry, including sorting, refining, grading, mixing, assembling, manufacturing and selling may be carried on without customs charges, supervision or formalities. The territory set aside as a free port is intended to be a great market and the center for the transshipment trade of the region.

The value of a free port district bears a direct relation to the extent of tariff restrictions existing in the country in which the district is located. Recent discussion of the desirability of free ports for the United States seems to have very largely omitted any detailed consideration of what part of our trade would be benefited by such an arrangement.

Hamburg Glibly Cited

The example of Hamburg is glibly cited to show the benefits that accrue from the establishing of a locality in which merchandise may be stored, handled, manufactured, or re-shipped without the inconvenience of customs regulation. The Hamburg free port has been undoubtedly successful, but Germany has a high protective tariff.

On the other hand, England, a free trade country, has in Liverpool and London, two of the greatest transshipping ports of the world, and handles successfully through her bonded warehouse system, dutiable commodities, such as tea and similar luxuries.

Between these two extremes lie the conditions existing in the United States—raw materials, very largely free of import duty, semi-finished and manufactured goods, more or less subject to a duty that is partly protective, and partly for the purpose of revenue.

Three Fundamental Conditions

Three other fundamental conditions must be borne in mind in a consideration of the problem, particularly if undue emphasis is not to be laid on the success of the European free ports:

First, the great bulk of the raw materials entering into our manufacturing are of domestic origin (this applies to our in-

creasing production for export as well as to production for our own needs and includes particularly railway materials) and that of those materials that are of foreign origin, a large part comes in free of duty;

Second, we are located geographically not only at considerable distance from the sources of important foreign raw materials, but we are also far from any foreign consuming markets with such concentrated purchasing power as exists in the foreign markets nearby Hamburg;

Third, our extensive coast line, though it has the one predominating port of New York, has also a large number of smaller ports competing among themselves even now for a share in the free port privilege, which, if granted liberally—as it would have to be or not at all—would, by decentralization, lessen the benefits that might otherwise be gained by one large trade center.

The idea of making the United States less dependent on the European transshipment raw material markets, and even of setting up such marketing centers in this country to which other nations will come as we have gone to them, is now very vital. Possibly, with our enlarged merchant marine, greater financing power and increased prominence in foreign fields, we may be able to overcome the handicap of distance and the inertia of established trade channels, and obtain some of the results desired. How would the establishing of free ports assist in this development?

Free and Dutiable Merchandise

Tables I and II show the relations that exist between free and dutiable merchandise as grouped into six classifications for the last six years. The first three of these years (ending June 30) are pre-war. The first two years, 1912 and 1913, represent imports under the old Payne-Aldrich tariff. The figures for 1914 show clearly the effects of the new tariff, although industry can hardly be said to have adjusted itself to the new rates of duty. The effects of the war during the

TABLE I—PERCENTAGE OF DUTIABLE MERCHANDISE IN EACH GROUP OF UNITED STATES IMPORTS

	Years Ending June 30					
	1912	1913	1914	1915	1916	1917
Crude materials for use in manufacture	20.6	19.8	13.2	11.9	10.2	9.1
Foodstuffs in crude condition and food animals.....	21.8	15.1	18.6	12.1	13.8	19.9
Foodstuffs partly or wholly manufactured	91.5	94.4	83.7	82.1	88.3	88.1
Manufactures for further use in manufacturing.....	47.8	48.3	37.1	31.8	28.4	24.3
Manufactures ready for consumption	78.4	76.2	71.6	68.2	61.4	57.5
Miscellaneous	26.01	34.1	35.2	35.3	34.6	37.3
Total	46.7	45.5	40.5	38.3	32.1	30.5

last three years are also to be borne in mind, though they do not materially alter the conclusions to be drawn.

Table I shows for each of the years the percentage of the imports in each of the groups of merchandise that is dutiable. "Foodstuffs partly or wholly manufactured" is the group in which the greatest percentage is dutiable, ranging from 94.4 per cent in 1913 to 82.1 per cent in 1915. The next group in point of proportion of dutiable merchandise is "manufactures ready for consumption." Of the "crude materials for use in manufacturing" group, which in total volume of trade as well as in point of free port interest is of most importance in this analysis, the percentage of dutiable imports was but 20.6 per cent and 19.8 per cent in 1912 and 1913, and under the new tariff dropped to 10.2 per cent and 9.1 per cent in 1916 and 1917.

Table II shows for each of the years the percentage of dutiable imports in each group to the total of the imports of all groups, both dutiable and free, in order to show the relative importance of the dutiable imports, to a small part of which a free port would cater, to our total import trade. Bearing in mind the argument that free ports would be of material

assistance to the manufacturer preparing goods for export, note that dutiable crude materials and dutiable manufactures for further use in manufacturing, each run under the new tariff only between 4 per cent and 5 per cent of our total imports. Even with a remarkable development of our export trade, the part of these dutiable materials that would enter into our exports would be a very negligible quantity.

Free ports may, of course, be used for the handling of merchandise that is not subject to duty. A steamer bringing both dutiable and non-dutiable goods might use the facilities of a free port for both classes of goods. Any free port districts that would be developed would probably be very modern in equipment and as low in charges as existing facilities, so that the district might attract a merchandise movement con-

TABLE II—RATIO OF THE DUTIABLE IMPORTS IN EACH GROUP TO THE TOTAL OF ALL U. S. IMPORTS

	Years Ending June 30					
	1912	1913	1914	1915	1916	1917
Crude materials for use in manufacture	6.9	6.9	4.4	4.1	4.4	3.8
Foodstuffs in crude condition and food animals.....	3.0	1.8	2.4	1.6	1.5	2.2
Foodstuffs partly or wholly manufactured	10.9	10.1	10.1	14.0	12.5	11.4
Manufactures for further use in manufacturing.....	8.5	9.3	6.2	4.5	4.6	4.4
Manufactures ready for consumption	17.1	17.1	16.9	13.7	8.8	8.2
Miscellaneous	0.2	0.3	0.3	0.4	0.3	0.2
Total	46.6	45.5	40.5	38.3	32.1	30.5

siderably in excess of the amount of dutiable merchandise that would actually benefit by the absence of customs restrictions and which would not be a full measure of the use that would be made of the districts. But this suggests the more important problem of the proper development of the entire port and terminal facilities of our seacoast, irrespective of whether or not free ports are permitted. As a matter of practical operation, it would be very difficult to import the small proportion of actual free port merchandise in the relatively few vessels that would discharge in the free port districts.

A Free Port's Activities

The activities of a free port fall in two main categories, re-exporting merchandise largely in the form in which it is imported, and manufacturing for export products of which imported materials form a part. It would seem from the above figures that only a limited use would be made of free port facilities for manufacturing purposes, although inquiry may develop specific industries whose use of imported dutiable raw or partly manufactured materials in products for export would warrant their taking up manufacturing quarters in a free port zone. The re-export of foreign merchandise with

TABLE III—IMPORTS AND RE-EXPORTS FROM BONDED WAREHOUSE

Year	Total Imports	Total Re-Exports	Ratio		
			Re-Exports to Imports	Re-Exports to Total Imports	Re-Exports to Total Re-Exports
1912	\$1,653,64,934	\$34,003,581	2.0	\$10,585,800	30.4
1913	1,813,098,234	37,377,791	2.1	12,141,100	32.5
1914	1,893,925,657	34,895,178	1.8	10,541,000	30.2
1915	1,674,169,740	24,410,875	1.4	1,281,000	5.3
1916	1,788,510	61,305,900	3.4	1,281,000	2.1
1917	659,551,885	63,036,795	9.6	1,281,000	2.0

* Not reported.

which a free port would apparently be most concerned, is then to be considered.

Table III gives an indication of what has been done under the existing bonded warehouse system. The percentage of total re-exports to imports is small, although the war has increased both the percentage and the actual amount. The portion of these re-exports representing merchandise dutiable when imported cannot be ascertained exactly. An indication is seen in the re-exports from bonded warehouses, which have been about 30 per cent of the re-exports. Or if we take the same proportion that is dutiable when imported, the amount

which would be available for free port handling has apparently been worth about \$20,000,000 in 1916 and 1917. The existence of free ports would facilitate this transshipment movement. Let us see what commodities would be favorably affected by such a plan.

The world's great commodity markets in London, Liverpool, Rotterdam, Hamburg and other European ports are those of raw materials such as rubber, cacao, coffee, cotton, silk, jute, and tea. Hope has been expressed that the United States would become the distributing center for one or more of these products—say rubber, coffee, and cacao—but free ports would hardly help in this development, since each of these commodities now enter free of duty, and except possibly for the formality of "entering," which would be necessary even in a free port for record purposes, and except for certain sampling, are not handicapped by customs regulations.

Easier Means to Secure Same Results

Even if these raw materials were dutiable, the difficulties of bonded warehouses and drawbacks could be more easily overcome than the more dominating factors in determining world markets of geographical location, established channels of trade, financing and insurance, and our own lack of world trading knowledge.

The most important of the commodities re-exported that are subject to import duty are: Antimony, chicle, jute manufactures, dried peas, precious stones and imitations of, cleaned rice, sugar, and leaf tobacco, of which the total value of the re-exports in 1916 was about \$10,000,000.

With free ports, the amount of dutiable commodities re-exported would, of course, be greater, and in considering the desirability of such districts, it is not entirely fair to measure their value by the experience recorded under customs conditions, which the ports would eliminate.

A list is given below of the most important raw and partly or wholly manufactured materials that are imported into the United States subject to duty in order to call them definitely to the attention of those who, under free port conditions, might import these products for re-export to other countries. Note the absence of railway materials.

RAW MATERIALS		
Aluminum	Antimony	Breadstuffs
Angels and wine	Glycerin	Campbor—crude, natural
Chicle	Indigo—natural	Licorice root
Vanilla beans	Feathers	Fruits and nuts
Tea	Olive oil	Precious stones (unset)
Flaxseed or linseed	Spices	Sugar
Tobacco	Zinc	

MATERIALS PARTLY OR WHOLLY MANUFACTURED		
Flour	Silk and woolen mfrs.	Laces, embroideries, etc.
Dyes, chemicals, drugs, etc.	Bristles	Furs—dressed and mfrs. of
Earthen, stone, and chinaware	Cotton thread and yarn	Mfrs. of fibers
	Brushes	

What in general are the trade movements in which the United States could figure to any extent as a distributing center? Geographical location to ensure the shortest distance between producer and consumer is an important factor, although there are notable exceptions, such as the tea and rubber movement through England. Even granted the shorter distance, steamship lines or the tramp movement of ships must create new channels.

First, there is the possibility of the distribution of European products via the United States to Latin-America (particularly to the Caribbean and West Coast countries, as little movement to Brazil and the Argentine could be expected via New York), and the return movement of raw materials from Latin-America.

Second, there is similarly a possible trade channel via our Pacific ports between the Far East and the Latin-American countries.

Third, there is the exchange of European with Far Eastern products via this country, insofar as this might compete with the direct move via the Suez.

It would be very desirable to possess the controlling markets of raw materials, such as rubber, which this country does not produce, and particularly those that enter largely into our requirements. But as has been noted, these are for the most part free of duty, and would be benefited by free ports only to the extent to which these ports might assist in developing the desired new trade channels.

Raw materials which the country does produce and which are dutiable, such as rice, wheat and other breadstuffs, sugar, tobacco, and certain vegetable oils, would be directly benefited to the extent that the free port system would release the transshipper—agent, refinery, factory—from the burden of red tape and attendant expenses. Though, as Irving T. Bush has suggested, the simpler remedy here would lie more naturally in an overhauling of the present bonded warehouse and drawback systems.

Materials required in the manufacture of merchandise which we would be able to sell abroad would be advantageously handled through free ports where these materials are either not available in this country or are in insufficient quantity. To what an extent these would enter into our growing export trade in manufactured articles it is difficult to determine from data available—probably only in relatively small amounts.

The Danger in Free Ports

The transshipping of foreign manufactured articles to the possible detriment of our own manufacturers would seem to require most careful economic consideration. A free port would not, of course, do more than simplify a trade movement now fully possible. But it might prove to be a deciding factor in a competition between a United States and a foreign manufacturer in the sale of goods to a country in which the foreign seller did not have direct sales or shipping connections. To take a very possible case as an example—suppose that a group of European railway supply manufacturers, availing of the facilities of a United States free port, were to have in stock there a complete line of their products, any selection from which could be offered to a foreign buyer—say from the west coast of South America. (Goods in bonded warehouses, where this merchandise would now be stored, may only be removed intact in the lots in which it is entered.) The foreign manufacturer would then have an equal advantage with our manufacturer in point of quick delivery.

Free port legislation would apparently be of benefit only to a small part of our foreign trade, and that part certainly does not include railway supplies. Suppose, however, that those few who would be directly benefited were to make their case sufficiently strong to warrant the support of those who would have no real use for the facilities. The legislation might conceivably be passed on the basis that every encouragement, however slight, should be given to our foreign trade. What might be the working out of the plan?

Certain benefits do accrue to the immediate locality in which a free port is located—the manufacturing interests attract labor in addition to the necessary dock labor, and real estate values appreciate; the movement of ships and their cargoes, with attendant expenses, and the banking, insurance, and other trade features are at least of local benefit. If the number of free port districts is restricted, the competition for these districts on the part of local chambers of commerce would undoubtedly open the way for political preferment and dissatisfaction. If the number is not restricted—in view of the necessarily expensive customs guard around each district, this is hardly conceivable—the benefits that might be gained by one, two, or even three large ports would with a larger number be "spread so thin" that they would not be worth while.

New York stands out pre-eminently as a location for one of the ports, should it be proved that they are of advantage to the country as a whole. Criticism has been expressed of

the already congested condition of the port, but the fact nevertheless remains, that the port handling 50 per cent of the United States imports is the natural radiating point for steamship lines to and from the greater part of the world, and that the selection of any smaller port on the Atlantic would be an attempt to divert trade much further from its natural channels than we are already trying to do in our attempt to establish the United States as a trans-shipment country in competition with England and Germany. Proper port development would allow a free port district to be accommodated.

Possible Free Ports

In addition to New York, one district, if the tariff commission finally recommends the free port idea and Congress passes it, would probably be of advantage on the Pacific Coast, and another on the Gulf. Neither of them would be large; each would cater to a relatively small number of commodities.

Dock Commissioner Hurlburt of New York has remarked that the protectionists in Congress are against the free port idea because they think it will let materials in free of duty; the free traders are opposed to it because it presupposes the continuance of tariffs. In general, there is a very great lack of public understanding as to what free ports are intended to do, and how much they will be able to accomplish for the benefit of our foreign trade. Many have spoken in favor of the idea, some of them, it must be stated, without a very clear conception of the volume of our trade that would be affected. And certain importers whose raw materials are not subject to

duty and who would, therefore, be only directly benefited, have urged the ports apparently on the ground that some time their commodities might be made dutiable. A very few, among them Mr. Bush, have expressed disapproval of the idea instead of taking for granted the general and unconfirmed statement that "it would be a good thing for the country, and, therefore, I am in favor of it."

If most of our merchandise were subject to duty, free ports would probably be a good thing for the country, if under existing tariffs it can be proved that it would be of enough use to the country, it would to that extent still be a good thing. But the burden of proof does very definitely lie with those who would make use of the facilities. Unless the tariff commission has already done so, the next step would appear to be a thorough referendum among those who would be affected to determine how much the free ports could be used on the basis of present trade tendencies. This would seem to be more productive of tangible results than any number of hearings.

The hearings held this past winter in various cities were advantageous in that they represent a part in the necessary campaign of education as to the functions of a free port. Such a campaign should be carried on in any event. But the remarks at the New York hearing were very general indeed, seeming to lack entirely any concrete data as to who and what would be benefited. Until the tariff commission or some other body can give us more definite facts, let us not be so hasty in urging free port legislation as the great panacea with which to develop foreign trade.

Freight Operations Under the Railroads' War Board

Remarkable Seven Months' Record, Partly Neutralized by Intolerable Conditions in November

DURING THE NINE MONTHS April to December, 1917, the railroads of the United States moved 9.8 per cent more ton miles of revenue freight than during the corresponding period of 1916 with an increase of only 1.1 per cent in the average number of freight locomotives in service and of only 2.9 per cent in the number of freight cars. This period covers that part of the year after the United States declared war against Germany and corresponds closely with the period during which the railroads were operated under the general direction of the Railroads' War Board.

The war board was organized at a meeting in Washington on April 11. For the purpose of recording the results obtained from its campaign for increasing the efficiency of the American transportation system it inaugurated a series of monthly reports of freight operations containing information which formerly was not available except in annual statistics. These reports were compiled by the Bureau of Railway Economics and that for the month of December, with a combined summary for the nine months, has recently been issued, as noted in last week's issue.

The combined report for the nine months, which is reproduced herewith, is of special interest as an indication of the results accomplished by the roads under the direction of the War Board. It covers the operation of 227,651 miles of line, or about 98 per cent of the operated mileage of Class 1 roads.

The primary purpose of the Railroads' War Board was to increase the efficiency of the roads to enable them to handle the maximum of freight with the available facilities; and to accomplish this purpose it devoted its efforts largely to obtaining a heavier loading of cars, the maximum tonnage per train, the elimination of delays in loading and unloading of

cars, greater mileage per car and per locomotive per day and an increase in the available transportation capacity by proper attention to repairs of cars and locomotives.

During the nine months' period under its direction the railroads represented in the table handled 303,751,995,337 ton miles of revenue freight, which is more than the entire revenue traffic of all the roads for any preceding full year except the record year 1916. In the calendar year 1916 the total for the Class 1 roads was 362,154,291,397 and in the year ending June 30 it was 339,883,189,699, but the largest previous total was 301,398,752,108 in 1915. The freight earnings in the calendar year 1916 were 19.1 per cent greater than in 1915.

The table also shows how the increase was accomplished. The average tonnage per train was increased from 624 to 667, or 6.9 per cent and the tonnage per loaded car was increased from 25 to 27.3, or 9.2 per cent. The average mileage per locomotive per day was increased from 66.6 to 67.9, or 2 per cent, but the average miles per car per day decreased 1.8 per cent, from 27.3 to 26.5, so it is apparent that most of the net increase in efficiency resulted from the campaign in which the shippers co-operated for heavier loading of cars.

When examined in comparison with the earlier monthly reports the table also shows the effect of the increasing congestion of freight during the later months of the year in the eastern district which resulted from the confusion caused by indiscriminate use of preference orders and the concentration of export freight at a few North Atlantic ports. The decrease in miles per car per day for the nine-months period is the result entirely of the conditions on the eastern lines, where the reduction was 5.5 per cent. The southern lines

showed an increase of .9 per cent and the western lines of .3 per cent.

For the six months, April to October inclusive, the increase in revenue ton miles handled had been 14 per cent, and there had been an increase in miles per car per day of 2.2 per cent.

The average mileage per locomotive per day had also in-

creased by 17 per cent over April, 1916. In May the increase was 16.1 per cent, in June 23.2 per cent and in July 20.2 per cent. By August, however, the increase had fallen to 8.4 per cent, in September to 2.9 and in October it was 5.3. In November there was an increase of only 2.9 per cent and in December there was an actual decrease of 2.6 per cent. The reduction in the rate of increase is partly attributable to the

FREIGHT TRAFFIC OF STEAM RAILWAYS, NINE MONTHS, APRIL TO DECEMBER, INCLUSIVE; 227,651 MILES

Item	UNITED STATES				EASTERN DISTRICT			
	1917	1916	Increase or decrease		1917	1916	Increase or decrease	
			Amount	Per cent			Amount	Per cent
Freight train-miles	495,283,718	482,658,258	12,625,460	2.6	197,164,004	199,405,169	d 2,241,165	d 1.1
Loaded freight car-miles	12,111,872,171	12,044,012,010	67,860,161	0.6	5,175,958,234	5,316,671,396	d 140,713,172	d 2.6
Empty freight car-miles	5,198,351,893	5,117,331,282	81,020,611	1.6	2,306,138,415	2,418,330,973	d 112,672,558	d 4.7
Total freight car-miles—loaded and empty	17,310,224,064	17,161,343,292	148,880,772	0.9	7,482,116,639	7,735,002,369	d 253,385,730	d 3.3
Freight locomotive-miles	585,913,786	568,518,367	17,395,419	3.1	259,261,771	258,964,823	296,946	0.1
Revenue ton-miles	303,751,995,337	276,555,311,578	27,196,683,759	9.8	144,162,071,967	133,926,014,025	10,236,057,942	7.6
Non-revenue ton-miles	26,734,764,949	24,717,751,382	2,017,013,567	8.2	8,478,053,202	7,362,343,277	1,115,709,925	15.2
Average number of freight locomotives in service	31,367	31,028	339	1.1	13,285	13,202	83	0.6
Average number of freight locomotives in shop or awaiting shop	4,330	4,667	d 337	d 7.4	1,927	2,029	d 102	d 5.0
Average number of freight cars in service	2,348,898	2,282,189	66,709	2.9	1,218,457	1,192,433	26,024	2.2
Average number of freight cars in shop or awaiting shop	134,246	139,674	d 5,428	d 3.9	72,751	74,210	d 1,459	d 2.0
Home	101,531	111,077	d 9,546	d 8.6	54,569	58,906	d 4,337	d 7.2
Foreign	32,715	28,597	4,118	14.4	18,182	15,304	2,778	18.0
Tons per train	667	624	43	6.9	774	709	65	9.2
Tons per loaded car	27.3	25.0	2.3	9.2	29.5	2.9	10.9	
Average miles per locomotive per day	67.9	66.6	1.3	2.0	71.0	71.3	d 0.3	d 0.4
Average miles per car per day	26.8	27.3	d 0.5	d 1.8	22.3	23.6	d 1.3	d 5.5
Per cent of empty car-miles	30.0	29.8	0.2	0.7	36.8	31.3	d 0.5	d 1.6
Per cent of freight locomotives in shop or awaiting shop	13.8	15.0	d 1.2	d 8.0	14.5	15.4	d 0.9	d 5.8
Per cent of freight cars in shop or awaiting shop	5.7	6.1	d 0.4	d 6.6	6.0	6.2	d 0.2	d 3.2
Revenue ton-miles								
Per freight locomotive	9,683,808	8,913,089	770,719	8.6	10,851,492	10,144,373	707,119	7.0
Per freight car	129,317	121,180	8,137	6.7	118,313	116,313	6,002	5.3
Average miles operated—single track	227,651.17	227,432.32	218.85	0.1	58,024.84	58,196.40	d 171.56	d 0.3
Decrease.								
Item	SOUTHERN DISTRICT				WESTERN DISTRICT			
	1917	1916	Increase or decrease		1917	1916	Increase or decrease	
			Amount	Per cent			Amount	Per cent
Freight train-miles	89,579,873	83,351,045	6,228,828	7.5	208,539,841	199,902,044	8,637,797	4.3
Loaded freight car-miles	2,027,373,856	1,949,046,508	78,327,348	4.0	4,908,840,091	4,778,294,106	130,245,985	2.7
Empty freight car-miles	953,110,222	865,317,073	87,793,149	10.1	1,939,083,256	1,833,183,236	105,900,020	5.8
Total freight car-miles—loaded and empty	2,980,484,078	2,814,363,581	166,120,497	5.9	6,847,623,347	6,611,477,342	236,146,005	3.6
Freight locomotive-miles	98,568,060	91,636,494	6,931,566	7.6	228,083,955	217,917,048	10,166,907	4.7
Revenue ton-miles	51,691,543,697	46,101,339,024	5,590,204,673	12.1	107,898,380,673	96,537,753,529	11,370,627,144	11.8
Non-revenue ton-miles	4,928,382,092	4,426,221,697	502,160,395	11.3	13,338,329,655	12,929,186,408	399,143,247	3.1
Average number of freight locomotives in service	5,456	5,376	80	1.5	12,626	12,450	176	1.4
Average number of freight locomotives in shop or awaiting shop	655	683	d 28	d 4.1	1,738	1,955	d 217	d 11.1
Average number of freight cars in service	325,580	310,088	15,492	5.0	804,861	779,668	25,193	3.2
Average number of freight cars in shop or awaiting shop	16,836	19,526	d 2,690	d 13.8	44,659	45,938	d 1,279	d 2.8
Home	12,896	16,168	d 3,272	d 20.2	34,066	36,103	d 2,037	d 5.6
Foreign	3,940	3,358	582	17.3	10,593	9,835	758	7.7
Tons per train	632	606	26	4.3	581	548	33	6.0
Tons per loaded car	27.9	25.9	2.0	7.7	24.7	22.9	1.8	7.9
Average miles per locomotive per day	65.7	62.0	3.7	6.0	65.7	63.6	2.1	3.3
Average miles per car per day	33.3	33.0	0.3	0.9	30.9	30.8	0.1	0.3
Per cent of empty car-miles	32.0	30.7	1.3	4.2	28.3	27.7	0.6	2.2
Per cent of freight locomotives in shop or awaiting shop	12.0	12.7	d 0.7	d 5.5	13.8	15.7	d 1.9	d 12.1
Per cent of freight cars in shop or awaiting shop	5.2	6.3	d 1.1	d 17.5	5.6	5.9	d 0.3	d 5.1
Revenue ton-miles								
Per freight locomotive	9,474,256	8,575,435	898,821	10.5	8,545,729	7,753,234	792,495	10.2
Per freight car	158,768	148,672	10,096	6.8	134,058	123,806	10,252	8.3
Average miles operated—single track	41,950.30	41,733.22	217.08	0.5	127,676.03	127,502.70	173.33	0.1
d Decrease.								

creased by 4 per cent. But the report for October and seven months showed decreases in the mileage per car and per locomotive. In both of these items the best record was shown in the month of May, when average mileage per locomotive per day reached 71.3 and the mileage per car per day was 29.6. In October the mileage per locomotive per day was as high as 69.8 but by December it had fallen off to 61.6. In December the mileage per car per day had fallen to 21.3 and in the eastern district to 16.7 as compared with 21 in December, 1916.

These figures illustrate how the remarkable record made during the first six months was to a considerable extent offset by the conditions of October and particularly of November and December.

In April the revenue ton miles moved showed an increase

fact that the figures for the later months are in comparison with the period of 1916 when traffic was increasing in volume.

COAL EXPORTATION AGREEMENT BETWEEN CENTRAL POWERS—According to an article published in the *Bohemian*, at Prague, it was agreed at a meeting held in Berlin between the German, Austrian, and Hungarian coal distribution officials, that for the months of March and April there shall be sent monthly to Austria a total of 572,500 tons of coal and coke from Silesia, and to Hungary 243,500 tons. In return, 275,000 tons of brown coal from the northwest Bohemian fields and 8,000 tons of hard coal from the Kladno and west Bohemian fields are to be sent to Germany.

Motive Power Conditions During the Past Winter

A Shortage of Locomotives Aggravated by Causes Mainly Produced by Weather Conditions

PROBABLY THE ONE THING to which the inability of the railroads to meet fully the extraordinary demands which have been placed upon them during the past winter has been attributed most commonly is a shortage of locomotives. There has been a shortage of motive power and undoubtedly this has been due partly to an actual shortage of locomotives. It is true, however, that much of the difficulty which has been attributed to a shortage of locomotives, has been due directly or indirectly to conditions which more locomotives could not have overcome.

A study of the orders for locomotives placed annually during the last decade indicates that there is an actual shortage of locomotives. A comparison of the number of locomotives ordered during the years 1909 to 1913, inclusive, with the growth of traffic and locomotive mileage performance during those years, indicates that the orders were about normal. The average orders placed during that period were for about 3,600 locomotives per year, while in 1914 orders were placed for but 1,265 locomotives, and in 1915 for 1,612 locomotives. An improvement was shown in 1916, when about 2,900 locomotives were ordered, but the number fell off again by about 200 locomotives in 1917.

While the number of locomotives ordered in 1914 and 1915 was very small, it was not an undue reduction when considered in comparison with the actual business handled during those years. But it left the railroads unprepared, for the sudden and rapid increase in traffic which began during the fiscal year 1916 and has continued ever since, and the exceedingly slow deliveries which have been the general rule since have given the roads little opportunity to catch up. Furthermore, the conditions are not fully indicated by a study of data applying to the country as a whole, owing to the fact that the extraordinary increase in the amount of traffic handled during the past year has not been uniformly distributed. In a large measure it has fallen upon the railroads in the eastern section of the country, all of whose facilities have been strained far beyond the extent indicated by general averages.

The motive power shortage which has been so acute during the past winter has been due, however, much more to causes decreasing the capacity of the locomotives actually available, than directly to a shortage of locomotives. The past winter was the second through which the railroads have been operating under extraordinary traffic conditions. While a few roads were able to enter the winter with their power in better shape than it was just prior to the preceding winter, in general there was a lack of a normal reserve in the average condition of the locomotives of the country. The effect of the exceedingly severe weather conditions would have been dire even with all the power in the best possible condition.

Effect of Severe Winter

In considering this matter, it should not be overlooked that winter conditions always affect the capacity and efficiency of motive power in two ways: First, by decreasing the tonnage rating during storms and cold snaps; second, by materially increasing the number of engine failures. Without considering the effect of snow, which may decrease the hauling capacity anywhere from zero to 100 per cent, the low temperatures prevailing in the eastern section of the country, and even in some sections of the south usually but slightly affected by winter conditions, required a reduction

of 25 per cent and upwards in maximum train loading. Ordinarily, the aggregate loss of capacity to the railroads in the greater part of the country is not large from this cause because the heavily reduced ratings are in effect for comparatively short periods and but a few times in the course of the winter. During the past winter, however, extremely low temperatures prevailed over practically all of the eastern section of the country, where traffic conditions were densest, for the greater part of two months and the snow-storms rapidly succeeding each other necessitated even greater reductions in trainloading. It is therefore evident that even though operation had otherwise been normal, the effect of the winter must have been an abnormally large loss in locomotive capacity.

Anyone who has followed the course of locomotive failures has observed the marked increase in their number during the winter months, even under average winter conditions. That engine failures should increase far beyond the normal winter average during the past winter was inevitable, even with all other factors affecting the condition of motive power remaining normal. But other factors were not normal. The capacity of locomotive terminals was decreased; for several months there has been an excessive turnover of firemen, resulting in a large number of inexperienced men being in service during the past winter, and the railroads have suffered their full share of the difficulties incident to any attempt to make steam from the kind of coal mined last winter.

While there may have been but little, if any, actual decrease in the number of men employed in the maintenance of locomotives during the winter, there has been a sufficient loss of experienced mechanics to materially slow up the operation of locomotive terminals. Added to this was the disorganizing effect of two months of continuous winter weather conditions, unprecedented both in the severity of the cold and in the quantity and frequency of the snowfall. Not only was the efficiency of labor greatly reduced, but it was practically impossible to maintain the usual number of men in service, especially on the exceedingly important, but disagreeable outside work around engine terminals.

The delays to the movement of power at engine terminals caused by these conditions resulted in the freezing up of many locomotives and increased the amount of running repairs required. While it is not impossible to operate locomotives without freeze-ups under the most severe weather conditions, even where they must frequently be stored outdoors in the winter, such a result can only be attained at the price of eternal vigilance on the part of engine terminal forces accustomed to such weather conditions. Where such conditions are not ordinarily experienced, however, and where more or less inexperienced labor is employed, an excessive number of locomotive freeze-ups, resulting in broken cylinders, burst brake pipes, etc., is inevitable.

These conditions all resulted in decreasing the amount and condition of the power available for the use of the transportation department. All of them directly affected the mechanical department or operations under its control. There were unusual operating conditions which had either a direct influence on the effectiveness of the locomotives while in service or indirectly produced similar results by hindering the proper maintenance of the power.

For a year or more there has been an excessive turnover of firemen as a consequence of which there are a large

number of comparatively inexperienced men in the engine service of many roads. At any time such a condition is a handicap and it was unusually so last winter. Low temperatures and snow always increase the difficulty of maintaining steam pressure and become a severe test of the skill of the most experienced firemen, and coal to the uniformly low quality available last winter does not help matters any. A slowing down of train movement, a loss of engine capacity and an increase of engine failures can only be the result of such a combination.

A regulation of the Fuel Administration requiring railroads to use coal on a pro rata basis from all mines which they served had a disturbing influence upon the quality and grades of coal which some of them were able to obtain. In one case this increased the number of mines from which the road received its coal by several hundred and resulted in a loss of control over the distribution of the several kinds of coal mined in the district.

The exceptionally high traffic density prevailing on the eastern railroads for the past year has resulted in the utilization of yard and terminal facilities practically to capacity. But little additional burden was necessary to cause congestion at these points, which immediately resulted in a general slowing up of the traffic movement. The additional burden was supplied by the weather conditions. Again, one of the effects was a loss of motive power. The congestion at terminals caused long delays to trains waiting to enter the yards. Indeed, it has not been an uncommon occurrence for crews to be caught by the 16-hour law almost within sight of the home terminal. Every hour of delay on the road means one less hour for the locomotive in the hands of the mechanical department for needed attention, as well as a probability of a considerable increase in the amount of work required to keep the locomotive in good condition. Furthermore, the long delays to locomotives caught in the storms, which followed each other in such rapid succession, resulted in very rapid deterioration. In fact, as one railroad man expressed it, the best way to operate a railroad under such conditions is "to put the locomotives in the roundhouse and lock the doors" until the storm has subsided.

Getting Ready for Next Winter

The foregoing paragraphs indicate that there were many contributing causes other than an actual shortage of locomotives to the shortage of motive power which has been so keenly felt during the past winter, and that practically all of them had their origin in the unprecedented severity of the winter. With the smooth running of locomotive terminals and regularity of road operating conditions following the winter weather there is evident a general catching up on running repairs and a marked improvement in motive power condition so far as the present and immediate future are concerned. Probably the greatest immediate need for motive power is in yard service to facilitate the clearing of terminals of the accumulation of cars encroaching upon their working capacity.

In order that the railroads may enter next winter with an adequate reserve of power, however, it is probable that not less than 60 per cent of the locomotives of the country will require general overhauling within the next seven months. This is an unusually large program and its accomplishment will necessitate extraordinary effort and the most effective use of every available facility for locomotive repairs.

Of the greatest value in meeting this demand for repairs will be more stable labor conditions. The best information available indicates that the number of men employed in the maintenance of locomotives is larger now than it was a year ago, which is a hopeful sign for future output. This, together with a decrease in labor turnover, due to a gradual stabilizing of the demand for labor in all industries, a gen-

eral realization on the part of men employed in railroad work of the importance to the country of the work they have in hand in their present positions, and the confidence that they will receive full justice which should be inspired by the Railroad Administration's handling of the whole wage problem, undoubtedly will have a very beneficial effect in increasing the general efficiency of locomotive shop operations. The working of longer hours already has had its effect in many shops and as the plan of working becomes more generally adopted a material increase in the aggregate output of the railroad shops of the country may be confidently expected.

Many railroads do not have adequate facilities for taking care of their requirements for power for general overhauling even under normal conditions, and under the extraordinary demands upon shop facilities obtaining in the present situation, they are finding it impossible to bring their power back to a condition in which there will be a normal reserve with which to face another winter. While it is doubtful if there is any railroad with what actually may be considered a surplus of shop capacity, there are a number of railroads with such relatively large shop capacity that in the present emergency they are fully justified in helping out those roads which are less fortunate. The railroads have already taken advantage of such possibilities and at the present time over 100 locomotives are being repaired in shops other than those of the owning roads. Until recently, however, this matter has been handled in a haphazard manner. It is now in the hands of the Manager of the Locomotive Section of the Railway Administration, under whom, as pointed out elsewhere in this issue, the fullest advantage will be taken of the country's aggregate shop capacity.

As was indicated at the beginning of this discussion, the acute shortage of motive power obtaining during the winter may be attributed perhaps as much to an unusual decrease in the effectiveness of the locomotives already available, brought about by conditions which could not altogether be overcome by the addition of new locomotives, as to an actual shortage in the number of locomotives. The importance of bending every effort to putting existing locomotives back into the best possible condition is therefore evident.

There are in service a large number of locomotives built before the general adoption of the superheater. Many of these locomotives are still of too great economic value, even under normal conditions, to be retired from service. The added capacity which may be obtained by the conversion of these locomotives should not be overlooked in an attempt to keep down expenditures or to expedite the turning of power through the shops. For the additional expenditure of money and labor required to make the conversion, as much additional hauling capacity could not be obtained in any other way.

There will be little difficulty in using all of the new locomotives the builders can turn out this year. The builders will probably be able to turn out between 3,500 and 4,000 locomotives for domestic use during the year 1918, a number considerably more than 1,000 in excess of the number built for home railroads last year. These locomotives, the distribution of which will more closely conform to the actual local requirements for new power than has ordinarily been possible, will add materially to next winter's reserve.

Indeed with the added relief which smoother working and better co-ordinated traffic arrangements have already offered, there is every reason to believe that the railroads will be in a far better position to meet the essential demands of the country next winter than they were last. Just what the weather will do to transportation, the country can only wait and see. It is a safe assumption, however, that it has few terrors which we have not already experienced.

Government Control of Railway Traffic Departments

Abandonment of Solicitation and Advertising Among the Changes Introduced by New Regime

GOVERNMENT CONTROL OF RAILWAYS has had, and probably will continue to have, more far-reaching effects on the traffic departments than in any other branch of the railroad organizations. The big outstanding fact brought out by the assumption of the control of the carriers by the government is the unification of the transportation system of the country for operating purposes. This, added to a condition of superabundant traffic resulting from war conditions, made the continuance of freight and passenger solicitation questionable. On the other hand, it has been the general consensus of opinion that traffic representatives who have devoted their lives to the solicitation of competitive business cannot be lightly considered. While the situation has reached the point where the director-general has ordered the discontinuance of solicitation, it is the understanding of those in close touch with the Railroad Administration that every effort will be made to take care of the soliciting forces in other railroad work.

It has been pointed out by many traffic men that the elimination of solicitation will not in any way alter the necessity for informative work on the part of the traffic departments. In other words, under any method of operation the public will demand certain information in regard to fares, rates, routes, classifications, service, etc. According to the latest information all outside traffic agencies throughout the country will be closed and the informative work done by them will be taken over by resident lines. For this purpose it will probably be necessary for the local lines to employ agents of outside offices to take care of business destined to the territory with which their work has made them familiar. In the passenger field it seems to be the intention of the Railroad Administration to centralize all city ticket offices, thereby saving the expense of maintaining separate offices in choice locations in the larger cities. Up to the present time ticket offices in both Washington, D. C., and Atlanta, Ga., have been combined.

An expected corollary of the order to discontinue solicitation was the order to stop advertising. Although the railroad administration has not specified what it means by "advertising," a literal interpretation of its order would mean the discontinuance of all efforts to increase passenger travel and freight traffic through the medium of publicity. While it is generally understood that this order will mean the end of campaigns to encourage pleasure tours to national parks, national monuments, summer and winter resorts, it is not interpreted as meaning the discontinuance of agricultural and industrial development work carried on for the purpose of creating new sources of freight traffic. It is pointed out that the agricultural work carried on by the railroads is particularly valuable at the present time to increase the food production of the country during the war. The fruitful efforts of the roads in this direction last year are pointed to with justifiable pride. One of the advantages which it is hoped will develop from the elimination of competition is further attention on the part of the railroads to the needs of all their patrons regardless of their size and importance. Under competitive conditions the railroads necessarily gave the best service to the large shippers and undoubtedly in many instances the small shippers at local points suffered.

One of the most radical changes ushered in by the new regime is the re-schedule of passenger service between the large cities of the country, with absolute disregard of former competitive conditions and with the one purpose in view of reducing passenger service to the minimum in order to save

fuel and locomotives for the movement of freight traffic. While the Railroad Administration has caused the removal of a large number of trains throughout the country, and particularly in the East, the first case of the revision of the schedules of all railroads operating between two large cities was the rearrangement of service between Chicago and St. Louis, effective March 17. The new plan resulted in a reduction from 15 daily trains between the two cities to 9, more evenly distributed throughout the day. The plan also provides that tickets between these two points are interchangeable, thereby enabling passengers to use other roads if the train they intended to take is overcrowded. While the Railroad Administration has made no definite announcement to that effect, it seems to be the general opinion that passenger tickets throughout the country will be made interchangeable. The director-general's staff is now working on the re-schedule of train service between other large points in the country, and in the course of time, no doubt, passenger service will be reduced to the minimum needs of the traveling public.

There is considerable speculation as to the future of the various territorial rate committees. In view of the further elimination of competition between roads, the logic of the situation would seem to demand a further extension of the work of these bodies rather than a curtailment of their work. There is some study of the possibilities of creating superior regional rate committees to take care of the larger questions affecting the three railroad regions of the country. These committees as well as the territorial committees will undoubtedly consist of railroad traffic officers of prominence who will have more real authority than the present committees and will hold sessions whenever necessary to consider the applications and complaints of the shippers and consignees in their jurisdictions. Under the present arrangement the negative vote of one road will nullify any action under consideration by a committee. Under the new plan all questions will be determined by majority vote. Under the new plans, if worked out, it is probable that joint tariffs will be issued in much greater numbers than in the past, and this will call for increased activity on the part of the committees. This view seems to be reaffirmed by the plans the Railroad Administration is understood to be preparing for the routing of freight. These plans, it is believed, include the working out of routes in the main avenues of traffic without regard to any principles except such physical facts as distance, grade, the condition of roadbed and rails, etc. This will mean that company lines will be ignored and the business which individual roads have spent years to build up will go over the roads which can handle it most economically.

All in all, the effects of government control on the personnel and methods of the traffic departments of the American railroads have been most profound, but we are still in the transition period with many problems yet unsolved. It is therefore only possible to outline what has been done up to this time and to indicate the probable developments of the future. The Railroad Administration is working out these problems carefully and deliberately with the greatest possible deference to the continued stability of traffic, relationships and the rights of railroad employees and officers who have spent their lives in competitive activity. For this work Director-General McAdoo has selected some of the foremost traffic executives of the country to assist him, and it is unlikely that he will take any steps that are ill-advised or unsound.

Corporate and Operating Organizations Separated

THE POLICY OF THE RAILROAD ADMINISTRATION, that the corporate and the operating functions of the railways are to be distinctly separated under federal control of the roads, the corporate functions to be under the control of the companies and paid for out of the compensation to be guaranteed by the government for the use of the properties, and the operating functions to be under the control of the director general and his organization and paid for out of operating revenues, was more definitely indicated than it has been heretofore by a general order and a circular issued by Director General McAdoo on March 28 and March 30. The general order provides that the president of each company shall be treated as the principal executive authority in all matters of operation and that the chairmen of boards of directors, or of committees of boards of directors, shall not exercise functions connected with the operation of the roads under federal control. The circular expresses the opinion that the government ought not to pay the salaries and expenses of officers whose services are not reasonably required for the operation of the roads.

This idea was expressed in a general way in Circular No. 10 issued on March 18, which provided that after April 1 expenses of offices, including salaries, devoted to financial affairs as distinguished from operation, might not be charged to operating expenses except as expressly authorized. This circular applied particularly to the financial offices in New York and elsewhere but it was understood as indicating the separation which was to be made between corporate and operating functions. It provided, however, that each carrier should present a statement showing the amount of such expense which it was claimed should fairly be chargeable to the government, with the reasons therefor.

General Order No. 16 and circular No. 17 are more explicit in indicating the policy to be followed although no order is made except as to chairmen of boards or of executive committees. It is stated that the entire subject is still under consideration and that the government may charge back against the corporate funds of the company any amounts charged to operating expenses after April 1 which it does not consider are properly chargeable to operation. The circular applies not only to financial officers but to traffic officers, counsel, and practically retired officers who have been continued on a salary in recognition of past services. Many of the railroad companies have already given consideration to these questions and it is understood that arrangements have already been made to transfer a considerable number of officers from the operating to the corporate accounts.

The order and the circular are as follows:

General Order No. 16

"In the organization of the various carriers, some doubt appears at times to exist as to the extent to which, if at all, the executive authority in operating matters is divided between the president of the company and the chairman of its board of directors, or of some committee thereof.

"For the purpose of simplification and definiteness it is ordered that the president of each company shall be treated by the United States Railroad Administration as the company's principal executive authority (subject to the director general), in all matters of operation under federal control and that chairmen of boards of directors, or of committees thereof, shall not exercise functions connected with the operation of the railroads under federal control."

Circular No. 17

"The director general is of opinion that the government ought not to pay the salaries and office and traveling expenses of officers whose services are not reasonably required

for the operation of the railroads. It is, of course, evident that in the past the railroad companies, in establishing and maintaining their staffs of officers, have provided not only for the actual necessities of operation, but in addition have provided (a) for financial and corporate functions beyond what is necessarily connected with operation—for example, functions calling for chairmen of boards of directors and of executive committees, etc.; (b) for other activities in which the company may be lawfully engaged, but whose operation is not to be conducted by the government; (c) for operating functions which were natural when railroads were operated under the competitive system, but which are unnecessary under existing conditions—for example, traffic functions connected with the obtaining of traffic rather than with the giving of adequate and convenient information and assistance to the public; (d) for officers who have practically retired from service and whose salaries have been continued because of their past services rather than because of their need for current operation; (e) for counsel whose services have not been needed for the conduct of ordinary operating activities of the company but who to a large extent, if not entirely, have devoted themselves to matters of a corporate character; (for example, many of whom are now devoting themselves to the problems in connection with the making of the contracts with the government for the use of the railroads).

"It will be necessary for the government to make a careful study to determine the extent to which operating expenses under government control should be relieved of charges for the salaries and office and traveling expenses of officers not necessary to carry on operating functions, and this circular is to give notice that this subject is and will be under consideration, and that in clear cases the government may charge back against the company any amounts charged into operating expenses on and after April 1, 1918, for the salaries and office and traveling expenses of officers who are not required to conduct railroad operations.

"This policy will not affect the positions of any officers whom the company itself may desire to continue to pay out of its own funds, but who are not necessary to railroad operations.

"It is the purpose of the government to carry out the above policy in a reasonable and considerate way and not to disturb unnecessarily the operating forces of the railroads. In general it is anticipated that the rank and file of railroad officers are needed for the conduct of the company's business and that practically all railroad employees, as distinguished from officers, can be continued in service even though the offices in which they now work may no longer be continued. It is believed that the readjustment of operating charges above suggested will be called for almost, if not entirely, with reference to general officers of the character illustrated by clauses a to e, whose functions are not necessarily connected with operation."

GERMAN FREIGHT ROBBERIES CONTINUE.—According to an official statement in the Prussian Diet concerning robberies on the State railways during 1917, merchandise to the value of \$14,250,000 had been stolen from freight trains and depots alone. The Minister of Public Works said that in 1914 only \$1,175,000 worth of freight was stolen. In 1916 the amount rose to \$4,450,000, and by the end of 1917 it had increased by more than 300 per cent over the preceding year. Within a certain period, which the Minister did not detail, 1,343 ordinary civilians and 2,622 railway employees, mostly "National Service" recruits were punished for theft. The authorities, says the London Daily Mail, found themselves powerless to check the carnival of robbery. They were compelled to regard it as a "war evil" which time alone would eradicate. Meantime they were forced to acknowledge that the security of freight entrusted to the State railways could not be guaranteed.

Large Expenditures Needed for Maintenance of Way

There Has Been a Marked Deficiency in the Outlay for Upkeep;
Rail Renewals Are Far in Arrears

IT IS A MATTER OF COMMON KNOWLEDGE among railroad men that the present condition of railway tracks and structures in the United States is not in conformity with established standards. In other words, there is an appreciable amount of what is known as deferred maintenance. This is apparent to any seasoned traveler who has noticed the deterioration in the riding qualities of the tracks, even on some of the highest grade main lines—lines which in the past enjoyed reputations for smooth riding and perfection of upkeep. Such purely qualitative comments are of value only as indicating a general tendency, but on the other hand any attempt at a quantitative analysis of anything so intangible as a condition of maintenance is beset with serious difficulties. It is possible to make a detailed inspection of a given piece of track and prepare a reasonably exact estimate of what would be necessary to restore it to standard condition, but a similar study of the conditions throughout the country covering all classes of property, including main lines, and terminals as well, would lead nowhere.

There are, however, a few indexes which may be applied to indicate the relative condition of railway structures and roadways today as compared to what it has been in the past, and of such indications probably the most important is to be obtained by a study of the amount of money spent from year to year for maintenance of way by the railroads of the country. For this purpose, a table is given below showing the expenditures for maintenance of way with the total operating revenues for the years 1913 to 1917 inclusive, and a column showing the per cent of maintenance of way expenses to operating revenues.

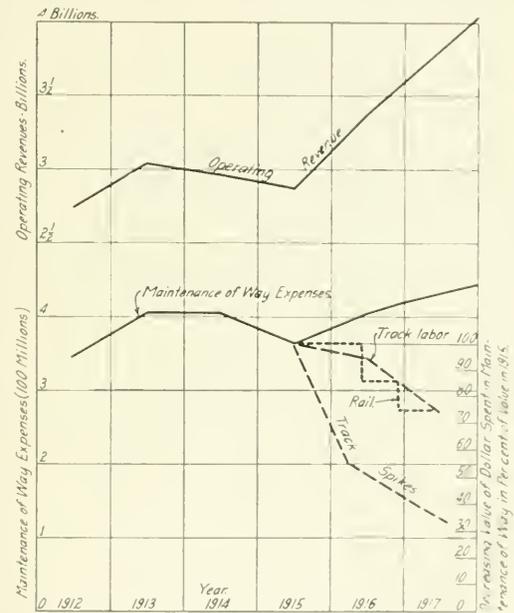
Year	Operating revenues	Expenditures for maintenance of way	
		Amount	Per cent of operating revenues
1912	\$2,744,342,277	\$348,470,704	12.7
1913	3,043,324,782	405,840,494	13.3
1914	2,969,898,838	403,682,593	13.6
1915	2,871,563,047	364,004,178	12.7
1916	3,381,945,764	404,554,315	12.0
1916*	3,592,591,023	421,193,640	11.7
1917*	4,041,914,239	444,458,855	11.0

*Calendar year, all others are for the fiscal year ending June 30.

Operating revenues are given here because of the relatively simple ratio they bear to the traffic carried by the tracks. From an examination of the table it is seen that the percentage relation of the maintenance of way expenditures to operating revenues has decreased from 13.6 per cent in 1914 to 11.0 per cent in 1917. Many of the items making up maintenance of way expenditures are independent of the volume of traffic, so that it is not to be expected that expenditures for maintenance will vary in direct proportion to the amount of traffic carried. Consequently, the decrease in relative proportion of maintenance expenditures from 13.6 per cent to 11.0 per cent, as noted above, is not in itself indicative of any deficiency in the expenditures, were it not for the unfortunate fact that the value of a dollar suffered a remarkable decrease during the period in question.

This is demonstrated in the diagram on which the gross operating revenues have been plotted in relation to the maintenance of way expenditures. Superficially this shows that the maintenance expenditures have increased and decreased relatively from year to year with the variation in the revenues, but to a somewhat less pronounced extent. However, this does not take into account the reduction in the purchasing power of the dollar expended, and to introduce this into

the comparison the three dotted lines have been added which show the reduction in the purchase value of the dollar in procuring three commodities typical of maintenance of way expenditures, namely: rails, track spikes and labor. These are expressed in percentages, taking the quantity that a dollar would purchase of each of these commodities in 1915 as 100 per cent. In the case of rails and track spikes the figures are based on the current quotations, while in the case



Relation of Maintenance of Way Expenditures to Operating Revenues with Indexes of the Decreasing Purchase Power of a Dollar

of labor the computations were based on the average hourly rates paid by a middle-western railroad for section laborers in typical rural communities.

These examples are given merely as indicating tendencies and it is not to be expected that these decreasing percentages may be applied directly to the expenditure for maintenance of way to determine the relative amount of effective work done in 1917 as compared to 1914. Nevertheless they give some indication of the decrease in the effectiveness of the expenditures made.

Rail Renewals

As rails form the all-important part of the track structure and as their purchase constitutes one of the large items of expense in maintenance of way, a study of rail purchases furnishes another insight into general maintenance conditions. However, a comparison of the rail renewals in any two years does not necessarily furnish a conclusive indication of the relative degree to which the tracks are being restored to standard condition, since a certain part of the tonnage has been purchased each year to be used in or as

an indirect result of newly constructed lines. Neither is it entirely safe to compare rail renewals from year to year with the traffic (operating revenues) or mileage because the increase in wheel loads, the use of heavier rail sections, and the change from Bessemer to open hearth rails, have without doubt produced some material modification in the relation of traffic to rail wear.

With these limitations in mind, attention is directed to the table given below which shows the tonnage of rails pur-

were depressed in 1914, were curtailed at least in a measure from what good judgment would have indicated as requisite for adequate maintenance, if the money had been available. Some indication of this tendency may be had by studying the last column in the table, which shows the number of dollars of gross earnings per ton of rails purchased. It is seen that this amount ranged between \$586 and \$785 in all the years from 1897 to 1907 with the exception of the single year of 1904, while between 1908 and 1913 this same quantity averaged well above \$1,000 and was more than \$1,500 throughout 1914, 1915 and 1916. This shows that insofar as earnings were concerned, rails were purchased in larger proportion in earlier years, although it must be remembered that new mileage entered somewhat more largely into consideration during former years that it has more recently. However, in spite of these uncertainties the fact remains that on the most liberal basis the rail renewals at the present time are seriously in arrears without any consideration of 1917, for which statistics are not yet available.

CONSUMPTION OF RAILS, TOTAL MILEAGE AND GROSS EARNINGS

Year	Tonnage of rails used	Total mileage	Gross earnings	Gross earnings per ton of rails consumed
1893	1,119,470	221,863	\$1,220,751,874	1,090
1894	1,008,516	229,795	1,073,361,797	1,064
1895	1,291,983	233,275	1,075,371,462	832
1896	1,056,675	239,140	1,150,169,376	1,088
1897	1,500,086	242,013	1,122,089,773	748
1898	1,679,538	245,333	1,247,325,621	742
1899	1,997,120	250,142	1,313,610,118	658
1900	2,025,511	258,784	1,487,044,814	734
1901	2,557,588	265,352	1,588,526,037	621
1902	2,943,789	274,195	1,726,380,267	586
1903	3,057,195	283,821	1,990,846,907	621
1904	1,906,237	297,073	1,975,174,091	1,036
1905	3,098,184	306,796	2,082,482,406	672
1906	3,654,794	317,083	2,325,765,167	636
1907	3,298,500	327,975	2,589,105,578	785
1908	1,726,224	333,645	2,440,638,832	1,413
1909	2,725,847	342,351	2,473,205,301	907
1910	3,290,712	351,766	2,812,141,575	854
1911	2,405,330	362,824	2,852,854,721	1,186
1912	2,885,222	371,237	2,906,415,869	1,007
1913	3,052,635	379,508	3,208,427,649	1,051
1914	1,792,986	387,208	3,127,729,588	1,744
1915	1,891,349	391,141	3,994,055,110	1,583
1916	2,340,468	394,944	3,625,252,371	1,549

General Conditions

Aside from any attempt at mathematical demonstration, the general deficiency in maintenance of way is manifested in various ways. With the growing scarcity and increased cost of labor, it is obvious that a large number of inexperienced and inefficient men have been employed in maintenance work, so that aside from the decreased value of a dollar in the purchase of hours of labor, there is no question but that the roads received less effective output for each hour of labor purchased. Shortage of materials and difficulty in securing delivery has also had some effect in slowing up work, although as a general rule the shortage of labor has been the most serious difficulty.

As a climax to the adverse conditions, the winter of 1917-1918 added not a little to the troubles of the men responsible for the condition of track. Going into the winter with the tracks in none too good condition to withstand low temperature conditions, the Middle West and the East experienced unusually severe winters. In some localities the severity of the storms and the prolonged low temperatures have not been equalled in a great many years, while added to all these adverse circumstances, most lines have been compelled to carry a traffic exceeding anything previously imposed. The fact that some of the lines have stood up as well as they have under the enormous traffic, in spite of the inadequate maintenance, is owing to the high standards of condition in which they had been kept previous to the present emergency. However, there is a definite limit to the time that the track may be neglected with safety and the penalty which must be paid as a result of this neglect, coupled with the burden of heavy traffic is now becoming manifest. There is only one cure for this condition—increased expenditures for maintenance of way.

chased by the railroads between 1893 and 1916 inclusive, in comparison with the total mileage of all tracks and the gross earnings. Considering the tonnage of rail purchases alone, it is seen that the rails purchased in 1914, 1915 and 1916 aggregated 6,024,803 tons, which is less by 1,717,980 tons than the tonnage purchased in any three consecutive years since 1902. The average for the three years 1914, 1915 and 1916 is only 2,008,268 tons as compared with an average of 2,837,055 tons for the years 1902 to 1913 inclusive. Assuming that this average represents a fulfillment of normal requirements and allowing for the 20 per cent increase in the mileage of tracks since 1907, the mid-year of this period, it is seen that rail renewals in 1914, 1915 and 1916 were deficient by 4,000,000 tons.

The chances are that the deficiency in rail renewals is really greater than this, as there is reason to believe that rail renewals from 1908 to 1913, during which railway finances were gradually approaching the condition to which they



Central News Photo Service.

Something New in Light Railway Cars

Can the Freight Car Situation Be Improved?

Many New Cars Will Be Built, But the Maintenance Problem Is Exceedingly Serious

THE RAILROADS OF THE UNITED STATES entered the year 1918 with the greatest number of unfilled car orders ever reported at that season. During the first months of the year the roads struggled with the worst weather conditions they had ever experienced. The movement of traffic was hindered by the severe storms and freight accumulated on the originating lines. As a result the shortage of cars is now even more acute than it was at the corresponding time last year. The excess of unfilled car orders over surplus cars on March 1 was 138,102, which is more than 8,000 greater than the shortage for the same date last year, and with the exception of three months, April, May and November, 1917, is the greatest net shortage on record. The demand for cars is not confined to any particular class of equipment but the shortage of box cars in the middle west is particularly serious as it threatens to result in the loss of large quantities of food-stuffs which are in such condition that they will spoil unless marketed at once.

For more than a year and a half the unfilled demands for cars have been in excess of the number of surplus cars. Though the need for additional facilities has been universally recognized the roads have not been able to secure the capital necessary to provide the equipment. Despite the fact that there was a shortage of cars throughout 1917, the number ordered during that year was less than for any previous year since 1906. The capacity and efficiency of the transportation system are of vital importance during the period of the war. The supply of cars has an important influence on the ability of the roads to handle the traffic that is offered to them. At present the supply of cars is not sufficient to meet the demand. What are the prospects for the future?

From present indications it seems likely that more new cars will be placed in service on the railroads of this country during the present year than they have received in any year since 1912. The Railroad Administration has announced that orders will soon be placed for 100,000 cars. The builders are now in a position to make prompt deliveries. They have comparatively few cars on order and while the material situation has caused some delay in deliveries during the past six months, the conditions at the present time are such that little difficulty should be experienced on account of inability to secure either wood or steel. Reports received from the railroads indicate that while some intend to keep the entire force of car men on repair work, the aggregate number of cars built in company shops will probably be as great in 1918 as it was in 1917. It seems reasonable to anticipate that 200,000 new freight cars can be supplied to the roads this year. This amount of new equipment will do much toward improving the situation as far as car shortage is concerned. However, unless additional tracks, motive power and terminal facilities are provided, an increase in the number of cars will do little to improve the operating conditions and in fact may make them worse.

Even though an exceptionally large number of new cars may be built the greater part of the business must be handled by the equipment now in service. For that reason the condition of the existing rolling stock is quite as important as the amount of new equipment that can be secured. The great increase in the ton miles per car during the last two years has made more than the usual amount of repairs necessary to keep the equipment in good condition. The track has deteriorated during the past year and the abnor-

mally bad condition has had its effect in increasing the wear and tear on rolling stock, besides causing an unusual amount of damage through derailments. There has been a widespread shortage of labor in the car department and the output has been still further reduced by the extreme cold weather. One road, for instance, reported that in a single month the shopmen at one of the large repair points spent over 9,000 ten-hour days shoveling snow and cleaning switches. The result has been that car repairs have of necessity been neglected.

The equipment is far from being in good condition. The draft gear and other parts which must be kept up if the cars are to remain in service are getting most of the attention. Doors and roofs are neglected to such an extent that it is difficult to get cars fit to load with high class commodities. One of the large eastern lines reported that in 30 days it had 200 truck failures due to such minor defects as nuts working off, cotter pins falling out and brake beams dropping. Care in the application of the parts would have prevented these costly failures. The repairs to air brakes are neglected to an extent that makes it necessary to use extra precautions on heavy grade lines. Such a condition should not be allowed to exist as it creates a possibility for serious accidents. Under the car service rules now in effect cars may stay off the tracks of the owning roads for long periods. As a result work which is usually done at regular intervals by the owner is neglected by the handling line because it cannot readily do it. It is seldom that a car is completely repainted except when on the home road. A great deal of steel equipment is now badly in need of painting and unless this is attended to promptly deterioration of the equipment is sure to be rapid.

The condition of equipment is not reflected by the percentage of cars in shop, which is practically the same as last year. For some time every effort has been put forth to move the traffic. The shippers have been willing to load any car that was placed on their tracks regardless of its condition and the railroads have accepted cars which formerly would not have been allowed to pass in interchange. These tendencies cannot go on indefinitely. Unless the equipment is maintained in good condition there will be a large increase in the losses in transit and if carried too far safety of operation will be sacrificed.

The repair work of the car department does not lend itself well to the application of machinery or improved methods, therefore, the question of car repair is largely a matter of securing the proper kind of laborers in sufficient numbers. The conditions vary widely in different sections of the country but on nearly every road there is now a marked shortage of car repairers. The wage increases on the railroads have not kept pace with the advances on other lines of work and in some places common laborers are paid practically the same rate as car repairers. In many sections the wages paid to laborers on the car department are far lower than in most industries. For instance in one southern district the rate for laborers in the car department was 22 cents an hour while the prevailing wage scale among industries and contractors was 30 cents. The result was that the railroad secured an inferior class of labor and was often unable to maintain a full force. To what extent the increases which will be authorized by the wage commission will improve the labor situation it is impossible to state. The working conditions in many car yards are far from ideal. Better

facilities would increase the production per man and make it easier to keep up the force.

Since the government assumed control of the roads the status of the M. C. B. rules of interchange has been radically changed. As it is really the government that does all the work and pays all the bills there is really no necessity for keeping a record of repairs, except as it may affect private car lines or the railroads of Canada and Mexico. It has been suggested that the labor involved in making bills for repairs and in settling the charges might be reduced by establishing regional billing departments. Some have favored even more radical measures and advocated that the rules be suspended for the period of the war. It seems, however, that this would be a step in the wrong direction. The M. C. B. code of interchange rules performs the important function of distributing the cost of equipment maintenance on an equitable basis between the roads.

Aside from this the enforcement of the rules insures that unsafe practices will not be adopted in the construction, repair or operation of cars. Those responsible for the operation of the roads cannot afford to do away with regulations which promote safety. If no record of repairs were kept it would be a difficult matter to insure that every one lived up to the provision of the M. C. B. code. There is no question that some of the rules might well be modified to take care of the changed conditions. For instance, Rule 120, as it now stands, provides that if the labor cost of making repairs to cars, for which the owner is responsible, exceeds a certain fixed amount, varying with the type of car, authority must be secured from the owner before the car is repaired. Under the present conditions no road would attempt to repair a car which would not be worth the labor and material spent upon it, and the work would be expedited if the handling line was not required to secure authority before proceeding with the repairs.

Many cars of weak construction have been given a new lease of life by reinforcement of members which could not meet the requirements of modern service. A great deal still remains to be done along this line. The work of reinforcing cars should be kept up as it offers an opportunity to in-

crease the serviceable equipment at a comparatively small cost. It is impracticable to attempt to reinforce cars except in the shops of the home road and unrestricted routing of cars will hamper the work. Although everything possible should be done toward strengthening cars, most roads will find this an inopportune time to attempt to carry out an ambitious program for the reinforcing of weak equipment. One large road in the middle west had planned to put steel underframes on about 1,000 cars. There was some delay in securing delivery and when the underframes were received the equipment was so scattered that very few cars of the classes that were to be reinforced could be found on the home lines. The records showed that there were 89 per cent of foreign cars on the road. As this is apt to increase rather than diminish, the betterment work will necessarily proceed but slowly.

The high percentage of foreign equipment on the lines promises to make the car repair problem increasingly difficult. The shop men are familiar with the equipment of the home road and on many classes of work their production when working on foreign cars will show a considerable decrease. The forces should be increased to bring the output up to the point where equipment with which the men are not familiar, as well as that owned by the roads on which they work, will be properly maintained. It is, of course, essential that all in the car department, as in all other departments, should realize that the roads are now a unit, and that there are no longer any foreign cars in the formerly accepted sense of the word.

Government control of the roads introduces new conditions in the car department. To meet these conditions successfully will require men who are resourceful and energetic, men who realize what the new order of things means and can act accordingly. Some are still clinging to the practices of former years and in making repairs are giving preference to cars belonging to the roads for which they work. This attitude must change. Every man in the car department must do his part to keep up the condition of all equipment regardless of ownership marks in order that every car may do its share toward producing the maximum of transportation efficiency.



Central News Photo Service.

British Infantry En Route for the Front Line

New Embargo Instructions and Car Service Bulletins

THE CAR SERVICE SECTION of the Railroad Administration has issued circular No. C. S. 1-A, a revision of circular No. C. S. 1, dated February 11, 1918, containing the following new instructions to be observed in the handling of embargoes. These instructions supplement and do not supersede those contained in General Order No. C. S. 17, dated January 15, 1918, which was issued by the Commission on Car Service.

1. Place embargo without delay against consignees who do not unload freight promptly upon arrival.

2. When other than an absolute embargo is placed:

(a) Exemptions must include as many of items in paragraph 6 as circumstances warrant.

(b) Such exemptions must be in the order listed.

(c) When necessary to place embargo varying from these provisions request, with supporting detail, must first be submitted to the Car Service Section for approval.

(d) Freight for export via ocean vessels or domestic freight for port cities and their outlying terminals shall be subject to the rules and regulations of the freight traffic committees having jurisdiction over such traffic, also subject to requirements with respect to export licenses as provided for in Car Service Section Circular No. C. S. 2 of February 15, 1918, or supplements thereto.

The committees already created are: Freight Traffic Committee, North Atlantic Ports, 141 Broadway, New York City; Southern Export Committee, Healy Building, Atlanta, Ga.

It is understood that permits for export traffic will be honored against all except general embargoes, or where specifically restricted: also that permits will not be issued for domestic traffic to port cities if such permits are in conflict with outstanding embargoes.

3. It should be understood that an embargo placed against carload freight includes less carload shipments which are ordinarily forwarded in carload lots.

4. Cars must not be loaded in violation of embargoes. When shippers disregard embargoes, agents must not issue bills of lading, and cars will be held at points of origin, subject to current demurrage charges, until released.

5. The instructions herein contained do not in any way authorize preference in car supply for freight exempted from embargoes.

6. Exempted commodities (code word in italics).

Embassy.—(a) Live stock, perishable.

Emblem.—(b) Coal, coke and charcoal; acids, alcohol, ammoniacal liquor, light oil (benzol and toluol), naphthalin, petroleum and its products; empty tank cars; empty metal, glass, or jacketed oil, acid, gas or ammonia containers.

Embank.—(c) Food, domestic (not export), for human consumption, including wheat, corn, oats, rye, barley, rice, cereal products, salt, canned goods, sugar, syrup, molasses, peanuts, vegetable oils and lard substitutes; feed, domestic (not export), for animals and poultry, not including hay and straw.

Embower.—(d) Materials consigned to the United States Government or its authorized agents or officers, including: The Public Printer; the Bureau of Engraving and Printing; the Post Office Department; *the War Department (Army); the Navy Department, navy yards and naval stations; the marine corps; shipments consigned to or for account of the United States Shipping Board, Emergency Fleet Corporation; shipments to the American Red Cross; the Imperial Munitions Board of Canada.

*Note.—Shipments for the War Department, destined to points named in Section 1 of Order No. 2, issued by the Director of Inland Transportation, War Department, Feb-

ruary 18, 1918, will be handled in accordance with the terms of that order.

Embass.—(e) Railroad material and supplies (other than coal and coke) consigned to an officer of the purchasing road at a point on such road, materials and supplies for the maintenance and operation of Pullman cars, materials and supplies consigned to locomotive and car manufacturers for the construction and repair of locomotives and freight and passenger cars.

Emberd.—(f) Printing paper and printing ink, empty ink drums.

Embolden.—(g) Acetate of lime, acetone, methyl acetone, chemical wood, ketone, carbide, carbon black, chrome, graphite, manganese, pyrites ores, copper, lead zinc, fertilizer, fertilizer materials, including agricultural lime, pulverized limestone phosphate rock, fuller's earth, liquid chlorine, alum, sulphate of iron and similar chemicals when to be used for purification of public water supply, and when consigned to municipal authorities, medicines, drugs, surgical instruments, surgical dressings, spraying materials, including arsenic (basis for insecticide), and implements for spraying, sulphur, tanners' extract, agricultural implements and farm machinery required for preparing the soil, binder twine, canning machinery, electrodes for smelting purposes, field and garden seeds, seed grain, nursery stock, food containers, laundry soap and soap powder, mine props, mine wagons, powder, and other materials and supplies necessary in the operation of coal mines, supplies for oil refineries, scrap and waste paper and other scrap stock for paper manufacture when consigned direct to paper mills or paper manufacturers, supplies for oil and natural gas wells, tin plate for manufacture of tin cans, wood pulp.

Distribution of Cars

The car service section has also issued the following bulletins regarding the distribution of cars:

"Please cancel any conflicting instructions, and effective at once discontinue the use of A. R. T. and D. S. D. refrigerator cars for packing house products. Deliver all A. R. T. and D. S. D. cars released west of Missouri river to D. & R. G. Deliver all such cars released east of the Missouri river to the Wabash and Missouri Pacific, except cars released on Texas lines, including M. K. & T. System and St. L. S. W. System, which will be delivered to the I. & G. N.

"Wabash, Missouri Pacific, and I. & G. N. railways will accept out of route all A. R. T. and D. S. D. cars via any junction point. Cars released by roads having no direct connection with these roads will route via direct lines, who will arrange for acceptance. Prompt movement is necessary to get these cars into Texas territory for the immediate protection of vegetables. We are advising railroads direct."

"The prospects are favorable for a large vegetable and fruit crop, and an unusually heavy movement of meat and dairy products. All available refrigerator, insulated and ventilated cars will be required for this loading, and it is therefore important that the use of these cars be confined strictly to the loading of commodities which require this class of equipment. Also that all such cars available be kept in constant service.

"Any railroad having at any time a surplus will report same to the Car Service Section in order that such surplus may be directed to territory where assistance is necessary in order to move food-stuffs which otherwise cannot be taken care of."

"Reports from potato loading territory are to the effect that there is in general a sufficient supply of refrigerator cars to meet requirements. Please cancel all restrictions against the application of railroad owned cars for packing house product loading, except Great Northern, Northern Pacific, Soo Line and Illinois Central refrigerator cars.

which should continue to go to owners. This arrangement does not change instructions that Pacific Fruit Express cars move to Union Pacific, American Refrigerator Transit and D. S. D. cars to Mo. Pac. and I. & G. N., Union Refrigerator Transit cars in banana service (series 1000 to 1999) to Illinois Central and Mobile & Ohio, and other U. R. T. cars to Wisconsin roads. Please also arrange that S. F. R. D. cars shall go to the Santa Fe; that F. R. L. cars shall go to the Frisco, Mo. Pac. or I. & G. N. for Texas; and that F. G. E. cars be returned to A. C. L. and S. A. L. for fruit and vegetable loading in Florida."

Director General McAdoo Authorized to Represent President

PRESIDENT WILSON on April 1 issued a proclamation formally vesting in Director General W. G. McAdoo authority to make agreements with the railroad companies for the compensation for the use of their property during government control and otherwise to represent the President as provided for in the railroad control law approved on March 21. The proclamation authorizes Mr. McAdoo "either personally or through such divisions, agencies, or persons as he may appoint, and in his own name or in the name of such divisions, agencies or persons, or in the name of the President, to agree with the carriers, or any of them, or with any other person in interest, upon the amount of compensation to be paid pursuant to law, and to sign, seal and deliver in his own name, or in the name of the President, or in the name of the United States, such agreements as may be necessary and expedient with the several carriers or other persons in interest respecting compensation, or any other matter concerning which it may be necessary or expedient to deal, and to make any and all contracts, agreements, or obligations necessary or expedient, and to issue any and all orders which may in any way be found necessary and expedient in connection with the federal control of systems of transportation, railroads and inland waterways, as fully in all respects as the President is authorized to do, and generally to do and perform all and singular all acts and things and to exercise all and singular the powers and duties which in and by the said Act, or any other Act in relation to the subject hereof, the President is authorized to do and perform."

Negotiations are still in progress between the counsel for the railroad companies and the legal department of the Railroad Administration regarding a standard form of contract agreement for the compensation of the companies for the use of their property. A proposed form of contract was first drawn by John Barton Payne, general counsel; Nathan Matthews, assistant to the general counsel; and C. A. Prouty, director of the division of public service and accounting of the Railroad Administration, with the co-operation of a committee including Commissioners Hall, Meyer, Clark and Anderson of the Interstate Commerce Commission. This was placed before the railway counsel and they in turn drafted another proposed form which was submitted on March 23, through a sub-committee headed by Alfred P. Thom, counsel for the Railway Executives' Advisory Committee, and including A. H. Harris, of the New York Central; George Stuart Patterson, of the Pennsylvania; C. W. Bunn, of the Northern Pacific; S. T. Bledsoe, of the Atchison, Topeka & Santa Fe, and Burton Hanson, of the Chicago, Milwaukee & St. Paul. A joint conference between the representatives of the Railroad Administration and the Interstate Commerce Commission committee and the railroad committee was held last Thursday to discuss details of the proposed contract and further conferences will be held.

Milton H. Smith, president of the Louisville & Nashville,

has denied a report that his company would not enter upon an agreement with the government but would appeal to the courts to fix its compensation. He said that a resolution authorizing an agreement upon the terms proposed by President Wilson had been prepared for presentation to the stockholders on April 3.

State Commissioner for Unqualified Support of McAdoo

AT A SPECIAL PATRIOTIC MEETING of the Pacific Railway Club at San Francisco, Cal., on February 14, the proceedings of which were briefly noted in the *Railway Age* of March 1, page 473, Edwin O. Edgerton, railroad commissioner of California, declared himself in favor of unqualified support of the United States Railroad Administration. He deplored the attitude of certain state commissioners who brought political influence to bear upon Congress in an effort to secure an amendment to the administration's railroad bill whereby the state commissions in every state might issue mandatory orders binding upon the director general as well as upon the railroads. He said that such a course would have immediately plunged the country back into the difficulties under which it was laboring when the government took over the railroads. "In such a great emergency as this," he said, "these regulatory laws do not accomplish their purpose and it would be a fatal error for Congress to inject into the law, or pass any measures that restrict the full power of the director general in running the railroads."

Mr. Edgerton was likewise opposed to giving the Interstate Commerce Commission the final voice in rates. He stated that government control would bring new problems which might require the fixing of new rates promptly and that to force upon the director general a hearing before making such changes would be fatal to effectiveness.

Explaining his own attitude as a state commissioner, he said: "If I see fit to express an opinion to the director general, I shall feel free to do so just as any railroad man should feel free to do. If he does not accept the advice I propose to line up with his decision. I propose to obey promptly any order that the director general may issue. I feel so strongly on that subject—that if the power of the state is retained, it is my judgment that it is the duty of the states to line up with the orders or suggestions of the director general. My conception is that the railroad problem is a national problem. I do not believe it is a state problem. The operations of railroads are so inter-connected, even in state movements, that they can be dealt with only as a national problem, and the whole authority should be centered in one place and under one man. . . . It would seem to me that one organization, one great system, under one control ought to be able to handle the huge job before it better than many separate organizations under many separate heads."

At the same meeting W. S. Palmer, president and general manager of the Northwestern Pacific, called upon all railroad men to get behind the director general and the government and work as they have never worked before to the end that the war may be won. He said there was no room at the present time for such labor-wasting laws as the full crew bill, and on this point said: "Why expend money uselessly to provide positions in the service when man power is needed elsewhere? As to the safety feature: I will only suggest that the annual wage of every extra brakeman employed under such law would equip at least two miles of track with automatic block signals; that the extra money paid under such regulation, since the first of such laws was enacted, would have equipped nearly every main trunk line in the United States with automatic block signals, and the additional safety gained over that secured by the employment of such men

would have been a thousandfold. Once installed, their value continued indefinitely, whereas, when the wage was paid, the service was ended."

He also stated that many branch lines in the United States should be abandoned in the interest of the conservation of cars, motive power and men. Highway motor car service, he stated, would suffice for these communities.

"Now that the stimulus of competition and the necessity for hunting traffic has been in a measure removed," he said, "the traffic people are in a position to exercise what has always been one of their chief functions. They form the intelligence department of the railroads. They come in contact with the public. They meet the shippers; they are in a position to educate them—to prove to them that transportation agencies are anxious to work with them and for them, and that they must drop the selfish motives which have underlain much of their reluctance to comply with regulations the enforcement of which would ultimately result to their own benefit. They must teach the doctrine of the greatest good to the greatest number. Shippers must show their patriotism by enabling the railroad men to double or quadruple the loaded mileage of their cars, to rapidly unload and load cars placed at their establishments to avoid concentration of their shipments in certain seasons."

Professor D. M. Folsom, chairman of the oil committee of the Federal Fuel Administration, addressed the club on the need for fuel conservation on the railroads. He pointed out that California had reached its maximum production of oil and that out of 8,000 oil wells in the state 2,000 were required to furnish fuel for railroads terminating in California.

Government-Owned Telephones in Tokyo Ten Years Behind Demands

GOVERNMENT OWNERSHIP of telephones is working out so far from well in Japan that at the present time there are 50 per cent more people waiting to have their telephone service put in than there are subscribers. The authorities hope to catch up with the demand by 1929—in not less than 10 years. In the meantime telephone brokers have bought up such telephones as are available, and any one who really must have a telephone in a hurry can obtain one for from \$575 to \$500. These facts are taken from the Japan Times and were forwarded for publication in Commerce Reports by Consul General George H. Seidmore at Yokohama. His extract follows:

The number of telephone instruments installed in Tokyo is 45,000. The number of persons who have applied for installations is now 60,000, and will continue to increase. An officer of the department of communications has stated that the authorities are of the opinion that it will be possible to satisfy everyone of these applicants within 10 years, not a very brief period. He was unable to give concrete plans of the government, since they are subject to revision in accordance with any change of conditions in the city. The government, however, is at least resolved to meet the demand within about 10 years.

In order to satisfy the demand for telephones it will be necessary to treble or quadruple the present number of new installations, which calls for great effort on the part of the authorities.

There are many reasons why the telephone system of Japan has so much trouble in meeting the demand. In providing for the expense consideration must be given to the time best suited for the flotation of loans. Thus it is impossible to obtain the capital at will, and work is postponed whenever the money market is hard. There is also the question of employees. Since the work involves the handling of delicate mechanism, experience and efficiency are necessary before the workmen can do the work satisfactorily. The shortage of hands naturally delays installation. The exchange apparatus used in Japan is imported, and being made for foreign operators, is rather too high or too wide for the Japanese telephone girls, so that its full working capacity can not be attained.

These conditions do not exist in other countries. There is no other city where there is such an accumulation of applications. Tokyo has only 2 telephones to 100 persons, whereas the city of Chicago maintains 20 to 100 population. Elsewhere there are no telephone dealers who make a profit on telephone transactions as in Japan.

The telephone is a government monopoly in Japan, and if the government transacted the business itself, these brokers would be unnecessary; but as it is they are necessary evil. The establishment of this brokerage market has brought telephones, like company stock, on the exchange. Like the stock-market price riggers, the telephone dealers attempt various manipulations to bolster the prices.

Tokyo is not the only place where such leaders are active, and they may be seen in all the large cities of the country, especially in Osaka, where prices even higher than in Tokyo are often quoted. Today a good call number costs more than 1,000 yen (\$498.50), while the minimum may be said to be about 750 to \$300 yen (\$74 to \$399).



UNCLE SAM—"Here's a SCRAP o' PAPER He Won't Destroy in a Hurry"

SHORTEN THE WAR—The sooner the irresistible might of this great republic is organized and put into full action the sooner the war will end. Every dollar invested in government securities works to shorten the war, to save the lives of American soldiers and sailors. Buy Liberty Bonds.

General News Department

Angus D. McDonald, vice-president and comptroller, southern Pacific Company, has been temporarily detailed to Washington as acting treasurer for the Railroad Administration under immediate supervision of the director of finance and purchases.

Three thousand six hundred gardens, averaging one-half acre each in size, were cultivated on the Burlington road's right-of-way, last year; and the company has distributed posters urging employees and the public to utilize the idle land of the company for war gardens again this year.

Economy in Using Fuel Oil is recognized on the Southern Pacific, Pacific system, by a distinctive mark, on the locomotive, of each class, which makes the best showing on its division. This decoration consists of bright red paint on the circular number plate which is borne on the front of the boiler.

Medals, recognizing 25 years of acceptable service, are now worn, or at least possessed, by 3,887 employees of the Southern Railway. President Fairfax Harrison has just made the third annual distribution, giving medals to employees who have completed 25 years' service since the last preceding distribution.

The existing standard time zones have been recognized by the Interstate Commerce Commission. Under the Daylight Saving Law the commission was required to define the limits of the five zones in which should be used, respectively, the times of the 75th, 90th, 105th, 120th and 150th meridians; but there was not time, before the day on which the law went into effect, to do other than recognize the existing limits; and that has been done. The 150th meridian is the standard for all Alaska.

Herbert A. Meyer, assistant to F. K. Lane, Secretary of the Interior, who has had charge (at Washington) of affairs in connection with the construction of the government railroad in Alaska, has been commissioned as a captain in the aviation branch of the Signal Corps and assigned to active duty in the field. The duties performed by Mr. Meyer in the Interior Department will be handled by Assistant to the Secretary E. C. Bradley.

The Rock Island Lines report an excellent record for increased carloading in the year 1917 as the result of an educational campaign among shippers and railroad employees. The net increase per car in all commodities was 20.5 per cent for the year, as compared with 1916. The average load per car was 51,800 lb., compared with 43,000 lb. in 1916 and 43,000 lb. in 1915. This includes all commodities loaded on the Rock Island lines. The increase in the loading of flour was 14.6 per cent.

Holdings of Oil Laws must be reported by railroads, in accordance with a circular which has been issued by Director General W. G. McAdoe. This circular calls for information concerning lands, wells and operations in which railroads have any direct or indirect interest; the estimated quantity of crude oil that could be produced within one year from April 1, 1918; the number of wells in operation, estimated cost of additional development necessary to obtain greatest production, proportion of present production used by respondent for fuel purposes, and otherwise disposed of, and other details.

The Train Despatchers' Bulletin for March conveys the news that a rival association of train despatchers is being formed. The Train Despatchers' Association of America, of which the Bulletin is the organ, is devoted to the improvement of the service and has a constitution which forbids strikes. The rival association, spoken of as the Western Train Despatchers' Association, came to the notice of the editor of the Bulletin by means of a circular mailed from Spokane, Wash., and one of the objects of the movement is to teach despatchers to "take advantage of their industrial position and to build up and protect an impregnable organization; . . . and to

deal fairly and honestly with all employers who are willing to investigate and adjust difficulties."

Charles P. Neill, manager of the Bureau of Information, Southeastern Railways, and former United States Commissioner of Labor, has been appointed chief of the Industrial Service Section of the Signal Corps and W. Jett Lauck, of Washington, D. C., editor of the Labor Gazette, and former consulting statistician of the United States Commission on Industrial Relations, has been appointed as his assistant. This completes the War Department's program of creating in each important procuring bureau an organization for the development and maintenance of satisfactory relations between employers and employees engaged in production for the Army. The work of these sections is being carried on in close co-operation with the Department of Labor and is being co-ordinated through the office of the secretary of war with the labor administration.

Car Builders Confer in Washington

Car builders, who had submitted tentative prices on standard freight cars to be ordered by the government, were called into conference Wednesday afternoon by John Skelton Williams, director of finance and purchases, to discuss the tentative figures.

"You Have Chosen a Dangerous Place to Walk"

This is the heading on a card which the New York, New Haven & Hartford, through its trackmen and crossing watchmen, gives to people who walk on the tracks. The card tells of the dangers of the tracks and points out how easily a safer way may be found. About 40,000 cards have been given out.

Inspection and Test Section

The Director General has announced the creation of the Inspection and Test Section of the Division of Transportation, with C. B. Young, mechanical engineer of the Chicago, Burlington & Quincy, as manager, with office in the Southern Railway building, Washington, D. C. The manager of this section will have charge of the test and inspection of materials and work in connection with the construction of standard locomotives and cars.

Freight Car Repair Section

The Director General has announced the creation of the Freight Car Repair Section of the Division of Transportation with J. J. Tatum, superintendent of the freight car repair department of the Baltimore & Ohio, as manager, with office in the Southern Railway building, Washington, D. C. The manager of the section will supervise the condition of and repairs to freight and passenger cars in all existing railway shops and at outside shops.

Railroads Show Deficit for January

For the first time since the Interstate Commerce Commission began requiring the filing of monthly reports of earnings in 1907, the railroads of the United States showed a deficit after the payment of operating expenses and taxes for the month of January, according to a preliminary summary covering 172 roads issued by the commission on March 28. Returns were still to be received from 24 additional roads, but those reporting, covering 215,456 miles of line, show a deficit in the place of operating income of \$2,227,535, as compared with an income of \$67,279,659 in 1917. This report strikingly reflects the influence of the unprecedented weather experienced in January, particularly in the eastern section. Railway operating revenues amounted to \$270,231,812, as compared with \$283,000,000 in January, 1917, and railway operating expenses were \$257,868,006 as compared with \$203,000,000 in 1917. Tax accruals were \$14,551,790 as compared with \$13,000,000 in 1917. The revenues per mile were \$1,254, expenses per mile \$1,197, net revenue per mile \$57, tax accruals

per mile \$67, and the deficit per mile \$10. The regular sworn reports have not yet been rendered for the month of January as the printing of the forms was held in abeyance pending the enactment of the railroad law, which became effective on March 21.

Safety First on the Canadian Government Railways

J. E. Long, safety engineer of the Intercolonial Railway (including also the Prince Edward's Island) reports that during 1917 on those lines 1 passenger, 9 employees and 20 other persons were killed, and 13 passengers, 704 employees and 21 other persons were injured. There has been a steady decrease in casualties since the "safety-first" department was started in January, 1914. In 1913 the number of employees killed was 19, and taking the annual average of the last four years and comparing with what the record would have been if there had been no improvement over the record for 1913, it appears that the decrease in the number of employees killed is 50 per cent; employees injured, 19 per cent; passengers killed, 58 per cent, and passengers injured, 10 per cent. The record of trespassers killed shows, in this comparison, a decrease of only 2 per cent, while trespassers injured increased 40 per cent. This four-year record of the safety-first department covers a period of very heavy traffic—a movement greater than in any similar period in the history of the roads.

Railroad Associations Approved

The Committee on Mail Pay, of which Ralph Peters, president of the Long Island, is chairman, which has been conducting the campaign for the railroads for a more equitable system of railway mail compensation, has been authorized by the Railroad Administration to continue its work, for the balance of the year and until further order. This and other railroad associations had been given a temporary approval until April 30 pending a permanent decision, which has now been reached as to this committee. The entire question of railway mail pay is now before the Interstate Commerce Commission for decision and the committee has represented the railroads in presenting evidence to the commission.

The Bureau for the Safe Transportation of Explosives and other Dangerous Articles and the Railway Fire Protection Association have also been approved.

Railway Wage Adjustment Board

Announcement has been made of the personnel of Railway Board of Adjustment No. 1 created by the Railroad Administration to deal with controversies between the railroads and the organizations of train service employees growing out of the interpretation or application of the provisions of wage schedules or agreements. The board will consist of four representatives of the railroads and four officers of the brotherhoods, as follows: E. T. Whiter, assistant general manager of the Pennsylvania, Western Lines; J. G. Walber, secretary of the Bureau of Information of the Eastern Railroads; J. W. Higgins, executive secretary of the Association of Western Railroads; C. P. Neill, manager of the Bureau of Information of the Southeastern Railroads; L. E. Sheppard, vice-president, Order of Railway Conductors; F. A. Burgess, assistant grand chief, Brotherhood of Locomotive Engineers; Albert Phillips, vice-president, Brotherhood of Locomotive Firemen and Enginemen, and W. N. Doak, vice-president, Brotherhood of Railroad Trainmen. The board will hold a meeting at Washington on Monday to organize and will proceed immediately to consider a number of pending disputes.

Government Action Against Thieves

Director General McAdoo has announced that a section for the Protection of Railroad Property and property of shippers in transit has been established in the Division of Law to enforce rigorously the federal law against theft from cars, stations, sidings, and wharves, and to take all necessary measures in co-operation with carriers to prevent loss from this cause, which in past years has been enormous. Philip J. Doherty has been appointed manager of the section. Full co-operation with this section is required from all officers and employees of the rail-

roads, and secret service men employed by the roads are especially required to co-operate with this section, both in protecting and investigating thefts, making arrests, or prosecuting offenders, and railroad attorneys and all other officers are required to give all possible aid.

Anyone having knowledge of any such offence should report the same to the nearest railroad officer or to Mr. Doherty, in order that indictment of the guilty parties may be had under the federal law, which carries a maximum penalty of ten years' imprisonment.

Railroad officers and employees are reminded that all property being transported by the railroads is in the custody of the United States and that they owe an especial duty to guard and protect the same and to report promptly any person who tampers therewith; and the United States looks to the officers and employees to do their duty in this behalf.

Railway Regiments' Thanks for Tobacco

A number of letters have been received expressing the appreciation of the men in the railway regiments now in France for the tobacco which they have received as a result of the contributions to the Railway Regiments' Tobacco Fund, by railway supply companies in the United States. C. W. Kutz, colonel commanding the Thirteenth Engineers, writing on March 1 says: "Ever since December 21 when I acknowledged receipt of your letter, we have been on the lookout for the shipment of tobacco which you had made. Yesterday our patience was rewarded by the receipt of three cases of smoking tobacco, each containing 12 full cartons and 4 mixed cartons of Bull Durham—1,076 packages; and 16 full cartons and 4 mixed cartons of Lucky Strike—424 cans—the total shipment being 3,288 bags of Bull Durham and 1,272 cans of Lucky Strike. The tobacco will at once be distributed among the companies of the regiment in proportion to the strength of each and then issued to the men by the company commanders from time to time. The members of this regiment feel very fortunate in having such friends as the contributors to the "Railway Regiments' Tobacco Fund," and hope by their actions to fully justify the interest of their friends in the United States. . . ."

Major John A. Laird, commanding the 12th Engineers, writing on February 27, expresses similar hearty thanks for three cases received on February 26.

V. J. Jaeger, Co. F, 13th Engineers, writing on March 4, acknowledges receipt of the first consignment of "generosity" from the Railway Supply Companies' Fund. "Words fail to express our appreciation. The smokes are the answer to our difficulties and a solace to the ills engendered in dovetailing railroading with the military end of this war game. In the language of our French comrades we simply say 'Je vous remercie.'"

Col. W. P. Wooten, of the 14th Engineers, acknowledging receipt of three cases of tobacco sends thanks to the donors and says that the men's enjoyment of the gift has been very great.

War Finance Corporation

The report of the conferees on the administration bill establishing the War Finance Corporation with a capitalization of \$500,000,000 and empowered to issue \$3,000,000,000 of bonds to assist in the financing of war industries, including railroads, was submitted to the Senate and passed, on April 1, and was also passed by the House on April 2. As the Senate passed the bill it provided for the issuance of \$4,000,000,000 of bonds, while the House bill provided for only \$2,000,000,000. The conferees agreed on \$3,000,000,000 as a compromise.

The corporation is authorized to make advances for periods not exceeding five years to any bank, banker or trust company in the United States having outstanding loans to persons, firms, corporations or associations conducting an established and going business in the United States whose operations shall be necessary or contributory to the prosecution of the war, but no such advance shall exceed 75 per cent of the face value of the loan; also to banks which shall have rendered financial assistance to persons, firms or corporations. The advances are to be made upon the promissory note or notes of the banks secured by notes, bonds or other obligations which are the basis of the advance by the corporation, together with securities held as collateral for such obligations. The corporation is also authorized in exceptional cases to make advances directly to any person, firm or cor-

poration or association conducting an established and going business in the United States whose operation shall be necessary or contributory to the prosecution of the war, but only for the purpose of conducting such business and only when in the opinion of the board of directors of the corporation the person, firm, corporation or association is unable to obtain funds upon reasonable terms through banking channels or from the general public. Such advances shall be for periods not exceeding five years and in no case shall the aggregate amount exceed at any one time 12½ per cent of the authorized capital stock of the corporation, plus the aggregate amount of bonds of the corporation authorized to be outstanding at any one time. Such advance shall be secured by adequate security of such character as shall be prescribed by the board of directors, equal to (except in cases of an advance made to a railroad in the possession and control of the President for the purpose of making additions, betterments or road extensions to such railroad) at least 125 per cent of the amount advanced by the corporation.

The bill also provides for a Capital Issues Committee to investigate and determine whether it is compatible with the nation's interest that securities shall be issued by any person, firm, corporation or association in excess of \$100,000. The bill provides that this shall not be construed to authorize the committee to pass upon any securities issued by any railroad corporation, the property of which may be in control of the government.

Railway Business Association Meeting at Chicago

Through the courtesy of the Railroad Administration, the forthcoming conference at Washington between the purchasing authorities and the car specialty manufacturers will be fixed for a date which will give members of the Railway Business Association ample opportunity to attend the convention of the association at Chicago on April 8.

The car specialty conference will be held not earlier than Thursday, April 11. Director of Purchases Williams, when President Post laid the situation before him, promptly wired that he would endeavor to arrange the car specialty meeting so as to enable members to attend the convention and Chairman Spencer of the Central Advisory Committee on Purchases telegraphs "You can say that meeting will not be held before Thursday of next week."

Following is the program for the Railway Business Association convention, which will be held at the Hotel La Salle:

11 a. m. (Red Room).—President's address and report of general executive committee on future activities of the association.

2 p. m. (Luncheon, ball room).—Lewis E. Pierson, chairman of the Irving National Bank of New York and chairman of the American Trade Acceptance Council, on prompter remittances for railway purchases.

2 p. m. (Red room).—Frank Rhea, of the Department of Commerce on Foreign Trade; on Opportunities in Railway Supplies, and report of committee on resolutions.

6.30 p. m. (Dinner, ball room).—Speaker to be announced.

U. S. Chamber of Commerce Meets at Chicago

The United States Chamber of Commerce will hold its sixth annual meeting at the Auditorium, Chicago, on April 10, 11 and 12. Representatives of more than 1,000 commercial organizations with a combined membership in excess of 500,000 business executives are expected to gather to discuss the further part business is to play in the war. One of the four chief subjects to be considered is Railroads and Highway Transportation. This discussion will be held on Thursday and will be under the leadership of Harry A. Wheeler, chairman of the National Chamber's Committee on Railroads. Among the speakers on this topic are Alba B. Johnson, president of the Baldwin Locomotive Works, who will speak on Motive Power; John F. Wallace, chairman of the Chicago Railway Terminal Commission, who will discuss Terminals; E. F. Carry, director of operations for the United States Shipping Board and president of the Haskell & Barker Car Company, who will speak on the subject of Car Supply, and Roy D. Chapin, chairman of the Highway Transport Committee of the Council of National Defense and also prominent in the automobile world, who will present the Possibilities of Highway Transportation.

Traffic News

The railroads centering in Scranton, Pa., have agreed that their freight stations shall be closed at 5 p. m., instead of 6 p. m. as heretofore. The closing time on Saturdays will be 3 o'clock.

The Railroad Administration and members of Congress have been receiving numerous letters of protest from chambers of commerce and other representatives of shippers protesting against the proposal in Trunk Line, Central Freight Association and Western Trunk Line territories, to impose charges ranging from \$3.50 to \$8.50 per day for trap-car service.

Representatives of southwestern lines serving oil-producing territory, representatives of oil interests and of the U. S. Fuel Administration held a conference at Chicago on April 2 to work out schedules for train-lot movements of fuel oil, gasoline and naphtha oil for naval and military use. The present demands on oil cars are in excess of the supply and the object of the meeting was to work out schedules which will conserve cars to the greatest possible extent.

Hearings before the House Committee on Interstate Commerce on the bill to make the fourth section of the interstate commerce law an absolute prohibition against charging higher rates for a longer haul than for the shorter haul over the same line in the same direction, were continued last week. H. C. Barlow, chairman of the executive committee and other representatives of the National Industrial Traffic League, testified in opposition to the proposed amendment.

United States Fuel Administrator Garfield has issued the formal orders instituting the zone system of distribution for bituminous coal. Twelve general orders, imposing upon the movement of coal the limitations arranged by the fuel administrator and the director general of railroads were issued. Each order covers a single consuming zone. The orders of the fuel administrator are supported by embargoes imposed by the director general of railroads on all coal movement except in accordance with the zone system plan.

R. G. Fagan, acting assistant superintendent of transportation of the Southern Pacific, reports that in 1917 his office had to deal with inquiries concerning more than 2,000 shipments of freight which went astray or were delayed because the marks on the goods were imperfect or had been lost. At the expense of much time and labor about 1,000 of these consignments were identified and delivered to their owners. There were 942 consignees who did not get their freight at all because the packages could not be identified.

The Food Administration has issued a circular urging shippers of eggs to load refrigerator cars to the maximum. The carload minimum is placed at 24,000 lbs. The Food Administration believes that this may be generally attained without increased breakage or without using a more expensive package. The Food Administration also calls attention to the fact that heavy production of perishables will create a strong demand for refrigerator cars, this year, denying that they will be so readily available as to allow extravagant use by any trades.

The round-trip excursion rate from Philadelphia to Atlantic City and other seashore resorts, used by many thousands of people in warm weather, has been advanced from \$1.00 to \$1.25, both by the Pennsylvania and the Philadelphia & Reading lines. It is said that the new rate includes the war tax of 8 per cent; which means that the railroad fare is \$1.16 and the tax 9 cents. It is expected that these tickets will be sold only on Sundays. Low-fare Sunday excursion trains have been suspended since January 6 as a part of the conservation of railroad men and locomotives for the movement of freight; but trains were run on Palm Sunday and on Easter.

At the annual meeting of the Traffic Club of Chicago on March 26, the following officers and directors were elected: President, Robert C. Ross, traffic manager, Joseph T. Ryerson & Son; first vice-president, E. R. Newman, assistant general freight agent of the Wabash; second vice-president,

Thomas J. Dixon, general manager, Arthur Dixon Transfer Company; third vice president, E. A. Stedman, vice-president, Wells, Fargo & Co.; secretary, C. B. Signer, agent, Delaware, Lackawanna & Western; treasurer, Willard E. Brown, western passenger agent, Florida East Coast; directors for two years: Chas. B. Hopper, general freight agent, Goodrich Transit Company; Murray N. Billings, assistant traffic manager, Illinois Steel Company; E. L. Dalton, traffic manager, Montgomery Ward & Co.; Albert G. Francis, railroad agent, Chicago Telephone Company.

Coal Production

The production of bituminous coal increased slightly during the week ended March 23, according to the bulletin of the United States Geological Survey. The total production, including lignite and coal made into coke, is estimated at 10,972,000 net tons. The average production per working day is estimated at 1,828,000 net tons, as compared with 1,729,000 during March, 1917. Bituminous coal shipments on 123 roads were 191,525 carloads. Anthracite shipments increased from 42,265 to 42,487 cars. The percentage of full time output lost on account of car shortage during the week ended March 16 was 22.9 per cent, as compared with 33.2 per cent lost from all causes.

Proposed Standard Fruit Crates

Eight standard crates for fruits and vegetables are described in a circular which has been issued by the Fruit & Vegetable Transportation Association of the South and East; and growers and shippers of fruits and vegetables are asked to see that their goods are put up in good shape to stand transportation. These proposed containers are described in great detail, so that any competent workman can make one of them exactly to standard. They are a lettuce crate, a lettuce crate, celled; pineapple crate, cabbage "barrel" crate (Norfolk), cabbage "barrel" crate (Florida), and asparagus crate; standard bushel crate and standard bushel crate, celled.

The Fruit & Vegetable Transportation Association of the South and East embraces in its membership all of the principal railroads carrying perishable freight from Florida and other southern states to northern cities, and also the Old Dominion Steamship Company. The chairman is H. C. Bixler, Pennsylvania Railroad, Broad street station, Philadelphia. In the circular he calls upon all interested to use sound containers, to select and pack their products with care and to mark each shipment plainly. The proposed standards have been decided upon in conference with all interests, including crate manufacturers and the United States Department of Agriculture.

No Sitting Up Nights to Fret

One thousand tons is the estimated daily weight of merchandise now being carried between New York and Philadelphia, 90 miles, by automobile trucks. Two new concerns have lately entered this field and it is said that about 150 large trucks are already in service. The rates are said to be about the same as those charged by the regular express companies, while in promptness and regularity the automobiles claim to be superior.

One concern, in a letter addressed to merchants, credits itself with the following merits:

"The most dependable and reliable trucking service between New York and Philadelphia. High-powered 5 ton Pierce-Arrow motor trucks, equipped with the latest windlasses.

"Trucks leave every day. You do not have to sit up nights fretting about merchandise being side-tracked in some freight yard.

"Our carefully trained drivers look after your interests, rather than our own convenience. By entrusting the delivery of your goods to us, regardless of size, shape or weight, you can do so with perfect confidence; and besides, you do not have to crate them, if you ship through us. Special monthly rate to manufacturers.

"Phone us, and our representative will call with valuable suggestions, and quote prices. Freight received before 5 p. m. will be delivered the following day (except in cases beyond our control)."

Further Curtailment of Advertising

The three regional directors of the Railroad Administration, A. H. Smith, R. H. Aishton and C. H. Markham, have each issued a circular directing the discontinuance of traffic solicitation. General orders directing the discontinuance of solicitation had been issued earlier in the year, but the following order was issued to avoid misunderstanding and to outline the policy more definitely:

"It is directed that immediately on receipt of this notice—

First: The solicitation of traffic, both freight and passenger, be eliminated.

Second: That men employed exclusively in solicitation be transferred, where needed, to other departments.

Third: It is suggested that the men employed exclusively in solicitation can be used to good advantage in the operating department in extending supervision to accelerate unloading of cars and movement of freight traffic."

Western Regional Director Aishton has also issued the following order to all lines within his jurisdiction.

1. Discontinue the custom of exploiting train service pleasure or health resorts and the like until further notice.
2. Discontinue all forms of advertising such as pictures, calendars, wall maps, etc.
3. Confine newspaper and other advertising to giving of necessary information to the public.
4. Standardize all time-table folders and limit their distribution, to avoid waste.
5. Folders must be purely informative and contain no advertising of luxurious trains, claims of superior service or extraneous matter of any description."

Transportation of Food Stuffs

Since early in February the Railroad Administration has been making constant efforts to expedite the transportation of grain, livestock, and other food stuffs at the request of the Food Administration, and according to daily and weekly reports compiled in the office of the Division of Transportation, has shown some very large increases in the movement of these commodities, as compared with the corresponding period of the preceding year. Daily reports are received of the grain receipts at eleven primary markets in the western district—Chicago, Cincinnati, Detroit, Duluth, Indianapolis, Kansas City, Milwaukee, Minneapolis, Omaha, Peoria and St. Louis—of the grain in elevators at the primary markets, and of the grain loading by cars, and these are tabulated weekly and kept in comparative form for reference. From February 11 to March 23, 73,760,000 bushels of grain were received at the primary markets, as compared with 32,512,000 in the corresponding period of 1917, an increase of over 41,000,000 bushels. Special efforts were made to get the grain into the elevators for drying, as approximately 60 per cent of the crop was soft. The receipts of oats during the same period ranged from over 6 million to over 8 million bushels weekly, a total of 42,771,000, which was an increase of about 15,000,000 bushels, but the wheat receipts were only 8,821,000, a decrease of 18,242,000 bushels, the movement of wheat to market being slack at that time. The total grain receipts were 124,352,000 bushels, an increase of 37,767,000.

The report of grain in elevators at primary markets shows an increase in grain from 3,584,000 bushels on February 2 to 12,333,000 on March 23. These figures correspond approximately with the usual weekly receipts, showing that the grain had been moved out of the elevators for consumption and export. The oats in elevators had increased from 10,853,000 bushels to 14,130,000, showing that out of total receipts of 42,000,000 bushels only 4,000,000 had remained in the elevators. The wheat in elevators on March 23 amounted to 3,621,000 bushels as against 5,425,000 bushels on February 2, and the total grain in elevators was 30,084,000 bushels, as compared with 19,940,000 on February 2.

The total grain loaded in the period March 11 to March 23 in eastern, southern and western districts had averaged over 4,000 cars a day. From February 10 until March 23 a total of 37,456 cars of livestock, dressed beef and perishables were forwarded east from Chicago and from February 12 until March 23 a total of 10,806 cars were moved in special food trains from Chicago and East St. Louis to New York, Philadelphia and Boston for export.

Supply Trade News

United States Government Locomotives

Specifications have been prepared by the Railroad Administration for 8 types of locomotives:

- Light and heavy mountain types.
- Light and heavy Mikado types.
- Light and heavy Pacific types.
- Six-wheel and eight-wheel switching locomotives.

The director-general will determine the number of each type which will be ordered for use in the different regions. The proposed standard specifications for locomotives although still subject to slight revisions, were given to locomotive builders some time ago and they have submitted their prices, which are being carefully scrutinized and checked. If the costs for any item seem high, the reason for it will be ascertained, and if necessary the government will arrange to purchase certain materials for builders where it can do so more cheaply. A meeting was held at Washington on Monday with the manufacturers of locomotive specialties to consider informally the specialties to be used on the standard locomotives to be ordered. A similar meeting will be held shortly with the manufacturers of car specialties. Detailed prices on the cars have been received and will be checked before a decision is reached as to the number of each type to be ordered.

Henry A. Hawes, representative in the Chicago office of the P. & M. Company, has resigned to join the Railway Engineering Regiment, at Camp Grant, Ill.

The H. W. Johns-Manville Company advises that its office in Memphis, Tenn., has been removed to 804-5 Exchange building, at Madison avenue and Second street.

The Asbestos Protected Metal Company, Pittsburgh, announces the appointment of Herbert Longstaff as manager of its St. Louis office, located in the Boatman's Bank building.

Colonel Henry P. Bope has resigned his position as vice-president and general manager of sales of the Carnegie Steel Company, effective April 1, 1918. He has been succeeded by William G. Clyde.

Laura G. Edwards, for ten years connected with the advertising department of the National Tube Company, has resigned, effective April 1, to enter the service of the publicity department of the A. M. Hyers Company.

R. W. Hunt & Co., Limited, Montreal, have been commissioned by the Canadian Government to inspect 100,000 tons of rails which that government has ordered from the Dominion Iron & Steel Company for distribution among the four principal roads of Canada. This commission includes the special inspection which necessitates the sending of a corps of inspectors to the mill at Sidney, N. S.

The Pittsburgh Testing Laboratory has turned over its building and equipment at Seventh and Bedford avenues, Pittsburgh, to the United States Government for the duration of the war. From April 1 until about June 15 its offices will be in the B. F. Jones Law building, Fourth avenue and Ross street. After June 15 its offices and laboratories will be located at 612-620 Grant street, the buildings being remodelled and fully equipped for the company's special needs.

Fred H. Jones has been appointed resident manager for the General Railway Signal Company, in charge of eastern territory, with office at 30 Church St., New York, effective May 1. Mr. Jones has been connected with the General Railway Signal Company since the time of its organization in 1904. During this period, he has held a number of the important positions with the company including assistant resident manager of the Chicago office and resident manager of the San Francisco office.

The Chicago Railway Signal & Supply Company, Chicago, has increased the size of its plant at Carpentersville, Ill., by taking

over a number of shop buildings formerly used for other purposes. Where space has been available in these various buildings, modern machines have recently been installed. A power house and hydro-electric station generating power from the Fox river has recently been placed in service. These increased manufacturing facilities have been added with the view of producing a more extensive line of signal apparatus and supplies.

W. S. Bartholomew, president of the Locomotive Stoker Company, has been elected vice-president of the Westinghouse Air Brake Company in direct charge of the activities of the stoker company and to attend to such other duties as may be assigned to him. Mr. Bartholomew received his education in the public schools of Chicago and in the North-Western University. He entered business life with Geo. B. Carpenter & Co., leaving that company to enter the service of Adams & Westlake, in course of time becoming eastern manager. In 1903 he entered the service of the Westinghouse Air Brake Company as New England representative at Boston, Mass. He remained here until 1905 when he was made western manager of the same company at Chicago, Ill. He was transferred in 1913 to the Locomotive Stoker Company, being elected president, and ever since has actively directed the development of the Street stoker and its distribution to the railroads throughout the country. He still retains his office as president of the Locomotive Stoker Company.

H. D. Savage has been elected vice-president of the Locomotive Pulverized Fuel Company. He will also continue as vice-president of the American Arch Company. Mr. Savage was



W. S. Bartholomew



H. D. Savage

born at Memphis, Tenn. He was educated in the public schools at Ashland, Ky., and at the Kenyon Military Academy. He started his business life with the Ashland Fire Brick Company in the manufacturing department serving in various capacities. Later he was appointed manager of sales and during his ten years in this position he made great strides towards putting the manufacture of high grade refractories on a scientific basis. He was largely instrumental in making Ashland the most modern brick plant in the country at that time introducing many features making for uniformity of product and increased output. Together with the late E. S. Hitchens he organized the Refractory Manufacturers' Association of which he was elected the first president. This association includes in its membership practically all the manufacturers and users of refractory materials. Mr. Savage's work as sales manager gave him opportunity to thoroughly study the application of refractories to the metallurgical field and he enjoys a wide acquaintance in the metallurgical industry of this country. In 1914 he was elected vice-president of the American Arch Company in charge of manufacturing. In this position he organized the manufacturing department of this company so that close supervision by trained

inspection is given the fire brick at the Arch company's plants. This resulted in higher grade brick and greater service life. In 1917 in addition to his duties as vice-president of the American Arch Company he was appointed manager of sales of the Locomotive Pulverized Fuel Company.

The firm of **Waddell & Son**, which has offices in Kansas City and New York, has lately become incorporated. The new firm of **Waddell & Son, Inc.**, includes besides **Dr. Waddell** and **N. Everett Waddell**, their former assistant engineers, **F. H. Frankland**, **Shorridge Hardesty**, and **L. C. Lashmet**. These five constitute the board of directors, the officers being **J. A. L. Waddell**, president; **N. Everett Waddell**, vice-president, and **L. C. Lashmet**, secretary and treasurer. Mr. Frankland is managing engineer; Mr. Hardesty, designing engineer, and Mr. Lashmet, office engineer.

On account of the growth of the Interstate Iron & Steel Company of Chicago, it has been found necessary to enlarge its offices. Because space was not available in the First National Bank building, the company has leased the east half of the 14th floor of the Monroe building, 104 South Michigan avenue, Chicago. The sales department at the Grand Crossing plant, which was recently made a part of the Interstate Iron & Steel Company, will be combined with the general sales offices and will also be moved to the Monroe building. It is expected that the change will be completed by April 6.

W. O. Duntley, president of the Chicago Pneumatic Tool Company, Chicago, resigned, effective April 1. According to a statement issued by the company, Mr. Duntley tendered his resignation in order to secure more time to look after his private business and also to take a long needed rest after 22 years in active service with the corporation. He will retain his interest in the company and will also remain a director and a member of the executive committee, and will continue to assist in an advisory capacity. No successor to Mr. Duntley has been elected, but **J. G. Osgood**, first vice-president will act as president.

George W. Wildin has resigned as general manager of the New York, New Haven & Hartford Railroad to enter the employ of the Westinghouse Air Brake Company as general

manager of the Locomotive Stoker Company, with headquarters at Pittsburgh, Penn. He brings to his new position extensive railroad experience and a well rounded out mechanical and managerial career. Born at Decatur, Illinois, February 28, 1870, he studied at the city schools and was graduated from the Kansas State Agricultural College in June, 1892, with the degree of Bachelor of Science. He entered railway service shortly afterwards as mechanical draftsman in the Topeka shops of the Atchison,

Topeka & Santa Fe. He subsequently became a machinist and a locomotive fireman on the Santa Fe and later an engineman on the Mexican Central. Leaving railway service he was for a time superintendent of the Aermotor Company, of Chicago. He soon returned to railway service however, as an engineman on the Chicago & Alton and then went to the Plant System, now a part of the Atlantic Coast Line, where he served successively as a machinist, locomotive and car inspector and as mechanical engineer. From April 1, 1901 to March 1, 1904 he was mechanical engineer for the Central Railroad of New Jersey. On March 1, 1904, he left that company to become assistant mechanical superintendent of the Erie, being promoted on April 1 of the same year to mechanical superintendent at Meadville. From January to

July, 1907 he served as assistant superintendent of motive power of the Lehigh Valley and then left that road to accept the position as mechanical superintendent of the New Haven. In May, 1917 he was promoted to general mechanical superintendent, and in September of the same year was again promoted to the position of general manager. Mr. Wildin was president of the American Railway Master Mechanics' Association in 1910.

Price Fixing by War Industries Board Approved

The President has approved the recommendation of the price-fixing committee of the War Industries Board that the maximum prices heretofore fixed by the President upon the recommendation of the board upon ore, coke, steel and steel products, subject to revision on April 1, 1918, be continued in effect until July 1, 1918; from April 1 to July 1, however, the maximum price of basic pig iron be reduced from \$33 to \$32 per gross ton, and that the maximum price of scrap steel be reduced from \$30 to \$29 per gross ton. No new contracts calling for delivery of any of said commodities or articles on or after July 1, 1918, are to specify a price unless coupled with a clause making the price subject to a revision by any authorized United States government agency, so that all deliveries after that date shall be within the maximum price then in force, although ordered or contracted for in the meantime.

It is expected that all manufacturers and producers will observe the maximum prices now fixed.

Dr. Snowden Returns from Australia

Dr. Albert A. Snowden, an exporter with offices at 149 Broadway, New York, has just returned from a business trip to Australia where he established a branch of his railway supply business in charge, as manager, of **Hon. H. C. Hoyle**, formerly minister of railways for New South Wales. Mr. Hoyle will be remembered as the special commissioner on railways who represented the Australian Government in this country last autumn when he addressed the Railway Business Association and other commercial bodies. Dr. Snowden is desirous of securing agencies for Australia and New Zealand for railway supplies and materials. He represents the **Simmons-Boardman** publications there.

Dr. Snowden reports that Australia at the present time is very prosperous due to the enormous production of primary products such as wool, wheat, meat, etc. While there has been a lack of sufficient ships to carry the surplus of these goods to foreign markets the British Government takes the entire wheat and wool production paying for it in advance and this brings plenty of money into circulation. Australia's mining interests have also benefited greatly by the war time prices.

Shipments to Australia are being made though not without difficulties. The recent allotment to the Australian trade of a large number of sailing vessels and other slow moving craft which have been taken from the eastern Atlantic to bring wheat from Australia to the United States affords the opportunity of further shipments from the States.

The Australian railways are in very fair condition, says Dr. Snowden, but as everywhere else in the world, there has been considerable depreciation of roadbed and equipment, because the local manufacturer cannot begin to meet the requirements. Reports by Mr. Hoyle and Mr. Henderson, chief engineer of the Commonwealth Railways and of other Australian railway experts who have visited the United States have created great interest in American methods and goals, so that with the shortage of materials and the high American materials the outlook for export trade to American railway supplies is very encouraging.

Trade Publications

Motor Cars.—**Murray & Co.**, Chicago, have issued an attractive 28-page booklet illustrating and describing the different types of motor cars made by this company. The booklet contains copies of advertisements which have appeared in technical papers recently, pointing out the advantages of this make of cars, and the names of a number of railroads using Murray cars.



G. W. Wildin

Railway Officers

Executive, Financial, Legal and Accounting

William Morris Imbrie, Jr., has been elected treasurer of the Savannah & Atlanta, with office at Savannah, Ga., vice **Thomas Goodbody**.

S. T. Bledsoe, assistant general solicitor of the Atchison, Topeka & Santa Fe, has been appointed general counsel with office at Chicago, succeeding **Walker D. Hines**.

O. D. Dalton has been elected first vice-president of the Valdosta, Moultrie & Western, and **S. W. Jones** has been elected treasurer; both with headquarters at Valdosta, Ga.

L. R. Deevers, acting auditor of the Wheeling & Lake Erie, with headquarters at Cleveland, Ohio, was appointed auditor, with same headquarters, succeeding **C. H. Holmes**, resigned, effective April 1.

Operating

A. B. Woodward was appointed chief dispatcher of the Salt Lake division of the Denver & Rio Grande, with headquarters at Salt Lake City, Utah, succeeding **C. E. Leverich**, promoted, effective March 14.

L. E. Jones, secretary and treasurer of the Valdosta Moultrie & Western, with office at Valdosta, Ga., has been appointed general manager, with headquarters at Valdosta, succeeding **W. M. Legg**.

A. B. Scates, trainmaster of the Louisville & Nashville, with office at Paris, Tenn., has been appointed superintendent of the Memphis division, with headquarters at Memphis, vice **F. N. Fisher**, resigned.

L. A. David, assistant superintendent of the Missouri Pacific, with office at Atchison, Kan., has been appointed acting superintendent of the Southern Kansas division, with headquarters at Coffeyville, Kan.

W. L. Robinson, supervisor of fuel consumption, Baltimore & Ohio, has resigned to accept a position in the operating department of the E. I. du Pont de Nemours Company, Wilmington, Del. Mr. Robinson is one of the best-informed men in railway fuel matters and is at the present time vice-president of the International Railway Fuel Association and the Smoke Prevention Association.

E. Flynn, division superintendent of the Chicago, Burlington & Quincy, at Chicago, has been promoted to general superintendent of the Nebraska district, with headquarters at Lincoln, Nebr., succeeding **A. G. Smart**, who was transferred to the Wyoming District, with headquarters at Alliance, Nebr., succeeding **E. E. Young**, who was appointed superintendent of the McCook division, with headquarters at McCook, Nebr., in place of **H. W. Maxwell**, who has been appointed superintendent of terminals at Kansas City, Mo., to succeed **J. P. Falk**, who was promoted to superintendent of the Chicago division, with headquarters at Chicago, succeeding Mr. Flynn. **N. C. Allen**, superintendent of the Casper division, with headquarters at Casper, Wyo., was transferred to the Omaha division, with headquarters at Omaha, Nebr., succeeding **J. H. Aydelott**, who takes Mr. Allen's place on the Casper division. The above changes were effective April 1.

Engineering and Rolling Stock

R. A. Winsor, engineer of tests and fuel inspector of the Chicago & Alton, with headquarters at Bloomington, Ill., resigned, effective April 1.

G. O. Huckett, master mechanic of the Chicago, Burlington & Quincy, with office at Sterling, Colo., has been appointed master mechanic, with office at Alliance, Neb., vice **J. G. Dole**, resigned, and **C. O. Davenport**, road foreman, with office at Alliance, has been appointed master mechanic, with office at Sterling, vice Mr. Huckett.

W. B. Stokes has been appointed master mechanic of the Wrightsville & Tennille, with headquarters at Tennille, Ga., vice **M. G. Brown**, resigned to enter the service of the Georgia, Florida & Alabama, with headquarters at Bainbridge, Ga.

H. P. Anderson, mechanical engineer of the Missouri Kansas & Texas of Texas, was appointed superintendent of motive power, with headquarters at Denison, Tex., succeeding **F. W. Taylor**, promoted to general manager, effective March 1.

E. C. Anderson, mechanical engineer of the Colorado & Southern, with headquarters at Denver, Colo., has been appointed assistant mechanical engineer of the Chicago, Burlington & Quincy, with office at Chicago. **H. E. Hines**, draftsman in the office of the mechanical engineer, of the Chicago, Burlington & Quincy, has been appointed mechanical engineer of the Colorado & Southern, succeeding Mr. Anderson. **G. G. Gilpin**, chief draftsman of the mechanical department of the Chicago, Burlington & Quincy, has resigned to accept service with another company.

Purchasing

W. F. Lamb has been appointed division storekeeper of the Southern Railway, with office at South Richmond, Va., vice **J. E. Angel**, promoted.

Railway Officers in Government Service

T. C. Powell, vice president of the Southern Railway at Cincinnati, has been appointed traffic representative of the War Industries Board at Washington.

Ralph Budd, executive vice-president of the Great Northern, St. Paul, Minn., has been appointed assistant to the regional director of western railroads in charge of capital expenditures, with headquarters at Chicago.

Charles Barham, general freight agent of the Nashville, Chattanooga & St. Louis, with headquarters at Nashville, Tenn., has been appointed regional director under the National Food Administration, with headquarters in Atlanta, Ga.

C. S. Albert, attorney for the Great Northern in Idaho and eastern Washington, with headquarters at Spokane, Wash., has been commissioned a major and assigned to the judge advocate's staff of the army. He will leave shortly for France.

D. L. Gray, assistant general traffic manager of the Erie has been appointed traffic representative of the Railroad Administration in co-operation with the Shipping Board, succeeding **J. F. Holden**, who has been assigned to special traffic work under **Edward Chambers**, director of traffic, of the Railroad Administration.

J. M. Herbert, president of the St. Louis Southwestern, has been appointed chairman of the inter-regional committee in charge of railroad operations at St. Louis and East St. Louis. He will issue such orders and instructions as will be necessary with the approval of the three regional directors of railroads, each of whom has lines under his jurisdiction entering St. Louis. **J. D. Watson**, assistant to the president of the St. Louis Southwestern has been designated by Mr. Herbert as his assistant and has relinquished his duties with the Cotton Belt in order to assume active charge of the new work.

Obituary

W. W. Cotton, counsel of the Oregon-Washington Railroad & Navigation Company, with office in Portland, Ore., died in Los Angeles, Cal., on March 13, at the age of 59.

Alexander Millar, who was secretary of the Union Pacific from 1888 to July 1917, died at his home in Plainfield, N. J., on March 31. He was born in Scotland and began railway work in 1872, as a stenographer with the Union Pacific. He subsequently served consecutively as bookkeeper, chief clerk in the controller's office and as assistant secretary. In 1888 he was appointed secretary of the Union Pacific; from October, 1893, to December, 1897, he was secretary and assistant controller and then served as secretary until July, 1917, when he resigned on account of ill health.

Contributors to the Financial Section



Frank A. Vanderlip

FRANK A. VANDERLIP is the originator of the War Savings Stamp idea, and has been in charge of the sale of Thrift Stamps and War Savings Stamps for the United States Government. The sale of these stamps has brought into the United States Treasury up to date more than \$75,000,000. Mr. Vanderlip's salary as director of this work has been \$1 a year. He is also president of the National City Bank of New York. He is the author of Chicago Street Railways, The American Commercial Invasion of Europe, Business and Education, and Political Problems of Europe. He was a reporter on the Chicago Tribune in 1889 and at one time was financial editor. He was editor of the Economist of Chicago from 1894 to 1897. From 1897 to 1901 he was Assistant Secretary of the Treasury. He has been president of the National City Bank since January 1900.



Leonor F. Loree

LEONOR F. LOREE is president of the Delaware & Hudson Company and chairman of the board of directors and chairman of the executive committee of the Kansas City Southern Railway. He was a close friend and valued adviser of the late E. H. Harriman, and a man of extraordinarily broad interests, both literary and financial. He combines both in his attitude toward other men and toward economic problems, a keen sense of humor with uncompromising fighting qualities, a combination rare to a degree. He is a graduate of Rutgers College, and began work as an assistant in an engineering corps on the Pennsylvania, and later was transitman on the topographical preliminary survey and location of the Mexican National Railway from the Rio Grande River to Saltillo, Mexico. He was president of the Baltimore & Ohio from 1901 to 1904.

Contributors to the Financial Section



Sir George Paish

SIR GEORGE PAISH is the author of *The British Railway Position*, *The Railways of Great Britain*, *The Railroads of the United States*, *Capital Investment in Other Lands*, and *Savings and The Social Welfare*. He was adviser to the chancellor of the exchequer and the British treasury on financing and economic questions in 1914 to 1915. In this connection, he came to America and helped in the adjustment of the crisis in the international money situation which had been brought about by the war. It is difficult to overrate the importance of his work at that time. From 1881 to 1888, he was secretary to the editor of the *Statist*. He was sub-editor of the *Statist* from 1888 to 1894, assistant editor from 1894 to 1900 and since 1900 has been joint editor. He is governor of the London School of Economics and was a member of the Departmental Committee of the Board of Trade on Railway Accounts and Statistics. He was knighted in 1912 in recognition of his work in connection with the revision of the accounts and statistics systems of British railways.



Albert Breton

ALBERT BRETON began his banking career in 1892 with the *Comptoir National d'Escompte* in Paris and was connected in various official capacities with their foreign branches in London, Calcutta and Bombay. He also has had business experience in Japan, China and Brazil. In 1905 he associated himself with American banking interests in New Orleans, and was up to 1916 first vice-president and a director of the Canal Bank and Trust Company. Mr. Breton has been active in the Louisiana Bankers Association, serving as its vice-president in 1908 and as president in 1909. During the three years previous to his connection with the Guaranty Trust Company, he made a special study of Central and South American banking business, and in 1913 organized the Banco Atlantida, which has branches in the principal commercial centers of Spanish Honduras, C. A. In February, 1916, Mr. Breton became associated with the Guaranty Trust Company of New York as special foreign representative, and in March of that year was made a vice-president.

Contributors to the Financial Section

ROBERTS WALKER is a lawyer, a member of the firm of White & Case of New York, a writer on dull subjects, which he treats with so much of imagination and wit as to make vividly alive the dullest of them. He graduated from Amherst in 1896 and took an LL.B. in Columbia Law School in 1899, and went to work for the law firm of Seward, Guthrie & Steele. He was made assistant to the general counsel of the Chicago, Rock Island & Pacific Railway and the St. Louis & San Francisco in 1904, and in January 1910 was made general counsel, chairman of the executive committee and president of the Rock Island Company. He became a member of White & Case in 1912. In the first rank of a profession that requires a prodigious amount of reading, Mr. Walker's acquaintance with other subjects is extraordinarily broad.



Roberts Walker

JOHAN E. OLDHAM is a partner in the firm of Merrill, Oldham & Company of Boston, Mass. He has been in the investment business since his graduation from Amherst College in 1888. He has been active in connection with the Investment Bankers Association of America and at present is one of the vice-presidents. In this organization he has been for several years chairman of the Committee on Public Utilities and is at present chairman of the Committee on Railroad Securities. He is also a member of the sub-committee on capital Issues-Federal Reserve District No. 1, Boston.



John E. Oldham

Contributors to the Financial Section



John R. Hall

JOHN R. HALL is manager of the bond department of Hallgarten & Company, one of the two or three larger progressive private banking houses which have been prominent in recent reorganizations of railroad companies. He is a graduate of Hotchkiss School and of Yale University (1902). He began work as a messenger in the First National Bank, New York; later got a clerical position in the Bankers Trust Company, and then became the secretary to Robert C. Pruyn, who was president of the National Commercial Bank of Albany. He was with Crawford, Patton & Cannon of New York, before going to Hallgarten & Company. Mr. Hall is a member of the Committee on Railroad Securities of the Investment Bankers Association of America and has taken an active interest in the work of this committee, especially in the proposals which the committee made suggesting that, at the time of the sale of an issue of bonds, a committee be formed for the protection of the bond holders' interest.



O. M. W. Sprague

O. M. W. SPRAGUE is the Edmund Cogswell Converse Professor of Banking and Finance at the Harvard Graduate School of Business and Finance. He is the author of *History of Crises Under the National Banking System*, and *Banking Reform in the United States*. He served as professor of economics at the Imperial University of Tokio, Japan, from 1905 to 1908. He took the degree of A.B. at Harvard in 1894, of A.M. in 1895 and of Ph.D. in 1897. From 1900 to 1904 he was an instructor in economics at Harvard and was then made an assistant professor. A year later he was made professor at the Imperial University of Tokio. A banker having personal interests involved would in all probability find it impossible to express his views as fully, as frankly and as fearlessly as Professor Sprague does about the much discussed War Finance Corporation.

FOREWORD

By Frank A. Vanderlip
President, National City Bank, New York

THE Railway Age, by reason of the able and thorough manner in which for many years it has covered the field of railway affairs, has made itself well-nigh indispensable to persons desiring to keep themselves well-informed upon the transportation industry. Its competent staff has dealt instructively with every phase of the railway business, including technical matters of special interest to operating officials, financial intelligence, economic problems and all of the numerous and intricate questions which have arisen out of the relations between the railways and the public.

In view of the responsible character of the publication and the ability with which its editorial policies have been directed, the announcement that it will broaden its field by adding to the regular departments which it has heretofore maintained a quarterly section devoted to general financial investment conditions, is a matter of public interest. Inasmuch as the railroads up to this time have supplied much the largest single class of securities appearing in the investment market, it is rather a natural departure for the Railway Age to extend its inquiries and comments to the fundamental conditions affecting investments.

The announcement says that the section "will be devoted to the science of the utilization of wealth as capital." There has never been a time when it was more important that the public should be impressed with the community value of capital than now. The waste of wealth going on at the present time is appalling. Enormous debts are being piled up, for the payment of which the good faith of the nations is sacredly pledged. Economic relations are being radically changed by the pressure of conditions which are themselves temporary, and there is evident danger of reaction when these conditions disappear. To meet this situation without disaster industry must be sustained after the war by large new investments in constructive work. There never is full employment for the industries except when such investments are being made. The almost complete absorption of surplus incomes by public loans during the period of the war will throw the country behind its normal development, and in order to recover this lost ground, as well as to provide immediate employment for the country's wage-earners, it will be important promptly to organize our resources to finance these new operations. That the wastes of war shall be made good, that the debts of the war shall be paid, that every man and woman wanting employment shall be able to find it, and that the efficiency and productivity of industry shall be so increased that wages may be sustained and the costs of living at the same time reduced—these are the aims to which we must unitedly set ourselves when the war is over.

There is need for all the agencies we can have to spread correct knowledge of the part which capital plays in community progress and of the patriotic service which it can render in times of peace as well as in times of war. I am sure that the Railway Age will do good work in its new field.

The Investment in American Railroads

What Has Happened and Is Happening to Invested Capital,
and the Relations of the Railroads Thereto

By L. F. Loree

President Delaware & Hudson Company.

THE TOTAL WEALTH of the United States as of the year 1912, which was that of the latest official inventory, is stated by the bureau of census as amounting to \$187,739,071,090, and may be divided as follows:

Real estate and improvements.....	\$71,801,428,367	
Furniture, carriages, etc.....	8,463,216,222	
Clothing and personal ornaments.....	1,295,008,593	
		\$84,559,653,182
Wealth subject to regulation:		
Railways.....	\$16,148,532,502	
Street railways.....	4,596,563,292	
Telegraphs.....	223,252,516	
Telephones.....	1,081,433,227	
Pullman and private cars.....	123,362,791	
Shipping and canals.....	1,491,117,193	
Waterworks privately owned.....	290,000,000	
Light and power plants privately owned.....	2,098,613,122	
		26,652,874,553
Wealth not subject to regulation:		
Agricultural production—		
Land.....	\$28,475,674,169	
Buildings.....	6,325,451,528	
Products.....	5,240,019,651	
Implements and machinery.....	1,368,224,548	
Irrigation enterprises.....	360,865,270	
Live stock, including range stock.....	6,238,388,985	
		48,008,624,151
Manufacturing and mining production—		
Manufacturing plants.....	\$8,097,113,448	
Manufacturing products.....	14,693,866,489	
Mining plants.....	2,894,804,300	
Mining products.....	816,552,233	
		26,501,336,470
Gold and silver coin and bullion.....	2,616,642,734	
Total.....		\$187,739,071,090

This accumulation of \$188,000,000,000 represents the total savings of the entire 300 years of settlement in this country. There is no official statement of the annual income. Estimates have been made by several authorities. From them it may be inferred that the total value of the national product and of all productive services in the year 1912 was in excess of \$35,000,000,000. It is startling to reflect that the accumulations of three centuries are no more than the income of five years of our present time, and reflection gives ample warning of the dangers inherent in income and inheritance taxes that strike directly at the productive capital fund.

The residence of man upon this earth has been estimated by the scientists at from 300,000 to 1,000,000 years. Evidences of civilization, whether in Greece, Egypt or Assyria, we are told, do not date back more than 10,000 years, so recent is this precious possession of the race. And what is of even greater importance, the slender hold we have upon it, seeing that in the 800 years of the "dark ages" we almost lost it. In the view of that experience we would do well in these parlous times to test out all our methods to eliminate any found menacing.

Industries Subject to Legislative Regulation

Roughly the investments of potential capital (by which I mean wealth productively employed) divide into three principal groups, of which one-fourth (actually 25.9 per cent) is invested in industries subject to the legislative regulation of prices or rates:

- (A) Those devoted to agricultural production;
- (B) Those devoted to manufacturing and mining; and,
- (C) Those devoted to steam transportation, traction lines, electric light and power companies, gas companies, water companies, telegraph and telephone companies, express companies, etc.—a group loosely described as public utilities and distinguished by the fact that, unlike the others, which are left substantially to the control of their management, these

are regulated by an ever-increasing mass of legislation, federal and state, and as well by commissions, either federal or state, serving as deputy-legislatures or a deputy-congress.

At a time when capital invested in groups "A" and "B" is profitable to an unusual and amazing degree, capital invested in group "C" is embarrassed and too frequently threatened with destruction. A condition that involves in difficulties steam railways lying in Missouri, Kansas and Texas and, as well, in Maine, New Hampshire and Massachusetts, urban and interurban traction lines on the Pacific Coast and in New York, gas companies in Illinois and Maryland, water companies in Ohio and Pennsylvania, telephone companies in Ohio, Indiana and Illinois, and the United States Express Company, is too widespread and involves too great a variety of business experience and association to be the accident either of corporate management, character of the service, or geographical location. We must look for an explanation to the difference in circumstance; to the regulation of statute and commission. For more than a generation these public utilities, so-called, have been the subject of public attack and have been on the defensive. It is the legislature and the commission upon whom the responsibility is now clearly seen to rest and to whom we must look for a speedy solution of our problems unless we are to be involved in disaster.

The old quarrel pictured in fable between the parts of the body as to which was the most important need not be imported into this question to justify a discrimination among the three groups nor of the elements comprising them, for in the light of the world war, involving both the principles and the character of our government, the steam transportation facilities become for the moment of commanding importance. It was a maxim of the great Napoleon that "for one thought that a general gives to his enemy, he casts a thousand anxious glances to the rear," so important to the existence of an army and the conduct of war are the lines of communication. The steam railroads of this country constitute at this time its first line of communication. The army on the battle-front cannot be maintained there unless the railroads are strong and vigorous and work at their highest efficiency. If they fail the army fails, and he would be a bold man who would say that with its failure the government itself could be maintained. The responsibility is now with the legislatures and the commissions. Having grasped these utilities, they and they alone can determine whether these utilities are to be strangled or energized.

It is of the first importance to try to arrive at an exact appreciation of just what has happened and is happening, and the relation of the railroads thereto. Our railroads have been in private hands since their construction began now nearly ninety years ago, and though during late years the control over their affairs has been extreme, and the liberty of action of their officers has been tremendously curtailed, these officers are still held responsible and still feel responsible for their operation and its results. It would be a reflection upon their ability and responsibility if the railroads reflected any neglect or inadequacy of their own effort. Their vindication is that it is admitted on all sides that these instruments of transportation have steadily improved in their character and efficiency, and that whether we consider the capital involved per mile

of line open, cost of the movement per passenger or per ton of freight carried, or the declining ratio of the amount of capital involved to the unit of service rendered, their history is the envy of the civilized world.

At this moment the physical condition of these properties, the steam railroads, is better than at any time in their history. Their locomotives and cars are of the most advanced type, are well maintained and are ample for the present demands upon them. There is no occasion in my judgment for anxiety regarding either the permanent way or the equipment for the next eighteen months. The matter for anxiety, and anxiety of the gravest character, is the supply of labor, the freedom of management, the maintenance of working capital and the integrity of credit.*

The Labor Situation

The reduction of the working time of some labor from 12¹/₂ per cent to 25 per cent, the withdrawal of large numbers for service in the army, when there is suddenly additional demands to supply the wants of our own armed forces and the needs of our allies, places a great strain upon all productive enterprises and especially upon those requiring a high degree of skill and training, as do the railroads.

In something less than three generations there has been built up in the railroad service of this country a practice and a personnel that for efficiency and character stands without parallel in the world. Men entering the service are subjected at the outset to a careful physical examination; they receive systematic instruction and are held to a high state of discipline. In the main they are subject to be called upon for duty at all hours of the day and on all days of the year. They are under control not only as to the disposition of their time but as to their personal habits. They are engaged in a hazardous occupation. Having in mind the character of the force so assembled, it is of the highest importance that relatively the rate of wages paid and the conditions of employment should be such as to attract and retain in this service the pick of the industrial community.

Swift's picture of "Gulliver" reduced to immobility by the 10,000 threads by which he was fastened to the ground by the "Lilliputians" is not an exaggerated illustration of the condition to which the railroads have been reduced. Lloyd George, then Minister of Munitions of Great Britain, said to a trades union congress in December, 1915:

"The next direction in which trade unionists can help us is by suspending during the war again all practices and customs which have the effect of preventing men from turning out as much work as their skill and strength permit. I am going to speak about that very plainly later on. What I will tell you now is that the reports we get from our own offices, the Admiralty, the War Office and the Munitions Department, show that if we had a suspension during the war of these customs which keep down the output, we could increase it in some places by 30 per cent, in other places by 200 per cent. Between 30 and 200 per cent—well, you know that makes the difference between victory and defeat in the quantity which you turn out and place at the disposal of our armies."

The difference between victory and defeat—that, I take it, may in the end depend upon the relief which the railroads are able to get from labor union restrictions and legislative and commission restrictions, limiting output, piling up burdens, reducing resources, assailing credit.

Cash is to a business enterprise what blood is to the human body; without it life ends. Credit is to a business enterprise what virtue is to a woman; it is not sufficient that it be good; it must meet Cæsar's demand of his wife and be above suspicion.

The income account statements do not necessarily reflect the ability of the railroad to meet its cash obligations. The

term "cash," so concise and so innocent, may embrace not only free working capital but moneys definitely required for sinking fund and other payments. It is a condition misleading alike to the commissions, to the corporate executive and to the investor. The working capital "necessary for the safe and convenient conduct of the business" of a railroad may be taken roughly at 10 per cent of its annual gross earnings. The Bradstreet Company reports that during 1916 "lack of capital" was responsible for 4,995 failures, being 30.3 per cent of the total failures during that year. Few things have so seriously involved business enterprises as the failure to provide working capital in adequate amount. Among the railroads, when the business is organized and under way, important as this resource is and subject as it is to varying and serious encroachments, it can in the main be nourished only from current income. Under the laws of most of the states, additional securities may be issued only for the purpose of acquisition of property, the construction, completion, extension or improvement of facilities, the discharge of refunding of lawful obligations, or the reimbursement of moneys actually expended for the foregoing purposes. This fund of working capital, its integrity dependent solely upon surplus income, may be drawn upon extensively by the hazards of business, such as washouts, fires, earthquakes and other catastrophes, and just now is being seriously impaired by the great rise in the prices of materials and supplies and the delays in their receipt, requiring the carrying of increased quantities in stock. An amount equivalent to about one-half the working capital of the railroads has been so absorbed in the inventory, and this condition constitutes a real menace in the situation.

Railroad Credit

The provision of moneys for the use of a railroad through the exercise of its credit is limited to a very small number of means—the first mortgage bonds; junior mortgage securities; income and debenture bonds; equipment bonds; short term notes; preferred and common stock.

(a) The number of railroads upon which first mortgage bonds can now be issued can be counted upon the fingers, so that at this time the issue of this class of securities is negligible.

(b) Junior securities, whether foreclosable upon failure to pay interest thereon or lacking such provision, as in the case of incomes and debentures, may be issued only and to the extent that the railroad shows a rate of growth in its net profits commensurate with the additional capital so to be invested in its properties. Such bonds become speculative securities if the net profits become barely sufficient to pay the interest thereon. The ability to market securities of this character, if they can be marketed at all or upon reasonable terms, depends largely upon the net profits remaining after providing for the payment of interest upon them, and it is upon this margin of safety that investors determine whether any given security affords a safe medium for the investment of their funds. If the interest is twice earned, the security may be expected to sell generally so as to give an annual yield approximately 1 per cent higher than the first mortgage bonds. If earning not more than one and one-half times, then the rate must be considerably greater. Unless there be a substantial margin, they can be sold only at a great sacrifice in price and the payment of a correspondingly high rate, if salable at all, which depends upon varying conditions and circumstances.

(c) The principle of the equipment bond is identical with that of the purchase of furniture upon the "instalment plan," and to the poorer companies involves similar hazards and hard-hips. Perhaps no one financial practice has so frequently involved the railroads in disaster as the free use of this method of credit. Under ordinary conditions moneys so obtained involve the payment of 20 per cent down and

*Government control temporarily may shelve the question of working capital and chance somewhat the technique of dealing with labor problems; but the fundamental principles which are the foundation from which railroad problems should be viewed are not changed by the war expedient of government control.

annual payments of 10 per cent of the remainder, as well as the payment of interest, so that the liquidation of the loan thus obtained imposes upon the railroads the obligation to pay it off at the very burdensome rate of 14 per cent a year. At the present time, with the very high cost of equipment, running in some cases 150 per cent in excess of that prior to the war, these instruments cannot be generally utilized.

(d) Short-term notes are temporary borrowings running usually from six months to three years, the cost of which increases with the increased length of duration. They are at the present time practically the only instrument of credit available to the railroads and are, in essence, a bankers' accommodation rather than an investors' lodgment.

(e) The margin of credit for preferred stock may be approximated by combining the interest and dividend charges and considering the ratio between these combined charges and the net earnings available for their payment. If the combined interest and preferred dividend requirements are earned one and one-half times, a fair basis of credit is established. If the net earnings are double the amount, the credit basis would be high.

(f) At a time when the public was not only invited but urged to put its money into railroad properties, the common stock was offered as an opportunity for speculative profit. If it be assumed that, as distinguished from this, some fixed dividend rate is to be looked for, then it is obvious that both such dividend rate and the margin of safety in respect to earnings for common stock would necessarily, by reason of the greater risk of capital, be greater than that for the preferred stock. How much can only be determined by experience and by a consideration of other opportunities for investment open to prospective purchasers.

(g) Any consideration of the subject of credit would be incomplete that, besides noting the payments of the principal of equipment trust notes, failed to call attention to the amortization of bond and preferred stock discount and expense; to sinking funds for the extinguishing of mortgage and other securities; and to the effect of the provision for these payments upon the cash situation of the railroads.

Competition for Investment Funds

The railroads seeking to attract a portion of the investment funds are not monopolies but competitive enterprises.

The rate of growth in their passenger business for the past ten years has not kept pace with that of the freight business; notwithstanding a heavy reduction in their rates of fare, due largely to the development of the automobile, the seating capacity of the pleasure automobiles today being greater than the aggregate seating capacity of all railroad and traction cars.

The parcel post has invaded the field of the express and merchandise movement. The law contemplating a handling here similar to that in European countries of maximum packages of 11½ lb. has been so construed by the postmaster-general as to promote shipments of 50 lb. and further increases are in contemplation.

Road competes against road, facility against facility, commodity against commodity, community against community, while some agencies, such as the shallow waterways, are maintained at public expense, not as legitimate means of transport, but for the sinister purpose of breaking down railroad rates through their subsidized activities.

In few fields of enterprise is competition keener or the hazard of investment more dependent upon competence of management.

The railroad once constructed must remain where it is, notwithstanding conditions that may reduce or totally dissipate its profits, while capital once invested in it is immovably fixed.

Additions to plant and enlargements of service may be arbitrarily required by lawful authority, while all the advantages of large business, improved methods and econom-

ical devices may be swept away by arbitrary though lawful reductions in rates.

The natural timidity of the investor in railroad securities is excited to a panic condition by two prime causes. He sees:

	Per Cent.
the United States Government, through the Fuel Administrator, fixing the price of coke at an advance of.....	216
the United States Government, through the President, fixing the price of wheat at an advance of.....	156
the United States Government, through the President, fixing the price of bituminous coal at an advance of.....	115
the United States Government, through the President, fixing the price of pig iron at an advance of.....	105
and the United States Government, through the Interstate Commerce Commission, fixing the freight rates of the railroads at an advance of....	4

So much he feels for the prospects of the future return upon the investment.

He sees, also, the United States Government engaged in a valuation of the railroads; a valuation that sees no value in cash on hand, the lawful money of the United States; no value in material and supplies on hand; no value in terminal facilities if organized under joint corporate enterprises; in fact, a valuation radical in origin radically administered.

So much he feels for the prospects of the future value of the property upon which the investment is invited.

Capital Requirements

All moneys available for investment represent savings. It is fashionable in some quarters to decry the institution of property, but it is upon the institution of property that our industrial civilization rests. The important fact about capital is not its unequal distribution or that some possess it in great amounts, but rather that some have had the wish, the determination, the self-sacrifice to save and that they have been willing to put their savings to the general use.

The total of railway capital outstanding in the hands of the public is reported by the Interstate Commerce Commission to have been in 1915 in excess of \$16,000,000,000. The number of employees reported by the commission is close to 1,500,000, so that for each name on the payrolls of the railroads there is an approximate investment of \$10,000, and each additional name added thereto must be predicated upon the provision of an additional sum of \$10,000.

At the extremes of the list of those making investments stand the conservative and the speculative investor. Among the first are a large number (banks, insurance companies, trustees, executors, etc.) who by law are limited to securities meeting certain requirements, including usually, in the case of railroad bonds, the maintenance of minimum dividend payments upon stock for a series of years. A suspension of dividends would close this market and may lead to extensive selling. On the other hand, a forced recognition of the loss of all the equities from which speculative value rises would destroy the worth of the common stock, which constitutes that final margin of credit upon which all the other securities depend.

The Vital Need

Exaggerated statements are much in vogue as to the financial needs of the railroads. There is about \$200,000,000 of maturing securities falling due in each of the next three years. If necessary, these could be extended by legislative enactment.

I do not believe that under present conditions the railroads can obtain, need, should have or could use any very considerable sums of capital funds. Their activities should primarily be devoted to and definitely subordinated to the winning of the war, and that is true also of the public they serve.

For this purpose no considerable additions to their fixed plant or equipment are necessary. Were they able to pay for and disposed to make such additions, the country would not be warranted in now taking on such additional burdens. Certainly no more should be spent for such purposes than can be paid for through the use of short-term notes or provided from surplus earnings under a proper rate structure. Should the margin for increased movement be exhausted, then in this country, as among our allies, shipments should be resolutely and remorselessly restricted. We are at war, at war for

our very life, and the railroads must be accommodated to this condition, strengthened where strengthening is necessary, their use restricted where such restriction is necessary. At this time of war, "on the minute" service for pleasure and civil commerce is as much out of place as is wasteful living. What is vital is that the rate structure should be so fixed as to set at rest the fears of security holders, relieve the minds of the management of the fear of disaster, make the finances of the companies secure, their funds ample, their circumstances easy, their movements free.

World's Money Markets, Now and After the War

The Greatest Wisdom and Foresight Will Have to Be Exercised to Meet the Delicate Situation That War Has Brought About

By Sir George Paish

RARELY HAS THERE BEEN greater difficulty in coming to any definite conclusions as to the future course of the world's money markets, and were it not that the world's common interest was likely to induce, indeed to compel everyone to act with great consideration and with a quite unusual degree of wisdom, one would not be so hopeful about the future as the facts of the situation now justify. Actual experience of what has been accomplished during the present war fully warrants one in anticipating that any further difficulties will be safely overcome and that the world's credit system will emerge from the extraordinarily trying ordeal to which it has been subjected not only uninjured but greatly widened and strengthened. On every hand admiration is expressed for the wonderful manner in which money has been provided for war in all the belligerent countries and everyone now recognizes that such things would not have been possible but for the growth of banking and investment which had rendered the credit system prior to the war so powerful and so efficacious in supplying the world with the capital it needed for the development of its natural wealth and manufacturing power, as well as for the provision of the machinery of transportation and of distribution.

No more convincing testimony to the efficiency of the credit system in providing money for war is required than the fact that all the money needed to finance the colossal expenditures of this war has been supplied on the general comment that if so much money can be found for war then why not for improving the condition of the great mass of the people in all countries.

Certainly the credit system has attained a reputation in war which it will not be easy to live up to in peace, and it is partly because everyone now recognizes that bankers and investors in giving credit are able to create wealth that there is some uncertainty about the future. All the old landmarks and tide levels upon which bankers used to rely for guidance have been swept away by the great torrent of credit now sweeping over the world. It is obvious that the credit system of the past was merely a child in comparison with what it will be in future now that in the present emergency it has become fully grown.

When one considers how greatly credit has contributed to the expansion of the world's wealth in general and to the well-being of these countries in particular in which it was most highly developed before the war one realizes that after the war is over the well-being of the race will show a rate of progress never hitherto witnessed now that the possibilities of the credit system are so widely recognized;

that is, provided that the war is ended by a democratic, clean and good peace.

To appreciate the course of the money market not only during the war, but after the war is over, it is essential to take the experience that is now being gained by the public into account.

The experience gained of war in these days shows that with everyone co-operating and with everything possible being done to facilitate the creation of credit both nationally and internationally there is practically no limit to the amount of money that can be borrowed both from bankers and from the investing public.

Of course, it is essential that we should all realize that at the present time these vast credits are not adding to the permanent wealth of the world and that for the greater part they are pure inflation, forcing up the prices of commodities, wages and profits. Nevertheless, they are attaining the end in view, the stimulation of human effort to produce things needed in a great crisis and to enable war to be waged on a scale never hitherto regarded as possible. Nor can it be denied that if the object in view had been the creation instead of the destruction of wealth that the world's well-being could have been enhanced in a most remarkable manner by such a vast creation of credit.

And no one can doubt that the world having had such an object lesson in the possibilities of credit will seek to apply its advantages after the war to the production of wealth and that as a result of this wider knowledge and appreciation of the power and the value of credit, wealth will increase much more rapidly in the future when the war is over than it did in the past.

Future of Money Market

It is the situation thus created that renders any forecast of the future of the money market a matter of very great difficulty.

One thing, however, is clear—that there will be no lack of demand for banking and investment money in all countries, both for the purpose of pursuing the war and, when peace comes, carrying out the work of reconstruction. The proportions of the sum required that will be provided by bankers and investors respectively cannot yet be decided. That depends upon many considerations. Just now investors in Europe are disposed to think that the war has entered upon its last stages and that the economic pressure upon Germany and Austria will at last have the desired result and are rather more disposed to allow their money to accumulate in the hands of bankers until they can form

a clearer idea of how long the war is likely to last. The consequence of this is to bring about a plethora of banking money in London and to cause bankers to reduce the rates of discount and the government its rate for treasury bills. But already a greater attractiveness of government bonds in comparison with bankers' deposit rates and treasury bills is again causing investors to subscribe to the government loans more freely.

Fluctuations of this kind are, of course, inevitable and can be more or less ignored, the essential factors in the situation being the constant need of all the money that can be supplied both by bankers and investors in all parts of the world until the war is over.

After the War Conditions

In considering the post war situation, account must first be had of the position that the war will leave. First of all, we shall have the fact that the belligerent nations will be heavily indebted to the rest of the world for produce and foods supplied during the war, the payment of which they have been allowed to finance temporarily in the countries from which the things have been bought.

Of course, if the countries in which these temporary loans are incurred were to demand immediate payment of the money due to them a very awkward situation would arise. But they are likely to do nothing of the sort. In the past, these countries have obtained very valuable help from France and Great Britain in the shape of immense loans of permanent capital for the development of their resources and now that the situation is reversed they are likely to act with the same consideration as was shown to them, and to make no demand for payment which cannot be readily met.

What is likely to happen is that these countries which normally are borrowers and not lenders and need to import more goods than they can usually pay for by exports will, after the war is over, again begin to go ahead and will take payment of the loans they have made to other countries during the war in the goods they need for their development. In other words, they will gradually take back the capital which they have accumulated abroad during the war from their great sales of goods and produce and will not need to borrow from other lands until the money due to them is liquidated. In this way the balance of trade against the belligerent nations that has piled up during the war will be gradually adjusted until eventually the effect of the war entirely disappears and the world resumes business as usual.

The inevitable effect of this situation will be to maintain prosperity and the volume of business in the countries that are now greatly adding to their wealth and are in a position to ask for payment after the war for the produce and goods sold to the belligerents during the war. On the other hand, the need to repay these loans will compel the belligerent nations to become both economical and efficient in order to produce the goods they will require to export in order to redeem the debt they have incurred to other nations as speedily as possible.

Maintaining Present Prosperity

Possibly, but not probably, this temporary debt will be liquidated by sales of securities possessed by the warring countries whose holdings of foreign securities alone amount to some £7,000,000,000 (\$35,000,000,000). But inasmuch as the countries to whom the money is due will for the most part need it for new capital expenditures not much of the debt is likely to be liquidated in this manner.

But whatever view is taken it is obvious that the international financial situation after the war will be a very complicated, not to say a delicate one, and will need to be handled with the greatest wisdom and circumspection.

Indeed, the importance of adjusting the financial situation will not be inferior to that of finding a solution of the

economic situation. In Russia we see that food is plentiful in some parts of the country, while in other parts vast numbers of people are starving because they have not the means of purchasing the food they need. No very great difficulty would have been experienced in adjusting this situation had the rulers of Russia really wished to do so, had given a reasonable amount of thought and good will to the matter, and had applied themselves to adapting the country's financial machinery to its economic needs.

It is of supreme importance that a situation such as that now existing in Russia should not be allowed to arise in the world at large after the war, with consequences as appalling as, or even more appalling, that have been witnessed in Russia.

Already suggestions have been made to bring about an understanding between all the nations of the world for the purpose not only of mutual defense and protection against any aggressive country in future but also to deal with the grave economic situation likely to arise after the war when the peoples of the enemy countries will be prepared to bid for food and raw material at any price unless an arrangement has been already reached for distributing the world's supplies of the essentials of life equitably between the nations. And it is obvious that a similar understanding is demanded for dealing with the financial situation not merely for the purpose of dealing with the problems directly arising from the war but in order to provide the poorer nations of the world with the financial assistance they will urgently need in order to enable them to pay for the food and raw material they will want to preserve them from starvation.



AIN'T IT A GRAND AND GLORIOUS FEELING ?

Making Our Resources Available for War

The Duty and Responsibility of the Individual American for the Successful Prosecution of the War

By John E. Oldham

Merrill, Oldham & Company.

THE great responsibility which the United States assumed by its entrance into the war, while not fully appreciated at the outset, is becoming more generally recognized with the progress of events from day to day. That the government has enormous tasks before it the necessities of which must be stated in millions of men and billions of money is a fact of which the significance is not easily comprehended.

It is vaguely understood that the resources of the country must be mobilized, organized and regulated, and that this involves a change from a nation of individual effort to a nation preparing for a serious, if not a desperate struggle for its own preservation. It is not difficult to understand how the work which is to be done by the army and navy will contribute to winning the war and to understand the importance of the activities that support them in the way of supplies, ships and hospitals. It is, however, difficult to see and appreciate the extent to which these activities are dependent for their success on the everyday activities of the balance of the people.

It is obvious that activities directly connected with the war will require the combined efforts of an immense number of people, and every day sees a great number of persons in civil life leaving their former occupations and taking up posts in the service of the country; placing themselves behind the army and navy in various ways and becoming part of a great national organization. Yet, except as war activities occasionally reach out to the individual in the form of a suggestion by some regulating body as to conservation of coal or food, or an appeal for funds or supplies for hospitals or relief work, the average man or woman has a feeling of detachment and of bewilderment in the magnitude of events that are taking place, and of insignificance and helplessness in finding any definite way to be of service. Nevertheless, in spite of the fact that every individual cannot be directly associated with government activities or with great organizations which supplement the government, he can be a part of the machine which is to carry on the war. On his own initiative and without association with others he can give as much faithful service, and as much assistance, and bear as much responsibility as if he wore a uniform or received his orders directly from a superior in the government employ.

The part which individual service accomplishes is difficult to understand unless considered in relation to the whole situation. Considered in this way it should be evident that effective service at the front is made possible only by service behind the lines; and the most valuable service behind the lines consists in making the resources of the country available for war.

Every effort, therefore, which serves to make them available—whether it is an effort to produce or conserve—is a direct contribution to winning the war. To make resources available which otherwise might be lost through waste, extravagance, or imprudent use is the primary purpose of the nation-wide campaign for thrift and economy; for resources which are made available through savings are as valuable as those which result from increased production.

The importance of thrift and economy in effectively organizing the country for war becomes evident "if we think

of finance in terms of labor instead of in dollars," as suggested by Mr. Everett Moss, of Boston, in his pamphlet entitled "Patriotic Economy"; the term labor as used and defined by him being understood to mean "personal service, whether of brain or of brawn, of the forty million of us who are engaged in gainful occupations."

The resources of the country can be made available for war only by the use of labor, and it is therefore clear that labor which is employed to perform tasks which are not absolutely necessary, which benefit the individual only, or which might be deferred, cannot, at the same time, be at the disposal of the government.

While the amount which can be contributed by the efforts of any one individual when considered by itself may not appear to be of great importance to the situation, yet it must be recognized that the efforts of millions of people when combined and taken collectively become a tremendous force. Failure to recognize that these facts apply to the present situation would appear to account largely for the difference of opinion on the part of the advocates of "business as usual" in war times, and those who contend that economy and thrift are factors of the greatest importance in the prosecution of the war.

The following illustrations are presented with a view to showing what it means in a practical way to utilize the full resources of a community or nation, and with the hope that they may serve to bring about a better understanding of the valuable and helpful service which can be performed by those not engaged directly in war activities.

Let us assume a community with no purpose except existence from day to day, making it necessary only to provide food, shelter and clothing. Let us further assume that the labor required both for production and distribution prorated over the whole population accomplishes the desired results by all working four hours a day.

If one-half of the people of this community were willing to work eight hours a day, this would permit the other half to remain idle.

Again, let us assume that one-half of the people are willing to work eight hours a day and continue to have no thought beyond their day-to-day requirements, but that these requirements are extended to include some kind of pleasure or luxury which does not increase efficiency or add to the general welfare of the people as a whole. Further, that the services of one-half of the people for eight hours a day are necessary for this additional requirement. In this community we would have labor fully employed; eight hours of labor being required of one half of the people to provide the necessities and eight hours of labor being required of the other half to provide luxury and pleasure.

Now let us assume a community of more progressive people with aims beyond the immediate satisfaction of their daily necessities, denying themselves pleasures and luxuries, and unwilling that any part of the population should remain idle. We might again have one-half working eight hours a day to supply the physical necessities of the whole population, and the remaining half—instead of staying idle or instead of being employed in furnishing pleasure and luxuries—devoting its efforts to furnishing better living conditions, and means of increasing production which will

eventually save labor, and producing a variety of other things which will serve some useful purpose in the future. With increased productive capacity the necessities of living would be supplied with less effort in the future, thus requiring the efforts of a smaller part of the population; the number available for employment in doing things which add to the comfort and welfare of the whole community would be automatically increased; the cumulative efforts of that part of the population not required to furnish the necessities would be the surplus production or savings of the community put into a form which would represent permanent wealth.

In the Case of Emergency

Let us consider that a disaster of some kind threatens these communities and for protection it is necessary in each instance to make use of every available resource. In considering this matter let us assume for the purpose of illustration that an eight-hour day is the limit of the capacity of the individual for the most efficient service and, further, that the resources when made available are most efficiently used.

In the first illustration the hours of labor would be increased for the whole population from four to eight hours. In the second a day's labor would be required of one-half of the population which would otherwise be idle. In the third labor would be diverted from the requirements of pleasure and luxury, and in the fourth labor would be diverted from activities which for the most part are devoted to the increase of permanent wealth.

This broad classification of the employment of labor applies as well to communities whose activities are varied and complex as it does to those where the activities are more limited and simpler in character. The composite of the four illustrations above results in a situation which is not unlike the situation of this country to-day. There is need for mobilizing our entire resources, and if we exclude for the time being such important additions as would result from the elimination of waste and an increase in hours of labor, the extent to which the resources of the country are made available for the prosecution of the war will be measured by the extent that labor now devoted to purposes other than the necessities of everyday life is made available for use by the government.

A difference of opinion may well exist as to what constitutes the actual necessities, what amount of effort should go to furnish necessary recreation and pleasure which serve to maintain health and to further efficiency; what enterprises should be promoted and what should be postponed; whether the curtailment of the production of things which are not essential to carrying on the war should take place immediately or develop gradually. Whatever difficulties are presented by these considerations are difficulties which have to do with the application of the principle and do not involve the principle itself.

A Service Everyone Can Render

The conclusion is inevitable that it is possible for everyone to render the government a service of first importance not only by reducing his personal requirements to the necessities, but also by the frugal use of these necessities, in order that the labor of the country as far as possible may be devoted to industries connected with the war.

A further service is the transfer of the control of labor which is thus made available, for it cannot serve the purposes of the government until the right to its use has been relinquished by the individual and transferred to the government. This service is the help which is contributed through the payment of taxes and by the purchase of government bonds. It may be noted that the payment of taxes calls for the permanent surrender of the right to the use of

a given amount of labor without compensation and is compulsory, and not voluntary. The purchase of war loan bonds, on the other hand, is a voluntary act and consists of a temporary surrender of labor with compensation for its use; the right to this use to be restored at some future time.

This transfer to the government of the right to the use of labor involves a financial transaction and is usually accomplished by the use of banking facilities. As all financial transactions of large amounts are handled in this way it will suffice for the purpose of illustration to consider this method as covering all transactions. A practical application of the foregoing may be seen from the following illustration adapted to an income of \$5,000.

When we say that a man has an income of \$5,000, we mean that he will receive in the course of the year the right to use labor for such purposes as he may choose to the extent of that sum of money. He may find that one-half of this amount, or \$2,500, will be required for labor to provide his necessities.

Perhaps he will be required to turn over a further amount of \$200 worth of labor to the government in payment of his taxes. With \$1,300 of the balance he may purchase labor to provide him with luxuries and pleasures, and the balance of \$1,000, for which he had no immediate use, he may keep in the form of a deposit in his bank to be assigned temporarily to the use of the bank's customers; or he may decide to turn this amount over to a railroad or to a municipality by purchasing a \$1,000 railroad or city bond; thus lending to the railroad or the city the use of \$1,000 worth of labor which will probably be used for construction of a permanent nature and thus add to the wealth of the community.

Disposition of the Surplus

It will be seen that after providing for the labor which supplies his necessities and the labor which he is required to contribute for the support of the government, he has the disposal of \$1,300 worth of labor, which may be used for luxuries and pleasures, and \$1,000 worth of labor for which he has no immediate use. It is the labor which can be used for these purposes, which in this case amounts to \$2,300, that the individual can put at the disposal of the government, in one form or another, and if he can reduce his necessities this amount may be still further increased.

Assuming that this \$2,300 exists as a bank deposit and is to be placed at the disposal of the government, the transaction is accomplished by the purchase of government bonds. This is equivalent to a transaction which results in transferring to the government the right to check against the bank account and the consequent release of any claim upon labor which it carried with it. The amount in the bank account remains unchanged by the transfer. It will still be used for the employment of labor, but the labor will be used by the government for purposes connected with the war. As a matter of fact, in its final effect a purchaser of government bonds temporarily loans labor to the government and merely postpones until a later date the full use and enjoyment of that labor for his own purposes. It is obvious that money enters into the transaction merely to facilitate the transfer of the right to the use of the labor.

With these principles in mind it seems clear that the individual—even though he is not directly connected with war industries or activities which are primarily war activities—is, nevertheless, a most important and necessary part of the machinery for carrying on the war; and that the measure of his contribution to winning the war will be determined by the extent to which he conserves his resources and makes them available for the use of the government.

While great emphasis was placed upon the importance of everyone subscribing to our recent war loans to the extent of his ability, the fact should be kept in mind that these

subscriptions serve only as the agency for transferring labor resources from the individual to the government, and cannot be of real value unless they fulfill this purpose.

Subscriptions based on money borrowed from the banks make no transfer of this kind at the time of the subscription and consequently do not increase the resources of the government in any way unless and until the loans themselves are liquidated by accumulated savings. It follows that subscriptions which were made with the intention of liquidating the loans by selling the bonds, instead of by accumulated savings have not served directly, at least, a permanently useful purpose. These subscriptions have merely resulted in placing the government in a position to enter the market in competition for the existing labor supply, and this could have been accomplished as well by the government making arrangements to borrow from the banks without the intervention of the individual. The economic effect is the same, whether the government borrows directly or through the individual. In either case the demands for labor result in higher costs for labor and higher prices for the things into

which labor enters, thus correspondingly increasing the cost of carrying on the war.

At best, these increasing costs cannot be avoided entirely as the supply of labor during the war will be unequal to the demands of both the individual and the government, but they can be substantially minimized by the individual decreasing his demands for labor for his own purpose. When this is fully accomplished and not until then can it be said that the country is efficiently organized for war and that the business of war is the sole business of the country.

Vast as are the resources of this country they are not unlimited. They cannot be made to do double duty; they cannot supply the luxuries and comforts of living to which people are accustomed in times of peace and at the same time provide for the necessities of war. The responsibility of making these resources available for the purpose of the government rests on no individual or group of individuals. It is a responsibility which concerns the whole people and can be met only by personal sacrifice and self-denial on the part of each and every one.

Government Operation of Railroads: Legal Aspects

Owners' and Creditors' Rights Are Almost Wholly Subordinated to Expediencies of the Government

By Roberts Walker,
White and Case.

THE FIRST THOUGHT of the average lawyer is that there are no legal aspects to our present governmental control of railroads. The actual taking over was a matter of war necessity, not of constitutional prerogative. Built upon this undeterminable power, the superstructure may or may not bear some resemblance to the body of adjudicated and statutory rights with which lawyers are conversant. At any point the paramount Federal authority may change or ignore some rule of law, no matter how definitely established. And in so doing, the Federal power might nevertheless be functioning in accordance with what was best for the nation and the railroads alike.

It would be hazardous to forecast the future of our Federal commandeering. It has not proceeded far enough to develop settled principles. It is still largely in the phase of investigation and correlation. The direction of the entity has hardly begun; the vertebrae and ribs of the Government's transportation beast are not definitely located. The statutes and a few instances are all that we can examine.

Contemporary Statutes

The general appropriations act of July 1, 1916,¹ gave the Interstate Commerce Commission \$3,500,000 with which to continue valuation work and secure information as to "stocks, bonds and other securities," carrying forward this dubious task. The Newlands Commission was created² to investigate the carriers. The Council of National Defense was³ required to investigate the railroads, looking to their co-ordination for defense and commerce. All this legislation was passed eight months or more before the United States declared war.

Controlling Statutes

Inserted⁴ between provisions for a bridge at Fort Riley and for horses for the militia, is the following:

"The President, in time of war, is empowered, through the Secretary of War, to take possession and assume control of any system or systems of transportation, or any part thereof, and to utilize the same, to the exclusion, as far as may be necessary, of all other traffic thereon, for the transfer or transportation of troops, war material and equipment, or for such other purposes connected with the emergency as may be needful or desirable."

The mental picture evoked is the temporary, emergency use of a route of travel—railroad, steamship or highway—to carry troops or munitions from Waco to Galveston, or from Pittsburgh to New York. There is no suggestion that railroads off the usual routes of such movements will be taken. All "other" purposes are "purposes connected with the emergency."

The statute used three basic words:

Possession,
Control,
Utilize.

The President's proclamation of December 26, 1917, added a weighty fourth word, "operation," and directed that the

Possession,
Control,
Operation and
Utilization

should be exercised by the director general.

The only purported authority for the commandeering of railroads generally, as far as this proclamation discloses, is the quoted language from the two joint resolutions⁵ declaring a state of war with Germany and Austria-Hungary, wherein "all of the resources of the country are hereby pledged by the Congress of the United States." These words cannot be said to constitute a taking-over; they doubtless

¹39 Stat. 262, 281.

²Joint Res. July 20, 1916; 39 Stat. 387.

³Act of August 29, 1916; 39 Stat. 619, 645.

⁴39 Stat. 649.

⁵Of April 6 and December 7, 1917, respectively.

reflect the feelings of every right-minded citizen, but, viewed as a statute, they lack all requisite provisions respecting compensation, without which such an enactment is idle under our constitution. Thus the initial operation of railroads, in so far as not clearly for "purposes connected with the emergency," had no statutory warrant. Nor, it is hardly necessary to add, has it any constitutional foundation: the Congressional rights "to regulate commerce" and "to establish . . . post roads," even if pertinent, have not been invoked by Congress.

Such was the statutory situation on December 28, 1917, when the railroads were actually taken over.

These comments are made in no controversial spirit, but we should realize how far the executive took unto itself powers not wholly supported by legislation. From its practical side, it was better to commandeer the railroads "all or none." From the governmental view-point, the effective way, and the fairest method to each railroad, was to take them all.

It is plain that those in authority have themselves given some thought to these conditions. In the compensation statute,⁶ passed nearly three months after actual possession and operation had begun, there are patent efforts to correct the statutory situation by express ratification or acquiescence. "The President having in time of war taken over the possession, use, control and operation," are the first words of section 1. By section 9, the provisions of the act of August 29, 1916, "except as expressly modified and restricted by this act," are kept in full force and effect, "and the President in addition to the powers conferred by this act, shall have and is hereby given such other and further powers necessary or appropriate to give effect to the powers *herein* and *heretofore* conferred. The provisions of this act shall also apply to any carriers to which federal control may be hereafter extended."

Thus the statutory state of affairs, in somewhat back-handed and *nunc pro tunc* fashion, has been made nearly satisfactory. That to which Congress expressly submits may perhaps be deemed to be that which Congress expressly authorizes. And any constitutional objection is met at the threshold by the manifest effort to provide adequate compensation and due hearing as to its adequacy. Federal operation is in the saddle, under conditions which no one will or should attack. For the best prosecution of the war, this great experiment must be given most thorough trial. In a number of cases, the compensation formula would work injustice, but means are provided for special treatment of special cases. There is likely to be some friction as to what may properly be charged to expenses; a symptom of this is the attitude already announced regarding fiscal offices in metropolitan cities, off-line counsel, etc. It is only natural that the Government, being entitled to the net revenues, should seek to enhance them by forbidding questionable deductions from gross revenues. Whether it necessarily follows that proper expenses disallowed by the director may justly be saddled upon the railroad's compensation is a question awaiting settlement. It may well be that the federal authorities will discover that successful operations will not by themselves restore railroad securities to the favor of investors. If the government should contemplate public sales of railroad bonds, it must give heed to the marketwise features to which investors are now thoroughly wonted, and provide (in the same spirit with which it has handled the Liberty Loans) convenient paying offices, registration, "splitting" facilities, and all the rest. The modest cost of the average eastern fiscal agency of a southern or western railroad is ordinarily quite justified by its importance to the general standing and marketability of the securities.

These and other areas of irritation are, however, only the growing pains of a nation just attaining stature as a warrior.

⁶ Act of March 21, 1918.

The corporations are all kept alive. They are merely ousted, temporarily, from the possession of their properties. Counsel for the director general likens his possession to a "lessee interest." While not a totally correct picture, the analogy is close enough. Each carrier corporation has become a landlord. It trusts that it owns a reversionary interest, but is not certain. Considering the involuntary nature of the arrangement, the director general's estate is more like that of a receiver; but reasons appearing elsewhere will indicate why that analogy may be distasteful: it involves possible clash with receivers already existing, while the government must assert paramountcy.

At all events, the corporation is to receive a cash compensation, which its directors in proper cases may distribute to stockholders by way of dividends. Prudence will dictate what part, if any, of the compensation must be accumulated against the day when the carrier gets back its property. The policy exercised by the director as to additions and improvements, in a given case, may thus be reflected in the rate of the dividends distributed.

Rights of Bondholders

The intention of those in authority seems to be that the rights of bondholders shall not be affected. It is true that one great right—that of holding the mortgagor accountable under its covenants to repair and improve—has been swept aside. But the right to receive payment of interest and principal remains unaffected. So, also, *probably* does the right to foreclose in event of default. We say "probably." On the analogy of the lessee estate, there should be no difficulty in foreclosing and selling subject thereto. As a bare theoretical matter, that is. But as a practical matter, there may well be a distinction and a difference. The courts will give weight to the fact of the director's possession, and presumably to his wishes as to the form and manner of sale. There may be questions as to whether improvements, not paid for by the carrier but by the director, though clearly intended to be covered by the granting clauses of the mortgage, will pass under the sale. And, as foreclosure usually involves reorganization, the director will be a further party to be consulted as to the form and terms of new securities, and the application of their proceeds.

Effect on Receiverships

When the director general assumed possession, several railroads were in the hands of receivers. On its face, the judiciary had control of these railroads, to the exclusion, on the theory of concurrent jurisdiction, of the executive, because the judiciary had exercised its power earliest. No clash is likely, it would seem, to develop on this point. The judiciary will probably lay aside its technical position, and look at the matter from a national viewpoint, recognizing a paramount right in the executive in the stress of war.

A subservient attitude on the part of the courts would not, however, fully meet the equities of the occasion. Suits are in progress to enforce bonds or equipment trusts—real contract rights, acquired for value in good faith, which the government should be no less anxious to safeguard than are the courts, if the securities of railroads are to maintain and improve their investment position. These litigations will of necessity proceed and must some day reach the stage of decree. Perhaps the next development will be in the form of decree. Instead of the foreclosure and sale, the courts may decree the *reorganization*, providing what new securities shall issue and on what terms they shall be exchanged for the old ones. Such a decree would accomplish everything possible during possession by the director general, since a sale subject to his possession would be a rather fruitless proceeding, and the question of rehabilitation expenditure is in his hands rather than those of the reorganizers. The fear of not barring dissentient

bondholders unless a sale be had, should be largely abated: that which is adjudicated with the sanction of the federal authorities will hardly be attacked successfully if and, or when federal control shall have ceased.

Closer at hand is the question of the correct posture of the receiver himself, vis-a-vis the director general. Theoretically the receiver is an "indifferent person" through whom the court seeks to manage justly for all interests concerned; practically, he responds to the preponderant groups of securityholders who are seeking the court's aid. In either case, he represents a viewpoint athwart that of the director general, who is operating for the nation during a crisis. Receivers will therefore have to decide whether to become the operating subordinate of the director, or to remain the manager for court or creditors. Upon electing the latter, the receiver will be shorn of all operating duties and powers, for these the director must control, and will become the custodian of non-operating assets, some few other sticks and chattels, and possibly of the government compensation. The courts will probably be amenable to suggestions of this character.

The Case of "Denver"

The director general had assumed possession before the application for a receiver of the Denver & Rio Grande Railroad. The court proceedings then marched up the hill and down again.

A general creditor filed a bill for a receiver, and the railroad answered, confessing and consenting. A hearing on the appointment was ordered. At the hearing, the Equitable Trust Company, with its \$38,000,000 judgment on the Western Pacific guaranties, was present. The director was represented only by a letter from his counsel. The court order was prefaced with a paragraph recognizing the possession of the director general, and went on to appoint receivers in the customary manner. This did not suit the director, whose counsel wrote to the court stating it to be "necessary that a line be drawn between the federal control and the receivership; that is, that the receivership deal with the corpus and with the assets belonging to the road at the time of the effective date of the proclamation. That the operation . . . of the railroad as a going concern shall be under the direct charge of the director general and not in any way affected by the receivership." The counsel outlined the precise steps desired, and the court obediently entered a new order, pursuant to which one receiver resigned to become the director's operating agent, while the other receiver was relegated to a custodianship of non-operating assets and of government compensation.⁷

This brief history is expressive of the director's policy toward receiverships. While to the conventionally minded it would seem to ignore established rights of securityholders and creditors to the administration of their debtor's affairs by courts of equity, the necessity from the government's view-point of unified complete control will probably be accepted as entitled to the right of way over all usual considerations.

Rates

By the compensation act, the President "may initiate rates, fares, charges, classifications, regulations and practices," immune from suspension. The Interstate Commerce Commission may, however, hold hearings on such tariffs, upon complaint, and make and enforce orders respecting same; but the commission must give weight to any recommendation the President may transmit as to the need for this or that increase.

This is a great step toward equitable tariffs in this country. For years we have gone on adjudicating as between

one destination and another, or one producer and another. But the real problem has never been touched. There has been no disinterested manner in which rates could be fixed as between one commodity and another, no authority which could keep desirable water competition from being killed out, no power to eliminate many underlying principles sanctioned by long practice, but not invariably just or reasonable. The opportunity for scientific treatment of rates and practices has at last arrived, and the greatest good or evil to the shipping public will depend on the use made of these tremendous powers.

The 15 per cent increase granted by the commission about the middle of March, while welcome, is an illustration of what ought soon to be regarded as an antiquated and barbarous method of dealing with the rate fabric. A general 15 per cent raise cannot fail to intensify every existing disparity as between commodity and commodity, classification and classification. It is to be hoped that this will be the last rate increase of the "horizontal" variety.

General

He is wise who can, and bold who will, prophesy the course of events in railroad properties. Inspection of the present factors, however, indicate a few principles:

- (a) Each corporation is being preserved as such.
- (b) Securities are being recognized and not disturbed.
- (c) There is no talk, as yet, of conveyances or consolidations or mergers, of reincorporation, or of dissolution.
- (d) The regulative methods are built upon the existing scheme of things, and no upsets or sweeping changes are suggested.

These and other signs can be read to indicate that the properties will go back to their owners when the war emergency is passed. They are not symptomatic of government ownership, but merely of government rental and tenancy.



"THIS IS YOUR SECURITY"

⁷Not then provided by statute, the court's phrase was "all rights and powers which may be hereafter created in favor of said . . . Railroad . . . by Act of Congress or otherwise."

Banking Institutions to Finance Our Future Abroad

Establishing Foreign Branches Is Not as Effective as Forming Affiliations or Partnerships With Separate Banks

By Albert Breton,

Vice-President in Charge of the Foreign Department of The Guaranty Trust Company of New York.

TO CONTINUE TO HOLD the commercial and financial supremacy we have gained through the war, our merchants and manufacturers must become thoroughly and practically acquainted with the financial machinery for marketing and distributing their goods both at home and abroad.

One of the chief obstacles to the extensive development of our overseas commerce, in fact, has been a more or less general unfamiliarity on the part of our manufacturers with the means that our banks afford for the financing of this business. Another handicap to our progress in the lucrative fields abroad, which will be more important than ever when peace is established, has been the inability or disinclination of our exporters to grant the credit terms demanded by foreign reliable buyers. It is certain, for instance, that our exports to Latin America will not reach their peak until we extend as favorable terms as our competitors.

Bank credit bridges the gap between the raw material and the finished product—between production and distribution. There is no mystery and little complexity about financing foreign trade. The principles are the same as in domestic business. There are only the differences of language, differences of currencies, and the greater distances. A shipment of cotton from the United States to England will illustrate how the financing of exports is conducted under ordinary circumstances.

How Exports Are Financed

An importer in England desiring to purchase cotton in this country first goes to his bank in England and establishes a credit for a certain amount of money, which he estimates will be sufficient to cover the purchases he is about to make. He next instructs his agent in this country to purchase for him a certain amount of cotton and to draw sixty and ninety day drafts on the English bank where he has previously established his credit. These drafts are drawn in English currency, viz., pounds sterling. As a ninety day draft in pounds, shillings and pence, payable in London, would not be acceptable to the cotton grower in payment for his cotton, the American buyer arranges with one of the large banks in New York, New Orleans, Galveston, Savannah, or some of the larger cities to take these drafts and pay for them in United States currency, so the grower can immediately receive payment in money he can use. The buyer may make such arrangement with a local bank and the local bank may in turn make the arrangements with the larger bank, but this is a minor detail.

So far the transaction is simple, but now comes the phases which require expert knowledge, foresight and sound judgment. These sixty and ninety day drafts carry no interest and the sixty or ninety days begin only from the time such drafts are accepted by the manufacturer in England. Therefore, the bank purchasing such drafts must calculate the number of days it will be "out" the use of the money; that is, the time which will be required to send the drafts to England and have them accepted, in addition to the sixty or ninety days they must run after acceptance. This calculation is necessary not only to include a sufficient interest charge during the time the bank is "out" the money, but also for reimbursement of the principal itself. After the New

York bank has made these calculations, it is then in position to advise the cotton buyer, or the local bank, of the rate of exchange or the amount in United States currency it is prepared to pay for the draft drawn in foreign currency. The grower does not care anything about all this foreign figuring and calculation, as he simply sells his cotton at so much per pound, yet this process must all be gone through with and the machinery must be there or he could not get his money without great delays and unwarranted risks.

Larger Banks Have Better Facilities

The question is not infrequently asked, "Why could not the local country banks send the drafts direct to the English banks without making use of the large banks in New York, Chicago, New Orleans and other cities?"

There are many reasons why the local country banks are unable to do this, the principal reasons being the following:

The local banks have not sufficient capital and deposits to await the maturity of any considerable amount of drafts or even the time necessary to send them to Europe for acceptance, so that it is to their advantage to handle a greater amount and turn them over quickly at a moderate profit. Even the largest banks in the United States have not sufficient resources to hold all of these drafts until maturity. They sell, or discount them in Europe at every favorable opportunity, so they can be in position to take care of the constantly increasing demands on them.

These drafts are drawn by a great many people on a great many banks, and the credit and standing of the drawers, the drawees, and foreign banks must all be carefully looked into and watched, so that loss is not sustained through fraud or failure. This requires a credit department and extensive system of credit reports which a small bank could not support.

It requires the undivided attention of a highly trained expert to deal successfully in foreign exchange and a small or even a moderate size bank could not afford to pay for the services of such a man.

The larger the bank, the better facilities and the more economical in conducting the transactions, with resultant good to business generally. While a comparatively small number of banks deal directly with the European banks, there is hardly a bank in the United States which does not have transactions that are a direct result of exports or imports and the larger banks are the channels through which these transactions ultimately find their way to foreign countries and make it safe for the bankers of the country at large to finance shipments of products to foreign countries.

Necessity for Co-operation

Unless American bankers extend their foreign banking business our manufacturers, exporters and all those who are directly or indirectly allied with them will be seriously handicapped not only in promoting our foreign trade but also our domestic commerce, for the two latter are interdependent. But before foreign banking can be extended and before we can reach the object we wish to attain, many things must be done. Some of them are now being accomplished.

To extend our foreign banking we need, first of all, co-

operation. We must not attempt to extend our foreign banking by individual efforts. Our bankers must go abroad hand-in-hand, like brothers, like soldiers in a common cause, presenting a solidly united front, joining hands to build our foreign trade. Unfortunately the principles of democracy sometimes are opposed to co-operation. This government has been built on principles of decentralization, and this independence of powers and rights sometimes means antagonism to co-operation when it comes to foreign trade and international finance. Our Sherman anti-trust law, for instance, prohibits co-operation among manufacturers. It has been a criminal offense for manufacturers, producing a similar line of goods, to combine to sell their products in a foreign country, even though they do not agree to uphold prices, but simply desire to build up their business for their mutual benefit. The new Webb bill, however, provides very judiciously and patriotically that manufacturers may go abroad and work together in foreign commercial fields.

Merchant Navy Needed

Another thing that we need is a merchant marine second to none. We cannot have foreign banking without foreign trade, and foreign trade cannot be obtained without a merchant marine. We are building great fleets of ships, and, I believe, that the American merchant marine will be one of the most important benefits conferred upon us by the war. Strange to say, every calamity has some good result. The Spanish-American war, for instance, disclosed to us the need for the Panama canal when the Oregon had to go around Cape Horn. Our panic in 1907 showed the necessity for the Federal Reserve system, and by good fortune the Federal Reserve system had just been put into operation when this country was called upon to play such an important part in handling the finances of the Allies. Now this war has come, and this country is paying its very large part of the bill, but we are going to have a merchant marine, which will insure foreign trade, and consequently, foreign banking. The day the United States is rendered independent of foreign shipping by its merchant marine, as its accumulation of gold makes it independent today of foreign credit, we will have no difficulty in maintaining our place in the first rank among the great nations of the world.

American Leadership

I am firmly convinced that after the war we will play a prominent part in international banking and financing. We cannot expect our Allies to be able to pay on demand all the loans they owe to the United States. Our power arising therefrom will not be abused, but it certainly will entitle us to considerable influence in international conferences. Countries like Argentina, Brazil, China, and others will seek the co-operation of the United States, and will come to us because we will be in the best position to supply them with the things they may need commercially and financially. We will play, therefore, a very important part in foreign finance, and handle a large volume of foreign banking business. Instead of British, French, Belgian and German banking syndicates financing China exclusively, and instead of international industrial groups in China, composed only of Japanese, British, French, Swiss and German concerns, there will certainly be American participants. The British, French, Japanese and other foreign bankers will be glad to take us in as their partners. As it is our duty to help them today as our Allies, it will be our reward after the war to have them recognize our financial institutions as entitled to a prominent place in the world's finances.

There are opportunities for foreign banking in every country. There are many different ways in which business can be developed. One of them is the branch banking system which is very well developed in Great Britain, in Canada,

in France and in Italy. In Canada there are half a dozen leading banks which have branches all over the country. In England the big clearing house banks are established everywhere. They are daily increasing the number of their branches in every town, by absorbing local banks or by setting up new offices. In France there are three or four banks with branches all over that country.

Foreign Branches

The national bank act of the United States, however, does not permit a national bank to establish domestic branches, neither does the banking law of New York state permit a state bank to have branches in the state. But New York state banks or trust companies may establish foreign branches after obtaining the approval of the state banking department. National banks may establish foreign branches, too, with the approval of the Federal Reserve Board.

The national bank system which has proved a great success in Great Britain, Canada, France, and Italy, so far as local business in those countries is concerned, has not proved so satisfactory when extended abroad. On the other hand, foreign trade banks with foreign branches have been quite successful.

The large British banks have very few foreign branches, although an erroneous impression to the contrary seems to exist here. Lloyds Bank has a branch in Paris, which is really a separate company, although it bears the same name. The London City and Midland Bank, the largest commercial bank in Great Britain today, has no foreign branch. The Bank of Montreal, and the Canadian Bank of Commerce have no foreign branches outside of the United States and Mexico. The Royal Bank of Canada has branches in the West Indies, and has specialized in certain territories under the protectorate of Great Britain and the United States. It is only lately that it has been going to other foreign countries, such as Venezuela, Costa Rica and Spain.

The French and Italian banks have few foreign branches, but all the big banks of these two countries have affiliated institutions. In other words, they work on the principle that the world is divided into different races, into different commercial sections, and that to handle business in different sections, like Latin-America, the Orient, and in the colonies, it is better to establish a bank specially fitted and organized to handle business in the countries pertaining to each of the foreign groups.

The American banker today is confronted with the problem of how to extend his foreign banking business. He can solve the problem by establishing his own foreign branches, or by establishing special banks in the different countries of the world, or by forming partnerships or affiliations with foreign local banks. Which of these methods is best? When it comes to management and handling of business I believe, as stated above, that each section of the world should be considered separately, according to its race, its laws, its customs, and its commerce.

There is the Mercantile Bank of the Americas, for example, which has been established to handle business principally in Latin-America, with branches in Paris, Genoa, and Barcelona. It has banks affiliated with it—not branches—which it controls in North Brazil, Venezuela, Ecuador, Peru, Nicaragua, and Colombia.

The Mercantile Bank of the Americas is composed of the Guaranty Trust Company, Brown Brothers, J. & W. Seligman and Company, the National Shawmut Bank of Boston, the Anglo and London, Paris National Bank of San Francisco, and the Hibernia Bank and Trust Company of New Orleans. Thus it is an association of banks controlling extensive foreign business, and I am inclined to think that this system is going to grow to a much larger extent as soon as the laws of the different states are amended so as to allow

different banks to work in co-operation and join their efforts to develop our foreign trade.

Neglected Possibilities

Our general lack of knowledge regarding foreign banking has been largely due to the fact that this is relatively a new country. Prior to the beginning of the great war we were occupied in developing our own business, our own resources, in building new factories, and in constructing new railroads. We were busy in the making of this wonderful commonwealth, which today has attained a pinnacle among the powers of the world. Therefore we may be excused to have overlooked the possibilities of foreign banking.

American bankers in general looked upon foreign banking as a special science having no points in common with domestic banking. They thought it required different business methods, and that it would require much study to understand them. Even today, outside of New York and some of the other big cities, most of the bankers think of foreign banking as something wonderful. Apparently they believe that unless they can speak Chinese, or Japanese, or some other strange language, they cannot tackle foreign banking. This, however, is not so. There is no wide difference between foreign banking and domestic banking. There are differences in laws, in customs, and there are differences in moneys; but fundamentally, the principles of foreign banking and domestic banking are the same.

Banking is a matter of receiving deposits, of extending credit, and of making loans and collecting them. There is no difference between making a collection on San Francisco and in making a collection on London. It amounts to the same thing. There is no difference between lending money on an ocean bill of lading covering cotton afloat to Liverpool, and in lending money on cotton warehoused in Memphis or Dallas or Savannah. It is simply a question of whom you are dealing with.

Functions of the Foreign Bank

What does a foreign bank do? It lends money, it extends credits, receives deposits, and makes advances on documents. There is no difference in handling a warehouse receipt, seeing that it is properly signed and endorsed, and in looking at an ocean bill of lading to see if it is properly drawn and endorsed. Up to 1914, when the Federal Reserve Act became effective, American banks loaned money, but they did not lend their credit. The Federal Reserve system has introduced and put into operation in this country the acceptance system used by foreign banks, which is nothing more or less than a loan of credit instead of a loan of money.

Requisites of Foreign Banking

To become familiar with foreign banking it is necessary to study only a comparatively few subjects.

First of all it is necessary to learn commercial geography. That is one of the things we have neglected. A clerk who comes into the foreign department of an American bank may know that Brazil is in South America, or that Buenos Aires is in Argentina, but it is almost certain that he will not know the names of smaller towns or the way to reach them.

Commercial Geography

A knowledge of geography is absolutely essential in handling collections. I have known of clerks sending collections on Merida, Yucatan, to Mexico City. It took two days for the collection to get to Mexico City from New Orleans, and two days to get back, and then it had to be sent direct to Merida. Collections on Para, which is in the northern part of Brazil, may be frequently sent to Rio de Janeiro simply

because Rio de Janeiro is the capital of Brazil. I remember one clerk sending a collection on Baranquilla, Colombia, to Medellin, Colombia. Baranquilla is about five days from New York by boat, and Medellin is away off in the interior, a two weeks' additional journey from Baranquilla.

These are only a few instances, but they illustrate details that are very important, because lack of knowledge or lack of attention to them means poor service to customers and loss of interest, as well as the possibility of ultimately being responsible for the amount of the collections so mishandled.

Knowledge of Languages Needed

Knowledge of modern languages is another essential factor in foreign banking. We have been neglecting modern languages. We are all interested today in South American countries, but very few of us know how to speak Spanish, or how to translate it. That is something we should learn to do as soon as possible. It is not necessary to know how to talk or to write Spanish like Cervantes, or, if we learn French, to write poetry like Moliere, but we should learn how to translate commercial letters, so that we may make entries in our books according to the contents of such letters.

Another requisite of successful foreign banking is a condensed knowledge of international law. We should know more about that subject, particularly about commercial law and local customs.

Dearth of Trained Men

We have enough capital, but not enough trained men. It is the lack of such men that is principally militating against our development in foreign countries. The chief reason for the slow penetration of our banks abroad is that we have so few men of experience to send abroad—men who can meet the people, men who are familiar with the language and customs of other lands, and who at the same time know our policies. There are plenty of men able thus to equip themselves, but they hesitate; they seem to think that foreign banking is very difficult, and that they are not fit for it. This attitude is a mistake. Learn the language of the country you intend to go to, and a few of the other things I have mentioned. Absorb the policy of our banks, study foreign markets and get somewhat familiar with their customs and regulations. Our representatives abroad must be educated to these essentials.

The Future

There will be enough foreign banking business for all of us, not only for New York banks but also for banks of Philadelphia, Boston, Chicago, San Francisco and other commercial centers. There will be plenty of business for all of us, and we can obtain reasonable returns without cutting rates and competing foolishly against one another. Our banks have to build new annexes abroad to help this country to keep its foreign trade, and to maintain its financial prestige in foreign countries.

The right thing to do is for them to get together, think together, and work together.

ANTICIPATING A TIMBER SHORTAGE IN ENGLAND, MR. Thornton, the general manager and chief engineer of the Great Eastern Railway, arranged contracts for a supply of sleepers from the pine forests in the south of France, to be delivered on the quay of Bordeaux. Soon after the first ship-load was ready for transhipment to England the British Government authorities asked to have the timber transferred to them. They have been so pleased with the quality that they have asked the railway company to relinquish the whole of the contract in their favor, and this has been done, as the timber was for the armies in France.—*The Engineer*.

Co-ordination of All Transportation Facilities

Under Private Operation Competition Could Be Eliminated and
a Federal System of All Transportation Be Effected

By John R. Hall,

Manager Bond Department, Hallgarten & Company.

THE precipitation of many economic questions for immediate disposition is one of the most important and bewildering results of the struggle in which the nations of the world are involved. We have for many years been so content to see problems settled by the slow methods of evolution, by discussions gradually developing public opinion, or by the action of the forces of economic necessity, that it is exceedingly difficult for us to realize that we can no longer be satisfied with a hand-to-mouth policy in anything that is vital to our interests or with seeking solutions only when difficulties take an acute form. Instead we, ourselves, must courageously take the initial steps, particularly at this time, in coping with problems which it not wholly new are bound up with conditions in many respects quite different from those existing in pre-war times.

There is a hopeful belief among some that the happy day which sees the end of the world convulsion will witness the reestablishment of general pre-war conditions, but it is doubtful whether the fulfillment of such a hope is either desirable or possible. The generations to come, freer from traditions which control contemporary thought and action, will find it easier to complete readjustments than it will be for us of the present day to launch them. But if the fact can be made plain to this generation that the old order has changed, to an extent as yet unknown, just in so far will it be possible for the nation as a whole to retain the best that we have built up as a foundation for the future.

The treatment of the railroad situation in this article, as the most important single factor in our national business life, is necessarily broad in outline without attempt at detail. There are too many questions involved to permit more than drawing outlines of various phases and conditions which must be so adjusted and rearranged that the new order may be workable, efficient and economically sound.

A Permanent Change in Organization

The government in assuming control of railroad operations has taken a step which is likely to mark the beginning of a permanent change in railroad organization and operation, as well as in the plans for development of all transportation facilities within the United States. This step is particularly significant in that it involves in effect the substitution of a unified national system for a competitive system, and, by virtue of the substitution, adopts the principle of co-operation.

The Director-General in a statement before the Senate and House committee, shortly after his appointment, said: "It was evident that under the competitive system it was impossible to get the co-ordination which was necessary to the efficient conduct of the war." Acting on this belief Mr. McAdoo is reorganizing the operations of many competing railroads along lines adapted to their operation as a single unit.

Orders are being issued which are calculated to co-ordinate the use of all transportation facilities with little or no regard to the effect they may have on the position of individual companies. If sufficient time permits him to carry out his policies Mr. McAdoo will have reformed the operations of a great many separate corporations into a unified

co-ordinated system which for all practical purposes will constitute an absolute railroad monopoly.

It is the purpose of this paper to give expression to the belief that the preliminary steps taken by the government should be regarded as the groundwork of a new and permanent railroad institution. By extending and perfecting the work of the government a unified American railroad system can be created in conformity with the purposes and requirements of a progressive people who, while ridding themselves of a continuous quarrel which has been a menace to business and a reproach to our democratic polity, are determined to have a transportation system capable of serving the whole country in the most efficient manner possible.

There are numerous reasons which make it seem unwise to return to a system of competitive railroad units. Many of these have to do with weaknesses inherent in the system itself and cannot be eliminated except by abolishing it. The necessity for such an extraordinary measure will be more readily appreciated by an examination of a few of the disadvantages associated with competitive railroad operation.

The Waste of Competition

The wasteful expense of maintaining and operating a large number of separate corporations, all engaged in the same business, with complete executive, transportation, maintenance and traffic organizations, and fully equipped with tracks, terminals, cars, motive power, stations, offices, machine and repair shops and other facilities essential to the operation of each as a complete entity is inherent in the competitive system. The extravagant use of labor under such conditions is unavoidable. Capital required to finance the improvement and betterment of numerous separate railroads, which in too many cases are facilities duplicated for competitive purposes, does not produce benefits commensurate with the cost. The roads which are well equipped physically and financially attract the lost business and can be run more profitably than roads poorly equipped in these respects. Generally speaking and with due regard for exceptions, the high standards of service given the public can be kept up or bettered in the one case and the lower standards tend to remain stationary or are lowered until disaster comes in the other. Communities served by the poor roads, therefore, must suffer under the burden of unfair and unwarranted handicaps. Fast passenger and freight service, calling for the right of way and requiring the highest standards in roadbed and equipment on many lines, are wastefully duplicated between competing centers. The capacity of cars and motive power must be kept by each road largely in excess of traffic requirements. Losses due to the competitive demand for equipment, supplies and labor are inevitable. The development of vast stretches of rich territory is neglected to intensively overdevelop the facilities of districts where competition is keen.

While the foregoing items by no means cover the field, it is evident that many things which would be wasteful in a unified system must be done by competing lines as matters of self protection. In fact they are such vitally essential attributes of successful competition as to make any suggestion for their elimination untenable. Yet, to continue the

system is only to enlarge unnecessary capital costs, wastes and inefficiencies to a prohibitive degree.

Because there does not appear to be any practical way of harmonizing the conflicting interests of independently operated railroad companies composing a competitive system, and because it is so vitally important that transportation facilities be co-ordinated, the perpetuation of the system cannot be justified on the ground of economy, efficiency or public interest. In order, therefore, to obtain the benefits of a system better fitted to provide adequate facilities for handling the rapidly expanding business of the country it will be worth while to give attention to a form of organization which adopts the principle of co-operation as the base of its business structure.

Co-operation in Industry

For the past twenty-five years the principle of co-operation, alone or in combination with the control or elimination of competition, has been developed particularly in other countries to the advantage of many forms of industry. The soundness of this principle has been fully demonstrated. By recognizing it as a natural evolution of sane business practice and in establishing policies and regulatory and supervisory laws, both England and Germany have encouraged business men to expand their activities to all parts of the globe. In the United States our legislators in failing to take account of changing conditions have enacted laws which have discouraged co-operation and in general hampered business of all kinds and especially that of transportation. The war crisis has merely accelerated the coming of the time when it would be realized that the measures we have in force are, when judged by results, destructive and cannot be continued except to the detriment of the country.

The desirability of co-operation has for many years been appreciated by railroad men. They attempted to secure its full benefits by pooling and traffic agreements, mergers, control through stock ownership, and otherwise, and have only been prevented from doing so by the interposition of uneconomic laws upholding the theory of forced competition. If, in the effort to secure the maximum of efficiency and economy, railroad men had been left free to follow their own devices, they must ultimately have reached the goal towards which the government itself is now hastening. Whether or not financially profitable the procedure of the government is likely to be so far-reaching in its effects as to raise an issue which will be determined on considerations involving the feasibility and desirability of unification under private or government ownership, and in no way involving a return of competitive units to their owners. If this question can be calmly dealt with there is at present good reason to believe that the principle of private ownership will be upheld in this country.

The Present Opportunity for Combination

The opportunity of combining all the railroads, through the voluntary action of the owners, has never before seemed so possible and certainly could not have been accomplished under such favorable circumstances. The most difficult and costly part of the task, that of co-ordinating facilities, has been assumed by the government, and while this is being accomplished the owners are relieved of the danger of financial disaster and are guaranteed a return that may be regarded as fair.

In view of the probability that neither the government nor the people will consent to a return to the old form of competitive operation, and of the possibility that an opportunity will be offered for the formation of a unified system under private ownership, it is fitting to take note of some of the more obvious benefits which may be expected to accrue therefrom.

A unified system of railroads physically merged and or-

ganized under a federal charter, and operated by means of a central controlling body with regional direction and supervision, would make it possible to save a great part of the heavy expense involved in maintaining hundreds of separate organizations. Rates could be made and adjusted on a broad basis of practical business considerations instead of on a competitive theory. Vexing and conflicting laws of the states and the regulations of the many public service bodies affecting rates, labor, material and operations could be largely superseded by the powers of a single federal commission.

The use of parallel tracks as double tracks; the linking up of lines not now physically connected; the pooling of the use of terminals, stations, docks, warehouses, cars, locomotives, machinery, repair shops, floating equipment and many other facilities would greatly increase capacity and efficiency, reduce operating and maintenance expense, and save the cost of all forms of new construction of a competitive nature. Standardization of types of cars and locomotives and many other supplies could be introduced and competitive purchasing stopped.

The Traffic Department

The expense of traffic departments with the exception of the tariff bureau and the industrial department could be largely eliminated; the expense of competitive advertising could be cut off; circuitous routes now enjoying differentials would discontinue such business except for overflow traffic; unnecessary duplication of competitive service in all parts of the country could be stopped, and fast passenger and freight mileage materially reduced. Cars and locomotives could be used to greater advantage, and freight and passenger mileage reduced, which would tend to increase the carrying capacity of existing facilities without additional capital outlay and at greatly lowered cost. A better use of labor could be arranged and its waste largely diminished; and the expense of unnecessary duplications of auditing, reports to commissioners, intercompany records, inspection, supervision and many other similar items could be curtailed to a considerable extent.

A studied policy could be inaugurated for national up-building; many miles of road into new territories could be built on the savings made by eliminating competitive construction; central electric generating stations could be built and many miles of road electrified in congested traffic districts from the same savings; a comprehensive study of labor unrest could be made by experts and their findings used to enable railroad officials to deal with the subject intelligently; a broad educational policy could be adopted by establishing a system for the careful training of men for skilled labor and executive positions, thus providing a continuous supply of capable progressive young men to solve the problems of advancing times.

Extent of the Saving

Consolidation of weak with strong roads has in the past proved beneficial to both. Unification is, in principle, a general extension of this practice to all railroads and should result in like advantages.

The elaboration in detail of the foregoing and the addition of many items not included would only serve to emphasize the fact that under the competitive system railroads are compelled to carry many heavy burdens by reason of duplicated facilities and inability to use labor and equipment in the most effective manner. Losses sustained as a result of operating under a competitive system are pure wastes which should in large part be saved by unification.

While it would be quite impossible to definitely figure the money advantages of operating the railroad lines on a unified instead of a competitive basis, it seems safe to estimate that net earnings alone could be increased in due

course by hundreds of millions of dollars per annum, and capital expenditures curtailed almost immediately.

It should not take many years to sufficiently perfect the workings of a unified co-ordinated railroad system so as to make its net earnings from operation larger than any yet produced under the competitive system. However, to secure the full advantages of such a system will take probably ten to fifteen years. All that should be hoped for from the government's efforts is an indication of the efficiency that can be attained under normal conditions when it will be possible with private control to include both economy and efficiency in measuring success. Under present conditions efficiency in moving men and materials for war purposes is necessary above all other things, for the government cannot now sacrifice anything for the sake of economy.

Not a Railroad Problem Alone

It must not be assumed, as in the past, that the problems of transportation can be cleared up by solving the railroad problem alone. The railroads, waterways, highways, port and shipping facilities are all interdependent in important respects, and it is vital that none of them be dealt with except while giving full consideration to its relation with the others.

For the last half century the United States has been fully occupied in developing its own resources and internal trade, but the time has now come when, in dealing with the transportation problem, it is of considerable consequence that full weight be given to the bearing that the overseas commerce of this and foreign nations may have on it.

England and Germany by virtue of possession, or political or financial control, enjoy special privileges in most of the best markets of the world outside of this country. To their credit it must be said that the commercial power which they have attained has been won by a thoroughness of treatment and a wise forethought, based on sound business principles and exact knowledge, which we will do well to emulate. By control of these markets, and in other respects, England and Germany have commercial advantages over us which can only be overcome under the protection and encouragement of a constructive governmental policy and by our business men making better use of available resources and originating new means for successful competition. No satisfactory results, however, can be obtained without a government policy which will address itself to the solution of the transportation problem as a whole, based on broad considerations of internal development and world wide commerce.

Other Agencies of Transportation

The railroads, aside from being permitted to form a unified system, should, with the assistance of federal, state and municipal governments, be allowed to co-operate with the steamship companies in constructing, financing and operating floating equipment, warehouses and other port facilities, in order that traffic may be efficiently handled at low cost. The advisability of giving encouragement to the extension of export and import trade by making special rates on this business should be given careful consideration. A thorough study of the waterways of the country should be made by the joint action of the federal and state authorities to determine what water courses may be widened, deepened canalized or connected to the advantage of commerce and trade. Acting on the theory that it would not be wise to attempt to extend railways into every square mile of the country, federal and state authorities by joint action could greatly advance the interests of labor, commerce and wealth by acting on a studied plan to place a complete system of well built motor highways at the service of those whose interests would be promoted by being thus brought closer to the rail and water systems. Port facilities are unorganized and are

in great need of attention by the government in co-operation with those who can, from their experience, forecast the trend of foreign trade and its future requirements. Neglected ports should be built up and new ports developed to provide facilities for a more economical distribution of traffic arising from foreign trade. A careful study of the relation of a strong mercantile marine to our military and commercial needs is essential and should result in such government action as will encourage American shipowners and investors to regard this business with as much enthusiasm as accorded to it by the same classes of people in other progressive nations.

The consolidation of the railroads under a federal charter will, of course, necessitate the enactment of a complete new code of laws covering the ownership, operation and development of all rail and water transportation facilities in the United States. The purpose of the new laws being to insure for the people all of the advantages of unified railroad operation, without incurring any of the dangers of government ownership, they will have to provide for supervision and regulation by a government commission which will assist rather than hinder the development of the system. From commissions now in existence must be taken away the arbitrary power to modify rates; and, in fact, the adjustment of rate questions should be made as free from governmental interference as is consistent with the necessity of reserving to a regulatory body the power to handle effectively exceptional needs for rate adjustments.

Changes in Rates

Changes in conditions beyond the control of the managers of the roads would be sufficient cause for a change in rates; but savings effected through greater efficiency, or losses through lower efficiency, would result in benefit or detriment to the railroad stockholders. It is undoubtedly possible to make a fairly sharp distinction between items not under the entire control of the managers—which would notably include wages, cost of materials, maintenance, taxes and interest—and those which, depending upon increased or decreased efficiency, are under their control. Changes in the former would automatically cause an adjustment of rates, though in respect to certain items, such as wages and maintenance, standards should be set up below which the road could not go. As regards the latter, however, savings effected as a result of efficiency would not influence rates, but would go to swell the net income of the railroad corporation, although provision may wisely be made that there be a fair rate adjustment whenever earnings conservatively distributable to the stock of the corporation exceed a stated percentage per annum.

The savings, which will result under private operation of the roads as a unified system after they have left the hands of the government and have been relieved from giving priority to war transportation, will unquestionably be so large that it will be advisable to give the government a share in the profits of the carriers when they rise above a certain point; and it may even be wise to do the same in the case of the operatives.

Though difficult, it is undoubtedly possible to work out in detail a plan for the semi-automatic adjustment of rates, and thereby eliminate the danger of rate inflexibility. Substantial changes in wages, cost of materials, etc., effective for long periods, would cause automatically an adjustment of the rate structure, so that the payment of dividends in excess of the percentage possible under earnings obtained while the roads are under government control could only result from increased operating efficiency. With labor and stockholders sharing in the benefits accruing from operating economy the incentive for personal initiative, which is of course the main advantage of private ownership, would be maintained, while the public through the government would

get its share of the profits resulting from the unified system, in addition to having at its command a vastly superior service.

The government in dealing with the rate question should consider the wisdom of permitting the railroads to earn a surplus in excess of the amount required for dividends, to allow for the sinking fund mentioned below, and to pay for all or part of the many improvements which are wholly or partly non-productive and which might better remain uncapitalized.

The plan for the exchange of stock of the various railroads for that of the federal corporation could perhaps be chiefly based on the earnings guaranteed by the government during its control. This would probably be more than fair to security holders as the system unquestionably cannot attain the highest degree of operating economy while the transportation of war materials is paramount, and consequently the roads must incur losses during war which would be saved for the stockholders during peace.

In taking over the railroads only the stock of the individual companies need be dealt with and its acquisition would be effected by exchanging the stock of the individual roads for that of the new federal railroad corporation. Stock of this company should be issued to an amount which would permit the conservative distribution of regular dividends at a rate sufficient to attract capital under most conditions when funds are needed for development. The eleven billion dollars of mortgage bonds and other funded debt would remain outstanding and unchanged as to secur-

ity, option being given to the holders to exchange them for bonds of the federal company bearing a slightly lower rate than the bonds refunded, but with redemption terms added to make the exchange desirable. A cumulative sinking fund of approximately nine million dollars per annum compounded at four per cent would discharge the present existing debt at the end of one hundred years. Were such a fund created and used first to retire the bonds of the federal company an incentive would be given to present bondholders to exchange their securities for those of the new company. All financing and refunding that could not be accomplished through the sale or exchange of stock of the federal company would be provided for by the issuance of bonds which would be the direct obligation of the federal company but secured only by a charge on its earnings.

The obstacles in the way of securing a workable and satisfactory transportation system by means of an attempt to co-ordinate the facilities of competitive units appear insurmountable.

The task of consolidating the railroads into a single system and of co-ordinating the operations of all the transportation facilities in the country is a great one. The easiest and most dangerous way to accomplish it is by accepting government ownership. The most difficult, but in every respect the most satisfactory way, is that which contemplates the retention of the policy of private ownership. Surely this country is not lacking in men in the government service, in business, and among labor groups who can and will rise to the occasion!

The War Finance Corporation

Inflation Can Be Prevented Only By Saving Drastic Enough to Offset
the Government's Extraordinary Demands

By O. M. W. Sprague.

Edmund Cogswell Converse Professor of Banking, Harvard University

THE WAR FINANCE CORPORATION to be established under the provisions of the measure which has been passing through Congress during the month of March is designed to meet four distinct financial requirements which have become increasingly evident with each month of the war. Large resources will be at the disposal of the organization—five hundred million dollars of government funds from the treasury as capital and at least three billion dollars to be secured through the sale of notes or short term bonds.

Whether all or only a part of these resources will be needed cannot now be determined. One of the functions of the corporation will presumably involve the employment of no large amount of money. The corporation is empowered to buy and sell liberty bonds, the object in view being the stabilization of their market price through the establishment of a broader market for them. In the exercise of this function no effort should be made to establish an artificial price for the bonds. The corporation will hardly be prepared to take indefinitely large offerings since the very fact of such offerings would indicate that the yield of the bonds was insufficient and that a stable price could only be found at a lower quotation. Owing to the fact that practically everybody with funds at his disposal has purchased the bonds, comparatively small sales have at times occasioned a considerable drop in market quotations. Handled with judgment, no large amount of money should be needed to prevent extreme declines due to temporary causes, declines which are apt to prove permanent as a result of the uneasiness which

they occasion in the minds of many inexperienced holders.

The second object of the measure is to conserve the available capital of the country for government use during the war by obstructing its employment for other purposes. Government war expenditure vastly exceeds the normal savings which have been available for investment during recent years. These savings are estimated at something like five billion dollars while the expenditure of the Government will apparently run between fifteen and twenty billion dollars. In these circumstances the drastic contraction of the employment of capital for other than war purposes is essential though it will not greatly lessen the absolute necessity for abnormal saving on the part of all classes of people.

The measure in its original form gave the directors of the corporation a veto power over all issues of capital in excess of one hundred thousand dollars other than those by states and municipalities. The grant of this great power was not regarded with favor by Congress. In its present form, only supervisory power has been granted, and this power has been lodged with a separate Capital Issues committee which may merely express its approval or disapproval of proposed security issues. It is to be hoped that the expression of opinion by this committee will be sufficient to prevent in large measure the use of capital for non-essential purposes. If such proves not to be the case, it will clearly be necessary to grant more drastic control over the situation.

The third object of the war finance measure is distinctly opposite in character. Patriotism stimulated by liberty loan

campaigns impels most people to devote all available funds to the purchase of government bonds. It has proved difficult, consequently, to refund maturing obligations of all classes of business corporations and to secure additional funds even by those engaged in war work. The War Finance Corporation will not tap resources which were not already available to the Government. Whatever funds it employs will by that amount reduce the funds which the Government will have at its disposal for other purposes. This is evidently true of the capital of the corporation since it is to come from the Treasury. It is no less true of the funds which the corporation will secure through the sale of its notes or bonds. Purchasers of the securities of the corporation will have less for the purchase of government bonds. The object of the arrangement is simply to provide machinery somewhat more effective than the treasury department through which both banks lending to war industries as well as those engaged directly in war work may secure needed funds.

Savings Banks

Finally the corporation is empowered to assist savings banks and building and loan associations quite regardless of whether they are employing funds in war work. These institutions are subjected to strain on account of the unfavorable effects upon them of the failure of the people up to the present time to provide from current savings the full amount of the funds which the Government is expending. The difference is made up to a moderate extent by the withdrawal from savings institutions of the savings of former years which have already been invested, and to an even greater extent by the expansion of credit on the part of the commercial banks and trust companies. The withdrawal of funds from savings banks, if one may judge from the experience of other countries, will perhaps not be sufficiently great to cause serious trouble. It is, however, desirable to make provision for a contingency of this nature. Consequently the War Finance Corporation is authorized to make advances for periods of a year to savings banks and trust companies, though at rates which properly are somewhat higher than the average rate of return on their investments.

Objection to the establishment of the War Finance Corporation has been raised on the ground that it may lead to inflation. Possibilities of inflation through the activities of the corporation are undoubtedly present, but this is not a valid objection to the measure. A condition of inflation is present whenever credit expands far more rapidly than the volume of trade. It has been going on since the beginning of the war, owing to the fact that the savings of the people are far less than the expenditures of the Government. It has, however, been a one-sided sort of inflation. We have had inflation through the commercial banks based upon commercial loans and loans on Liberty Bonds, and as a result of purchases of the bonds and government certificates of indebtedness by them. The effects of this inflation are seen in the rapid advance of prices. A moderate amount of inflation can continue almost indefinitely because the necessary slight adjustments which it involves can be made without much difficulty. Rapid inflation, on the other hand, threatens the complete disorganization of the entire industrial mechanism as was witnessed in Russia just before the revolution.

Uniformity in Expansion

How far it is possible to go on the road of inflation cannot be determined in advance, but it is clear that one-sided inflation will lead to collapse at an earlier date than somewhat more rapid inflation affecting all classes in the community. Owing to the fact that the federal reserve banks may only rediscount commercial paper and loans based on Liberty Bonds and government certificates, there has been a tendency for the banks to curtail accommodation for investment and refunding purposes. But the Government having

preempted the supply of available investment funds and having also resorted extensively to borrowings from the banks, both business corporations and savings institutions find themselves in a difficult situation.

Alternatives

The War Finance Corporation is simply a palliative for some of the consequences resulting from inflation. It provides an arrangement by which the Government will provide directly some of the funds which in ordinary circumstances would have been secured through private channels. The Government might have used a part of the proceeds of its sales of Liberty Bonds for this purpose. It would then have been necessary to float a somewhat larger amount of such bonds than will now be necessary, bonds of the finance corporation taking their place. The Liberty Bonds would have been available at the reserve banks for loans and might have been purchased by them. The situation is not fundamentally changed by giving the bonds of the finance corporation a similar quality. The extent of inflation will be measured by the extent to which the total expenditure of the Government exceeds current savings. There is but one remedy for inflation—the desirable but painful remedy of drastic economy on the part of all citizens to an amount which will approach, if not fully cover, the requirements of the Government for funds.

Some of the results of inadequate economy and the consequent resort to the financing of the war largely by inflation are familiar. Others are not as yet very generally perceived. The burden which will fall upon persons with stationary incomes if the war is largely financed by credit expansion is well understood. The rise of prices will seriously damage such people and also of course greatly increase the money cost of the war. It is not generally recognized, however, that inflation and the consequent rise of prices may have very serious consequences upon the solvency of many corporations and impose heavy burdens upon the holders of large classes of securities.

Difficulty of Making Adjustments

During the Civil War there was a comparatively small amount of outstanding securities—bonds and preferred stocks—having a fixed rate of return. Moreover, there was then no considerable number of concerns engaged in supplying commodities or services at a fixed or customary price, as is the case now with the bulk of public service corporations, and also of a considerable number of concerns producing goods sold at a standardized price. Nearly everyone except salaried people in former times could adjust himself to rising prices by advancing the price of his own product or services. If there should be a further advance in prices of, say, 100 per cent or even 50 per cent, the effect upon all those whose investments consist mainly of bonds and preferred stocks of every variety and also of common stock of public service corporations will be most serious. It would seem that this is a consequence of inflation which if brought home to the investment classes, and investment bankers, would induce them to set their face sternly against further inflation. An effective check, however, upon inflation cannot be found in piecemeal restrictions. The necessity for inflation can only be avoided by the adoption of measures which will induce universal economy on the part of all classes of citizens.

While the War Finance Corporation is necessary on account of the inflation which is taking place, there is a danger that by making the policy of inflation temporarily somewhat more feasible, its establishment may work against due economy. This danger can only be met by renewed efforts directed toward impressing upon the public the vital importance of a vastly greater curtailment of civilian consumption than has been generally adopted up to the present time.

Railway Age

INVESTMENT ECONOMIST SECTION

WILLIAM E. HOOPER,
Financial Editor

There are two signed articles in this issue of the Financial Section which deal directly with the Liberty Loan. Railroad

Understand What the Liberty Loan Is

men have been liberal subscribers to the first two Liberty Loans and will undoubtedly be liberal subscribers to the third one. It is right and it is something to be proud of that it is patriotism more than anything else which has led to previous Liberty Loan subscriptions and will lead to subscriptions for the present issue of United States bonds. Nevertheless, every man owes it to himself and to his family to make an effort at least to understand something about the nature of the investment which he makes when he buys Liberty Bonds. While, in a broad way, most of the articles in the Investment Economist section deal directly or indirectly with investment, there are two articles—the one by John E. Oldham, a Boston banker, and the other by Professor Sprague of Harvard University—that every railroad man who has bought or intends to buy Liberty Bonds—and that should mean every railroad man without exception—should read with care. Professor Sprague's article deals with the War Finance Corporation, which, like the War Savings Stamps, is a device in addition to the sale of Liberty Bonds which the Government is using to raise funds and credit to finance the war; but a correct understanding of the functions of this War Finance Corporation is of the greatest value in correctly understanding the part the Liberty Loan plays in financing the war. Mr. Oldham's clear, simple, illuminating exposition of the duty which each one of us owes to his country in the way of investment in Liberty Bonds should be read equally carefully by the trainman and by the railroad president. Lack of clear thinking about the right way and the wrong way to buy Liberty Bonds is just as possible in the executive offices as it is in the cab or caboose. The point which Mr. Oldham makes that unless you purchase your Liberty Bond out of your savings and hold it without borrowing against it, you are not helping your country, but rather aiding inflation—jacking up prices against yourself and everyone else—cannot be overemphasized, it is fundamental.

Secretary McAdoo has recommended, and presumably Congress will follow his recommendations, that the third Liberty

Terms of the Liberty Loan

Loan bear interest at $4\frac{1}{4}$ per cent and the bonds will not be convertible into any other issue of bonds made later. This is a lower rate of interest than that expected by many bankers and if it marks, as it possibly does, the limit beyond which the government interest rate will not go on bonds issued for this country, it compares with the limit fixed by the English government of 5 per cent. It is very desirable that the interest rate on Liberty Bonds should be kept as low as possible and still have them eagerly sought after both as investments and as expressions of patriotism. The higher the rate of interest fixed on Liberty Bonds, the more temptation there is for people who have money in the savings bank to draw it out to buy Liberty Bonds rather than to make fresh savings to purchase these bonds. The higher the interest rate on Liberty Bonds, the further downward will the sale of billions of these bonds drive the prices of all classes of fixed interest-bearing corporation securities, and also the prices of mortgages. Savings banks' funds are very largely

invested in fixed interest-bearing securities of corporations and in mortgages. A high rate of interest, therefore, would work a double hardship: it would tend to increase the amount of deposits withdrawn and to lower the margin of safety behind deposits. The fact that Secretary McAdoo believes that the combination of patriotism and credit, which is the warp and woof of the fabric of the sale of Liberty Bonds, is $4\frac{1}{4}$ per cent as compared with England's 5 per cent shows a courage and a belief in the American people that it is now up to them to justify. It will be remembered that the first Liberty Loan, that bearing interest at $3\frac{1}{2}$ per cent, is convertible into any later issue; the second Liberty Loan is convertible only into this, the third Liberty Loan. The second Liberty Loan bore interest at 4 per cent. There would appear to be an incentive, therefore, for holders of the second loan immediately to convert their bonds into the new $4\frac{1}{4}$ per cent bonds, unless, of course, there is something in the detailed enactment of the law which makes the 4 per cent bonds desirable for some specific reason as compared with the $4\frac{1}{4}$ per cent bonds. On the other hand, holders of $3\frac{1}{2}$ per cent bonds may well hesitate to exchange them for the $4\frac{1}{4}$ per cent bonds. If these $3\frac{1}{2}$'s are not exchanged, they carry the privilege of conversion into any later issue. If, therefore, a year from now, or two years from now, if the war unhappily lasts as long as that and conditions have changed so materially that it becomes necessary to issue a 5 per cent bond as the British government has done, then the holders of $3\frac{1}{2}$'s who have not exchanged can make the exchange into the 5's and will have lost only $\frac{3}{4}$ of 1 per cent interest for a year or two years and will gain $\frac{3}{4}$ of 1 per cent—the difference between the $4\frac{1}{4}$ and the 5 per cent that might be issued—for the full number of years which the new bonds will run.

The government has decided to advance to the New York, New Haven & Hartford the \$40,000,000 necessary to meet

A Forecast of the Government's Attitude

the short time notes which mature in April. This has been hailed as an indication that the Government intends to deal fairly with holders of railroad securities and also forecasts a fair attitude toward all investors in corporation securities. As a matter of fact, it is somewhat of a back-hand compliment to show pleased surprise that the government is going to play square. It could do nothing less than this. The banking resources and the investment resources of the country are being placed unreservedly at the disposal of the government in its efforts to finance the war. It is not a matter of surprise that the government should lend its aid in the New Haven situation—it is rather a matter of course. In England, all the financial machinery of the country was placed at the disposal of the government and the government has reciprocated by lending its help and advice wherever this was necessary to keep the machinery in good working order. Co-operation between Washington and Wall street will be a good thing for both. Washington should not accept with suspicion the whole-hearted aid which the financial interests of the whole country have tendered and, on the other hand, Wall street should not hail fair dealing on the part of the government as something to be surprised at.

It is to be hoped that the article by John R. Hall on a uniform transportation system, which is published in this issue of

A Unified System of Transportation

the Investment Economist section, will draw forth extended discussion from bankers, railroad men, insurance company officers, and, above all, from federal and state legislators. There is hardly a paragraph of it that could not profitably be expanded and discussed pro and con. In one sense, Mr. Hall

discusses railroad matters from an outsider's point of view, but, on the other hand, he has had a far more varied experience with railroad affairs than the average officer, even one who has risen to an executive position because his experience has been with many different roads. He has had the responsibility of passing upon the question of whether or not his house should offer securities of various railroads to their customers, and he has been actively engaged in working out the reorganization plans of roads that have recently been in the hands of receivers or are now in receivers' hands. If some of his suggestions seem impractical to men who have spent their lifetime in railroad work, let us by all means have the reason why they are impractical set forth. If there are parts of his outline which seem vague or inconclusive to congressmen or newspaper editors, or students of the transportation problem of this country, let us have a full discussion of these points. As a starter, would it be possible to administer, even under the most highly perfected form of private management, such a huge industrial activity as the operation of 260,000 miles of railroad from one central point without the evils of red tape and formalism which would be a bar to progress and individual initiative?

A Confession of Faith

IN HIS FORWORD to the Investment Economist section of the *Railway Age*, Frank A. Vanderlip says: "There is need for all the agencies we can have to spread the correct knowledge of the part which capital plays in community progress. * * * There are not few but many very successful businesses founded upon the bedrock principle of secrecy. Nearly every banker in the larger financial centers of the country would probably hazard the opinion that the Standard Oil Company is a highly efficient commercial organization, that it is well managed to an extraordinary degree; but do any of us know anything about it? Hardly anything at all, except the amount of dividends that are paid. An investment in Standard Oil is an investment made on faith. It is in the ordinary acceptance of the term a pure gamble. Judgment based upon facts is entirely lacking."

For years the American railroads, which have formed the backbone of private investment in American corporations, have been compelled to make available to the investor and to the general public the intimate details of their financial affairs. We believe that no part of the present difficulties and low estate of the railroads is due to this enforced publicity. In fact, railroads continued to be favorably considered by investors, despite adverse regulation, amounting sometimes to confiscation, long after their dividend declarations would have warranted almost complete withdrawal on the part of investors. This was due in part probably to tradition, but in even greater part to the fact that the investor felt that at least he knew what he was getting into.

Public utilities have, on the whole, had less salutary frankness forced on them. Holding company devices are the almost universal rule. State public utility commissions have to some extent compelled accounting that is intelligible and illuminating, but the primary object of most of these commissions has been the lowering or at least the holding down of rates. Unless this also is changed, it would appear that many public utilities may have to go through some of the experiences of the railroads. Possibly it is not the proper function of the government to compel frankness in the interests of the investor. It is, however, our conception that it is the duty of the banker who recommends an investment to his customers, and that it is the duty of a paper which discusses financial subjects to demand a plain statement of conditions where possible, to give confidence to corporation offerings of securities in the measure of the frankness with which their business condition is stated.

The man who is in business only for himself, using only his own capital, has a right, except in his income tax state-

ment, to conceal from others all the facts. But just as soon as a business has been incorporated, leaving the manager and directors without personal liability beyond the amount they have paid for stock, the concern asks the investing public to take a share in its business through the purchase of stock or to lend it money through the purchase of bonds, it should give to the public all the facts connected with the conduct of the business that can consistently be made public, without an actual—not theoretical—disclosure of valuable trade secrets. It is an incontrovertible fact that, if investors were repulsed by secrecy, not allured by it, they could very soon compel industrial corporations as well as public utilities and railroads to come out into the open. Secrecy and speculation, however, go hand in hand. It is in the interest of the investors who are not allured by secrecy, but are desirous of forming an opinion of their own on the merits of their investments, that the Investment Economist section of the *Railway Age* will be edited.

Wages Increased

THE STANDARD OIL COMPANY has announced an increase of 10 per cent in wages, making a total increase since August 1, 1915, of 62.8 per cent in general wages, and 80.57 per cent in wages of common labor, in addition to a reduction made in 1915 in hours of labor from 9 to 8, or the equivalent of a further increase in wages of 19.57 per cent. Furthermore, the Standard Oil Company has given to all employees without contribution on their part individual life insurance policies with benefits ranging from a sum equal to three months wages to \$2,000. The company has also made very liberal provision for accident disability, allowing half pay for sickness of more than seven days and continuing this pay for, in some cases, six months and in other cases one year.

There are three points of view from which this subject may most profitably be discussed. Will it benefit the community as a whole? In other words, is it economically sound? Second, is it a good thing for the employees themselves individually? Third, is it a good thing for the company?

If, in the aggregate, the employees who receive these wage increases consume no more than they did in 1915 and the surplus which they are now receiving, as compared with 1915, is devoted to some productive use such as better education for their children, investment directly or indirectly in such a way as to have this surplus used productively, it will certainly do the community as a whole no harm and presumably be a benefit. There are only two ways in which the higher wages can be paid. One is by a higher price being paid for Standard Oil products by the consuming public or a less profit taken by the stockholders of the Standard Oil Company. It is getting a little into the realm of speculation to try to determine whether the surplus wealth which is now being assigned to the employees would have been consumed or saved if it represents wealth taken away from the consumers of Standard Oil products. On the other hand, it may be said with a fair degree of certainty that of this wealth assigned employees represents profits which would have been assigned to stockholders of the Standard Oil Company, it very largely is wealth that would have been used productively and not consumed had it been continued to be assigned to stockholders instead of to labor. The point that should be understood is that if this surplus of wealth assigned to employees, is consumed by them, instead of being used productively, a loss to the community as a whole will result. If wages are sufficient for the worker to gratify his normal wants for food, drink, clothing, and pleasure, an increase of wages, which is consumed entirely by larger purchases of some of these things, is an economic loss to the world.

From the point of view of the individual employee, it

would seem, at first sight, that an increase in wages was pure gain; but even here it will depend entirely on how this increase is used as to the extent of the gain to the individual. If it were to be used entirely to pay for an increased consumption of beer, for instance, it might result in an actual loss, not a gain, to the individual. Furthermore, if it is out of proportion to the worth of the individual as a worker, it, at least potentially, works harm to the individual. If the laborer gets something for nothing, by just so much is his moral fibre and his incentive to better his condition depleted.

The provision of free life insurance, without any contribution on the part of the insured, appears to be in the nature of something for nothing, which is potentially harmful. The desire to save, in order to protect one's family against want in case of the worker's death, is one of the incentives to better labor and to greater production. To do anything to lessen this incentive would seem to be economically wrong. If the employee is not asked to contribute anything toward his life insurance, something of the incentive to greater production is removed. On the other hand, had the insurance been conditioned by some contribution on the part of the employee, the incentive to greater production would have been very much strengthened. If you tell a man that if he will save one dollar, you will add five to it, you have very greatly added to his incentive to save. If the Standard Oil Company had told its employees that for every dollar each of them saved toward life insurance the company would add five dollars of life insurance, saving would have been encouraged and there would have been less of the element of danger of corruption of moral fibre lurking in the "getting of something for nothing."

From the point of view of the company, and as a business proposition purely and simply, this wage increase, reduction of hours of service, and free life and accident insurance and sick benefits, is probably an attempt to bind the employees closer to the Standard Oil Company, to offset the influence of the labor union, and to compete more strongly in the general labor market against other employers. If the object which the company has in view can be accomplished in this way, it is surely thoroughly good business.

Don't Wait Until It Is Too Late

INDIFFERENCE ON THE PART of individual investors in railroad securities has, in the past, been a source of financial loss of a magnitude hard to calculate. If railroad security holders and those indirectly, but none the less vitally, interested in railroad security values are indifferent to their own interests in the present crisis, there may be a bitterly sad awakening awaiting them when it is time to return the roads to their owners. Savings banks in nearly all the eastern states and many of the middle and western states are large holders of railroad securities. The larger life insurance companies have a very large part of their assets invested in railroad securities. Few savings bank depositors or holders of life insurance realize how utterly they are at the mercy of the government in its treatment of the railroads in the present crisis. The stockholder or bondholder or the insurance bank depositor who thinks that now that the government is to guarantee a certain fixed sum to be made available for the payment of interest and dividends on railroad bonds and stock there is no longer a need to scrutinize the earnings of his road, is laying himself open to a rude shock and a serious loss.

If rates are not so adjusted as to yield enough from the earnings of any particular road to meet the government's guarantee, the security holder of this road, if he stays ignorant of conditions till his company resumes uncontrolled and unguaranteed operation, may find himself let in for a

very heavy loss. Whether the security holder is aware of the facts or not, the financial markets will have adjusted themselves to the basis of the earning power, regardless of the fact that up till the moment of returning the roads to their owners, the government has been making up a deficit from operation.

The truth is that the railroad security holder owes it to himself to watch with greater care than ever the earnings of the property in which he has his money. It is for this reason that the suggestion which was made to discontinue accounting as between different companies for the allocation of the divisions of freight and passenger rates is so full of danger. At first sight it would seem that a large amount of work in the accounting offices might be eliminated and, since the only interest of the government is to get a lump sum large enough to cover the lump sum of its guarantees, it would not be of any particular value to know which road was earning more and which less than its proper proportion. Even in the case of the government, this would be a short-sighted way to make a comparatively small saving. No system of cost accounting can properly be worked out without the allocation of revenues as well as of expenses. A knowledge of earnings is necessary to railroad executive officers for proper control of their expenses and it is just as necessary now that these officers report to the government as it ever was.

If the comparatively few people who are close to the stock market and financial news sources are the only ones to follow carefully and intelligently the earnings of individual properties under government operation, it is probable that the great majority of investors, together with savings bank depositors and holders of life insurance, will be left to get caught in the trap of their own indifference. Protest of the few wise observers of the course of events to the government would have little effect even if they were to make the protest, and generally they are not the ones who do the protesting. The security holder himself has got to watch the course of events and if the earnings of his particular road are not adequate to cover the government's guarantee, he should protest most vigorously to the government.

A detailed list of the holdings of bonds and mortgages by each individual life insurance company doing business in New York is published by the State each year; yet how many holders of life insurance ever try to check up for themselves to see what the value of the assets of their company is? Savings banks have to make an individual report in detail of their holdings of corporation securities and mortgages in Massachusetts; yet how many savings bank depositors ever look at this report which may be had for the cost of postage from the commonwealth of Massachusetts? These people, the individual investor, the savings bank depositor, and the holder of life insurance are in a position to protest now against rates or practices which are not remunerative to the particular company or companies in which they have a direct or indirect interest with an effectiveness that they little realize the power of. We believe and most students of the subject believe that it will be to the interest of the government to so adjust rates as to amply cover its guarantees to railroad security holders; but the duty and responsibility rests upon the individual investor to see that the guarantees to his particular company are being earned not in part by the surplus from some other company but by his own company.

There is another angle to this subject: If, by misfortune, government ownership should become a fact, the securities of those roads which, under government control, did not earn sufficient to cover the government's guarantee are going to fare pretty badly. It will be through no fault but that of their own if this turns out to be the case because security holders have not followed monthly and yearly earnings and have not protested against inadequate earnings.

Annual Reports

American Car & Foundry Company

A CONTINUANCE of large earnings to the American Car & Foundry Company would appear to be probable either in the event of war continuing for an indefinite period, or in the event of peace within six months. Before the war almost the entire business of the company was the manufacture of freight and passenger cars, car parts, and small industrial cars. At present a very considerable part of its business is the manufacture of munitions, trench helmets and the like for the Government. This business is proving very profitable to the American Car & Foundry Company, and in the year ended April 30, 1917, during which time the company was turning out similar work for the allies, earnings were very much greater than for any other year since the company's organization.

Earnings from all sources, after the payment for materials consumed and operating expenses, exclusive of repairs and renewals, amounted to \$17,522,909. From this there was charged off \$7,212,037 for renewals, replacements and repairs, and the cost (entire cost) of special equipment for the production of munitions. This left \$10,313,872 available for dividends, since the American Car & Foundry Company has no outstanding bonds. The regular 7 per cent dividends on the \$30,000,000 preferred stock called for \$2,100,000, and in addition the company paid 6½ per cent, calling for \$1,950,000 on its \$30,000,000 common stock. There is appropriated as a reserve for dividends on the common \$2,250,000, which, together with the \$150,000 heretofore appropriated for this reserve, makes a total reserve equivalent to 8 per cent on the common. Appropriation of \$2,500,000 was made for general overhauling and improvements, and of \$500,000 for improving working conditions of employees, and there was \$1,010,872 to be carried to surplus account.

On April 30, 1917, the company had \$6,017,220 cash, \$17,713,438 accounts and notes receivable, and \$19,211,221 materials on hand inventoried at cost or less. Accounts payable amounted to \$16,225,942.

The American Car & Foundry Company was organized in 1899. Its plant consists of 16 freight car shops, 4 passenger car shops, 11 wheel foundries, 12 gray iron foundries, 3 rolling mills and forges, 3 saw mills, 1 malleable foundry and 1 brass foundry and auxiliary shops.

In the first year or two after the organization of the company, the principal efforts of the management were directed toward the development of a flexible and compact organization. The business was concentrated in those plants where the most effective work could be done, and some of the comparatively obsolete plants were dismantled and sold. By 1909, ten years after its organization, the combined plants had a capacity of 125,000 freight cars, 1,500 passenger cars, 350,000 tons of wheels, 300,000 tons of forgings, and 300,000 tons of bar iron. During the calendar year 1917, United States and Canadian companies' orders for freight cars from the American Car & Foundry Company totaled 11,655. The United States Government orders for France totaled 4,018, and the French Government 1,850. Russia had ordered 16,500 freight cars, but the order for 10,000 of these cars was still the subject of negotiation when the Russian Government collapsed, so that there was no loss here to the American Car & Foundry Company. The order for the other 6,500 was only placed in June, and comparatively little work had been done on these cars, which were all to have been four-wheel, so that there is possibly some small loss on that order.

The total number of passenger cars ordered from the

American Car & Foundry Company in the calendar year 1917 was 186.

If it is true then that the company is making large profit from war business, as its income account for the year ended April 30, 1917, would indicate, a continuation of the war would mean a piling up of large sums available for common dividends. On the other hand, there has accumulated in the past few years a very great need for both freight and passenger cars on American railroads, and this need will continue to grow at an even greater rate than heretofore. The American Car & Foundry ought also to be in a particularly good position to get a large volume of foreign orders. When peace comes, therefore, there will be an enormous latent demand for cars, car wheels and car parts. When the railroads are restored to their owners, their credit will have to be very greatly strengthened—this is a necessity—and new equipment and repairs to equipment will be one of the first uses to which new money raised by the railroads will have to be put. Peace, therefore, ought to as surely continue large profits for the American Car & Foundry as would a continuance of war.

The Western Union Telegraph

IS WESTERN UNION a peace stock as well as a war stock? That is a question about which opinion may well differ. The war has benefited the Western Union very greatly, but it is only fair to say that a large part of the profit which has come in the last two years could not have been made had not the management of the Western Union pursued a far-sighted, progressive and courageous policy for some years before the war. The volume of land line and cable service in the calendar year 1917 was 66 per cent greater than in 1914. Gross operating revenues in 1917 amounted to \$76,995,511. This compares with \$61,919,141 in 1916, \$51,171,795 in 1915, and \$46,264,777 in 1914. The unprecedented industrial activity in 1916, and the entry of the United States into the war in 1917, account for the increase in the number and length of telegrams handled by the Western Union. There have been literally thousands of messages sent each day during the past two years by telegram that under ordinary circumstances would in all likelihood have gone by mail.

When peace comes, will the people who have been telegraphing return to the use of the mails? Probably a great many of them will. Some falling off in business of the Western Union would appear probable, but there is another angle from which to look at this. There are a great many people now telephoning messages which would, under ordinary circumstances, be telegraphed. This class of message, coming back to the Western Union with the return to normal conditions, ought in part to offset the loss of the messages now being telegraphed which in peace times would be sent by mail. Furthermore, the Western Union is now doing a huge business for the Government. The rate on Government messages is only 40 per cent of the commercial tolls, and, whereas the Government paid \$3,000,000 for its telegrams in 1917, if the commercial rate had been charged for these messages they would have cost \$7,500,000. The Western Union claims apparently with a great deal of justice, that its Government business is done at an actual loss. If that is so, when peace is declared the loss from the cessation of Government business in gross earnings will be more than offset by a decrease in expenses.

In 1917 operating expenses, including repairs, rentals and taxes, amounted to \$62,783,006 and, after the payment of interest on bonds and the deduction of \$2,650,000 for reserves, there was \$11,715,366 available for dividends. This is equal to 11.7 per cent on the outstanding stock. The regular 6 per cent dividends were paid and an extra dividend of 1 per cent was paid, calling for \$6,982,298. The amount available for dividends at the end of 1916 was \$12,395,405;

at the end of 1915 \$10,167,592; and at the end of 1914 \$5,371,395. In no one of the years prior to 1917, however, was there a deduction on account of reserves.

The Western Union is, of course, affected by labor scarcity and the high cost of materials. Over 1,200 employees have already gone into military and naval service. In 1917 there was an increase in salaries and wages of \$3,380,000 and, in addition, the company made a special payment to employees receiving \$2,000 a year or less, on the same basis as the special payment made in 1916. This special payment consisted of the flat sum of \$25 to all messengers at independent offices, 7 per cent of the regular annual wages to employees receiving less than \$1,200, and 6 per cent of regular wages to employees receiving from \$1,200 to \$2,000. This special payment, meant to offset the high cost of living for the small salaried employees, called for \$2,170,000 in 1917, and is, of course, included in expenses.

Even before the increased business due to the European war added so much to its revenues, the Western Union was making a considerable progress in net earnings. The adoption of the night letter, the day letter and the delayed cable message, at reduced rates, all made for a fuller utilization of the plant during what would have otherwise been a slack time. It is easy to look back now and say that it was an obvious thing to do to put in the cheap night letter and the comparatively cheap day letter and delayed cable, but actually it took a good deal of courage. It was not so obvious when it was done that this service might not make serious inroads into the more expensive expedited service. Such has not, however, proved to be the case.

In 1914 the Western Union had 25,784 offices and operated 1,581,571 miles of iron wire, 676,196 miles of copper wire and 2,875 miles of land line cables. The miles of pole line totaled 199,473. There was 22,915 nautical miles of ocean cables. During 1917 the company spent net \$5,218,054 on additions and betterments to plant and equipment, and included in this was \$250,000 for property in Chicago on which the company is this year putting up a building which will cost approximately \$1,500,000.

Current liabilities at the end of 1917 totaled \$14,169,906, and this included \$7,683,490 audited vouchers and accounts payable. There was \$5,635,124 cash on hand, \$13,561,005 accounts receivable, and \$15,869,654 marketable securities.

Republic Iron & Steel Company

WHEREAS THE BETHLEHEM STEEL CORPORATION'S total income was about six times as great, after allowing for federal taxes, in 1917 as in 1914, the Republic Iron & Steel Company's total income, after making provision for "excess profits, taxes, and other contingencies," was more than seven times as great in 1917 as in 1914. The increase in gross business was very much greater for Bethlehem than for Republic and, while the comparison of total profits is not an exact and, in detail, accurate comparison, it does show in a striking way how great has been the prosperity of Republic Iron & Steel under war conditions. It is an interesting and a somewhat curious fact, however, that the market price of neither the 7 per cent cumulative preferred stock of the Republic Iron & Steel or of its common stock reflects fully the change that has taken place in the income account from the beginning of 1914 to the end of 1917.

The gross volume of business in 1914 was \$21,366,249. In 1917 it was \$78,325,461. Total profits in 1914 amounted to \$2,407,552 and in 1917, before the deduction for excess profits, to \$28,769,021. The company subtracted \$9,878,657 for excess profits taxes, etc., leaving total profits, after the payment of taxes, of approximately \$18,460,000, or more than 7½ times the profits in 1914. Bethlehem's gross sales in 1914 were \$47,500,000 and its net profits \$9,649,668. In 1917 gross sales amounted to \$298,929,531

and profits, after the deduction of taxes, to \$53,979,360. Of course, any comparison between the value of Bethlehem stock and Republic Iron & Steel would have to take into consideration a great many other factors than those mentioned—the huge additions which Bethlehem has made to its assets, for instance; but the figures quoted are meant only to call attention to what the Republic Iron & Steel Company is doing.

After allowing approximately \$2,000,000 for depreciation and renewals and \$274,072 for exhaustion of minerals and allowing the previously mentioned \$9,878,657 for excess profits taxes, there was \$16,616,532 net profits in 1917. From this was deducted \$759,335 interest on bonds, and the 7 per cent dividends on the \$25,000,000 preferred stock, calling for \$1,750,000, and 6 per cent dividends on the \$27,191,000 common stock, calling for \$1,631,460. There was left a balance of \$12,475,737 to be carried to profit and loss. In 1916, a total of 18 per cent was paid on the preferred stock, so wiping out the cumulated back dividends, and 1½ per cent was paid on the common and \$9,881,298 was carried to profit and loss.

The following table shows a comparison of the production in gross or net tons of the Republic Iron & Steel in 1917 and 1914:

Tons	1917	1914
Iron ore (gross).....	1,706,555	1,233,105
Coke (net).....	1,329,809	859,911
Limestone (gross).....	406,306	28,755
Pig iron (gross).....	1,062,657	777,811
Bessemer steel ingots (gross).....	675,182	391,836
Open-hearth steel ingots (gross).....	486,601	371,409
Total steel ingots (gross).....	1,161,783	763,235
Finished and semi-finished products (net).....	1,109,829	760,054

As a matter of fact, production in 1917 was restricted in the second quarter of the year by an explosion which destroyed one of the principal power stations of the company, and in the fourth quarter of the year by a shortage in fuel and in transportation facilities.

During the year \$7,277,461 was spent for new constructions and additions to the property. To insure an adequate supply of fuel, new mines were bought, against which there is outstanding \$1,000,000, 6 per cent first mortgage bonds. A new blast furnace was completed during the year and was blown in in September, 1917. The company now has a capacity for the production of pig iron, totaling 1,425,000 tons. The actual production in 1917 was 1,062,657 tons.

The striking thing about the growth in prosperity of the Republic Iron & Steel is the great increase in the percentage of net earnings to gross volume of business. In 1914 it was less than 10 per cent; in 1917, even after subtracting excess profits, taxes, it was over 23 per cent.

The Republic Iron & Steel, however, has had its troubles with labor as have other steel companies and industry in general. Payrolls in 1917 amounted to \$17,574,481, or an average of \$1,211 per man. In 1915 payrolls totaled \$8,558,574, or an average of \$771 per man. These figures do not include the men working in the coal mine which was purchased during 1917. Notwithstanding the much higher rate of wages paid per man, actually a less efficient class of labor is employed. If, for no other reason, lack of experience is a large factor.

The balance sheet of the Republic Iron & Steel shows the company in a very strong position as regards working capital and liquid assets. Total current liabilities amount to \$13,145,000, but of this only \$3,475,000 are accounts payable and the greater part of it is made up of the \$8,597,086 accrued excess profits taxes and \$845,365 provision for the dividends payable January 1 and February 1. Total current assets amount to \$39,090,580, which includes \$4,367,794 cash and \$14,358,265 United States certificates of indebtedness and Liberty Bonds, and \$13,475,652 inventories of manufactured products and materials and supplies at cost or less, and \$908,863 ore at docks and only \$5,980,005 accounts and notes receivable.

The Baldwin Locomotive Works

THROUGHOUT the profits which have accrued to it during the last two years, the Baldwin Locomotive Works has been able to write down the book value at which patents and good-will have been carried from \$16,699,299 to the comparatively nominal amount of \$899,299. In other words, with the exception of this amount the assets, as shown on the balance sheet, are a considerable value of tangible property. Real estate, machinery, and tools is carried at \$27,467,201, and during the calendar year there was spent on additions to this plant \$1,187,207.

The Baldwin Locomotive Works has been building locomotives since 1831. It has a manufacturing plant in the fifteenth ward of Philadelphia covering 16 acres. The company has bought or secured option on 370 acres of land at East Chicago and, furthermore, the board of directors has authorized the purchase of land adjoining the Eddystone, Pennsylvania, plant at a cost of approximately \$2,500,000. The Eddystone property consists of 225 acres of land, with a plant now being used to manufacture munitions, but which can eventually be adapted to the manufacture of locomotives. The Eddystone property is leased to a subsidiary corporation, the Eddystone Munitions Company, all of the capital stock of which (\$100,000) is owned by the Baldwin Locomotive Works.

In 1913 the output of locomotives was 2,025. This dropped off very sharply in 1914 to 1,804. In 1915 it was 1,869, and in 1916, 1,989. In 1917 the entire plant was being worked nearly to capacity. There were 2,748 locomotives built, and, in addition, \$13,835,707 of other regular work was completed. In addition, contracts for shells and other special work amounting to \$20,972,584 were completed. Thus the gross sales in the calendar year 1917 amounted to \$98,263,865. This compares with \$59,219,058 in 1916, \$22,083,011 in 1915, \$13,616,163 in 1914, and \$37,630,969 in 1913.

The manufacturing profit in 1917 was \$11,779,020, in 1916 \$6,361,811, in 1915 \$2,725,573, in 1914 \$320,609, and in 1913 \$3,886,475.

The percentage of manufacturing profit to gross sales compares as follows:

1917	12.0
1916	10.7
1915	12.3
1914	2.4
1913	10.3

The Baldwin Locomotive Works has outstanding \$9,-

400,000 first mortgage bonds and \$20,000,000 preferred stock and \$20,000,000 common stock. Regular dividends of seven per cent on the preferred stock (on which dividends are cumulative) have been paid since the incorporation of the present company in 1911. From 1912 to 1914, inclusive, two per cent dividends annually were paid on the common stock; but since 1914 no common stock dividends have been declared.

The common stock is now selling at 77 and the preferred in the neighborhood of 100. The first mortgage bonds are selling at about 100. In February and March of 1914, before the declaration of war and after the prosperous year of 1913, Baldwin common was selling at 50, Baldwin preferred at 108, and the five per cent first mortgage bonds at 104.

The balance sheet of December 31, 1913, showed plant and equipment, which we now know included \$16,699,299 patents and good-will, carried at \$37,081,026, current assets at \$15,735,635, which included \$4,563,848 cash and \$3,155,175 inventories. There were only \$449,442 accounts payable. At the end of 1917, plant and machinery, excluding any good-will and patents, was carried at \$28,254,408 and current assets at \$38,811,325. This included \$6,757,339 cash and \$20,434,766 inventories. Accounts payable amounted to \$5,768,698, and bills payable to \$8,250,000.

The market now puts a value of \$15,400,000 on the \$20,000,000 Baldwin Locomotive common, on which in 1914 it put a value of \$10,000,000. If we should subtract from the assets the \$30,000,000 par value of preferred stock and first mortgage bonds and subtract also the patents and good-will, the amount of current liabilities, debt to the Government and interest accrued on bonds, we get \$22,361,048, the net assets allocatable to the common stock in 1917, and \$8,188,492 in 1913.

Cities Service Company

THE CITIES SERVICE COMPANY is a holding company for companies doing a considerable variety of public utility and other businesses and the plants of these public utilities are scattered broadly over the country. For instance, one of the subsidiary companies is the Denver Gas & Electric Light Company of Denver, Colo., one the Empire District Electric Company of Joplin, Mo., the Danbury & Bethel Gas & Electric Light Company and the Empire Gas & Fuel Company,



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The King of the Belgians Inspects a Belgian Heavy Battery

with a large number of subsidiary oil companies. While, of course, the public utilities part of the business has had to face the great increase in cost of labor and materials, without in most cases, any opportunity to raise rates, the astonishing increase in oil production has, together with a great increase in fuel consumption, because of industrial activities, added very greatly to the gross income of the Cities Service Company.

Gross earnings in the calendar year 1917 totaled \$19,252,-492, comparing with gross earnings of \$10,110,343 in 1916. This is an increase of over 90 per cent. Earnings available for dividends on the common stock amounted to \$60.73 a share. Only \$6 in cash and \$6 in stock was paid out in dividends. It is a rather remarkable fact that although the company has expanded its operations on a very large scale and at a very rapid rate, the bonds outstanding against the subsidiary companies are equal to only \$1.42 for each one dollar of annual subsidiary gross earnings.

The combined capital assets of the subsidiary companies are carried at \$345,247,763. The Cities Service Company itself has outstanding in the hands of the public \$25,666,300 common stock and \$66,494,800 preferred stock, and of the subsidiary companies there is \$3,685,869 common stock outstanding in the hands of the public and \$5,975,144 preferred stock outstanding in the hands of the public. The Cities Service Company itself on January 10, 1918, had on hand \$2,191,552 cash, with only a nominal amount of current liabilities. The balance sheet for the combined subsidiary companies is for December 31, 1917, and on that date the subsidiaries had \$1,621,964 cash in local banks and \$1,501,314 cash in out-of-town depositories. There were \$4,524,867 current accounts payable, \$19,544,818 bills payable and \$4,580,171 taxes accrued. The total current liabilities of the subsidiary companies including the items just mentioned, amounted to \$32,916,097. The total current assets of the subsidiaries, including the cash previously mentioned, was \$36,602,334, of which the two largest items were crude and refined oil stock \$11,013,489, and stores and supplies \$8,228,545.

The combined statement of earnings of the Cities Service Company and its subsidiaries is especially interesting. In 1914, gross earnings amounted to \$19,093,653, expenses to \$11,577,582, and interest charges to \$3,069,327, leaving \$4,446,744 available for dividends. By 1916 gross earnings had increased to \$48,052,573, operating expenses to \$28,908,646, interest charges to \$5,076,074, and the amount available for dividends to \$14,067,853. In 1917 the combined gross earnings were \$69,634,872, operating expenses \$44,180,841, interest charges \$5,976,506, leaving \$19,477,-526 available for dividends.

The United States Steel Corporation

NO ATTEMPT will be made here to comment on the showing made by the United States Steel Corporation in the calendar year 1917.

The following table gives the income account for the years ended December 31, 1917 and 1916:

	1917	1916	+ Increase — Decrease
EARNINGS Before charging interest on bonds and mortgages of subsidiary companies:			
First quarter	\$78,994,371.04	\$63,110,730.27	+ \$15,883,650.77
Second quarter	90,592,701.88	83,501,065.24	+ 7,091,636.64
Third quarter	73,007,297.57	88,159,733.30	- 15,152,435.73
Fourth quarter	61,567,101.04	108,225,573.63	- 46,658,472.59
Total for year	\$304,161,471.53	\$342,997,092.44	- \$38,835,620.91
Less, interest on outstanding bonds and mortgages of the subsidiary companies	8,869,291.50	9,422,914.94	- 553,623.44
Balance of earnings	\$295,292,180.03	\$333,574,177.50	- \$38,281,997.47
Less, charges and allowances for depreciation applied as follows, viz.:			
To depreciation and extraordinary replacement funds and sinking funds on bonds of subsidiary companies	43,296,038.26	32,762,072.38	+ 10,533,965.88
To sinking funds on U. S. Steel Corporation bonds	7,257,233.41	6,785,540.27	+ 471,693.14
Net income in the year	\$244,738,908.36	\$294,026,564.85	- \$49,287,656.49
Deduct:			
Interest on U. S. Steel Corporation bonds outstanding	21,256,303.17	21,602,852.90	- 346,549.73
Premium paid on bonds redeemed			
On subsidiary companies' bonds	117,914.50	146,277.11	- 28,362.61
On U. S. Steel Corporation bonds	745,933.69	870,673.57	- 124,739.88
Balance	\$222,618,757.00	\$271,406,761.27	- \$48,788,004.27
Add: Net balance of sundry charges and credits, including adjustments of various accounts	1,600,807.54	124,969.11	+ 1,475,838.43
Balance	\$224,219,564.54	\$271,531,730.38	- \$47,312,165.84
Dividends on U. S. Steel Corporation stock:			
Preferred, 7 per cent.	25,219,677.00	25,219,677.00	
Common: 1917, regular 5 per cent, extra 1 1/2 per cent; 1916, regular 5 per cent, extra 3/4 per cent	91,494,450.00	44,476,468.75	+ 47,017,981.25
Net income	\$107,505,437.54	\$201,835,584.63	- \$94,330,147.09
Less, Appropriated from net income on account of expenditures made and to be made on authorized appropriations for additional property, new plants and construction	55,000,000.00		+ 55,000,000.00
Balance carried to undivided surplus	\$52,505,437.54	\$201,835,584.63	- \$149,330,147.09

*Balance of earnings after making allowances for estimated amount of Federal income and war excess profits taxes.

Chairman E. H. Gary in his annual report says in part:

The large demand for iron and steel products which existed during 1916 continued during the year 1917. This was increased after the entrance of the United States into the European war, especially for certain lines of products required for the war program. These demands largely exceeded the producing capacity of the manufacturers and, because of the largely increased cost of labor, raw material and supplies, the prices for steel products advanced materially.

Two general advances in wage rates of employees of 10 per cent were made on May 1 and October 1, respectively. These followed three increases in 1916, each of substantially the same percentages and resulted in making the wage rates in effect at close of the year 65 per cent above the rates prevailing at the close of 1915 in the case of unskilled labor and an average of 58 per cent higher in respect of all employees. In December, 1917, the average earnings per em-



place per day of all the employees, exclusive of the administrative and selling force, was \$4.00; and of the total, including the administrative and selling staff, \$4.65.

The smallest number of employees in the service of the corporation and its subsidiary companies during the year in any month was 250,836, and the highest number 277,526. The average number employed during the entire year and the total payroll in comparison with results for 1916 were as follows:

	1917	1916	Increase	Per cent
Average number of employees during the entire year	268,078	231,668	15,390	6.1
Total amount of payroll	\$47,370,400	\$34,388,200	\$8,982,898	31.9

During the year 11,486 employees of the United States Steel Corporation and its subsidiary companies entered the regular war service of the United States.

At December 31, 1917, the tonnage of unfilled orders of the subsidiary companies was 9,381,718 tons of rolled steel products, a decrease in comparison with December 31, 1916, of 2,165,568 tons. The conditions prevailing in respect of governmental regulation of prices, priority orders on production and the demands for war purposes directly and indirectly of a large percentage of the output of the mills, naturally interferes with forward buying by customers.

The output of the properties and plants of the subsidiary companies in 1917 did not quite reach the record figures of the previous year, notwithstanding additions and extensions completed and placed in operation increased somewhat the capacity. The decrease in production and output in 1917, compared with 1916, is attributable principally to inability to secure sufficient employees to fully man the plants and to the lack of ample transportation service to furnish the plants with necessary raw materials and supplies. The production during the year, in comparison with results in 1916, of basic raw materials and of semi-finished and of rolled and other finished products for sale to customers was as follows:

	1917 Tons	1916 Tons	Increase or decrease Tons	Per cent
Iron ore mined	31,781,769	33,355,169	1,573,400	- 4.7
For use in making coke	24,554,525	26,606,041	2,051,516	- 7.7
Coal mined	6,942,298	6,162,340	779,958	+12.7
For use in making coke	31,496,823	33,768,381	1,271,558	- 3.9
For steam, gas and other purposes	17,461,675	18,901,962	1,440,287	- 7.6
Coke manufactured	6,494,917	7,023,474	528,557	- 7.5
Limestone quarried	15,652,928	17,697,637	1,954,709	-11.1
Use iron, ferro and spiegel	20,285,061	20,910,589	625,528	- 3.0
Steel ingots (bessemer and open hearth)	14,947,911	15,460,792	512,881	- 3.3
Rolled and other finished steel products for sale	11,917,000	10,425,600	1,491,400	- 4.7
Universal Portland cement				
	Bbls.	Bbls.	Bbls.	
	11,917,000	10,425,600	1,491,400	- 4.7

The shipments of all classes of products to customers dur-

ing 1917, in comparison with the shipments during the preceding year, were as follows:

	1917 Tons	1916 Tons	Increase Tons	Per cent
Domestic Shipments				
Rolled steel and other finished products	11,917,000	10,425,600	1,491,400	+14.3
Pig iron, ingots, spiegel, ferro and open hearth	184,795	4,188	180,607	+4,311.1
Iron ore, coal and cokes	399,267	1,171,013	(771,746)	- 65.9
Sundry materials and by products	199,787	169,447	30,340	+17.9
Total tons all kinds of materials, except cement	14,600,849	14,670,248	62,399	- 0.4
Universal Portland cement (bbls.)	10,298,799	10,861,426	(562,627)	- 5.2
Export Shipments				
Rolled steel and other finished products	3,328,183	466,791	2,861,392	+613.1
Pig iron, ingots and spiegel	1,179	6,606	(5,427)	- 82.1
Sundry materials and by products	1,211	1,000	211	+21.1
Total tons all kinds of materials	4,528,573	474,397	4,054,176	+854.3
Aggregate tonnage of rolled steel and other finished products shipped to both domestic and export trade	15,379,422	11,342,043	4,037,379	+35.6

Total value of business (covering all of above tonnage):	1917	1916	Increase	Per cent
Domestic	\$1,023,393,678	\$702,801,167	\$320,592,511	45.6
Export	179,488,730	159,463,290	20,025,440	12.6
Total	\$1,202,882,408	\$862,264,457	\$340,617,951	39.5

The expenditures made during the year for repairs, maintenance and general up-keep of the properties in comparison with outlays for similar purposes during the preceding year were as follows:

	1917	1916	Increase	Per cent
Ordinary repairs and maintenance	\$84,666,857	\$63,313,553	\$21,353,304	+33.7
Extraordinary replacements and general rehabilitation	7,957,472	6,079,474	1,878,398	+30.9
Total	\$92,624,329	\$69,392,627	\$23,231,702	+33.5

The large increase over previous year in the expenditures for current and ordinary maintenance is accounted for to a considerable extent by greater cost of labor and material.

The total of all charges to and allowances from gross earnings for the year to cover exhaustion of minerals and deterioration arising from wear and tear of improvements amounted to \$136,057,605, an increase of \$31,481,226, or 30.1 per cent, in comparison with similar charges and allowances in 1916.

The total charges to income account for the year for taxes levied against the Corporation and its subsidiary compa-



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Turkish Prisoners Loading Barges in Egypt

nies, *exclusive* of Federal income and excess profits taxes, amounted to \$18,800,260, in comparison with \$16,907,712 for 1916. Charges were made against 1917 earnings for an estimated allowance of \$233,465,435 for account of Federal income, war income and excess profits taxes for the year. The exact amount of these taxes which may be due and payable cannot be fully determined at the date of writing this report, and it is possible that upon final compilation of tax returns, based on the latest Treasury interpretations of the law, subsequent adjustments may be necessary. It is believed the charges stated will be sufficient to cover the final figures.

During the year there were purchased or constructed by the subsidiary manufacturing, coal and railroad companies additional railroad equipment for general transportation service, as follows: 31 locomotives, 4,280 steel freight cars, 324 box and dump cars, and 28 road cars of various kinds, costing in all \$10,002,070. Three 12,700-ton capacity ore carrying vessels were purchased and placed in commission during the year. One additional steamer of same type was ordered for delivery in 1918.

At the date of writing this report the total amount expended on authorized appropriations for new plants, extensions and additions and betterments, including iron ore mine stripping operations for 1918, equaled approximately \$187,000,000. It is estimated that about \$110,000,000 of this total will be expended in 1918.

In January, 1918, there was offered to the employees of the United States Steel Corporation and of the subsidiary companies the privilege of subscribing for shares of Common Stock of the Corporation, at the price of \$92 per share. Subscriptions were received from 43,258 employees for an aggregate of 95,437 shares. These subscriptions represent an increase of 10.7 per cent in respect of number of subscribers, and 41.5 per cent in the number of shares subscribed over the previous year. The conditions attached to the offer and subscription, aside from the feature of price, were generally similar to those under which stock has been heretofore offered to employees. The usual distribution of special compensation to employees on the basis of the plan adopted in 1903 was also made.

The Trustees of the United States Steel and Carnegie Pension Fund disbursed during the year 1917, in pensions to retired employees, the sum of \$712,506.65. Pensions were granted during 1917 to 241 retiring employees.

The total amount expended by the Corporation and the subsidiary companies during the year for safety work was \$998,806, in comparison with \$848,080 in the previous year. Compared with results in 1916, the fatal and serious accidents per 100 employees showed a decrease of 14.67 per cent, and, compared with 1906, a decrease of 41.63 per cent. The reduction in the relative number of accidents in 1917, compared with previous year, is notable in view of the increased force employed during 1917, which included many new employees not familiar with safety rules and regulations.

The total amount disbursed by all the companies during 1917 in connection with work accidents was \$3,171,994. Of this sum 87 per cent was paid directly to the injured employees or their families or in taking care of them. These payments were made either in accordance with the provisions of the Workmen's Compensation Laws enacted by the several states in which the subsidiary companies are operating, or under the Corporation's Voluntary Accident Relief Plan where there is no statutory law applicable.

In furtherance of the established policy of providing modern sanitary facilities for the health and comfort of the employees, much additional equipment was installed throughout the plants and mines during the year. This added equipment included drinking water systems and sanitary drinking fountains, closets, wash and locker rooms, including 496 shower baths and 15,763 lockers.

The efforts of the Corporation and its subsidiary companies toward the improvement of the material welfare of the employees and their families referred to in previous annual reports have been systematically continued. Due to the increased labor forces and the scarcity of dwellings, it has been necessary for the subsidiary companies to build a large number of houses to accommodate the workmen. Much thought and study has been given to the design and plans of these houses, with a view to furnishing the workmen homes with modern conveniences and at a moderate rental. Through the aid of the subsidiary companies, employees were enabled to increase largely the number of vegetable gardens planted by them during the past year. Considerable unoccupied land adjoining the plants was laid out in plots, which employees were permitted to use for raising vegetables. Altogether, the area utilized by employees for this purpose equaled 2,082 acres and comprised 15,705 gardens.



The Small Investor

IT will be the object of the Investment Economist section of the Railway Age to avoid columns of statistics. The quotation, therefore, of stock and bond prices will not be included; but every subscriber to the Railway Age has the privilege of writing in to the Small Investor and asking for price quotations on either listed or unlisted securities. The Railway Age will undertake to furnish an approximate quotation of all securities listed on the New York Stock Exchange as of the day of the receipt of the inquiry and will do its best to furnish a bid and asked price for unlisted securities with such information as is available from reliable sources.

We will be glad to answer inquiries, which we will treat as confidential, about investment securities and while, of course, such quotations of prices and answers to inquiries cannot be guaranteed, they will be obtained in all cases from sources which we believe to be reliable and impartial.

What is an Investment?

PUTTING a penny into a little iron bank from which it cannot be extracted is not an investment, but it contains one of the elements necessary to making an investment and the psychology of it is worth examining. Why is it that the iron bank should play so important a part in making it easier to save? It is just as much a saving if the penny is kept in the small boy's trousers pocket as it is if it is put into the iron bank. For one thing, however, the boy has to save the same penny over and over again if he carries it in his pocket. Every time he passes a candy store he has to perform an act of self-denial. On the other hand, when he puts the penny into the bank, he makes one act only of self-denial.

The Century Dictionary defines invest as "to employ for some profitable use; convert into some other form of wealth . . ." The distinction between saving and investment is the difference between unemployment and employment of money but still the psychology of the boy's penny bank enters into investment. When you save and make an investment, your saving or act of self-denial is completed. You do not have to save the same money every time that you wish to go to the theatre or to indulge in any pleasure that costs money.

It is, of course, this perfectly well recognized trait of human nature that makes it easier to sell almost anything on the instalment plan; but in investment the saving is made with the expectation of profit either through wages which someone else is willing to pay you for the use of your money or enhancement of the value of the other form of wealth, in which you have invested your money, measured in terms of money.

There is a great variety of ways in which the man or woman who will save can make an investment. Money put in the savings bank is in the final analysis money which is entrusted to someone else to invest. It is only in degree that it differs from direct investment in mortgages or bonds on the advice of someone in whom you have confidence. When you put \$50 in a savings bank, however, you are indirectly making a diversified investment. The deposits of the savings bank are used to buy many different kinds of corporation securities and to loan on real estate in different communities, so that, if the savings bank management has used bad judgment in a single instance or a few scattered instances,

the impairment of the value back of your \$50 is so slight as to be negligible. To put money in a savings bank, therefore, is one of the safest ways of making an investment. Since, however, the risk of loss is one of the elements which enters into the price which you can get in the form of interest for the use of your money, the interest paid by the savings bank is comparatively low.

Let us assume that you can make a regular investment of \$50 every two months. Is it possible to invest this money directly in securities of corporations and in time get a diversified investment based on your own judgment? If you are willing to put a certain amount of thought and study into it, it is possible. In this department of the Financial Quarterly of the *Railway Age*, there will be discussed in the simplest terms and in considerable detail the general principles which can be applied to forming a judgment of the worth of an investment in corporation securities. In this first article, the barest outline only of these principles will be given.

The first question is as to what constitutes security for an investment. The distinction between stock and bond is the distinction between a partnership in a business and being a creditor of the business. If you buy stock of any corporation, you are buying a right to share in the profits of that business and are intrusting your money to the management of the business with the knowledge that this money will be used to meet losses if there are losses. If you buy bonds, you lend your money to the business and as long as the business can pay its debts, you will receive a certain fixed amount every three months or every six months as wages for the use of your money.

Broadly and roughly, the large corporations in which you might consider making an investment, that is, buying their stock or their bonds, may be divided between (1) railroads, (2) public utilities and (3) industrials.

Whether you invest in the stock or in the bonds of a railroad company, the only real security for your investment lies in the net earning power of the railroad. Even if the investment is in first mortgage bonds where, if the railroad should default in interest, the bondholders could step in and take the road, wiping out the interest of stockholders to the full extent necessary to get the par value of their bonds, it still remains true that net earning power is about all the security that the bondholder has. If operating the railroad as a railroad will not earn net enough to pay the interest on the first mortgage bonds, the right to sell the road is of almost negligible value where the amount of bonds per mile of road is nothing more than the merest fraction of the cost of building such a road.

Under the heading public utility, come street railway companies, gas and electric companies and the like. Security in this case rests on the type of franchise which the company has, the potential and actual consumer demand for its services and the freedom which it enjoys from competition. There is also, of course, the question of the fairness with which the company is likely to be treated by the authorities which have the power of regulating it. If a gas company has a perpetual franchise, exclusive right to lay gas mains in a growing and prosperous town, and is subject to jurisdiction of a public utility commission which has a record for fair dealing, the security of its bonds or stock is, other things being equal, comparatively high. With the public utility as with the railroad it is primarily net earning power which forms the security for the bondholders as well as the stockholders.

Industrials, so called, are the companies which do a manufacturing or selling business as, for instance, the Republic Iron & Steel Company, the American Woolen Company, or Sears Roebuck & Co. With these companies the first question of security of investment must be answered from a study of the assets and liabilities of the company. Has the company sufficient cash to give it ample working capital? What is the value of its liquid assets? By liquid assets is meant

things which can be sold comparatively readily and the sale of which would not mean the discontinuance of the business; for instance, stocks of raw material and all manufactured articles on hand would be liquid assets of a manufacturing company in contra-distinction to its manufacturing plant, which latter, while it might be saleable and usable for other manufacturing purposes, is indispensable for carrying on the business. The next question is as to the conservation of the valuation of assets. Is a fictitious value placed on good will and patents, and by fictitious in this case is meant too high a

value? If good will and patent are carried at a nominal sum, \$1 or \$100, it is true that this may be a fiction but it is a fiction in the interests of conservatism.

The industrial, unlike the public utility with an exclusive franchise, is always subject to competition. The protection against competition must lie in an organization and plant which permit of a low manufacturing cost.

This outline is not intended to be anything more than indicative of the method of approach of an investigation as to the value of an investment.

Relation Between the Stock Market and Investment

The Difference Between Speculation and Investment Is Fundamentally a Difference in the Mental Attitude

IT IS SOMETIMES SAID that all Americans who buy corporation securities are at heart speculators, not investors. This is not strictly true, but it is true that very often the American investor confuses speculation and investment in a way in which the French investor does not. The French investor, and to a great extent also the English investor, thoroughly understands that what he wants to do is to purchase a fixed income and that his primary concern is to make certain that this income will be surely and regularly paid him. The American investor, and this is equally true of women who are in circumstances which should lead them to adopt the French view without reservation, confuses the market price at which from time to time their investment securities are quoted with the value and security to them of the income which they have purchased.

An open security market is of value to investors as well as speculators but, whereas the speculator makes his profit from the fluctuations in the price at which securities are bought and sold in this market, the investor uses the market as a place in which to buy the securities which yield the income which he desires, or to sell these securities if necessity arises.

In the ordinary use of the term investment, is meant, either a purchase of securities with the sole object of receiving an income from the interest thereon or the dividends thereon, or a purchase with the expectation of enhancement in market value. For the purposes of this discussion, however, when investment is spoken of, only the simple pure variety—purchase of income—is meant. The investor, therefore, in this sense, is interested in the fluctuations in market price only as they offer a more or less propitious time to make a purchase of securities. After deciding that a particular time appears to be propitious to buy a certain security, the investor may well forget entirely the daily quoted price of his security. What he should continue to watch is the earnings of the corporation whose security he has bought.

The speculator is concerned with a number of elements of varying importance, and by speculator is meant the purchaser of corporation securities who is not concerned solely with the income which they yield him but is also desirous of making a profit through the sale of his securities at a higher price than he paid for them. The two principal factors which he must study are the general trend of all security prices—the general trend of the market as it is called. The other factor is the relative trend of the price of the particular security which he is considering buying as compared with the general trend of prices.

The trend of the general market for so-called standard

railroad stocks has been slightly upward since the beginning of 1918 and of the industrial stocks, most dealt in on the New York Stock Exchange, upward. On the other hand, the trend of prices of railroad bonds has been slightly downward, of industrial bonds, slightly upward, and of public utility bonds downward during January and nearly stationary in February and March. Both bonds and stocks have been lower in price in the first three months of 1918 than they were in either 1917 or 1916, and bond prices have been lower than they were in 1915. It would appear, therefore, that the present is a propitious time for the investor who desires to buy income to make an investment, regardless of the fact, which he must recognize, that if the war continues for a considerable period, the market price at which the securities he may buy will be quoted may and probably will be lower than the price which he pays for them now.

To the speculator who is looking for an enhancement in value reflected in a higher quoted price, this possibility cannot be disregarded. Prices are low now but it is quite conceivable that they may go lower still. For speculative purposes, the industrial stocks would appear to be in a much more favorable position in general than railroad stocks. There are many industrial companies which are making large profits out of the manufacture of articles required for the conduct of the war and some of these companies will be in a position to continue to make large profits out of the deferred need for their products in times of peace. With the railroad stocks, however, the outlook is not at present encouraging.

While Director General McAdoo denies any desire to have the Government retain the railroads after the elapse of twenty months after the declaration of peace, it is not at all unthinkable that the Democratic party would go to the country in 1920 with one of the planks in its platform advocating a retention of the railroads, either by a continuation of control and operation or the further step of outright government ownership of the railroads. If government ownership were to be the issue and the country should have the misfortune to adopt it, owners of railroad securities would be, it appears now, in an unenviable position.

While the courts follow public opinion more slowly and conservatively than Congress, after all public opinion is the ground work on which court decisions are founded, even though the legal justification of these decisions is based on previous legal decisions. If the country should vote for government ownership, there is an imminent danger of a huge confiscation of equities of the holders of railroad securities, the courts notwithstanding.

EDITORIAL

Railway Age

EDITORIAL

Francis S. Peabody, chairman of the Peabody Coal Company, has written for the *Railway Age* a brief but important article, which we publish elsewhere in this issue, on the transportation of coal for railway use during the period of government control. Mr. Peabody was formerly chairman of the Committee on Coal Production of the Council of National Defense, and is one of the largest coal operators in the United States. He worked out for the Railroads' War Board a zone system for the distribution of coal for commercial and domestic use which was the basis for the zone system which has been adopted by the Fuel Administration. The railways are very much the largest consumers of coal. Mr. Peabody estimates that they use one-third of all that is produced in the country. Railway men need hardly be told that under the competitive system of railway operation there was a large waste of transportation in the handling of coal for the use of the roads themselves. This was mainly due to the fact that each road sought to get for itself as large a part as possible of each haul of coal intended for its use because this tended to swell its own earnings and at the same time kept down the amount of freight charges it had to pay, directly or indirectly, to other roads. This system, natural but expensive under competitive operation, is needlessly expensive and wasteful of transportation under unified operation. The remedy, Mr. Peabody contends, is a zone system of production and distribution similar to that adopted for commercial coal. His suggestions are earnestly recommended to the consideration of the Railroad Administration and the managers of the individual railways.

The waste in iron and steel that will be occasioned by the use of standard locomotives amounts to such a large sum that it must be given serious consideration, particularly when this material is in such demand for purely war purposes. In the last week's issue of the *Railway Age* attention was called to this fact on page 843. The study has been carried further if the requirements for Mikado, Santa Fe, Mallet, Pacific, Mountain and switching types of locomotives last year were to be fulfilled with the proposed standards, of the weights given by Alba B. Johnson in a paper on the Railroad Administration's Motive Power Problems, published elsewhere in this issue, there would be over 25,000,000 lb. more of locomotive material used than was used last year. The requirements this year will undoubtedly be twice those of last, and it can be safely said that if standard locomotives are adopted, 50,000,000 lb. more of iron and steel will be used than would be necessary if the roads were permitted to order locomotives best suited for their requirements. Based on a cost price of 15 cents per pound, this means that the increase in the cost for locomotives this year would amount to some \$7,500,000. Can the Railroad Administration afford such extravagance? Is there any excuse for such extravagance, particularly when the adoption of standard locomotives will give many road-power which is unsuitable for their conditions and power which they are not prepared to maintain? Will any slight increase in the output of the locomotive builders warrant any such increase in the cost for locomotives?

The representatives of the *Railway Age* have invariably found when talking with men conversant with locomotive design and operation that there is a distinct feeling against the adoption of standard locomotives for all the railroads in this country, particularly at this time. So general is this feeling that it is beginning to appear that the director general has not been getting the consensus of opinion on this very important subject. The railroad men particularly seem to hesitate to speak their minds. Every interview on the subject is closed with an admonition from them—"Now don't quote me. I am working for the government and I intend to be a good soldier." They cannot better perform their duty to their country than by doing what they can to prevent the Railroad Administration from making a mistake which is so full of disastrous possibilities. It is the duty of every railroad man who knows, to speak through the most direct channel he has—either through the regional directors or the standardization committee,—and give his honest and just opinion on the practicability of standard locomotives. Alba B. Johnson, president of the Baldwin Locomotive Works, in a paper before the U. S. Chamber of Commerce, which is published elsewhere in this issue, has availed himself of an opportunity of saying what he thinks on standardization. He says: "It may be said that the workman who is responsible for the best workmanship should be entitled to the selection of his own tools, and similarly, that the railroad manager who is responsible for his record of efficiency and economy, should be permitted the widest discretion in selecting the locomotives which he regards as best fitted for the conditions of service upon his line." And further: "Thus, instead of simplifying the problem of locomotive maintenance, the introduction of government standards would complicate it." He closes his discussion with the admonition that: "Especially should this (standard locomotives) be considered most carefully when the world-wide danger of this war is upon us." There are other men as well able to speak on this subject as is Mr. Johnson—men in the railroad field, who know just what standard locomotives will mean to them. Let them speak before it is too late!

An interpretation of the Hours-of-Service law by the "rule of reason" instead of on the basis of the strictest possible construction, is one of the unusual things recorded in our Court News column this week. It is in a decision by Judge Bullington in the United States Circuit Court of Appeals at Philadelphia. The engineman and fireman of a helping engine had a good deal of time off between runs and the judge suggested that now, when everybody is in duty bound to work to his utmost to win the war, there ought to be some reasonable way in which this rest-time should be allowed for. Whether or not this view will be sustained, under the cold scrutiny of the full bench of the higher court, we do not know. Indeed, the declaration is perhaps to be classed only as an *obiter dictum* and so of only temporary interest; but it is at least a refreshing variation in the dreary and mending succession of strict constructions by which, dur-

ing the past dozen years, the courts have converted the rules of freight-train running into a petrified strait-jacket, in which no one has a chance to breathe. In essence, the controversies over hours of service are only a part of the campaign of the brotherhoods for higher pay; but, nevertheless, every airing of the subject helps to impress the fact that every railroadman's duty at the present time is to put forth his best efforts for efficiency, whether his day's work is done in 8 hours, or is scattered over 18 hours. His own health, physical and mental, as related to his personal efficiency, is the only justifiable limitation. Another significant *obiter dictum* of this decision is that wherein the judge says that the Interstate Commerce Commission, instead of prosecuting the railroads in the courts for their infractions of laws which in some respects are almost unworkable, ought to formulate and prescribe reasonable rules under which the laws could be complied with according to the normal dictates of common sense. What could be more rational?

The Transverse Fissure Problem

THE DETERMINATION of the conditions leading to the development of interior transverse fissures in steel rails has proved one of the most baffling problems with which railway men and metallurgists have been confronted for many years. Although brought prominently to light in the investigation of the Lehigh Vailley wreck at Manchester, N. Y., in 1911, little really definite information has been developed regarding the causes of this type of rail failure, in spite of the fact that it has been given close study by many rail experts since that time. However, the attention which is being given to this problem, and the data which are being collected have demonstrated the fallacy of certain theories that have been advanced and are narrowing down the range of possible causes and thereby bringing nearer the final solution.

The most recent contribution to this subject is the paper by James E. Howard, presented before the American Institute of Mining Engineers in New York on February 20 (abstracted in the *Railway Age Gazette* of November 30, 1917) and the discussions of this paper, several of which are published in part on another page in this issue. In his paper Mr. Howard repeats the conclusion advanced frequently in his reports to the Interstate Commerce Commission that transverse fissures are fatigue fractures which may develop in rails which are structurally free from any known defects. In other words, he believes that they are the result solely of service conditions. In this position he is supported by the manufacturers, but opposed by railway men, and this line of cleavage was particularly evident in the discussion at New York.

Representatives of the manufacturers have advocated decreasing the loads to which the rails are subjected, or increasing the section of the rail. To the first suggestion railway men reply that it is impracticable, while maintaining that the necessity for the second has not yet been demonstrated. That some of the manufacturers are alive to the importance of the problem is indicated by the statement of a representative of one of the large steel companies that his firm is planning to build a machine in the near future which will test full sized rails to determine the effect of section, chemical composition and methods of manufacture on the ability of the rails to withstand the stresses to which they are subjected in track.

In support of their contention that transverse fissures are not fatigue fractures arising primarily from the overstressing of the rail in service, but arise from defects originating in the mills, a number of the railway men presented data to show that transverse fissures have occurred in rails which have been subjected to very limited service, while they have not been found in other rails which have carried a very

heavy traffic; also this form of failure is more prevalent in rails secured from some mills than from others and certain heats show many more failures than other heats from the same mill.

While transverse fissures are relatively few, measured in terms of the total number of rails in track, as pointed out by several railway men, the inherent possibility of a serious accident resulting from a failure is so great and the probability of detection is so limited that a study of this subject warrants the closest attention in order that the causes may be determined and the conditions leading to the development of this form of rail failure in the mill and in the track may be removed.

George A. Post and the Railway Business Association

THE TWO MOST IMPORTANT EVENTS which took place at the meeting of the Railway Business Association in Chicago on Monday were the announcement of the fact that George A. Post intends to retire as president of the association and the reference to the present executive committee of the duty of reorganizing the association and appointing its future officers.

Mr. Post was the father of the association. He has been president of it ever since its organization. Its principal purpose in the past has been to promote good relations between the railways and the railway supply companies and to educate public opinion and public officials regarding the railway question. For the leadership of the association, while seeking to accomplish these purposes, Mr. Post has shown that he possesses an excellent equipment. He is a public speaker of rare ability. He is a diplomatist of consummate tact. While always willing to lead, he has always been equally willing and even anxious to take counsel with and be guided by the judgment of his associates. The association under his presidency has done well the things it set out to do. Recently new conditions have developed in both the railway and railway supply business. The railway supply business has been confronted by entirely new problems. Mr. Post has never rendered such able and valuable service to it as he has within recent weeks in presenting the point of view, the rights and the problems of its members to Director General McAdoo and other officers of the Railroad Administration at Washington.

The new problems which government control of the railroads have presented to the railroad supply business, together with Mr. Post's impending retirement from the presidency of the Railway Business Association, have made clear the necessity for greatly broadening the scope of this organization and reorganizing it. The association at its meeting in Chicago adopted a change in its constitution, delegating to its executive committee the determination of the scope of its work and the way it should be done in the future and the task of working out the reorganization.

This sweeping delegation of power gives to the executive committee a very important duty and imposes on it a very heavy responsibility. The way in which the executive committee performs its duty and discharges its responsibility may largely shape the entire future of the railway materials business in this country.

In every body of men there always are some who believe in the use of conservative methods and some who believe in the use of aggressive measures. The thing which makes an efficient and useful organization is the combination in judicious proportions of conservatism and caution on the one hand with aggressiveness and courage on the other. The Railway Business Association desires and will need the generous, whole-hearted support of all the manufacturers of and dealers in railway materials who have rights to be protected

and legitimate interests to be promoted. To form an organization which will secure the support of all these interests and which will protect and further their interests while at all times recognizing and promoting the rights and interests of the public also, is the problem and the opportunity of the executive committee.

Government control has raised the new problems with which the railway materials concerns are now confronted. Government ownership would be a menace to the rights and welfare of the entire railway materials business. A broad view of the situation should be taken and it should be handled cautiously but vigorously, diplomatically but courageously.

Two Great Industries—An Analogy

THE GOVERNMENT, having assumed control of railway operation, and guaranteed the net return of the companies, has become responsible for railway operating expenses. The prices paid for equipment and supplies enter into operating expenses. Therefore, the government naturally wishes to avoid paying excessive prices. It ought to do this. It is not only to the interest, but it is the right, of the public that the railways shall be operated, under government control, as economically as is consistent with the rendering of service appropriate to present conditions, and with the payment of reasonable wages to labor and reasonable prices to the concerns from which equipment and supplies are bought.

But experience in the regulation of railway rates has shown that the word "reasonable" is susceptible of widely varying interpretations. To owners and managers of railways "reasonable" rates have meant rates high enough to keep the companies in a prosperous condition and enable them to raise sufficient capital adequately to develop their facilities. To most of the regulating authorities "reasonable" rates have meant the lowest rates that could be made which the courts would not hold confiscatory. The latter theory has prevailed in regulation, and in consequence we have seen numerous railways reduced to bankruptcy; capital frightened away from the transportation business; and both the extensive and intensive development of the railways almost entirely stopped. We have seen the railways, in the midst of the greatest of all wars, become unable to finance their requirements or adequately serve the government and people; and we have seen it become necessary, as a war measure, to suspend the entire system of regulation and to guarantee the financial returns of the railway companies.

In view of our experience with government regulation of railways there need be no surprise that the railway supply companies became filled with suspicion and apprehension when officers of the government Railroad Administration began to suggest the elimination of patents and royalties in the sale of their goods, to ask to see their cost accounts, to inquire how large their capitalizations and investments are, and what percentages of profit they have been making. Nor is it surprising that the supply companies are not restored to a sense of complete security when officials of the Railroad Administration give assurances that the government will be fair in dealing with them.

They recall that the railways have always been given assurances from official sources that they would be fairly treated. In most cases, these assurances have been sincere. Probably most of the regulating officials honestly believe today that the railways always have been fairly treated, and that the cessation of railway development with the consequent acute congestions of traffic and demoralization of business, have been due to causes other than regulation. But business men and the public know that the kind of regulation which has been applied to the railways has been the chief cause of these conditions. The railway supply concerns have only

too good reason to know it, and with the disastrous experience of their customers, the railway—so fresh in mind, they naturally become greatly disturbed when they think they see government control beginning to assume toward their business an attitude similar to that which government regulation began to assume some years ago toward the railroad business.

The Director of Purchases in the Railroad Administration is John Skelton Williams, controller of the currency. Nobody has ever described the destruction of railroad credit more graphically, or stated the reasons for it more forcibly and accurately than Mr. Williams did in a letter which he wrote to the Interstate Commerce Commission, and which was published in the issue of the *Railway Age* for November 16, 1917, page 891. As an experienced business man and an important government officer Mr. Williams saw very clearly what the destruction of the credit of the railways and the interruption of their development meant to the country. He also saw clearly that what had caused these things was the unjust and excessive reduction and limitation of profits in the railroad industry.

Mr. Williams can hardly fail to see that similar reduction and limitation of profits in the railway supply business must and will have similar effects upon that industry; and that it is impossible to arrest the development of this or any other large industry without harmful effects upon the entire country. Patriotism forbids that any class of men or concerns should raise their prices excessively and practise profiteering during the war. These things the government should prevent. But patriotism does not require that concerns engaged in any essential industry shall forego normal, reasonable profits during the war; and certainly no essential industry should be singled out from all others, and required to do this.

It has been pointed out many, many times, with reference to the railroad business, that reasonable profits, from the standpoint both of the welfare of the companies and the country, are profits which will maintain the industry in a healthy condition and cause it to grow sufficiently to meet the increasing demands of the country upon it. Exactly the same thing is true of the railway equipment and supply business. This argument, with respect to the railroad business has fallen on deaf ears, and today the nation is paying for its mistakes in dealing with the railways, and paying dearly. Let us hope that it will not have to be said in future years that government control initiated a policy as ruinous to the railway supply industry as government regulation has proved to be to the railway industry.

Lehigh Valley

THERE WAS LESS CONGESTION on the Lehigh Valley in 1917 than in 1916. In fact, it was one of the few eastern roads which, in 1917, was not at one time or other pretty badly tied up. A remarkably good showing in operation was made. The train load in 1917 averaged 102 tons more than in 1916. The 1917 average for all freight was 778 tons. Carloading was considerably better, the average per loaded car being 29.10 tons in 1917 as against 26.64 tons in 1916; an increase of over 9 per cent. Whereas in 1916 the Lehigh Valley had a debit balance of \$512,000 for hire of freight cars, there was a credit balance of \$195,000 in 1917. The Lehigh Valley should, under normal conditions, have a credit balance for hire of freight cars; it is one of the roads which have followed the policy of buying a liberal supply of cars and the situation that arose in 1916 was brought about by the inability of the Lehigh Valley to get rid of other companies' cars which had been sent loaded on to its line. As an instance of this, large equipment orders for Russia were shipped to the Lehigh Valley and had to be held under load for a long period of time. Eventually, the cars were unloaded where they stood and released for service, but this long delay ran up the per diem to an

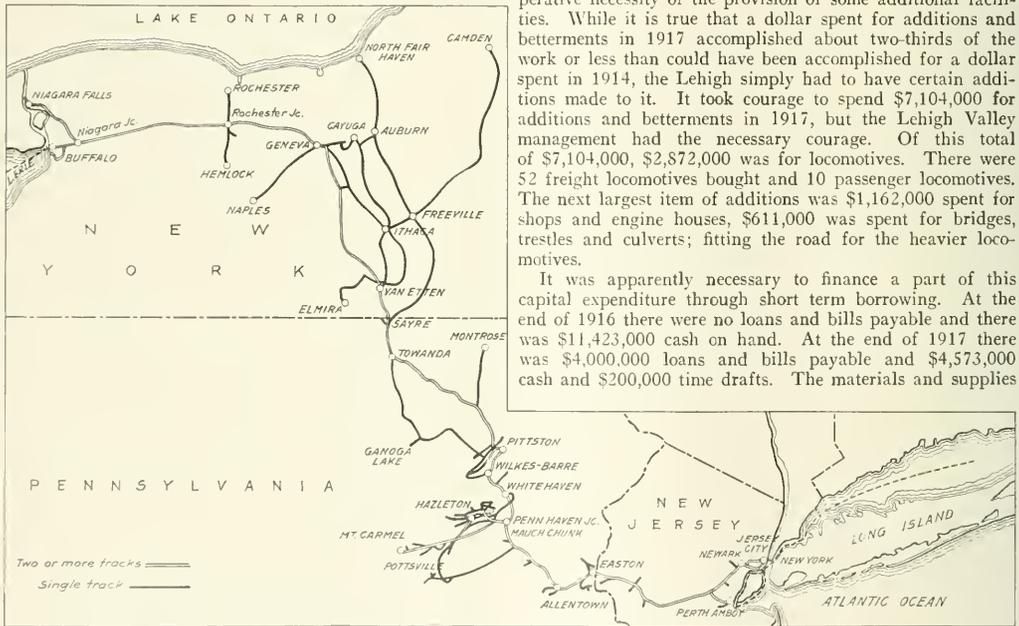
abnormal extent. In the matter of getting coal shipments through, the Lehigh Valley made a most creditable showing in 1917. The road was never, during the entire year, stopped to coal shipments.

The gain in train loading and car loading, the freedom from congestion, the successful efforts to keep coal moving, are all the more creditable because of the almost unbearable labor conditions which existed for the Lehigh Valley and, of course, also for other roads in its territory. The expenses ran up to an abnormal extent. Transportation expenses amounted to \$23,343,000, an increase of \$5,767,000 over 1916; while the increase in operating revenues was only \$4,499,000; the total operating revenues in 1917 being \$53,358,000. The Lehigh Valley's 10 per cent dividend calls for \$6,061,000 and, had it not been for the declaration of a \$2,398,000 dividend (a dividend of about 25 per cent) on the Lehigh Valley Coal Company stock, which the Lehigh Valley Railroad owns in its entirety, the railroad company would not have fully earned its dividends. The net income,

1902, became chairman of the board of directors and E. E. Loomis, vice-president of the Delaware, Lackawanna & Western, was elected president of the Lehigh. Mr. Loomis was a man very much respected and liked by all classes of officers and employees on the Lackawanna, and the operating results obtained under the rather staggering labor conditions of 1917 would appear to indicate that he has already succeeded in getting a fine spirit of team work on the Lehigh Valley. As a matter of fact, it was largely intensive supervision on the part of the higher officers which kept the road open during the entire year. There were times during the year when general officers went out to larger yards and lived there for weeks on end.

The Lehigh Valley, at the beginning of 1917, was a well maintained eastern trunk line which, however, compared to either its neighbor, the Lackawanna, or its neighbor, the Erie, had had little spent on it in recent years for additions and betterments. The great pressure of business in 1916 demonstrated, beyond a further question of doubt, the imperative necessity of the provision of some additional facilities. While it is true that a dollar spent for additions and betterments in 1917 accomplished about two-thirds of the work or less than could have been accomplished for a dollar spent in 1914, the Lehigh simply had to have certain additions made to it. It took courage to spend \$7,104,000 for additions and betterments in 1917, but the Lehigh Valley management had the necessary courage. Of this total of \$7,104,000, \$2,872,000 was for locomotives. There were 52 freight locomotives bought and 10 passenger locomotives. The next largest item of additions was \$1,162,000 spent for shops and engine houses, \$611,000 was spent for bridges, trestles and culverts; fitting the road for the heavier locomotives.

It was apparently necessary to finance a part of this capital expenditure through short term borrowing. At the end of 1916 there were no loans and bills payable and there was \$11,423,000 cash on hand. At the end of 1917 there was \$4,000,000 loans and bills payable and \$4,573,000 cash and \$200,000 time drafts. The materials and supplies



The Lehigh Valley

after including the coal company dividend and paying fixed charges, etc., available for dividends, were \$7,152,000 in 1917, and in 1916, without the inclusion of any dividends on the coal company's stock, was \$7,828,000.

Some conception of the difficulties under which the management worked may be had from the fact that 2,108 new men were hired as locomotive firemen, although the normal force was but 1,343 and 3,123 new trainmen were hired to maintain a regular force of 2,404. The increased cost of fuel alone amounted to \$2,036,000.

As a result of the increase in freight rates granted by the Interstate Commerce Commission on June 27, 1917, the average ton mile rate on merchandise freight was 0.017 cents, that is seventeen one hundredths of a mill greater in 1917 than in 1916, and the freight rate increase netted the company less than \$609,000.

During the early part of the calendar year, 1917, E. B. Thomas, who had been president of the Lehigh Valley since

account had increased from \$3,563,000 to \$6,229,000 but the increase in the value of supplies must account for a large part of this apparent increase. The same supplies, valued at \$6,229,000 at the end of 1917, would have been valued on June 30, 1914, at \$2,062,000 less.

The table shows principal figures for 1917 and 1916:

	1917	1916
Average mileage operated.....	1,443	1,444
Coal freight revenue.....	\$20,402,226	\$18,330,850
Merchandise freight revenue.....	22,705,556	21,478,421
Passenger revenue.....	4,894,990	4,598,212
Total operating revenues.....	53,358,446	48,859,909
Maintenance of way and structures.....	5,353,466	4,967,202
Maintenance of equipment.....	9,999,610	9,118,815
Traffic expenses.....	1,013,395	1,009,061
Transportation expenses (rail line).....	23,343,165	17,576,066
Transportation expenses (water line).....	798,534	870,079
General expenses.....	1,147,267	1,075,199
Total operating expenses.....	41,826,166	34,764,977
Taxes.....	2,126,626	1,804,812
Operating income.....	9,403,324	12,279,778
Gross income.....	14,480,490	15,267,045
Net income.....	7,151,859	7,827,771
Dividends.....	6,060,800	6,060,800
Surplus.....	1,091,059	1,766,971

Railway Business Association Discusses Problems

Urges Inviolability of Patent Rights. Commends Conduct of War and Asks Loyal Support for McAdoo

THE ANNUAL MEETING of the Railway Business Association was held in the Hotel LaSalle, Chicago, on Monday of this week, the entire day being given over to the business sessions. Owing to the very general interest in the problems of the railway supply field the attendance exceeded all previous records for similar meetings of this organization, over 300 railway supply men being present.

George A. Post, president of the association, called the meeting to order at 11 o'clock. In his opening address he dwelt upon the problems now confronting the railway supply industry, referring to the more important ones specifically and in considerable detail. He outlined the conferences which he has had with the director general and the director of purchases relative to their attitude towards the railway supply industry. Mr. Post urged those present to refrain from criticism of the administration for apparent delays and emphasized the fact that while "the name of the firm may have been changed, the same people are doing business inside as before."

Pierson Talks on Trade Acceptances

At the conclusion of Mr. Post's address the meeting adjourned to an adjoining room for lunch, during which Lewis E. Pierson, president of the Irving National Bank, New York, and chairman of the American Trade Acceptance Council, spoke on "Proper Remittances for Goods Delivered." Mr. Pierson advocated the use of trade acceptances in place of open accounts in credit transactions in the railway supply business. (This plan of handling credits was described in the *Railway Age* of March 1, p. 463.) Mr. Pierson emphasized the fact that the trade acceptance method is a plan for the handling of credits and is not concerned with cash transactions. Trade acceptances represent value and usability. Being self liquidating with definite maturities their absorption is accomplished readily and automatically. Mr. Pierson stated that experience has shown that trade acceptances are paid promptly on maturity, while open accounts are not. Detailed investigation has disclosed that there is probably no industry in the country in which 75 per cent of the open accounts are paid on or before maturity, while the cases in which trade acceptances are not paid when due are so rare as to be negligible. With open accounts, a careful business man must make provision for slow payment.

Mr. Pierson emphasized particularly the opportunity for the introduction of trade acceptances by the railway supply industry at the present time. He called attention to the fact that although the railways are commonly able to meet their obligations when due, it is very generally true that they extend their payments beyond the specified dates. Trade acceptance will overcome this for no road will desire to weaken its credit by failing to make provision to pay the acceptances at maturity. At the present time when the government is in charge of the operation of the roads, and when it is also actively promoting the Federal Reserve plan, of which the trade acceptance is a feature, and when the Railroad Administration and the Treasury department are under a common head, it would appear to be a most favorable time to introduce the trade acceptance idea among the railroads.

Frank Rhea Speaks on Foreign Trade Opportunities

Frank Rhea of the Bureau of Foreign and Domestic Commerce addressed the association at luncheon on the opportunities for the sale of American railroad supplies in foreign

lands, and particularly in the Orient from which he recently returned after making a careful study of commercial conditions in that part of the world. The results of his investigations have already been covered quite exhaustively in the *Railway Age* of March 19, page 585, and the issue of March 22, page 697. In his remarks to the Railway Business Association he pointed out the great opportunity presented to that body to take a leading part in the development of foreign trade for American railway devices.

He was particularly emphatic in pointing out that foreign trade requires long preparation with deferred returns, and a most painstaking study of conditions peculiar to other countries. He stated that the United States would have to expect severe competition from other manufacturing nations, and mentioned in particular the careful and scientific preparation of the British to prosecute a vigorous campaign for commerce in the Orient at the conclusion of the war. The British, he said, had made foreign commerce a profession, and the best of their young men entered the field with the expectation of spending their whole lives in it.

He described the various methods in which American railway supplies have been marketed in the Orient in the past, which have already been outlined in the articles above mentioned in the *Railway Age*. In this connection he stated that he found the Locomotive and Car Builders' dictionaries to be an important factor in promoting American railway supply materials in Australasia and the Far East. He also stated that American railway and technical journals circulated in those countries and were held in high esteem.

One of the peculiarities of the Oriental market which he brought out is that the distance from the sources of supply makes it necessary for railroads to anticipate their requirements far ahead. New Zealand lines, for instance, contract for materials and supplies in some instances three years ahead. This condition, he pointed out, made it much more serious for those countries to change standards, and hence the life of equipment there was much longer than in this country.

Foreign business cannot be successfully carried on by individual companies. Competing American firms will find it advantageous to combine for purposes of foreign trade expansion, and in some instances may find it advantageous to pool their patents. The government can give some practical assistance to American manufacturers by selecting and tabulating information received from consuls in other countries, but at best the work of the government is more or less academic; practical details of definitely determining the requirements of foreign markets and painstakingly fulfilling them, will have to be worked out by the railway supply industry.

Although there is some truth in the statement that "business follows the investment," Mr. Rhea pointed out that a large proportion of the foreign roads are Government-owned, and therefore not tied by financial strings, while many privately owned lines are paying off their indebtedness and thereby becoming free to make their purchases wherever they please. American products stand high in the estimation of foreign countries, and only need intelligent marketing to win a large foreign trade. In this connection he mentioned the Chinese lines which are in great need of new equipment and new facilities. This, he said, could not be secured because of the difficulty of financing new purchases, and he suggested that American manufacturers might introduce the equipment trust scheme in that country with success.

Mr. Rhea is strongly of the opinion that a development of

foreign trade and the building up of a commercial fleet to carry it, will prove one of the strongest arms of our national defense in the future. Our entrance into that field, however, will demand our best efforts and our whole-hearted attention.

Afternoon Session

A large part of the afternoon session was devoted to a discussion of the policy of the director general with reference to railroad purchases. On this subject President Post amplified his remarks during the morning session, based on interviews with Mr. McAdoo. At the inception of the standardization movement, Mr. Post said, there was considerable misunderstanding of the purposes of the Railroad Administration and many of the manufacturers gathered the idea that it would mean the use of only one or a few devices to the exclusion of competing supply companies. On the contrary, standardization means uniformity of dimensions and locations of devices, and does not exclude any manufacturer who is willing to conform to these requirements. He further pointed out that the director general's office will only concern itself with major purchases running into millions of dollars, whereas the regional directors will supervise purchases of medium proportions and the individual purchasing agents of the various railroads will continue to make smaller purchases, consisting in the main of current supplies bought from month to month and those materials which have a fixed life of use on their lines.

In discussing the effects of standardization attention was called to the fact that even if orders were placed at the present time, several months would elapse before many manufacturers could change their patterns to conform with these new standards. The discussion closed with a brief consideration of the patent situation. In response to a request of the president for those men present to rise whose business rested largely on patent rights for which royalties had to be paid, it developed that a large number of those in attendance responded.

At the conclusion of the deliberations the Resolutions Committee, A. L. Humphrey, chairman, offered a number of resolutions which were passed by the organization. The first matter taken up was an amendment to the constitution providing for the insertion of a new Article II after Article I, as follows:

"The government of this organization shall be vested in and its policy determined by the general executive committee as constituted in accordance with the by-laws." Mr. Humphrey explained that the purpose of this amendment was to facilitate quick action under the present uncertain conditions, and to make possible the formulation of policies and plans befitting the association's expanding opportunities for service.

Supply Manufacturers' Liberty Loan Day

The second resolution offered called attention to the fact that about 50,000 men were reported by railway supply companies to be in the service of the United States and recommended that the thousands who remain behind should back up the colors by purchasing Liberty Bonds. The suggestion that the director general of railroads designate April 20 as Railway and Railway Materials Manufacturers' Liberty Loan Day, was heartily approved.

The loyal support of the association to the President of the United States in the performance of his difficult responsibilities of prosecuting the war was pledged anew, and the work of the director general and the railways was commended.

Resolutions of thanks to Lewis E. Pierson and Frank Rhea for their addresses were passed unanimously. All manufacturers of railway supplies were invited to join the Railway Business Association in order to profit by the joint activities of that body.

Progress and Patents

The most important resolution passed by the association was that relating to the patent rights of railway supply manufacturers. It reads as follows:

"With satisfaction we observe that the evident aim in constructing the government standard equipment designs and specifications was to admit a broad scope of interchangeable appliances. We welcome also the assurance by the director general that the purpose is to encourage during government control the demonstration and adoption of improvements not yet established. These are policies of progress. They will tend to preserve and stimulate the industrial enterprises whose occupation it is to achieve mechanical advance in transportation science. We earnestly commend to the director general's consideration the fact that a large proportion of these enterprises is founded upon patent rights and that an indispensable essential to preserving the enterprises themselves is to maintain unimpaired the normal status of patents. The owner of the patent who leases to a manufacturer has a contract which cannot be abrogated without his consent and which he may not be in position to abrogate. The royalties are the earnings of his genius. The enterprise which owns patents has for an asset, in some cases its chief asset, as a going business the right to protection against under-bidding by concerns whose overhead cost has not included the experimentation, demonstration, development and improvement of the device."

Resignation of Mr. Post

At the annual dinner it was announced that George A. Post, president of the Railway Business Association since its formation, would decline re-election. This occasioned the presentation of the resolution expressing the deep appreciation of the Association for Mr. Post's able and indefatigable efforts in its interests and the sincere regret of the organization that the pressure of his private business demands his retirement. The resolution reads in part as follows:

"It will be impossible to measure the obligation which is owed to Mr. Post by the group of industries interested in the Association he has so ably fostered during the twelve years of its existence. It was he who first drew for us the picture of the isolated industrial craft units, each in its community possessing latent influence, but none of them using that influence upon the common problem; the picture of those crafts then portrayed illustrated how they might become with a common center of action. To unite those unco-ordinated units, this far-sighted leader perceived, would mobilize their knowledge, their wisdom and their strength and through organization apply their energy to beneficial activity. The Association which resulted from that suggestion has amply justified the prophecy.

"Serving without salary, a condition which he regarded as essential to his influence, Mr. Post has devoted himself to this movement with a prodigality of self-sacrifice that seems incredible to those who find it difficult to make much smaller contributions of time and energy to similar movements. We deplore that any circumstance should deprive us of his leadership. We rejoice to know that this actual circumstance is another and imperative activity and not age or infirmity. To us, under whatever leadership, his past example and present wisdom will always be as a beacon protecting us from hidden rocks. With one voice we fervently pray for his health, long life, prosperity and happiness."

The passing of this resolution was followed by an ovation to Mr. Post. Letters eloquent of appreciation regarding Mr. Post's work were read from H. H. Westinghouse, G. M. Basford, Samuel Rea and Frank W. Noxon.

The Committee on Nominations and Organizations (A. H. Mulliken, chairman), recommended that the plan for the reorganization of the association and election of officers for the coming year be referred to the present Executive Committee for action later; this resolution was adopted.

Railroad Administration's Motive Power Problems*

The Development of the American Locomotive and the Possible Effects of Standardization

By Alba B. Johnson

President, The Baldwin Locomotive Works, Philadelphia, Pa.

THE HISTORY OF RAILROAD development has been one of continuous improvement in size and power and in perfection and economy of details from the beginning of locomotive construction in England and America until the present time. The Rainhill trials conducted on the Liverpool & Manchester in 1829 demonstrated the practicability of Stephenson's "Rocket," which, in its essentials, combined most of the features of present day locomotives.

The Rocket and Old Ironsides, Mr. Baldwin's first locomotive, weighed about five tons each, and were scarcely larger than the motor trucks now commonly used on highways. It would be without the scope of this paper to trace the development of locomotives from Old Ironsides of 1832, to the latest triple compound Mallet, or the most approved Decapod of the present day. The 85 years which have elapsed since the successful trials of the John Bull on the Camden & Amboy; the DeWitt Clinton on the Mohawk & Hudson and the Old Ironsides on the Philadelphia, Germantown & Norristown, have been years of constant experiments and improvements, whilst corresponding experiments and improvements have been going on concurrently in the various countries of Europe. Each railway has endeavored to excel others in efficiency and power, and each locomotive builder has striven to excel his competitor.

Development of the Locomotive

Viewing the whole progress of locomotive development, one general fact is apparent; in years of excessive business the time and thought of railroad men have been so fully occupied with the movements of traffic as to leave little opportunity for the problems of improving methods and appliances. Waves of depression follow successively waves of expansion, and during years when earnings are small and the necessity for economies is urgent, much attention is concentrated upon problems of improvement. The result has been that each period of business depression has been followed by new developments in the art of transportation. It would not be difficult to trace the periods of minimum traffic which resulted in the changes in track from the 40-lb. to the 60-lb., the 60-lb. to the 80-lb., and the 80-lb. to the 100-lb. rail and now even to the 130 lb. rail; in the car, from the 20-ton to the 30-ton, the 30-ton to the 40-ton and the 40-ton to the 50-ton and 70 ton capacity and now in some cases to the 100-ton capacity; and in the locomotive from the 15-in. by 24-in. 30-ton locomotive of the '70's to the 17-in. by 24-in. 40-ton locomotive of the '80's; the 20-in. by 24-in. 60-ton locomotive of the '90's to the 22-in. by 28-in. 100-ton locomotive of the first decade of this century; and the development of the larger types of Mallet, Santa Fe and Mallet—ranging from 300,000 to 500,000 lb. weight—which have been built during the present decade.

The process of development has in each instance been somewhat as follows. It has been found that the readiest means of increasing revenues is to increase the carrying capacity of cars, so that a greater amount of revenue freight can be hauled for each unit of car mileage. The increase in car loading reduced the number of cars which could be

hauled per train, and resulted in a demand for larger locomotives capable of hauling no less a number of cars than before. This found its limit in the capacity of rails and bridges to sustain the increased axle loads. Again and again rails and bridges have been replaced to permit of the constantly increasing axle loads from 10 to 15 tons, from 15 to 20, from 20 to 30 and finally to about 35 tons, the present maximum axle load. If we stop to consider for a moment what this has meant to the industry of the country, we will realize that each change has involved practically the total replacement of rails, bridges, cars, and locomotives on existing lines throughout the whole country, and each step has resulted in a reduction of the cost per ton mile until the cost of transportation in the United States has gone far below that existing in any other country. In the majority of instances each contract for cars and locomotives has been made to new specifications and in comparatively few instances have existing contracts for either cars or locomotives been duplicated without incorporating the changes which have resulted from the combined causes of experience and competition.

Standardization of Locomotives

Standardization has been an ideal much talked of but never realized in actual practice, because standardization implies the crystallization of present practice as the practice of the future, and means that no further changes shall be made as the result of experience or invention. Carried to its logical extreme, the adoption of inflexible standards at any time during the history of locomotive development would have involved the stoppage of progress at that point. Many attempts have been made to fix standards for particular railroads and groups of roads, but in every instance these have given way to the urgency of keeping pace with other roads which have not attempted to bind themselves with the iron bands of standardization. The practical result of such attempts has been that those lines most rigidly adhering to their standards have agged behind their competitors.

The result of more than eighty years of experience has convinced railroad men that the most advantageous field for standardization is in details rather than in the complete locomotive or car as a unit. Most of the advantages sought through standardization have been obtained by analyzing or standardizing the design of various parts common to a considerable number of classes. What the American Railway Master Mechanics' Association and the Motor Car Builders' Association have perhaps accomplished in procuring the adoption of complete standard units would advocates of standardization would have liked to see they have done splendid service to the transportation interests of the country by the adoption of the numerous standard details, by their discussions and by their interchange of experiences. It may be said that their accomplishments have been as great as it was humanly possible to achieve under the conditions of diversity of managements, diversity of ideas and the necessity of constantly keeping abreast of the march of improvement. American railroad men need have no fear of comparison with other countries either in the practical common sense which has been shown in the conservative encouragement given to improvements in en-

*Read before the United States Chamber of Commerce meeting at Chicago, Ill.

gineering practice, or in the reductions which have been achieved in the cost of transportation. They have been quick to adapt to American conditions improvements which have been worked out abroad; they have maintained the suitability of American locomotives, not only for American conditions of operating, but they have also maintained the adaptability of American standards for all countries where the conditions approximate to those existing in the United States, thus developing a large foreign trade in railway equipment and materials.

War Brings New Conditions

The participation of the United States in the world-war has brought about new conditions. A mass of legislation and regulation which had accumulated during years of peace and which was predicated upon certain popular fears and prejudices resulted in the failure to allow increase in revenues corresponding to increased costs. The necessities of the war soon demonstrated that these regulations which prevented co-operation by insisting upon competition, did not make for efficiency, but prevented many measures of improved service which the railroad managers were themselves eager to adopt but which had been made prohibitive. In order at a single stroke to untangle this situation, the government of the United States decided that it was wise to assume control of transportation by placing all the principal lines in the control of a director general of railways, and to operate the roads as a unit during the period of the war and for a fixed time thereafter. For the first time in the history of the country all of the railroads became subject to a unity of management and to a unity of control in their purchases. For the first time it became practicable to adopt and to enforce standards to a large extent. The very forces of competition had brought about a uniformity of general dimensions and weights of locomotives for trunk line service. Inasmuch as all kinds of cars were being hauled indiscriminately over all railroad lines, there could be no reason why a diversity of details should exist amongst those belonging to different railroads. To a lesser degree, perhaps, these considerations apply also to motive power. If one type of locomotive could haul a given train across the continent to the west bank of the Mississippi river, there appeared to be no adequate reason why a locomotive of different type or different details should be required to haul the same train from the east bank where the grades and working conditions were not too divergent.

In the early days of railroading it was quite common for the same line to have different types of locomotives to haul its trains over different divisions of the road. The same conditions now exist upon a larger scale. Notwithstanding a certain amount of standardization of the locomotives on each road, there is a large diversity amongst different roads having practically the same operating conditions. The opportunity given to the director general of railways to unify the motive power of all railroads, was unique, and the conception a fascinating one. The work of preparing standard specifications and drawings was entrusted to a committee comprising eleven railroad officials who collaborated with representatives of the three principal locomotive builders. As the result of their diligent and continued work, twelve standard specifications have been agreed upon and recommended as follows, and their final approval is now under consideration. They are of the following types and weights:

Type	Axle load	Total weight
Mikado	55,000 lb.	290,000 lb.
Mikado	60,000 lb.	325,000 lb.
Santa Fe	55,000 lb.	360,000 lb.
Santa Fe	60,000 lb.	390,000 lb.
Mallet (2-6-6-2)	60,000 lb.	440,000 lb.
Mallet (2-8-8-2)	60,000 lb.	540,000 lb.
Pacific	55,000 lb.	270,000 lb.
Pacific	60,000 lb.	300,000 lb.
Mountain	55,000 lb.	320,000 lb.
Mountain	60,000 lb.	350,000 lb.
Switcher (0-6-0)	55,000 lb.	165,000 lb.
Switcher (0-8-0)	55,000 lb.	220,000 lb.

The tenders have been standardized with tanks of 8,000, 10,000 and 12,000 gal. respectively.

No one railroad will be compelled to order all of these 12 standards; even the largest trunk lines may find half that number sufficient.

Extent to Which Standardization Should Be Carried

A delicate and interesting question of policy is to what extent these standards should be confined to the essential elements of the locomotive, and to what extent they should be confined to its accessories. The committee wisely adopted the principle of defining only the essential locomotive, leaving a certain freedom to the railroads to maintain their standard accessories, and a certain freedom of competition among manufacturers of railway equipment. It must be borne in mind that the railway equipment business itself is a most important one, embodying as it does several hundred separate manufacturers, with invested capital running into the hundreds of millions and employing several hundred thousand men. These separate manufacturers have studied incessantly to improve their appliances and to reduce costs. Their productions are of two classes, first, those materials or devices which have become essential parts of locomotives, such as air brakes, tires, headlights, injectors, steam gages, etc., etc.; and second, those which are not strictly essential to locomotive operation but which contribute to efficiency and economy. Amongst the latter are such things as mechanical stokers, superheaters, feed water heaters, power reverse gears, etc. These devices are constantly shifting from the second to the first class. Most of those now universally conceded to be in the first class were at one time probationary. Many of those now rated in the second class are rapidly achieving recognition as essentials to be regarded as in the first class. To carry standardization to its extreme limit would involve a determination of the most desirable among many competing devices, and would destroy the market for all the others and throw their makers out of business. It would check the transfer into the first class of those items enumerated as of the second class and would also paralyze every effort toward the invention and introduction of new improvements.

The committee has wisely refrained from attempting a solution of these problems, and its further course with respect to them is yet to be ascertained. Some policy must eventually be adopted, however, either of leaving the railroads which are to receive and operate the standard locomotives, latitude to designate such specialties as in their experience have proved worthy of adoption, or for the director general of railways, through his advisers, to make a selection. The former would appear to be in every way the wiser course.

Standard Locomotives Will Complicate Repair Problems

I have stated above that the standard specifications have been recommended for approval. They have not yet been finally adopted, as a strong plea is made on behalf of the railroads similar in principle to that applicable to locomotive accessories, that each railroad should be allowed to continue to adhere to the standards already adopted. The choice of course involves the weighing of the respective advantages. It may be said for the railroads' contention, that under normal conditions locomotives are not shifted from one road to another, but are generally used continuously upon the same division to keep the traffic movement balanced, and are kept in repair continuously by the same shops. These shops are supplied with standard repair parts and the workmen are proficient in maintaining the repairs of these existing standard locomotives. To introduce a new government standard upon all lines as an entirely clean proposition would be simple

enough, but to introduce it on lines and conditions affecting an entire continent and already equipped is quite a different problem. It necessarily compels all lines to provide themselves with stores of repair parts adapted to the government standard locomotives. Thus, instead of simplifying the problem of locomotive maintenance, the introduction of government standards would complicate it.* These complications would last far beyond the period of government control and would continue as long as the railroad standard and the government standard locomotives operated side by side upon the same lines.

Railroad Managers Should Be Allowed to Choose Locomotives Best Suited to Their Conditions

It may be said that the workman who is responsible for the best workmanship, should be entitled to the selection of his own tools, and similarly, that the railroad manager who is responsible for his record of efficiency and economy, should be permitted the widest discretion in selecting locomotives which he regards as best fitted for the conditions of service upon his line.* If, however, it should be urged that the advantages of standardization to which the roads can work, would in the long run be sufficient to compensate for the disadvantages of present increased confusion, then some principle must be discovered by which standardization shall avoid the cessation, if not the extinction of improvements. Every improvement in some sense involves the destruction of standardization. It would be an evil day for American engineering and for American progress in the art of transportation, which would involve a policy of discouragement to new and useful improvements in the art. We should therefore look carefully before we leap, to make sure that we are not giving up the substance of continued growth in efficiency and economy, to grasp the chimera of standardization. Especially should this be considered most carefully when the world-wide danger of this war is upon us.*

Electric Locomotive Development

Any paper upon the subject of railway motive power under the national administration would be incomplete which did not touch upon the remarkable growth and development of electric power transmission in transportation service during recent years. At the Chicago World's Exposition in 1893, the first electric switching locomotive was shown suitable for industrial purposes, and tests were made of its hauling capacity in comparison with a steam switching locomotive of similar weight in which the advantage was shown to be decidedly in favor of the electric locomotive. Shortly thereafter the North American Company caused the construction, under the supervision of Sprague, Duncan & Hutchinson, of an electric locomotive for use on the Northern Pacific, but the failure of that company and the fact that it was far in advance of the general development of the times, caused its abandonment before it came into practical service.

Shortly after this the Baltimore & Ohio undertook the construction of its tunnels under the city of Baltimore and contracted with the General Electric Company for locomotives with large power to handle its trains through these tunnels for the purpose of avoiding smoke and gases. These locomotives proved to be highly successful, but it was several years after their construction before other electric developments succeeded. Meanwhile, however, there had been a continual growth in the adaptation of electric power to interurban trolley lines, to small industrial locomotive units and to mining and other underground problems. Then followed the application of electric power to the Hoosac Tunnel Line, the New York, New Haven & Hartford; the

West Jersey & Seashore 65 mile line to Atlantic City from Philadelphia; the Long Island; and the Grand Trunk tunnel under the Detroit river. Nearly simultaneously the Norfolk & Western and Chicago, Milwaukee & St. Paul decided upon extensive installations of electric power, both of which are now completed and are showing marked success.

The necessity of avoiding smoke and gases in railway operations in cities soon induced the adoption of electrification for reasons entirely independent of any economies. The elevated lines in New York City were the first and were soon followed by the New York Central and the New Haven Lines, forced thereto by the operation of the tunnels to the Grand Central station. Then when the Pennsylvania decided upon the construction of its extensive system of tunnels to give a continuous line under and through New York City, the adoption of electric power was unavoidable.

The third cause for the introduction of electric power has been the necessities of suburban traffic in and about New York, Philadelphia and other cities. Practically all these electric railway enterprises have involved different sets of conditions and have resulted in a study of their peculiar problems which has worked out a motive power well adapted to each case. So large a volume of experience has now been gathered that it may be said that electric transmission of power to railway service has largely passed the experimental stage and the efficiencies predetermined are realized.

The question arises as to what is to be the future relationship between steam and electricity. Doubtless the electrification of suburban lines and the application of electricity to lines having great density of traffic will be financially justified, and as these grow in number and join themselves together, electric zones will be created in which it will be more economical to adopt electricity exclusively as the motive power.

Any question of rivalry between the steam and electric locomotive may be set aside. The problem is wholly an economic one, the only question being as to which is the more efficient and suitable for the particular conditions, and the consequent adoption of one or the other is dependent upon the geographical or other circumstances governing each case.

The introduction of electric locomotives by reason of the cost of installation must be a gradual one. The increase of efficiency and economy must be clearly shown before capital can be induced to make the necessary investment. As these advantages are conclusively shown, so will the development of electrification grow, but it would appear that the great transportation problem of the country as a whole, outside of the larger cities and their suburban territory, must for some time rely upon steam locomotion as its most available and economical motive power.

Money for Improvements Restricted

The motive power of the country is admittedly inadequate to the service demanded of it under the present war conditions. During the depression preceding the war there was a small surplus of power which, as should have been foreseen, would be absorbed in traffic with the first increase of activity. As a rule, railroads have purchased locomotives largely under the spur of excessive traffic and have abstained from purchasing during periods of reduced earnings. This is contrary to the economics of the situation. Enlargements of facilities should be made in times of depression, because, first, that is the cheapest time to do it; second, it is the most convenient time to do it; and third, it is the time when the managers can give most attention to doing it; and fourth, the employment of labor arising out of large railway purchases tends to mitigate the severity of a general depression. The reason the railroads have not done this since 1907 is, that under the regulatory policy which went

The emphasis is ours.—EDIT R



Photos from International Film Service.

Triple Wreck Near Amsterdam, N. Y., April 8, 1918

into effect at that time, railway managers have not been able to accumulate surpluses sufficient in their judgment to warrant bold construction in times of small earnings, and especially because future earnings have not been susceptible of approximate calculation even where the volume of traffic could be estimated in advance. Adequate provision of motive power, like adequate provision of other rolling-stock and other facilities, can only be assured when Congress places upon the functionary charged with the duty of regulating rates, the definite responsibility of making such rates as will yield earnings sufficient for thorough maintenance, for adequate improvements and sufficient to attract the capital necessary for providing additions and extensions.

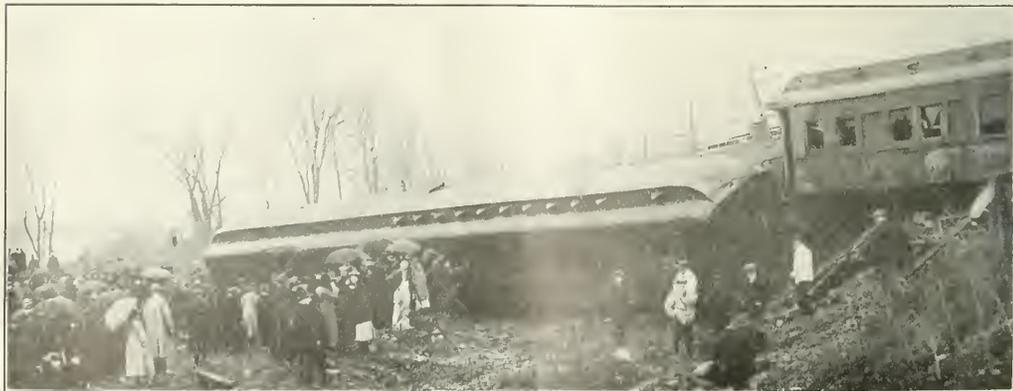
Spectacular Wreck Near Amsterdam, N. Y.

THE EMPIRE STATE EXPRESS of the New York Central was wrecked at a point about 1½ miles west of Amsterdam, N. Y., and 35 miles west of Albany, on Monday, April 8, and its engineman, John R. Botts, was killed; but the passengers and the rest of the trainmen all escaped with their lives, though the train was running at full speed. This train, first established in 1891, and for some time the most noted fast long-distance train in the world, has been said never to have had a derailment or collision in which a passenger was fatally injured; and this statement appears still to be true. And the train has made this remarkable record of 26 years, while running for nearly the whole of its route over a four-track railroad, meeting

(or passing) several times as many moving freight trains as would be met on a two-track road. And it is the fact that the road is four-track which makes this accident especially notable, for three trains were involved.

The first accident was to an eastbound freight. A car in this train was derailed by the breaking of a truck and several cars fell across the westbound passenger track. The Empire State Express (train No. 51) ran into this obstruction, and the engineman was killed and the fireman injured. The freight cars already blocked the northerly part of the roadway and the first two cars of the passenger train were thrown to the southward and across the eastbound passenger track, and one car lodged several rods south of the right of way. Into this obstruction, eastbound express passenger train No. 16 ran and its engine was partly overturned. The engineman and fireman were injured. The reports show that about 20 passengers in the westbound train were injured, but none seriously in the eastbound.

WILL BEAUTIFY SCENERY ALONG CHINESE RAILWAY.—The Empire Line, as the Peking-Hankow railway is known, is to be one of China's attractions to foreign travel, according to Dr. C. C. Wang, its enterprising managing director. A landscape gardener under Dr. Wang's direction is already drawing plans for a system of flower gardens and banks of shrubbery at the stations, and it is also intended to reforest the hills along the line so that the scenery everywhere will be attractive. Within a year or so Dr. Wang feels he will be able to get out an advertising folder that will attract the tourist traveler to a trip through the heart of China—*Oriental News and Comment*.



Eastbound and Westbound Passenger Trains Derailed by Obstructions Almost at the Same Moment

Railroad Traffic Activities Consolidated or Discontinued

IN ACCORDANCE with the general policy of discontinuing all competitive activities of the railroads, all traffic solicitation and most of the traffic advertising, Director General McAdoo has issued the following instructions to the regional directors, who, in turn, have issued them in circulars to the roads.

1. Discontinue the separate city freight or passenger offices where the public may be adequately served at the depot. This applies particularly to the smaller cities.
2. Consolidate or group all city ticket offices, placing the union office in convenient location where rental is reasonable providing sufficient space to properly accommodate the public.
3. Cancel all arrangements with tourist or other similar agencies for solicitations of passenger traffic or sale of tickets.
4. Discontinue all off-line traffic offices.
5. Employees released as a result of above to be assigned to other duties to the extent possible. Some now employed in off-line offices will be needed by the local line to strengthen its traffic forces in order to properly care for the additional work which will result from the above changes.

The functions and services formerly performed by the off-line offices in protecting the needs of the public will be incorporated in the offices of the initial lines.

Separate off-line traffic offices were created by the various transportation interests on account of existing keen competition for passenger and freight traffic, and were primarily headquarters for soliciting agents who were stationed in all commercial districts for the purpose of protecting the interests of the carrier by whom they were employed. Now there is no competition, which eliminates need for solicitation by the individual carriers. The policy is stated to be one of efficiency with all possible retrenchment and economy consistent with protecting the best interests of the public.

The employees released from their present duties as a result of this, are to be assigned to other duties as far as possible, with the same roads. Some now employed in off-line offices will be needed by local lines to strengthen other traffic forces to properly take care of the additional work entailed upon the initial lines on account of this change. In making this readjustment, it is intended to work as little hardship as possible upon the employees concerned. Many of these men have been in the service of their respective lines for long periods, and their railroad insurance and pension rights will be protected.

It is announced that no community will be deprived of adequate sources of information and advice as to matters

connected with passenger and freight service. It will be necessary for the lines directly serving each locality to see that their offices are manned and equipped to furnish the needed information and advice. This will include the issuance of through bills of lading, quotation of rates, passing reports of cars on route, advice to prospective passengers, and all other necessary information heretofore furnished by the off-line offices.

A circular issued by R. H. Ashton, regional director for the western roads, ordering the discontinuance of general advertising by the railroads, was noted in last week's issue. Similar orders have been issued by the other regional directors in response to an order issued by Director General McAdoo. Mr. McAdoo stated that during the period of government operation and control of railroads it is apparent that the large expenditures hitherto made by the carriers for various forms of publicity are unnecessary, and that the custom of exploiting train service, pleasure or health resorts and the like, must be discontinued until further notice. The orders affect all forms of general advertising, such as pictures, calendars, wall maps, etc., and newspaper and other advertising must be confined to the giving of necessary information to the public. A recommendation was asked as to the quantity and character of necessary newspaper advertising in each territory.

Time-table folders are also to be standardized and their distribution carefully checked to avoid waste. All advertising of luxurious trains, claims of superior service and extraneous matter of every description is to be omitted and the folders made purely informative. To bring about this standardization, committees of passenger traffic officers from the eastern, western and southern districts, with A. L. Craig, general passenger agent of the Chicago Great Western, as chairman, has been appointed to work with the division of traffic. The committee is now in session at New York, and although representatives from the various departments who are familiar with the compilation of folders may be delegated to represent the members of the committee, the sessions will be continued until the work is completed and submitted to the Railroad Administration for approval.

According to the Interstate Commerce Commission's report for 1916, the total expense of the class I roads for "outside agencies" was \$24,471,940 and for advertising the expense was \$7,781,776. Not all of these expenses will be saved by the new orders because the salaries will be continued but there will be a very large saving in rentals and office expenses generally. In 1916 there were 6,043 traveling agents and solicitors and their compensation was nearly \$9,000,000. There were also 1,998 employees of outside agencies whose compensation was nearly \$2,000,000 and 705 other traffic employees whose compensation was \$785,930.



Photograph by "In-Force" and "Under-Force" N.Y.

Getting the Goulash Cannon Aboard



French Chasseurs Off for Duty in a New Sector

Accounting Under Federal Control

DIRECTOR GENERAL MCADOO has issued General Order No. 17 to the chief executive officers of carriers subject to federal control, prescribing the following rules and regulations to govern the recording of and accounting for all transactions which arise during federal control:

(1) For accounting purposes federal control began as of January 1, 1918. Immediate steps shall be taken by each carrier subject thereto, to open new and separate books of accounts, such as cash books, general and subsidiary ledgers and journals, and all supporting and subsidiary books and records incident thereto, upon which shall be recorded transactions which arise under and are incident to federal control on and after January 1, 1918. Such books shall be designated and are hereinafter referred to as "Federal Books."

(2) The totals of the accounts "Cash," "Demand loans and deposits," and "Time drafts and deposits" appearing on the corporation's books as of December 31, 1917, shall be transferred to the federal books, debited to accounts of the same titles, and credited to a deferred liability account styled "(Name of corporation)—Cash—December 31, 1917." On the corporate books the amount of such balances should be transferred to a deferred asset account styled "U. S. Government—Cash—December 31, 1917." All cash transactions subsequent to December 31, 1917, relating to operations prior or subsequent thereto, shall be recorded in the federal cash book opened as of January 1, 1918.

(3) The total of account "Net balance receivable from agents and conductors" appearing on the corporation's books as of December 31, 1917, shall be transferred to the federal books, debited to an account of the same title, and credited to a deferred liability account styled "(Name of corporation)—Agents' and Conductors' balances—December 31, 1917." On the corporate books the amount of such balances should be transferred to a deferred asset account styled "U. S. Government—Agents' and Conductors' balances—December 31, 1917."

(4) The total of account "Materials and Supplies" appearing on the corporation's books as of December 31, 1917, shall be transferred to the federal books, debited to an account of the same title, and credited to a deferred liability account styled "(Name of corporation)—Materials and Supplies—December 31, 1917." On the corporate books the amount of such balance should be transferred to a deferred asset account styled "U. S. Government—Material and Supplies—December 31, 1917."

(5) In addition to the assets above specified, there shall be likewise transferred to the federal books and similarly recorded thereon, such other working assets of the corporation as may be mutually agreed upon.

(6) There shall be currently entered, upon such federal books, in the manner and under the rules and regulations prescribed by the Interstate Commerce Commission or which may hereafter be prescribed, all transactions involving revenues, expenses, taxes and rentals, and other items corresponding to those which constitute the basis upon which the standard return to the carrier shall be determined. Such entries shall include corresponding assets and liabilities and the cash settlement thereof; also all transactions involving materials and supplies subsequent to December 31, 1917.

(7) Transactions of the corporation, including those arising out of cash receipts or disbursements, which do not affect or which do not enter into and form a part of those used in determining the basis of standard return, such as interest and dividends received or paid, miscellaneous rents, and other similar corporate transactions, including additions and betterments, shall not be recorded on or passed through such federal books unless such transactions be negotiated and conducted for account of the corporation by or under the direction of the Director General. Where such income transactions are

negotiated and conducted by or under the direction of the Director General the transactions shall be recorded on the federal books but credited or charged to an account to be opened, styled "(Name of corporation)—Corporate income transactions." Concurrently, corresponding entries should be made on the corporate books charging or crediting the accounts prescribed by the Interstate Commerce Commission or which may hereafter be prescribed, the offset being in an account styled "U. S. Government—Corporate income transactions." Where additions and betterments are made by or under the direction of the Director General, the expenditures shall be charged on the federal books to a deferred asset account "(Name of corporation)—Additions and Betterments." Concurrently, entries should be made on the corporate books, charging the appropriate accounts and crediting a deferred liability account "U. S. Government—Additions and Betterments."

(8) Current or operating assets, other than those prescribed in paragraphs 2, 3, 4 and 5 hereof, such as, balances due from individuals and companies, and liabilities, such as, vouchers, payrolls, etc., which were due to or by the corporation as of December 31, 1917, shall not be transferred in detail to the federal books; but as and when such assets are collected or the liabilities are paid, they shall be credited or debited as the case may be, on the federal books to a deferred liability account styled "(Name of corporation)—Assets, December 31, 1917, collected," or to a deferred asset account "(Name of corporation)—Liabilities, December 31, 1917, paid." There should be concurrently made, on the corporate books, corresponding entries debiting and crediting the U. S. Government with assets collected and liabilities paid.

(9) Transactions relating to operations, as defined in paragraph 6 hereof, if not previously accrued, shall be included in and shall form a part of the operating results of each carrier regardless of the date thereof. Items clearly applicable to the period prior to January 1, 1918, commonly called "lap-overs," shall be ascertained currently, set up on the federal books, and included in the appropriate accounts as heretofore. At the end of each month, the total of "lap-over" credit items shall be charged to an unadjusted debit account styled "Revenue prior to January 1, 1918," and credited to a deferred liability account styled "(Name of corporation)—Revenue prior to January 1, 1918." The total of "lap-over" debit items shall be credited to an unadjusted credit account styled "Expense prior to January 1, 1918," and charged to a deferred asset account styled "(Name of corporation)—Expense prior to January 1, 1918." Operating revenues which have been accrued currently in accordance with the established practice of the carrier, shall be considered as current revenues and not as "lap-over" items.

(10) The accounts between the U. S. Government and the corporation, for which provision is made herein, shall be adjusted in such manner as may be hereafter agreed upon.

(11) Inquiries as to the interpretation and application of the provisions of this order and the procedure to be observed under its requirements shall be addressed to the Director of Public Service and Accounting.

THEFTS ON GERMAN RAILWAYS.—It is hard to be hungry and remain honest, as the Prussian railway authorities have discovered. The Railway Minister has recently sent a circular letter to his chief directors of traffic calling attention to the fact that thefts of freight on the railways "are still increasing at a frightful pace"; and he announces methods for combating them. Railway stations and storage warehouses are to be better watched by military and police officials. Cars must be sealed and the seals regularly inspected by superior officials.—*N. Y. Tribune.*

Late Developments Regarding Transverse Fissures

Data Presented by Engineers Points to Origin of Defects in Mill Practice Rather Than Service in Track

ONE OF THE PAPERS presented at the annual meeting of the American Institute of Mining Engineers, New York, on February 20, was a discussion of transverse fissures by James E. Howard, engineer physicist of the Interstate Commerce Commission (abstracted in the *Railway Age Gazette* of November 30, 1917). Mr. Howard's conclusion expressed in this paper was that "transverse fissures are fatigue fractures and that they develop in rails which are structurally free from any known defect. It is a modified type of fatigue fracture in which there is a compressive component in the rail next the running surface of the head. The presence of this compressive component accounts for the interior origin of the transverse fissure. It constitutes the difference which the introduction of the term transverse fissure was intended to emphasize over the common type of fatigue fracture in which this component is absent and which in consequence thereof has an exterior origin."

This paper brought out considerable discussion on the part of railway men and the representatives of the rail manufacturers who have given this subject particular study. The discussion of C. W. Gennett, Jr., was abstracted in the *Railway Age* of February 22, page 421. Abstracts of several other discussions of special interest to railway men, which have just been made available for publication, appear below.

John D. Isaacs

John D. Isaacs, consulting engineer, Southern Pacific, New York City, submitted the following discussion.

In brief, Mr. Howard bases his conclusion upon the following facts:

1. The law of fatigue of metal was established 50 years ago. Repeated reversed stresses above 30,000 lb. per sq. in. cause failure of iron; and above 40,000 lb. cause failure of steel.
2. Steel rails in track are subjected to repeated alternate bending stresses, the magnitude of which depends upon magnitude of wheel loads.
3. Cooling stresses exist in rails from the time of manufacture; these are compression on surface and tension in interior.
4. Cold-rolling in service increases the surface compression.
5. Eighty per cent of the transverse fissures have occurred on the gage side, 20 per cent over the web and none on the outside.
6. Fissures have been located at will on the right or left side or central in the head by progressive gaggling.
7. In the metal surrounding transverse fissures, neither microscope nor chemical analysis shows anything unusual.
8. No other theory as to the cause of transverse fissures has been proved.

From these facts Mr. Howard draws the following conclusion: Transverse fissures are fatigue fractures caused by excessively great repeated reversed stresses. He recommends that fiber stresses in rails be restricted to less than 40,000 lb. per sq. in.

The following facts appear to controvert this conclusion: 1. Transverse fissures have occurred in rails which showed very little wear.

2. Mere increase in the weight of rails has not brought immunity from transverse fissures and rails of the heavier sections have displayed transverse fissures after short service.

3. Transverse fissures are very rare (Southern Pacific reports show one failure in 114,000 rails per year). If fatigue were the cause, all of the old rails in heavy service should be breaking from this cause.

4. Transverse fissures are more prevalent in the product of some mills than in those of others.

5. The range of repeated stresses is greatest at the surface of the rail, as shown by Mr. Howard's table, which may be extended as shown in the accompanying Table 1.

TABLE 1.—HYPOTHETICAL CASES OF LOADING A RAIL IN WHICH INTERNAL STRAINS PRE-EXISTED

Rail under assumed loading stresses in head, pounds per square inch	Running surface of head	Interior element in region of transverse fissures
40,000 lb. compression	55,300 lb. compression	26,755 lb. compression
30,000 lb. compression	45,000 lb. compression	19,235 lb. compression
15,300 lb. compression	3,000 lb. compression	6,595 lb. compression
No wheel load	15,300 lb. compression	5,245 lb. tension
15,300 lb. tension	Zero stress	17,485 lb. tension
30,000 lb. tension	15,300 lb. tension	29,725 lb. tension
40,000 lb. tension	24,700 lb. tension	37,245 lb. tension
Range of repeated stresses	80,000 lb. or 125 per cent	64,000 lb. or 100 per cent

It is seen that the range of stresses at the region of transverse fissures is 64,000 lb. and 25 per cent more than this, or 80,000 lb. at the surface of the head. The effect of fatigue of metal should be greatest where the range of stress is greatest and if the rail failed from this cause, the break should start at the surface. This disposes of the principal argument upon which Mr. Howard's theory is based.

6. Mr. Howard could not locate transverse fissures "at will" lengthwise of the rail by progressive gaggling nor could he produce transverse fissures in any specific plane, indicating that some inherent defect starts the fissure. Transverse fissures were developed by him by groping for the weak places—progressive gaggling.

7. Service is required to develop any sort of a defect into a failure.

8. The relation that exists between wheel loads and track stresses has not been even approximately determined. Limitation to a definite intensity is therefore impossible at present.

In conclusion Mr. Howard's theory that transverse fissures are fatigue fractures caused by excessive and repeated reversed stresses has not been proved and cannot be true in the face of the above facts. A limit cannot be put upon the fiber stresses in rails in track until the relation of wheel loads and track stresses has been established beyond a doubt. Until this relation is known, the present practice, that of laying rails which experience shows will satisfy the traffic conditions, must be continued and reliance must still be placed upon failed-rail statistics, to show where caution is necessary and where reasonable safety is not provided.

Robert Trimble

Robert Trimble, chief engineer maintenance of way, Pennsylvania Railroad, Western Lines, Pittsburgh, Pa., submitted a table and a graphic chart containing information that he had accumulated regarding some rails manufactured by two steel companies, and laid in the main tracks of a railroad system under as nearly uniform conditions as it is possible to find, with reference to alignment, grades, road-bed and traffic conditions.

All of the rails referred to in the statement and chart were manufactured by the open-hearth process under the same specifications; that is, for any one year both mills used the same specifications. The rails are all 100 lb. per yard, and

of a uniform section throughout. In regard to service, if there was any difference at all it was in favor of the rails rolled at mill A.

Mill A furnished, during the period, 83,100 tons, of which 108 rails have been removed because of the discovery of transverse fissures. Mill B furnished, during the same period, 101,300 tons, of which 12 rails were removed because of the discovery of transverse fissures.

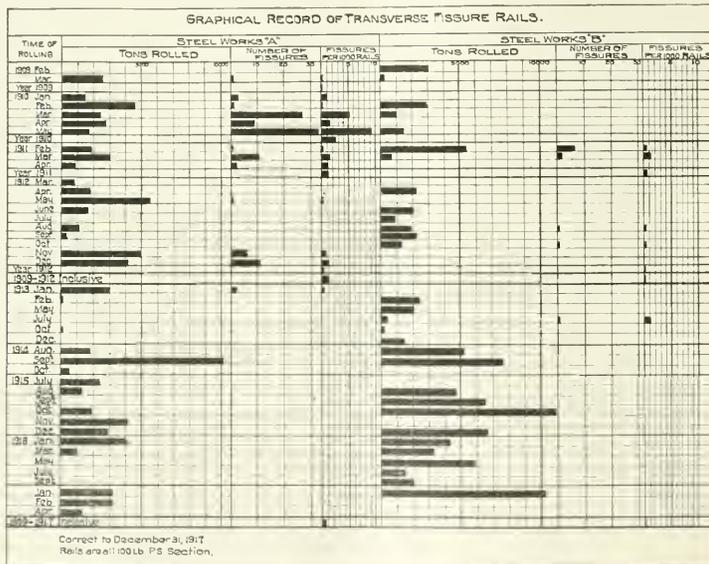
A study of the chart showed:

1. A relatively small number of failures of mill B rails compared with mill A rails: mill A has six times as many failures per 1,000 rails as mill B.
2. Mill A rails have disclosed failures in 13 out of 33 rollings; and mill B rails have disclosed failures in 5 out of 30 rollings.
3. Mill A rails furnished prior to February, 1913, show that 13 rollings out of 18 have disclosed transverse fissures; while mill B rails furnished during the same period show that 4 rollings out of 13 have disclosed transverse fissures.
4. Mill A shows great variation in the results from its

1913, 6,251 tons, a total of 16,295 tons of Bessemer rail. This rail is of the same section and is laid in the same tracks under the same conditions as the open-hearth rail, and none of this rail has disclosed transverse fissures so far.

A large tonnage of Bessemer rail rolled previous to 1909 is still in the tracks, subjected to the same service as the open-hearth rails, and the question arises: If transverse fissures are due to fatigue, why do we not have as many failures from this cause in Bessemer rail as in open-hearth rail? This question has not been answered by the mill men nor by Mr. Howard. A mill man's reply to this question was "open-hearth rail is not ductile enough to stand the heavy loads." It is reasonable to ask, is Bessemer rail more ductile than open-hearth? I do not understand that it is.

There is information in regard to two specific heats of rails rolled at Mill A. One heat, rolled in March, 1910, was removed from the track in January, 1916, because of disclosing numerous transverse fissures. Seventy-eight rails from this heat were investigated; 10 disclosed transverse



A Graphic Comparison of Transverse Fissures from Two Mills

rollings. One rolling of 1,700 tons in May, 1910, showing 33 fissured rails; a rolling of 2,600 tons in March, 1909, which had been in service 14 months longer, shows one fissured rail; and in another case of 4,600 tons rolled in February, 1910, there is but one fissured rail.

5. The rails from mill A show a very much more frequent occurrence of transverse fissures than the rails from mill B, with a correspondingly wider range of variation in regard to the failures developed in the various rollings.

In regard to the rails which have been found with fissures, there is information to show that the material furnished did not meet the specifications in some respects.

During all of this period there has not been brought to my attention a single failure of Bessemer rail with a transverse fissure on the mileage of road, covered by the statistics referred to above, and laid to open-hearth rails.

Mill A furnished, in 1909, 4,812 tons, and in 1911, 450 tons, a total of 5,262 tons of Bessemer rail. Mill B furnished in 1909, 8,544 tons; in 1911, 1,500 tons; and in

fissures, while the other 68 rails did not. Another heat, rolled in December, 1912, was removed from the track between February and May, 1917; 61 rails were examined, 21 disclosing transverse fissures, and 40 not disclosing them. In the case of this heat, the A rails were rejected at the mill, making this heat a suspicious one. All of these rails were in the track, the rails of each heat being subjected to substantially the same service for the same period of time.

The 78 rails rolled in March, 1910, taken from track, were examined by means of bending tests in a rail-gagging press. One purpose of the examination was to determine to what extent other fissures occurred in this heat of rails, and it was thought that this could best be done by gagging the rails with the head down so as to put this member in tension. The method adopted was to break the rails in two by nicking and bending in the gag press, and then to give each half a bend of about 4 in. Starting at one end, the rail was gagged at short intervals until the other end of the half length was reached, and if the rail stood this test with-

out breaking, the gagging was repeated in the other direction. The amount of the gagging was such as to produce a bend of about 4 in., measured as the distance or ordinate from a string spanning about 16½ ft. of rail, to the middle of its length. When subjected to this test, 58 of the 78 rails stood the bending without breaking. The other 20 rails broke in one or more places, and 10 of them showed transverse fissures, varying in size from some scarcely recognizable to some of large size. In the 10 rails that broke without showing fissures, the fracture radiated from a "gray spot" in the interior of the head, except in the case of rail No. 54 in which one break occurred 29 ft. 7 in. from the head end, the break seeming to start from the top surface and in the case of rail No. 66, which had a horizontal flaw about ¼ in. from the top of the head and several inches along the side of the head.

A summary of results is given in Table 2.

TABLE 2.—SUMMARY OF TESTING TESTS							
Rail letter	A	B	C	D	E	F	Total
Broken, showing fissures	1	4	7	3	0	0	10
Broken, without fissures	1	8	10	1	0	0	10
Total broken	2	12	17	4	0	0	20
Not broken	7	7	5	11	14	14	58
Total rails removed	9	19	22	15	14	14	78
Total in heat	9	22	27	15	21	21	131

One noticeable feature of these results is that there was no breakage of any of the E or F rails, of which 26 of the 43 in the heat were tested. None of the E or F rails broke, and thus, also, no fissures were found in any of them. The highest breakage ratio was found in the B rails and the next highest in the C rails.

It will be noted that 20 rails broke, with a total of 49 breaks. Twenty of the breaks showed fissures, distributed among 10 rails, and 29 of the breaks were without fissures, distributed among 14 rails; thus 4 of the rails showed breaks both with and without fissures. It is interesting to note that 14 of the 20 fissures occurred in B rails and that 26 of the 29 breaks occurred in B and C rails. One C rail gave 7 breaks, and if we exclude this rail, 14 of the 22 plain breaks occurred in B rails. The A, C and D rails which showed fissures each showed 1 fissure, while the B rails which showed fissures averaged 3½ fissures per rail.

It would appear that we have well-founded reasons, from the facts hereinbefore set forth, for the following conclusions:

1. Obviously a large percentage of rails laid should show failure from transverse fissures if these are caused by fatigue due to a repetition of wheel loads.

For example, the figures herewith indicate one failure to about every 3,000 rails out of the entire lot, or 1/30 per cent. The other 2,999 rails were subjected to the same repetitions of the same wheel loads, and consequently to the same fatigue, and if failure is caused by fatigue, we are clearly justified in expecting a very much larger number of failures from this cause than we actually find, especially if the material is overstressed, as has been suggested.

It may be said that the above figures are unfair by reason of the fact that a large proportion of the rails had not been in service long enough to develop transverse fissures. To meet this case, let us take, for example, the average of the rails from 1909 to 1912, inclusive, in which case we have one failure to each 1,100 rails. This is about 0.1 per cent. We maintain that we should expect to find a higher percentage of failures than this if they are caused by fatigue from overstress.

2. As a corollary from conclusion No. 1, many rollings of rails have not disclosed transverse fissures after having been in service a longer time than rollings of rails which have disclosed transverse fissures. This would indicate that the latter rails must have contained some inherent tendency toward transverse fissures before being placed in the track.

The above discussion may not throw much light on the cause of transverse fissures, but it does seem to indicate that

the cause of such fissures cannot be definitely attributed to overstress in the rail caused by the present wheel loads.

On two of the systems of the Pennsylvania Line, we had in track January 1, 1917, 219,000 tons of 100-lb. rail and 146,000 tons of 85 lb. rail. Assuming the rails to be 33 ft. long, this would mean about 788,000 rails in the track. The probability is that there is a larger number, by reason of short rails. During the year 1917 there were 451 breakages of these rails, or one to about every 1,700 rails. These breakages cover the oldest as well as the latest rails laid. Again, it would appear that there should be a higher ratio of breakages if these rails are much overstressed by their present loads.

Dr. P. H. Dudley

P. H. Dudley, consulting engineer, New York Central Lines, New York, submitted a written discussion of which the following is an abstract:

There is a marked reduction in the number of interior transverse fissures developed in the rails manufactured in the past few years. The two main tracks of the New York Central between New York and Chicago contain about 625,000 rails, figured on a 33-ft. basis. We have had 514 rails fail from interior transverse fissures in these two main tracks in the last 5 years. Of these rails, 176 are from three small lots made by direct rolling in November and December, 1910, and January and February, 1911 amounting to about 15,000 tons. Should we subtract these 176 failures from the total, it leaves only 137 breakages during 5 years for the great majority of the rails, most of them made by direct rolling.



A Magnified View of a Transverse Fissure

The average service of rails in the main line is 8 to 10 years, and the rate of failures for the present larger tonnage will about double the former figure, or, say 275 for the main line. In 625,000 rails, 275 failures is at the rate of one in 2,250, per 10-year period, or one in 22,500 rails per year. Stated another way, this rate is one failure per 7 miles of track per 10-year period, or one failure per 70 miles of track per year. On a percentage basis, this is 0.44 per cent per 10 year period, yet successful efforts are being made to eliminate this small percentage in future rollings.

I have spent the parts of several years at the steel mills engaged in the manufacture of rails, and have then followed their service in the track year by year. I have measured the unit strains in the rails under moving locomotives and cars by my strammatograph and have found some of the favorable relations which can exist between them and the rails in the roadbed. It should be stated that the maximum strains in the base of the rail occur directly under the wheels, also the maximum compression in the head of the rail. At the point

of flexure in the rail, these reverse to tension in the head, which may be one-fourth and sometimes one-third of that under the wheels.

The wheel spacing governs the spans of the bending rails rather than the tie spacing, which is not generally understood. I do not find in the many tests of the unit strains in rails with my stremmatograph, which autographically records those under the wheels in the base and also in the wheel spacing, that our rails are overstrained.

Personally, as one of the engineers who has had the responsibility of rail manufacture and the investigations of interior transverse fissures, I find so much that Mr. Howard has evidently overlooked that I am unable to accept his conclusions of their origin, or agree that they are fatigue fractures.

G. J. Ray

G. J. Ray, chief engineer, Delaware, Lackawanna & Western, Hoboken, N. J., also submitted a written discussion in which he stated that it was his opinion that there is ample evidence to show that mill practice does in some manner or other influence the transverse fissure. He said in part: We have found, in practice, that open-hearth steel rail 0.75 to 0.85 carbon or thereabouts, does not show any flow of metal to speak of under the present wheel loading and heavy traffic. We have also found, to our sorrow, that transverse fissures are most sure to occur in steel rail with carbon above 0.80 and, in order to reduce the number of failures by transverse fissures, we have very materially lowered the average carbon with correspondingly good results in reducing the number of transverse fissures and in extending the life of the rail before such failures begin to make their appearance. It seems to me this is pretty good evidence that practical results on the track do not in all cases correspond with Mr. Howard's laboratory results.

If the prevailing rail section, or the present track structure is wrong, the manufacturers and other critics have not as yet suggested a practical modification of either to overcome the trouble. If we have reached the point where the present wheel loading is too great for the steel, regardless of the weight or form of the rail, we are certainly in a deplorable situation.

Mr. Howard states: "Next, it is important to ascertain the limit of endurance of rails which have been in the track and have acquired a state of internal strain. There is no apparent reason why this barrenness of fundamental data upon steel rails should longer continue." The Lackawanna has lots of data for rails rolled back as far as 1908, and much evidence to show the limit of endurance in actual service. but, of course, we do not know anything about the internal strains acquired by the various rollings except in so far as they have been determined by Mr. Howard in certain samples furnished him for experimental purposes. We do know that certain heats are more susceptible to transverse fissures than others.

In 1913, the Lackawanna had 46 heats of steel rolled at one steel mill during the month of January. Before this rail had been in service a year, transverse fissures had occurred in one heat and it became necessary to remove that heat from the track by the time the rail had been in service two years. Until the spring of 1917, or after four years' service, no other transverse fissures had shown up in any of the remaining 45 heats, although the rail was all laid in the same track. The heat which failed was very low in ductility as compared with the average of the remaining heats.

I have noted many other similar instances to convince me that certain heats are subject to transverse fissures, at least to such an extent that they tend to develop earlier in the life of the rail. Very careful observation of a mass of data has shown conclusively that the per cent of elongation developed

under the drop hammer is uniformly less with the heats in which transverse fissures have developed than with heats in which no transverse fissures have occurred. It is undoubtedly a fact, as stated by Mr. Howard, that transverse fissures have occurred with rail of all weights and ages. Nevertheless, in my experience with 80-lb. Bessemer rail, rolled at Scranton, we never had a transverse fissure, although much of this rail was still in service and carrying heavy wheel loads and big tonnage up to within the last few years. Not only did transverse fissures never appear, but the rail never did give any trouble from breakage. If such rail could be manufactured in the '90s, why is it that it cannot be manufactured now?

My first experience with the transverse fissure was in 1909, some two years prior to the date of the wreck referred to by Mr. Howard. Ever since that time, I have been making an earnest effort to ascertain how to avoid accepting heats of steel in which transverse fissures are liable to occur. The more I study the subject, the more I am convinced that mill practice and chemistry do influence this type of failure. I am also convinced that it is entirely within the range of possibilities to manufacture rail with reasonably good wearing qualities and at the same time not be liable to failure due to transverse fissure, within a reasonable life of the rail, under the present wheel loading and dense traffic. With one steel mill putting out many thousand tons of rail rolled since 1911, we have had only one transverse fissure, and that was in 101-lb. rail rolled in 1913, after five years' service.

A. W. Gibbs

A. W. Gibbs, chief mechanical engineer, Pennsylvania Railroad, Philadelphia, Pa., submitted a written discussion, of which the following is an abstract:

It must, I think, be admitted that the service does very greatly affect the development, in the rail, of this as well as other kinds of failures, and that where the greatest density of traffic in combination with the greatest intensity of loading is found, the greatest number of rail failures of all kinds are to be expected. Mr. Howard's paper does not give proper consideration to the fact that in the same stretch of track, subject to identical service as to tonnage and speed, certain rails show one or a number of transverse fissures, while their neighbors remain sound. Is it not true, therefore, that it is the service which has the selective property of picking out these rails which are predisposed to failure of this kind? While not claiming that transverse fissures existed originally in the rail, I do claim that certain rails are predisposed, from the time they leave the mill, to the development of this kind of failure when exposed to service.

Unfortunately, it is not practicable to make an investigation of the interior condition of any given rail and afterward subject that rail to service, and a post-mortem in case it develops a transverse fissure. Therefore, the best that we have been able to do is to examine representative rails when new and others, associated in the same heats, which have failed from this cause. I cannot but believe that there is initially a difference in the rails which fail as compared with others in the same heat and service which do not fail, and until our investigations show us what this difference really is, we shall make no real progress toward applying a remedy.

Our records very clearly show that certain rollings have been entirely immune from this kind of failure, while other rollings have shown so large a number of them that it is impossible to believe that it is the service condition which accounts for it. To illustrate: Several years ago in the rolling of our heavy section, two mills each furnished almost exactly 10 per cent of the rails received for the year. One mill's rail has no failures to date; the other has closely 60 per cent of all failures for all mills rolling that section that year, and 63 per cent of the transverse fissures. There have been other instances almost as marked. It seems to me, therefore, that

work such as that instanced by Dr. Dudley, in tracing back to the mill in the effort to identify the cause of the failure, is the only helpful line of progress leading to a remedy.

One speaker suggested three remedies: Perfect track; reducing the weights of equipment; and heavier rail. This is simply begging the question. Perfect track has never existed, and can never be expected. No more can perfect equipment be obtained by any practical maintenance. Weights of equipment cannot be reduced unless we are to retrograde. Heavier rail must justify itself by a marked reduction in failures of all kinds: at present it is on trial. It must be said that the best rail we are now getting is good enough, judging by the service results. On the other hand, we are getting, under the same specifications, rail which we cannot believe is good enough, judging by the results. Our problem is to detect, before failure, what produces this difference and apply a remedy for the bad rail.

H. D. Hibbard

H. D. Hibbard, Plainfield, N. J., submitted a written discussion which is abstracted below:

Admitting with the author that "brittleness of fracture in all grades of steel is characteristic of fatigue tests" we may yet look farther back to find out, if possible, why some rails and some steels are more prone to have transverse fissures than others, for it has been found that rails from certain heats of steel developed these fissures under a service which did not fissure rails of other heats. This demonstrates that some steels resist the fissuring conditions better than others, or to put it otherwise, that they are better.

It seems to me that a quickly developed transverse fissure in a rail results from a combination of causes which begin with the treatment of the molten metal in the furnace and end with the fissuring of the rail in the track. Briefly, these are poor steel, massive head, internal stresses in the head, and, given such conditions, to the wheel action in binding the rail and stretching the top surface metal of the head by cold rolling, as the author has described, the tendency being aggravated by gassing, which may at least determine the location of the fissures, or some of them. Thus the service stresses, instead of being the fundamental cause, may be, as it were, the last straw, and in the absence of internal stresses in the head, they might not be great enough to fissure the rail.

The quality of the steel is determined largely by the way it is finished in the furnace, a well worked, easily killed bath, not readily described in words, being wanted; this demands more time than furnacemen, who are paid for the tonnage produced, are sometimes willing to allow. Then sufficient time must be allowed after the final additions for the oxides and silicates (sonins) resulting from the consequent reactions at least to agglomerate into drops, and preferably enough time for the drops to rise to the top.

The heating and rolling which, of course, must be properly done are now rarely responsible for poor steel and presumably for transverse fissures. Nevertheless, it is quite conceivable that in rapid heating and rolling ingotism is not wholly obliterated and that cementite remaining undissolved between the grains weakens the metal. The additional time for this afforded when the blooms are reheated before going to the finishing mill may cause the diffusion of more carbon of the cementite, and so justify in a measure the opinion of those who think such reheating prevents transverse fissures.

The occurrence of fissures in open-hearth steel may be fairly laid to the more massive heads, which became common at about the same time that the use of open-hearth steel for rails became general, rather than to the process. The interior of the head of a rail, which cools last, is in a state of tension, as Howard and others have found; this is true of the interior of every piece of steel cooled in the open, and the more massive the piece the greater the tension. When the stresses from wheel action, added to that initially in the cen-

tral part of the head, exceeds the strength of the metal, fissuring begins to grow under continued service. The better the steel the better it will resist.

If this explanation of the genesis of transverse fissures be correct, the cure for the trouble, or at least a method for reducing it to the minimum, is fairly obvious:

First, have the steel well made, so that it will pass a more severe drop test than is now prescribed; this will cause the rejection of heats poorly made and therefore immediately liable to transverse fissures.

Second, heat properly and finish the rolling of the rail when wholly at a temperature near, but above, the recalescence point.

Third, retard the cooling of the rail after rolling so that it shall cool at a substantially uniform rate throughout; this will prevent internal stresses in the head and elsewhere. Rails to be so cooled would be hot-straightened and would not require to be cambered after rolling, as is necessary when they are to cool in the open air according to present practice. Then cold-straightening would be diminished, if not avoided.

Of course, rails thus dealt with could not be heat-treated by any process involving accelerated cooling unless it were followed by annealing. Rails so made could be safely made of higher-carbon steel than now, and for that reason would better resist cold-flowing and stretching of the surface. Heavier sections could also be employed, which would better resist the wheel action, which contributes toward the development of transverse fissures.

Railroad Engineers in the War

THE GOVERNMENT'S COMMITTEE on public information has issued a review of the first year of America's participation in the war, based on authorized statements by officials of the government departments concerned, which contains some information regarding the work of the railroad engineers, one of whose first tasks was the reconstruction and extension of a railroad 600 miles long from ports of embarkation to general bases of operation.

Of the special engineer units recruited for service on railroads and in the maintenance of lines of communication, many are already in France and others are awaiting recruitment to full strength in order to be ready for over-seas service. The first engineer troops, 1,100 strong, to be sent abroad, arrived in France about three months after war was declared. Since that time the number has been greatly augmented. These troops have been constantly engaged in general engineering work, including the construction of railroads, docks, wharves, cantonments, and hospitals for the use of the American Expeditionary Forces. They have, in some instances, in the performance of their duties, engaged in active combat with the enemy.

Through the inability of the Russian government to accept certain railroad equipment and supplies ordered in this country, the Engineer department has been able to secure 200 locomotives, by assuming a liability of \$11,000,000 therefor, with the understanding that the Russian government could purchase them later if desired. These locomotives have been rented to American railroads, and have thus assisted in reducing the shortage of motive power in this country.

Rails were obtained in the same way and in great part sent to France in return for rails loaned by the French government to the American Expeditionary Forces.

The office of the Director General of Military Railways, from the beginning of the war to February 20, 1918, had placed orders for railway supplies having an aggregate weight of 754,000 long tons and a value of about \$142,000,000.



Zone A



Zone C



Zone D



Zone E



Zone F



Zone G



Zone K



Zone L



Zone M

The Bituminous Coal Zones

Western, Carolina, Clinchfield & Ohio and short line connections.

H—All producing districts in Alabama.

K—All producing districts in Ohio.

L—In the West Virginia high volatile fields, mines on the Kanawha & Michigan and the Kanawha & West Virginia and on the Coal & Coke (west of Dundon) and short line connections.

M—In the high volatile fields of West Virginia and Kentucky, mines in West Virginia and Kentucky, in the Thacker-Kenova and Kanawha districts on the Norfolk & Western and the Chesapeake & Ohio and Kentucky mines in the eastern Kentucky districts on the Chesapeake & Ohio and the Sandy Valley & Elkhorn and connections.

N—In the low volatile fields of West Virginia and Virginia mines in the Pocahontas, Tug River and New River districts on the Norfolk & Western, the Chesapeake & Ohio and the Virginian and short line connections and also mines in the high volatile Clinch Valley districts in Tazewell and Eastern Russell counties along the Norfolk & Western and on the Virginian.

P—All mines in Northern West Virginia, Pennsylvania and Maryland on the Baltimore & Ohio, Western Maryland, and the Coal & Coke east of Dundon and short line connections as well as all of the mines north of these lines are allowed to ship eastbound to all points in the states of West Virginia, Maryland, District of Columbia, Delaware, Pennsylvania, New Jersey, New York and the New England states reached by customary eastbound routes, including coast for transshipment to vessels at tidewater. They are allowed to ship westbound except to all Lake Erie ports for lake transshipment only, with the further exception that Pennsylvania producing districts are allowed to ship as far west in Ohio as the line of the Pittsburgh & West Virginia and the Wheeling & Lake Erie through Wellington to Lorain and the Pan Handle West Virginia producing district in Broke, Marshall, Hancock and Ohio Counties, W. Va., as far west as the line of the Baltimore & Ohio, Cleveland, Lorain & Western branch, Bridgeport to Lorain, Ohio.

Railway Engineers Fought Shoulder to Shoulder With Canadians

THE AMERICAN RAILWAY ENGINEERS who helped stem the tide of the onrushing Germans during the opening days of the battle now in progress fought shoulder to shoulder with Canadian engineers in carrying out their task, according to Associated Press despatches last Monday from the American Army in France.

They held their ground stubbornly and retired to previously prepared positions only when forced to do so and inflicted casualties by the thousand upon the Germans as they advanced in close formation, in one place as many as seven waves, each wave ten men deep with one hundred yards between the waves.

The Americans with the Canadians had all the ammunition they needed, and although they were unsupported by the artillery and armed only with rifles and with a few machine guns they poured scythelike streams of bullets into the enemy at several different times until their weapons were so hot as to be useless.

Fought Furiously for Days

This handful of American soldiers, who were not hardened to such terrific slaughter, were sickened by the shambles they created, but fought furiously for several days, helping to hold the enemy all the way from near St. Quentin to the vicinity of Noyon.

These were the Americans mentioned at the time in the

official communiqués, but these details of their exploits it has only now been possible to secure.

When the German attack began the Americans were working in the rear lines with the Canadians under Canadian command. They quickly threw down their tools and seized the weapons with which they had been armed for some months and formed themselves into a fighting unit. The Germans came on and finally reached the positions where the Americans were waiting.

The exact number of the engineers cannot be given, but they were comparatively few. They had no intention of retreating, and were bent upon killing all the Germans possible.

Held Their Fire

As the first gray enemy wave advanced the American forces let them come until they were within certain range, then opened fire, pouring in a storm of bullets. Gaps appeared in the advancing lines at many places, some of them large, where the machine guns had chewed through. Still the German waves came on, without firing a single shot—just advancing.

The Americans were unable to understand these tactics, but nevertheless were certain that it was a question of slaughtering the enemy or being themselves smothered under the advance. By this time their weapons were so hot, that they could not be used effectively, and the enemy was close, so that the engineers retired, fighting, took up another position, then turned and began operations again. A British officer who witnessed the engagement is reported to have said:

"They held on by their teeth until the last moment, inflicting terrific casualties on the enemy. Then they moved back, waited for the Germans and repeated the performance."

Sample for the Germans

By the time the engineers reached a place somewhere near Noyon they were nearly exhausted and almost without equipment. There they were given a chance to rest and re-equip. According to all reports, they were entitled to it, for certainly they gave the Germans a generous sample of what the enemy is to expect from the American army.

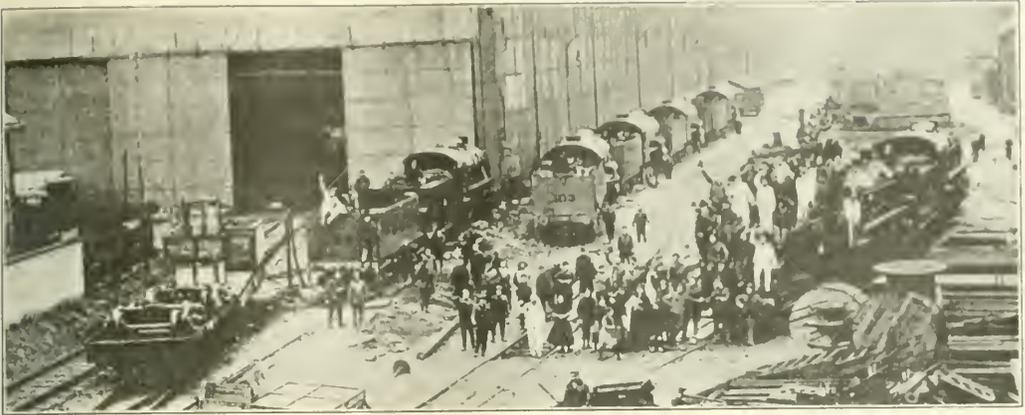
During a battle unusual stories always crop up, but the following is one which the correspondent heard from an unquestionable source, and it is said to have been verified:

In one of the periods when the American engineers and their Canadian comrades in arms were holding a position what appeared to be a British staff motor drove up. The driver was in the uniform of a British soldier, and the man in the tonneau was in the uniform of a British staff officer. The officer stepped out and asked for the commanding officer. He was taken to a Canadian officer near by. The staff officer ordered the commander to retire four kilometres, saying that the Germans were pressing on both flanks and he might be cut off.

For some reason the Canadian commander became suspicious. He had the staff officer searched when the latter failed to produce his authority, and papers were found on him proving that he was a German officer. He and his chauffeurs were immediately shot.

American engineers are said to have been present when this incident occurred.

RAILWAY RATES INCREASED IN GREECE.—By Royal Decree published in the Greek Government Gazette of December 15, 1917, all railways in Greece are authorized for the duration of the war, and for the period of one year after the conclusion of peace terms, to increase all passenger and freight rates by 30 per cent over rates existing as of December 15, 1917. All special discounts for freight transportation are to be abolished, and all classes of freight and express will be charged at 30 per cent more than the regular schedules obtaining on December 15.



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American Railway Engineers Assembling Their New Locomotives in France

The Railroad Drive for Liberty Loan Subscriptions

Nothing to Be Permitted to Interfere With Making Railroad Campaign a Maximum Success

UNDER THE LEADERSHIP of three railroad presidents, chairmen respectively of committees of other railroad presidents in the three railroad regional districts, the drive for Liberty Loan subscriptions is on in full swing. It is the intention of the railwaymen to reach by personal solicitation every employee on every railroad the country over, and nothing is going to be permitted to interfere with making the Railroad Liberty Loan Campaign a maximum success.

In this drive as in the other two campaigns, subscriptions by employees on a partial payment plan will be a leading feature. Employees will be allowed either to pay for their bonds in full in one payment or by installments, to be deducted from the payroll if desired, over a period not to exceed 10 months. In cases where payments covering prior Liberty Loans are as yet uncompleted, the ten months' payments on the forthcoming loan may commence from the completion of the present payments, but not later than three months from now.

The director general has announced his willingness that current operating revenues of the carriers should be used as far as may be necessary in advancing the payment for subscriptions pending reimbursement by officers and employees. In the case of carriers whose current operating revenues are not adequate to permit of their making payment in cash for the amount of bonds necessary to cover subscriptions of their officers and employees, arrangements will be made through the Regional Committee to secure loans through Federal Reserve Banks or other channels.

The Eastern Committee

The work of the committees during the past week or 10 days has dealt with bringing to the attention of every railroad president the importance of the campaign and in explaining the best methods to be followed to secure maximum results.

In a letter to the presidents of the eastern railroads, F. D. Underwood, president of the Erie and chairman of the Liberty Loan Committee for the Eastern Regional District, said:

"On this, the first anniversary of America's entry into the world war, our Government offers the people a third opportunity to display their loyalty by subscribing for Liberty Bonds. An immediate response will be necessary to win the war for democracy. A wide distribution of the Third Liberty Loan, paid for out of current and future earnings of the people, will be necessary to make it a success. A greatly enlarged sentiment in favor of the practice of economy, and a renewal of the spirit of self-denial and patriotism is looked for and urged. Economy practiced by everyone will help

to pay part of the expenses of the war, and will go far toward winning a victory for world freedom.

"In the previous two campaigns for the sale of Liberty Bonds nearly 650,000 railroad men demonstrated their loyalty in a substantial manner, and there is every reason to believe them to be even more fully impressed at this time with the necessity of participating in the government's plan to borrow for war purposes \$3,000,000,000.

"Thousands of railroad men have gone to the trenches, many sacrificing good positions, some of them their lives, in the cause of freedom; other thousands who remain at their posts are no less loyal and willing to do their part, which they can do in buying Liberty Loan Bonds. Such co-operation in previous loan campaigns had a wholesome material and moral effect. It is hoped that the effort to make a good showing will be doubly renewed, and that the reputation of railroad men as loyal and patriotic citizens will be permanently and firmly established when the Third Liberty Loan drive closes on May 4.

"The Liberty Loan Committee has been formed at the request of the secretary of the treasury to aid in providing the machinery for the men to subscribe for the bonds and pay for them in installments out of their future earnings and in a manner that will promote the general welfare and cause little hardship.

"It is hoped your company will actively co-operate in placing before all its officers and employees the opportunity to

perform this patriotic service. Reports to the committee during the progress of the former subscriptions indicated that the results did not come up to expectations until the effect of the efforts of special organizations or committees of officers and employees had become manifest. Too much stress cannot be made upon the importance of organization into various committees to make special efforts to appeal personally to each employee. Almost everyone can subscribe something, and it would be a failure in their bounden duty not to do so. The work, to be helpful, must be immediate and thorough. While each company will probably find it desirable to adopt machinery and methods of appeal suited to its own organization, we enclose by way of suggestion a draft of a circular to be brought promptly to the attention of officers and employees, and a draft of subscription blank for the subscriber to sign and indicate the denomination and amount of bonds subscribed for, and method of payment.

"These forms should be forwarded to the treasurer of your company, who will draw therefrom a list of the denominations of bonds required to cover the subscriptions made, for

"Fight—or Buy Bonds"

By E. E. Loomis

President of the Lehigh Valley, and a Member of the
Railroad Liberty Loan Committee for the
Eastern Regional District.

Every railroad man should be a subscriber to the Third Liberty Loan. Through the efforts of the Director General, it seems certain that they will be placed in deferred classifications for military service. This is as it should be. Skilled and experienced railroad men, conscientiously giving the best that is in them at their daily tasks, are rendering the nation as great a service as would be possible in the army itself. They go to make up the most vital force behind our fighting organization.

Special opportunities to subscribe are offered railroad men. They may buy bonds on the installment plan through monthly deductions from their pay. They do not have to begin paying for the third issue until payments for the first loan are completed.

These advantages make their duty as bond buyers all the greater.

To my mind railroad men, particularly, must answer the call.

"Fight—or Buy Bonds."

filings with the bank with which he has made his subscription arrangement.

"Although the committee can supply certain posters and advertisements on request, otherwise, it seems necessary that each company shall print its own circular letters and subscription blanks, prepare and distribute its own advertisements, and arrange with its own banks, or otherwise to purchase and carry the amount of bonds required to meet the subscriptions made.

"This committee will co-operate, and will heartily appreciate suggestions. In view of the shortness of the time, it will be desirable for each company to at once adopt such plans as seem best to accomplish the desired object. The committee requests advice as to the particular plan adopted. It should be advised weekly as to the amount of subscriptions received."

The Western Campaign

"Reports from presidents of the railroads in western territory indicate most patriotic support of the Third Liberty Loan by railway officers and employees," said W. G. Bierd, chairman of the Railroad Liberty Loan Campaign Committee for the western regional district, last Monday.

"Under a plan approved by W. G. McAdoo, Secretary of the Treasury and Director General of Railroads, all Liberty Loan subscriptions by railway officers and employees are to be solicited through railroad committees and representatives," continued Mr. Bierd. "The campaign organization which

campaign have been carefully considered, and it has been determined that the following form of organization should be immediately formulated upon each railroad, upon whom the importance of the work should be thoroughly impressed and by whom substantially the same methods and procedure will be followed by all lines in the Western Regional District:

I. *General committee.*—Headed by the president, or other executive officer, who will issue and enforce necessary instructions. It may select other officers to serve on this committee with him.

II. *General office committee.*—Three representative general officers, who necessarily must devote a portion of their personal effort, and in turn shall appoint captains under their jurisdiction in the various general office departments.

III. *Divisional committees.*—Three or more representative division officers or employees.

While these officials or employees can devote only a portion of their personal time, they must realize the importance of the ultimate success of this railroad campaign and follow up daily the work of such captains and leaders under their jurisdiction in the respective branches of the service, as they may see fit to appoint. It is suggested that all brotherhood representatives in the various crafts, both general chairmen, division chairmen, and local chairmen, be utilized to the fullest extent in the furtherance of this campaign.

IV. *Terminal committees.*—This committee should be composed of three or more such employees as station agent,

No.

Date 1918

Please subscribe for me the following number and amount of the Third United States Liberty Loan Bonds, via:

Bonds of \$ 50.00 each, \$ Bonds of \$ 500.00 each, \$

Bonds of \$100.00 each, \$ Bonds of \$1,000.00 each, \$

Mark with cross how payment is to be made

By cash.

By deducting the amount (per value) in ten equal installments from my wages on the company's pay rolls for the second period of each month commencing with second period of April, 1918. If payments are discontinued before completion, full amount paid in will be refunded, without interest.

Division Name

Occupation Address

Location Name of employing office

DO NOT WRITE ON THIS SIDE

Subscriber No

Location

MONTH	PAYMENT	MONTH	PAYMENT	Bond delivered	1918
April	\$	April	\$			By
May		May			
June		June		Number of Bond	
July		July		Date of receipt	
Aug.		Aug.		Remarks	
Sept.		Sept.			
Oct.		Oct.			
Nov.		Nov.			
Dec.		Dec.			
Jan.		Jan.			
Feb.		Feb.			
Mar.		Interest			
April		Total	\$		

Subscription Card Suggested by Western Regional Committee

has been effected on every western railroad insures every person on its payrolls being personally solicited to subscribe to this Liberty Loan. A record will be kept by every railroad of the subscription of each employee. A summary of these records will show exactly how much the railway employees have contributed to this loan.

"It is the aim of every railroad president to have every officer and employee subscribe to this bond issue. It is already apparent that there will be keen rivalry between the western roads not only to reach the 100 per cent mark, but to have the largest subscription in proportion to the number of employees.

"In round numbers on the four hundred railroads in the Western Regional District, there are 800,000 officers and employees, and their annual wages are about \$550,000,000. Watch the railroad men go 'over the top' in this Liberty Loan Campaign."

The Use of Committees

In all three regional district campaigns, particular stress has been put on the necessity of using committees and of reaching every man. The organizations suggested by the Eastern and Western committees are similar. That following, however, is the plan suggested by Mr. Bierd:

The best methods for securing the maximum results in this

yardmaster, roundhouse foreman, car repair foreman, storekeeper, and such other employees in charge of large forces.

V. *Shop committees.*—A committee at each shop composed of three or more of the officers in charge, such as superintendent of motive power, master mechanic, master car builder, shop superintendent, general storekeeper, etc.

It may be necessary that further sub-committees be appointed in the mechanical department to cover all outlying shops and that numerous sub-committees and captains thereof be appointed in all large shops and repair yards.

VI. *The divisional committees,* of which the chairman would undoubtedly be the division superintendent, shall see that all other classes of employees not specifically covered are properly organized under their jurisdiction, such as local agents, track foremen and track men, bridge and building department employees, signal department employees, miscellaneous telegraph and telephone linemen and maintainers.

It is the intention that every employee of the railroads shall be personally urged to subscribe for as large an amount of Liberty Loan Bonds as possible by the officer on whose payroll he is carried, each such officer in turn reporting to his superior officer, and they in turn to the various committees having jurisdiction in this campaign over such officers and employees. It is important that no employee should be overlooked and that they should be solicited repeatedly by the

captain or leader having jurisdiction until such subscriptions as they may be willing to make have been secured.

A daily record should be made and turned in to each of the sub-committees, and in turn to the general committee, showing the amount of subscriptions received for the day. As these records are turned in from day to day to local committees, renewed efforts should be concentrated upon all employees not making subscriptions or not making sufficiently large subscriptions, and continued until it is definitely determined that no subscription can be secured from such employee.

With the elimination of all competition for traffic and the consequent reduction now being made in solicitation forces, there are quite a number of older traffic employees being transferred for duty in other departments. It is suggested that of these men, a sufficient number, and consisting of at least one man, should be delegated to each of the above named committees on each line, and if men are available that a greater number of such traffic officers be assigned to the committees most needed, these men to act in the way of a flying squad, to be fully posted on all features connected with the Liberty Bond Campaign and in position to address gatherings of employees and members of the respective committees, and thereby give any desired information that may be required and stimulate a patriotic interest that should exist among all officers and employees. These men are generally of a type, and their experience has been such that they should be well fitted for undertaking work of this character. They can readily acquaint themselves with all the details of the campaign by carefully reading the literature and attending some of the general meetings that will be held in various communities for that purpose. It is the intention that these men will be subject to the instructions of the various committee chairmen, and will be despatched from one location to another as may appear necessary to stimulate the desired interest and accomplish the maximum results.

Chicago Supply Trade Organizes to Push Liberty Loan

The railway supply trade in Cook county, Illinois, has been organized to push the Third Liberty Loan. C. K. Knickerbocker, Griffin Wheel Company, is general chairman of the committee. Vice-chairmen are as follows: F. A. Poor, P. & M. Company; C. H. Riddell, Baldwin Locomotive Works; H. W. Wolf, American Car & Foundry Company; Thomas Finigan, American Brake Shoe & Foundry Company; R. H. Ripley, American Steel Foundries; A. P. Bowen,

Pullman Company; T. W. Aishton, National Malleable Castings Company, P. R. Smith, Ayer & Lord Tie Company; E. P. Wells, Charles H. Besly & Co., and G. K. Sage, Fairbanks, Morse & Co. The following supply trade men have volunteered their services in support of the drive: A. S. Goble, Baldwin Locomotive Works; C. S. Palmer, Pittsburgh Steel Company; John Ritchie, P. & M. Company; W. J. Pierson, C. B. Carson, H. G. Turney, A. S. Anderson, and F. J. Stender, Adams & Westlake Company; L. R. Dewey, C. P. Wright, J. G. Tawse, A. G. Delany, American Brake Shoe & Foundry Company; Eugene L. Williams, G. D. Casgrain, A. W. Brown, Griffin Wheel Company; Jack Patton, Ajax Forge Company; H. A. Smith, J. E. Gougeon and C. L. Bates, Railway Review; E. A. LeBeau, Chicago Railway Equipment Company; G. K. Sage, F. E. Church and F. F. French, Fairbanks, Morse & Co.; W. J. Morden, Morden Frog & Crossing Company; N. C. Naylor, Railway Steel-Spring Company and C. S. Boggs, A. W. Clarke and W. W. Taylor from the Central Liberty Loan Committee.

Rainbow Division Committee in New York

The railway supply firms in New York are organized for the Third Liberty Loan Campaign through the Rainbow Division's Special Liberty Loan Committee for the Machinery and Machine Tool Trades. The committee is headed by J. W. Lane, president of the E. W. Bliss Company. R. L. Patterson, president of the American Machine & Foundry Company is vice-chairman; Charles B. Houston of the E. W. Bliss Company is secretary and Charles A. Hirschberg, publicity manager of the Ingersoll-Rand Company, is publicity director. The committee itself is composed of over 40 members of which about 12 are associated with companies in the supply field. These 12 include L. Barron, secretary of the De La Vergne Machine Company; Leigh Best, vice-president of the American Locomotive Company; G. D. Branston, treasurer of Manning, Maxwell & Moore; C. I. Cornell, treasurer of the Pratt & Whitney Corporation; F. S. DeLano, treasurer of the American Car & Foundry Company; George Doubleday, president of the Ingersoll-Rand Company; F. F. Fitzpatrick, president of the Railway Steel Spring Company; Henry Fuller, vice-president of the Fairbanks-Morse Company; H. C. Knox, treasurer of the American Brake Shoe & Foundry Company; John Lidgerwood, president of the Lidgerwood Manufacturing Company; T. Frank Manville, president of H. W. Johns-Manville Company and E. A. Stillman, president of the Watson-Stillman Company.



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Captured by the British in Palestine

Our Foreign Trade in Railway Supplies

An "Exploration" of the Purchasing Commissions and
Export Houses in New York

By P. Harvey Middleton
Executive Assistant, Railway Business Association

TO OBTAIN INFORMATION of value to those members of the railway supply craft who may desire to enter the foreign field, I was requested by our Association to go down the line in New York. I was to imagine myself as a railway supply man who had never dealt in foreign accounts and who was disposed to explore the possibilities in that direction. When I had become somewhat saturated with the spirit of the character which I was to enact, my first impulse was a curiosity to see whether I could sell railway supplies to foreign railroads just as I could to domestic roads—without setting foot outside the country or risking the lives of members of my sales force on a trip through the haunts of the submarine. I found that starting from our New York office I could call upon the actual purchasing agents of some 20 foreign railways without going outside a belt of Manhattan bounded on the south by the Battery and on the north by the City Hall.

The Direct Method

At 17 Battery Place I sent in my card to A. Ankersmit, who is the American representative of the Netherlands Government and who buys supplies for the railways of the Dutch East Indies. Mr. Ankersmit, whatever the custom in the land of dikes, conforms while among us to a gracious practice which I understand is universal among railway purchasing agents in America—he hurried out to greet me and conducted me immediately to his private office. "We have bought in this country," said Mr. Ankersmit, "locomotives, freight cars, rails and accessories, also general equipment for the state railways in Java and Sumatra to an amount which I should estimate at about \$4,000,000 during the past two years. My government operates in Java and Sumatra 2,485 kilometers of standard gage track and 87 kilometers of narrow gage track, and we have 700 kilometers under construction.

"We have 513 engines in operation, 1,600 passenger cars and about 10,000 freight cars. When we buy material it is on the basis of f. o. b. factory. We attend to all the shipping details. This arrangement is during the war. In times of peace we would buy f. o. b. New York and I would attend to the shipments. I have placed orders recently with one company for about 9,000 tons of rails and have also ordered 4,500 tons from two other companies. I can tell American manufacturers that there is considerable business awaiting them in Java. Before the war the business went to England, France and Belgium. Holland does not export a great deal. With a population of 34,000,000, with 200-sugar plantations, with coal mines, with coffee and cotton plantations, and with lines of steamships connecting Java directly with New York and San Francisco, there is no reason in the world why Americans should not obtain valuable trade there."

I was assured by Mr. Ankersmit that railway supply salesmen would always receive a hearty welcome at his hands.

Some Specialties Not Bought

Then I went over to 43 Exchange Place to see J. P. Ripley of the J. G. White Engineering Corporation, which has the management of the Pacific Railway of Nicaragua, a little

* From a pamphlet written for distribution at the Railway Business Association meeting in Chicago on Monday.

republic where the United States marines are industriously protecting American interests. The J. G. White Corporation, also manages the Philippine Railway, which operates in the islands of Panay and Cebu. "All the purchases for these two roads are made from this office," said Mr. Ripley, "and we are always more than glad to meet railway supply salesmen. We buy about everything except rail braces, tie plates, anti-creeper, superheaters, power reverse gears, block signals, and six-wheel trucks. We haven't any use for these things. Our trains do not operate at high speeds and the weights carried are not heavy. All our trains are run on train orders." In this case also the buyer attends to the shipping.

I next called upon A. Palanca, an engineer representing the Italian State Railways, whose office is at 291 Broadway. "You can tell your people," said Mr. Palanca, "that we buy cars, car wheels, boiler plates, boiler tubes, lubricating and fuel oils and other miscellaneous supplies. All material is forwarded on our own ships and the Italian Ministry of Shipping maintains an office here."

Good Demand in Far East

At 17 Madison Avenue I interviewed Mr. Iyama, the purchasing agent of the Imperial Government Railways of Japan. "We have our own car and locomotive plants in Japan," he said, "which produce one-third more than we can use, the surplus going to China. We do, however, buy from American manufacturers steel plates, shapes, rails, lubricators, injectors, gages, spring steel and other semi-manufactured commodities. We recently placed an order with a Colorado company for 20,000 tons of standard American 75-lb. rails."

Purchases for the government lines and for the privately operated railways of Japan and China are also made by Mitsui & Co., the most powerful commercial concern in Japan, whose New York manager is Konosuke Seko. "In 1917," said Mr. Seko, "we made purchases in the United States of railway equipment \$2,300,000, of electrical machinery and appliances \$2,900,000, of steel products \$5,200,000 and of general machinery \$3,500,000." The Okura Company, whose New York manager is B. Imai, is another active Japanese railway purchaser. I called upon Mr. Imai at his office in 30 Church street. "We are changing from 60 to 75-lb. rails as fast as we can throughout Japan," he said, "and we are also going to widen our gage, which is at present 3 ft. 6 in. This will of course necessitate large buying of supplies." I glanced over Mr. Imai's record of recent orders, which included boiler tubes, buffers, cast steel forgings and steel castings, rolled steel wheel centers, couplings, plate glass, steel axles, steel bars and plates, boiler plate and firebox plate, steel channel and flat bars, steel frame plate for locomotives, steel round bars, steel rails, trestle-bridge material, electric railway cars and equipment, etc.

Good Market in Cuba

A railway supply salesman will find a score of other foreign railways in the downtown district of New York. At 280 Broadway, for instance, I found the purchasing agent of the Bolivia Railway, an American corporation which has done considerable buying in this country for the new lines now being constructed in Bolivia. Among others interviewed was H. Bellefeuille, secretary of the Havana Central

Railroad at 42 Broadway. This company acts as purchasing agent for six railway companies in Cuba. "The supplies purchased for our companies," he said, "include every class of material used by steam and electric roads, and also all materials necessary for the maintenance and operation of electric power houses and lighting systems along our lines." The National Railway of Tehuantepec (which, in case you don't know it, is an isthmus in Southern Mexico) is at 65 Broadway. Other countries represented in New York are Peru, all the republics of Central America, Brazil, Haiti, Ecuador, and Panama.

A list of all purchasing agents of foreign railways with offices in the United States can be furnished by the Railway Business Association.

This gives a clear idea of the opportunities offered by the direct method. Another opportunity for securing direct orders is afforded by the occasional visit of railway purchasing agents sent here by foreign companies or governments. For instance, Justiniano Sotomayor, vice-general manager of public works of Chile, recently arrived at the McAlpin Hotel, having been sent to this country to buy railway supplies. Judicious enquiries at the principal hotels in various large cities will reveal the presence of these gentlemen from time to time.

The Commission House

Having exhausted the possibilities of dealing direct with the agents of foreign railways located in this country, I turned to another avenue at home which is open to the manufacturer. This is the export commission house.

I called upon Homer C. Johnstone, manager of the steel department of Gaston, Williams & Wigmore, Inc., one of the largest export houses, with established offices and sales forces nearly all over the world. Some idea of the size of this company may be gathered from the fact that it has over 400 employees in its New York office and over 1,000 in its Paris branch.

(The gist of Mr. Johnstone's remarks as reported by Mr. Middleton was given in Mr. Johnstone's article in last week's *Railway Age* on "How the Export Houses Help in Foreign Trade." In addition, however, to some of the things mentioned in his article Mr. Johnstone told Mr. Middleton, "We have supplied all our branches with copies of the Locomotive Dictionary and the Car Builders' Dictionary, so that our men in the field can familiarize themselves with the subject.—Editor.)

I next visited W. A. Will of Dutilh-Smith McMillan Co., 50 Broad street, an export commission house which purchases railway equipment for various countries in Latin America. "Our Buenos Aires office was opened especially to take care of railway supply business," said Mr. Will. "If a railway supply manufacturer desired us to take up the introduction of his products into the foreign markets served by us we would place the matter in the hands of our branch offices in Buenos Aires and Rio de Janeiro and instruct them to put their salesmen to work on it. They are seeing buyers all the time and have the advantage in dealing with them—which a railway supply manufacturer dealing direct would not have—that they not only sell them American goods but buy their products for the American market. On receiving an order we would pay cash for the goods at the plant of the railway supply manufacturer and he would have nothing further to do with it. The troubles connected with transporting the goods from his plant to destination and the extension of credits would be up to us."

The African Market

Then I called upon L. P. Lawrence, secretary of Arkell & Douglas of 44 Whitehall street, New York, an export commission house with branches or agencies in many foreign countries. "Our purchasers of railway material," said Mr.

Lawrence, "are exceedingly large, particularly for British and Portuguese South and East Africa. We purchase also for Australia, Mauritius, India and South America, but our African purchases are very much the largest, as we are the purchasing agents for this country and Canada for the Union of South Africa government. To give you an idea of the volume of this business, we might mention that we have on hand at the present time orders which will amount to over \$550,000." A call was also made upon Jardine, Matheson & Co., of 25 Madison avenue, who have 25 branches in China and Japan.

These are typical export commission houses. There are many reliable houses of this character in New York, Boston, New Orleans and other seaports. A list of such houses with their trade ratings and foreign connections can be furnished by the Railway Business Association.

The export commission house serves equally the foreign buyer and the exporting manufacturer. Transactions are greatly simplified. The foreign buyer, instead of corresponding with a score of manufacturers in the United States, located at various places, writes a letter to one commission house, combining the orders. The commission house distributes the order to the various manufacturers, collects the goods in one shipment, makes one bill of lading and one draft on the buyer. Only one set of shipping papers is necessary for the entire transaction. The commission house adds a percentage to the manufacturer's price to pay for its service.

Foreign Investments

I now decided to make an excursion into the realm of statistics to find out just what the foreign trade in railway supplies amounted to. I returned to the Association office and waded through the statistics of exports of domestic merchandise, picking out those articles which were obviously railway supplies, such as locomotives, cars and wheels, spikes, switches, ties, etc. I found that for the 12 months ending December, 1917, the exports of these articles totaled \$103,616,813. This figure would be materially increased if it were possible to separate railway purchases included under iron and steel, machinery, hardware, tools, etc. It was thus apparent that considerably over \$100,000,000 a year of American supplies were exported to foreign railways in spite of the heavy investments of Europe in those enterprises.

I called at the National City Bank to learn just what Americans were doing to overcome this handicap of foreign investments. Over 60 per cent of the railroads of South America are controlled by British capital. "A railroad constructed with British capital will buy its equipment and supplies in England," said Beverly D. Harris, vice-president of the Bank. "A debtor country must naturally make its purchases largely in the market of the country where credit may be obtained in some form or other for the settlement of trade balances. Recognizing this condition as fundamental, the American International Corporation with a capitalization of \$50,000,000 was created by the National City Bank for the permanent expansion of American foreign trade. Under its charter it can own and operate railway and street car lines and other public utilities and manufacturing establishments."

Following the lead given by Mr. Harris I went over to the Equitable building to the office of the American International Corporation, where I was informed that the Siems-Carey Railway & Canal Co. of St. Paul, Minn., will construct as soon as possible with money furnished by the American International Corporation over 3,000 miles of lines in the rich Chinese provinces of Szechuen, Hunan and Chihli—provinces with a population much larger than that of the entire United States—which will be opened up to foreign trade by these new American owned railways.

Having now personally investigated the various avenues

of export trade opened to railway supply manufacturers at home, my next inquiry was directed at the methods adopted in securing orders by direct contact with the buyers in foreign countries. I put the question up to George H. Charls, vice-president of the American Rolling Mill Company, who has recently returned from a trip to England and South America.

Co-operation in Foreign Trade

"There is only one avenue to success," he said, "and that lies in co-operation, if possible the forming of syndicates quite as strong and well organized as those of our foreign competitors. Under present conditions if 20 steel companies are persuaded to go after export business in Brazil, at least 20 men must be sent to that country. If 20 countries offer a field, at least 400 men must be sent abroad, and they will have to compete with one another. If 20 steel companies co-operate under the provisions of the Webb bill, one man can accomplish the result of 20. In the name of pure economy and self defense we cannot safely pursue any other course. The same plan will permit the joint co-operative advertising of all members."

As all authorities seem to agree that the American manufacturer must combine to secure his share of foreign trade I went back to the American International Corporation to have a talk with W. S. Kies, vice-president, who is regarded as an authority on export combinations. "Can you give me a rough outline," I asked Mr. Kies, "of how railway supply manufacturers could proceed in forming an export combination?" Mr. Kies replied as follows:

How to Form a Combination

"After the passage of the Webb bill," he said, "a group of both competing and non-competing manufacturers could form a railway supply exporting corporation, with branches in the strategic trade centers of the world. The leaders in the industry should be at the head of such a combination to make it successful. Each member at the beginning of the year would report to the corporation the amount of his product available for export during the year, conditions of delivery and acceptance of orders, and price at which he would sell in a foreign market. The sales force of the corporation would undertake the disposal of exportable surplus of its members on the terms and conditions specified, obtaining the best price possible, making use of its own branches, of export commission houses, trained salesmen, and every other agency of demonstrated value in building up foreign trade. The difference between the price quoted and the price obtained would belong to the export corporation as a profit, and upon all sales all members would pay to the export corporation a minimum percentage as a commission. Whenever a demand was found to exist in a particular market for a certain quantity of goods which must be sold at a lower price than quoted by any of the members, in order to meet foreign competition, all members would be notified of the possible order and given an opportunity to meet the foreign price, the lowest bidder or bidders receiving the order. The export corporation would provide an expert to gather statistical and other data of value to the industry, which would be distributed promptly to all members.

"If such an organization were created, with men of the right calibre at the head of it, the American International Corporation would be glad to co-operate with it." In this connection it should be borne in mind that the American International Corporation already owns the Allied Machinery Company of America, which does a large foreign business in machine tools, and also owns the Allied Construction Machinery Corporation, representing a group of non-competing manufacturers. This last company acts as sole direct foreign selling agent and representative for the products of the Lakewood Engineering Company, the Thew Automatic

Shovel Company, the Parsons Company, the Austin Manufacturing Company, the Western Wheeled Scraper Company and the Hydraulic Pressed Steel Company.

This little story describing a tour of observation only touches a few high spots. Every manufacturer of railway supplies has his own problems and probably no two would want answers to the same questions. Certainly there is no single place where all the questions of all concerned on this subject can be answered. The Railway Business Association office does not pretend to be so thoroughly equipped with information that all inquirers can be answered out of our own resources. It is probable, however, that any member who is afflicted with perplexity can save time by making use of our office which will either respond forthwith, or obtain the information for him, or advise him where he can get it.

New England Railroad Executives' Committee

WHILE RAILROAD AFFAIRS are undergoing a rapid process of centralization under the direction of the Railroad Administration, a considerable degree of decentralization has been introduced in the eastern district by the organization of local district committees of railroad executives for the purpose of settling locally many problems which affect the roads serving various districts. The first of these district committees to be organized was that of the New England roads, which was suggested to the regional director, A. H. Smith, as the result of a conversation between the executives of two of the New England roads, Percy R. Todd, president of the Bangor & Aroostook, and J. H. Hustis, receiver of the Boston & Maine, on New Year's day. Later similar committees were organized for the New York & Niagara, Central, Philadelphia, Baltimore & Pittsburgh, Hampton Roads, Michigan and International Boundary districts.

The New England committee is known as the New England Railroad Executives' Committee and comprises the chief executive officers of the following roads: New York, New Haven & Hartford, Boston & Maine, Boston & Albany, Central New England, Maine Central, Bangor & Aroostook, Rutland, Central Vermont, Grand Trunk, Canadian Pacific Lines in Maine and the president of the New England Steamship Company. J. H. Hustis, receiver of the Boston & Maine, is chairman of the committee. Immediately after the formation of the committee representatives of the most important industrial organizations in New England, at the suggestion of Chairman Hustis, formed a committee composed of such men as the president of the Boston Chamber of Commerce, the chairman of the board of directors of the Old Colony Trust Company, the chairman of the Associated Manufacturers of Massachusetts, an officer of the Arkwright Club, composed of 100 cotton mills, and other men of that type, about 12 in number. This committee is known as the New England Transportation Conference and its object is similar to that of the Railroad Committee, to deal with the railroad in setting at home if possible all questions arising between the commercial organizations in New England and the railroads of that territory. The conference requested the Railroad Committee to appoint one of its members to sit with it each week at its meeting in Boston and to act as the medium of communication between the commercial and railroad interests. Mr. Todd was selected by the Railroad Committee as its representative for this purpose.

It is stated that the business men have displayed a splendid spirit in co-operating with the railroad executives to make government control of railroads during the war a success, and it is believed that they have set an example which could be followed with results mutually satisfactory to both

railroad men and representatives of the shippers in all parts of the country.

As an illustration of the character of the matters discussed at these meetings, at the first meeting of the conference a representative of the Arkwright Club set forth the condition of the cotton mills due to the fact that they had from 6,000 to 8,000 carloads of cotton in transit from Arkansas and other southwestern points to New England since the latter part of October and early in November, none of which had reached destination, but all of which had been paid for on order bills of lading. The aggregate amount that members of the club had paid out on this account was approximately \$80,000,000, and a banker member of the conference added that for the first time in twelve or fifteen years the New England cotton mills were borrowing money on short term notes to pay their current expenses because of their failure to receive the cotton and secure a return from its manufacture. This matter was taken up with the railroads and an arrangement reached by which one trainload a day was forwarded regularly out of the accumulation at St. Louis via the New York Central, as originally billed.

But as a result of one of the possibilities under government control most of the accumulation was handled via Memphis, Tenn., instead of via the New York Central, and forwarded to Savannah, Ga. Arrangements were made through the director general's office for the Shipping Board to furnish steamers to carry the cotton to New England ports. There were no through rates or divisions in existence from Memphis via the port mentioned to New England and the diversion could hardly have been made under private management of the railroads. But under the arrangement made the cotton was brought forward with such promptness that the situation was materially relieved. Most of the cotton mills were engaged in manufacturing for government purposes and if some such arrangement had not been made they would have had to close down. The movement of cotton via Savannah was mentioned in a recent issue of the *Railway Age*. A large number of more or less similar matters, many of them purely local to New England, have been taken up and disposed of through the medium of this weekly conference between the commercial and railroad interests.

Reports of Capital

Expenditures Required

PURSUANT TO GENERAL ORDER NO. 12, issued by the director general with respect to railroad work involving charges to capital account, the division of capital expenditures has issued a series of forms on which railroads are to report their schedules of proposed work for the recommendation of the regional directors and the approval of the director of the division of capital expenditures. The budgets of most of the roads for 1918 had already been submitted in preliminary form prior to the organization of this division and most of those for the larger roads have already been tentatively approved. The instructions regarding the reports, as given in D. C. E. circular No. 1, are as follows:

First. Please prepare promptly and forward not later than April 30, 1918, a schedule by class of work, of all uncompleted work contracted for or commenced prior to January 1, 1918, which involves charges to capital account after that date. Such schedule should be on D. C. E. Form 1 and should show location of work, brief general description, total estimated expenditure, value of salvage recovered from property retired, amount chargeable to operating expenses, amount chargeable to capital account, amount expended to December 31, 1917, chargeable to operating expenses and to capital account, respectively, amount required subsequent to December 31, 1917, to complete the work divided as between operating expenses and capital account, and should be

divided into classes on Form 1, in accordance with the classification given on D. C. E. Form 1A. There should be a recapitulation on D. C. E. Form 1A of the schedules given on D. C. E. Form 1. Copies of said forms are transmitted herewith and made part hereof. All projects involving a charge of \$5,000 or more to capital account subsequent to January 1, 1918, should be shown as separate items on D. C. E. Form 1, and projects involving a charge of less than \$5,000 to capital account should be reported as a single item at the foot of the schedule of each class of work and included in the total of the class.

Second. A monthly report, commencing with the month of January, 1918, of all work contracted for or commenced during the month involving a charge to capital account for any single project of less than \$5,000 should be made on D. C. E. Form 2, giving total estimated expenditure, value of salvage recovered from property retired, amount chargeable to operating expenses, and amount chargeable to capital account; and should be reported by classes as indicated on said D. C. E. Form 2. Reports for the months of January, February, and March should be forwarded promptly and before April 30, 1918, and reports for subsequent months should be prepared promptly and forwarded before the 15th day of the succeeding month. Copy of D. C. E. Form 2 is transmitted herewith and made part hereof.

Third. A separate report for each project contracted for or commenced subsequent to January 1, 1918, involving a charge to capital account of not less than \$5,000 or more than \$25,000 should be made within 10 days after the work has been or shall be contracted for or commenced on D. C. E. Form 3, and a separate blank should be used for each report. Projects of this description commenced or contracted for during January, February, or March should be reported as promptly as practicable before April 15, 1918. Copy of D. C. E. Form 3 is transmitted herewith and made part hereof.

Fourth. To obtain the authority required by section "Second" (for the construction of new lines, etc.), section "Third" (for purchasing or building new equipment), and by section "Sixth" (for work involving a charge to capital account in excess of \$25,000) of General Order No. 12 issued by the director general, application should be made on D. C. E. Form 4 and a separate blank should be used for each application. This requirement applies to all work involving a charge to capital account in excess of \$25,000 contracted for or commenced subsequent to December 31, 1917, even though included in the answer to the director general's questionnaire of February 2, 1918, and covered by any general approval of the budget embraced in such answer. Projects contracted for or commenced during January, February, or March should be reported as promptly as practicable and before April 15, 1918. Copy of D. C. E. Form 4 is transmitted herewith and made part hereof.

Fifth. D. C. E. Form 3 and D. C. E. Form 4 should bear separate serial numbers, each beginning with No. 1 and continuing consecutively; and these numbers will represent the record numbers of the Division of Capital Expenditures and the regional director as well as the carrier, and will constitute the reference for all correspondence in connection with the work covered thereby. The information given on these forms should be sufficient to afford an understanding of the general character of the work and the necessity therefor but need not be elaborate or in detail. Where the work was included in the answer to the director's questionnaire of February 2, 1918, reference should be made thereto.

Sixth. A monthly report commencing with the month of January, 1918, should be made on D. C. E. Form 5 of the total authorizations and expenditures to the end of the month, for capital account. The reports should embrace all uncompleted work contracted for or commenced prior to January 1, 1918, and all work subsequently contracted for, commenced or authorized which involves charges to capital account after January 1, 1918. The report should divide the work into

classes in accordance with the classification given on D. C. E. Form 5 and should show the total estimated expenditure; value of salvage recovered from property retired; amount chargeable to operating expenses; amount chargeable to capital account; expenditures prior to January, 1918, chargeable to operating expenses and to capital account respectively; expenditures for the month chargeable to operating expenses and to capital account respectively; and expenditures from January 1, 1918, to the end of the month chargeable to operating expenses and to capital account respectively, in accordance with said D. C. E. Form 5. Reports for the months of January, February, and March, 1918, shall be forwarded promptly before April 30, 1918, reports for subsequent months should be prepared promptly and forwarded before the 25th day of the succeeding month. Copy of said form is transmitted herewith and made part hereof.

Seventh. D. C. E. Forms 1, 1A, 2, and 5 should be prepared in triplicate and two should be sent direct to the Director of the Division of Capital Expenditures at Washington, and the other should be sent to the regional director for the district. D. C. E. Forms 3 and 4 should be prepared in triplicate and be sent to the regional director for the district. The regional director should at once transmit to the Director of the Division of Capital Expenditures the original and one copy, retaining the other copy for his file and information. In case he approves without qualification, he should sign the form accordingly. In case he disapproves, he should transmit with the form a memorandum of his views. One copy of each form will be returned to the carrier through the regional director, who should note on his copy the action taken by the Director of the Division of Capital Expenditures.

Eighth. Each carrier should immediately cause to be printed the blank forms necessary for him to comply herewith, upon a fairly good quality of paper, of sheets of the

exact size and following the style of type and ruling indicated by the sample blank forms transmitted herewith.

Ninth. The accounting methods prescribed by the Interstate Commerce Commission and now in force afford the data required for making the reports herein required and prompt compilation and return in all cases is urged. Uniformity should be maintained, and when in doubt in connection with the use of these blanks, the question should be submitted to the Director of the Division of Capital Expenditures. The classification of work as given on the forms is deemed sufficient for the purposes for which reports are required, but there may be some large and exceptional work which, in the case of some lines, might well be shown separately, and blank numbers are left in the classification for such cases. It is hoped, however, that these cases will be rare.

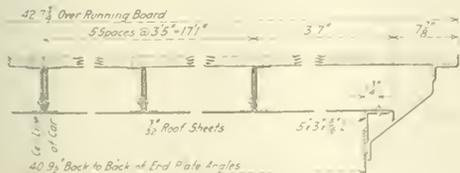
For the purpose of securing uniformity in reporting all work involving a charge to capital account a schedule is prescribed for the use of all roads under federal control. So far as is practicable while maintaining the identity of each separate improvement this conforms to the classification of investment in road and equipment as prescribed by the Interstate Commerce Commission.

In order that the division may be correctly informed of the amount expended by carriers, chargeable to capital account, during the years 1915, 1916 and 1917, carriers are requested to submit a report showing separately for each year the total expenditures for additions and betterments excluding equipment, total expenditures by classes for equipment, total expenditures for construction of new extensions and branches, also new lines, total expenditures chargeable to capital account and miles of road operated at the close of the year. These reports are to be sent both to the regional directors and to the director of the division of capital expenditures.

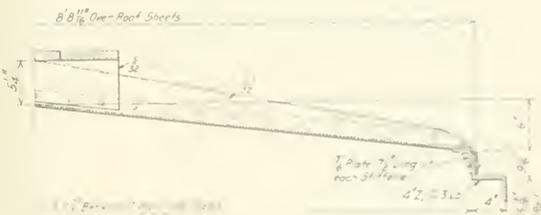
United States Standard Steel Sheathed Box Car

Specifications and Designs Are Similar to Other Box Cars.
Wooden Lining on Sides and Ends

THE RAILROAD ADMINISTRATION issued during the past week specifications and drawings for a 50-ton steel frame, steel sheathed box car having an estimated weight of 40,000 lb. As in other designs, every attempt has been made to have the details of these cars the same as the



Length inside	40 ft. 10 in.
Width inside*	8 ft. 6 in.
Height inside*	9 ft. 0 in.
Length over striking plate*	44 ft. 1 1/2 in.
Length over roof sheets	46 ft. 8 in.
Width over side plates	9 ft. 4 in.
Width over sill	10 ft. 0 in.
Height from rail to top of striking plate	12 ft. 0 in.



One Type of Roof Construction Permitted on the Steel Sheathed Box Car

other standard box cars. The underframe is practically a duplicate of the single sheathed car, several of the door details are the same and the draft sill is the same with the exception of minor changes necessitated by the design of the car. The body specifications are the same as those for the box cars published in the *Railway Age* of March 29, page 785. This car is to be carried on the standard 50-ton truck and has the following general dimensions:



Underframe.—The underframe is very similar to that used for the single sheathed box car, having 12-in. channel

a division pro rata to be made among all coal operators in the district. In the case of two or three non coal producing railroads requiring coal from the same or nearby coal producing centers, for the purpose of efficient and economical handling of trains, the orders for each railroad could be concentrated in certain definite sections so that movement could be by train-load rather than in smaller quantities.

As most railroads consume more coal in winter months than during summer months, shipments should be made during the months of April, May, June and July of not only the requirements for those months, but in addition an amount equal to the storage capacity, for use during the four winter months of November, December, January and February. It should be as much the duty of the railroads to store this coal to provide against extra winter demand, as it should be the duty of the coal operators to load it.

During the months of August, September and October the

current requirements of the railroads should be shipped and the storage left intact. During the months of November, December, January and February the tonnage ordered should be only that required for use during those months, less the coal already stored during the summer months. There should be no difficulty in securing by daily shipment during the month of March the current requirements.

Railroads should be required to repair during the summer months the old and useless (from the standpoint of regular shipments) coal and flat cars, for utilization during the winter months in handling storage coal to such points on the line as necessity requires, thereby releasing serviceable equipment for commercial use at that time.

A plan of this kind would not only bring about great economy in the use of equipment but would do away with the present disastrous condition and most effectively help the labor situation.

Regulations for Reconsignment of Carload Freight

Elaborate Provisions for All Reasonable Demands. Separate Rules for Inspection and for Coal

THE INTERSTATE COMMERCE COMMISSION has given its approval of new rules and charges for the diversion and reconsignment of carload freight proposed by certain carriers in response to the commission's decision in the reconsignment case and has authorized all carriers by rail to establish them, effective on May 1. The approval does not authorize the cancellation of diversion or reconsignment rules applicable to less than carload freight. The rules are as follows:

Application

Freight in carloads, except as provided below may be diverted or reconsigned on this company's lines, subject to the following rules, regulations and charges.

If request is made for the diversion or reconsignment of freight, in carloads, this company will make diligent effort to locate the shipment and effect diversion or reconsignment, but will not be responsible for failure to effect the diversion or reconsignment desired unless such failure is due to the negligence of its employees.

Definition

For the purpose of applying these rules, the term "Diversion" or "Reconsignment" means:

- A change in the name of the consignee.
- A change in the name of the consignor (See Rule 6).
- A change in destination (See Rule 5).
- A change in route at the request of consignor, consignee or owner.
- Any other instructions given by consignor, consignee or owner necessary to effect delivery which requires a change in billing or an additional movement of the car, or both (see Section *f* of Exceptions).

Conditions

The services herein authorized are subject to the following conditions:

- That shipments have not broken bulk.
- Orders for diversion or reconsignment will not be accepted under these rules at or to a station or to a point of delivery against which an embargo is in force.
- On "Straight" consignments the original bill of lading should be surrendered or other proof of ownership established. On shipments consigned "to order" original bill of

lading should be surrendered, or in its absence, satisfactory bond of indemnity executed in lieu thereof, or other approved security given at the time the diversion or reconsignment order is placed.

(d) Request for diversion or reconsignment must be made or confirmed in writing.

(e) *Prepayment or guarantee of charges.* All charges accruing under these rules must be paid or guaranteed to the satisfaction of the carrier by the person or persons requesting the diversion or reconsignment or reforwarding before shipments are forwarded.

Exceptions

These rules will not apply to:

- Ex-lake grain from lake ports or ex-lake rates. (For Central Freight and Trunk Line Associations' roads only.)
 - Grain, hay, straw or grass and field seeds held or stopped for official inspection. (General Diversion or Reconsignment Rules will be applied by Southern roads.)
 - Fresh or green fruits; fresh or green vegetables (including potatoes and onions); fresh berries and melons.
 - Coal and coke (not including petroleum coke) (General Diversion or Reconsignment Rules will be applied by Southern and Southwestern roads on Coal and Coke.)
- No charge will be made:*

(e) For a single diversion or reconsignment if order for such diversion or reconsignment is received at initial billing point before car leaves the yard at such initial billing point, provided the change involves no extra movement of the car.

(f) Where a car is placed for delivery at destination, and an order for the delivery of the contents thereof to other than the billed consignee is or has been presented to and accepted by the agent of this company at destination, and no change is involved in billing records, nor additional movement of car required.

(g) Where a change in route is made necessary by embargo placed against the billed destination or route there subsequent to acceptance of the shipment by carrier at point of origin.

Rules and Charges

Rule 1. Transfers and waybills covering shipments which have been diverted or reconsigned under these rules, should bear separate notation stating where and when the diversion

or reconsignment was effected, and charges if any were made.

Rule 2. Freight rate applicable: These rules and charges, will apply whether shipments are handled at local rates, joint rates, or combination of intermediate rates. The through rate to be applied under these rules is the rate from point of origin via the diversion, reconsigning or reforwarding point to final destination in effect on date of shipment from point of origin. If the rate from original point of shipment to final destination is not applicable through the point at which the car is diverted, reconsigned or reforwarded, in connection with this line, the Tariff rates in effect to and from the diversion, reconsigning or reforwarding point will apply, plus diversion or reconsigning charges.

Rule 3. Demurrage and track storage rules. Freight stopped, diverted, reconsigned or reforwarded under these rules will in addition be subject to demurrage and track storage charges lawfully in effect at point where stopping, diversion, reconsignment or reforwarding is accomplished.

Rule 4. (a) Application: The rules published herein, governing the diversion or reconsignment of freight, are applicable while the freight is in possession of this company also when it has reached billed destination on this line and has been delivered to switching road for placement.

(b) **Switching charges additional:** If diversion or reconsignment is made after arrival of car at billed destination and the car has been delivered to a connecting road, the switching charges of connecting road will be in addition to any other charge named herein.

(c) **Diversions or reconsignments beyond rails of this company:** When diversion or reconsignment is requested after shipment has passed out of possession of this company, or when request is received too late for this company to effect the change desired, such request will be transmitted to direct connecting carrier to which shipment was delivered, when the responsibility of this company will end; and the shipment will be subject to rules of the carrier on whose rails the diversion or reconsignment is accomplished (Except as per section *a* of this rule).

Rule 5. (a) Only one change in destination will be permitted by this company under these rules, except as provided in section *b*, and then only provided the car has not had a previous change in destination after leaving the initial billing point.

(b) If the consignor, consignee or owner requests a subsequent change necessitating movement of the car, the shipment will be treated as a reshipment from point of reforwarding and will be charged at the tariff rate therefrom, plus \$5 per car.

(c) If a car is stopped short of billed destination after it has had one diversion or reconsignment under these rules, charges will be made on basis of the tariff rates to and from the point at which the first diversion or reconsignment was accomplished plus five dollars (\$5) per car in addition to the other diversion or reconsignment charges previously accrued.

Rule 6. Change in name of consignor. The charge for a change in the name of consignor with no further change in billing instructions, will be \$1 per car, except as provided in Exceptions paragraph *e*.

Rule 7. Diversion or reconsignment in transit: If a car is diverted or reconsigned in transit prior to arrival at original destination, or if the original destination is served by a terminal yard, then prior to arrival at such terminal yard, a charge of \$2 per car will be made for such service.

Rule 8. Stopping in transit: If a car is stopped for orders for the purpose of delivery or diversion or reconsignment or reforwarding prior to the arrival at original billed destination, or if such destination is served by a terminal yard, then prior to arrival at such terminal yard, on request of consignor, consignee or owner, a charge of \$2 per car will be made for such service and the point where the

car is stopped will be considered the destination of the freight. If the car is subsequently forwarded from point at which held, the Provisions of Rules 9, 10, 11 or 12, as the case may be, will also be applied. The service of stopping as provided in this rule will not prevent one change of destination under the provisions of section *c* of Rule 5.

Rule 9. Changed at destination on orders given before arrival: If order for diversion or reconsignment is placed with local freight agent at billed destination or other designated officer, in time to permit instructions being given to yard employees prior to arrival at such billed destination, or if the original destination is served by a terminal yard, then prior to arrival at such terminal yard, a charge of \$2 per car will be made for such service.

Rule 10. Diversion or reconsignment to points outside switching limits before placement: If a car is diverted, reconsigned or reforwarded on orders placed with local freight agent or other designated officer after arrival of car at original destination, but before placement for unloading, or if the original destination is served by a terminal yard, then after arrival at such terminal yard, a charge of \$5 per car will be made if car is diverted reconsigned or reforwarded to a point outside of switching limits of original destination.

Rule 11. Diversion or reconsignment to points within switching limits before placement: A single change in the name of consignee at destination and (or) a single change in or a single addition to the destination of his place of delivery at destination will be allowed:

(a) without charge, if order is received in time to permit instructions to be given yard employees prior to arrival of car at destination, or if the destination is served by a terminal yard, then prior to arrival at such terminal yard.

(b) At a charge of \$2 per car if such orders are received in time to permit instructions to be given to yard employees within twenty-four (24) hours after arrival of car at destination, or if the destination is served by a terminal yard, then within twenty-four (24) hours after arrival at such terminal yard. (See Note).

(c) At a charge of \$5 per car if such orders are received subsequent to twenty-four (24) hours after arrival of the car at destination, or if the destination is served by a terminal yard, then subsequent to twenty-four (24) hours after arrival at such terminal yard.*

Rule 12. Diversion or reconsignment to points outside switching limits after placement: If a car has been placed for unloading at original billed destination and reforwarded therefrom without being unloaded, to a point outside of the switching limits, it will be subject to the published rates to and from the point of reconsignment, plus five dollars (\$5) per car reconsignment charge, except that in no case shall the total charge be less than the charge based on the through rate from point of origin to final destination, plus \$5 per car reconsignment charge.

Rule 13. Diversion or reconsignment to points within switching limits after placement: Cars that have been placed for unloading and which are subsequently reforwarded without being unloaded, to a point within the switching limits of the billed destination will not be subject to diversion or reconsignment charge, but will be subject to the switching or local rate in addition to the rate from point of origin to billed destination.

Rules and charges governing grain, seed (field), seed (grass), hay or straw, carloads, held in cars on track for inspection and disposition orders incident thereto at billed destination or at point intermediate thereto.

Grain, seed (field), seed (grass), hay or straw, carloads, may be held in cars on track for the privilege of National, State, Board of Trade or other official inspection and disposition orders incident thereto at billed destination or at a

*In computing time, Sundays and legal holidays (national, state and municipal) will be excluded. (When a legal holiday falls on Sunday the following Monday will be excluded.)

point intermediate thereto, subject to the following rules and charges. These charges shall be made in addition to demurrage, track, storage and other lawful charges, and shall accrue to the road performing the service and be noted on the waybill.

The term grain as used herein includes corn, barley, oats, rye, wheat, buckwheat, popcorn, grain screenings and seed screenings.

(Note.—The Southern Roads will apply the general diversion and reconsignment rules on commodities, specified above, diverted or reconsigned on their rails, at and south of the Ohio river and Potomac Yards).

RULES **CHARGE (See Note 1).**

Rule 1. When disposition order is received prior to expiration of twenty-four (24) hours after first 7:00 a. m. after arrival,

\$2 per car.

Rule 2. If disposition order is received subsequent to the period prescribed in Rule 1, but within seventy-two (72) hours after first 7:00 a. m. after arrival,

\$2 per car for the first 24 hours plus a charge of \$1 per car for each additional 24 hours or fraction thereof.

Rule 3. If disposition order is not received within the seventy-two (72) hour period prescribed in Rule 2,

\$5 per car.

Note 1.—If delivery is taken and car is unloaded from track where inspected the above charges named in Rules 1, 2 and 3 will not apply.

Rule 4. In computing time, Sundays and legal holidays (national, state and municipal) will be excluded. When a legal holiday falls on a Sunday, the following Monday will be excluded.

Rule 5. For the purpose of disposing of car after it has been officially inspected the disposition order received after official inspection will be considered as being in lieu of consignment instructions under which car arrived at official inspection point.

Rule 6. If grain, hay, straw, field seed or grass seed, c. l. is held on track except for official inspection the general diversion and reconsignment rules published in I. C. C. No. — or subsequent issue, will apply.

Rules and charges governing the diversion or reconsignment of coal and coke.

(To govern in the territory north of the Ohio and Potomac rivers and east of the Mississippi, including Kentucky, West Virginia and Virginia).

Application

Coal, except Lake Cargo and Tidewater Coal, Boulets or Briquets, or Coke (except Petroleum Coke) in carloads, may be diverted or reconsigned on this Company's lines, subject to the following rules, regulations and charges.

If request is made for diversion or reconsignment this company will make diligent effort to locate the shipment and effect diversion or reconsignment, but will not be responsible for failure to effect the diversion or reconsignment desired unless such failure is due to the negligence of its employees.

Definition

For the purpose of applying these rules, the term "Diversion" or "Reconsignment" means:

- (a) A change in the name of the consignee.
- (b) A change in the name of consignor (See Rule 6).
- (c) A change in destination (See Rule 5).
- (d) A change in route at the request of consignor, consignee or owner.

(e) Any other instructions given by consignor, consignee, or owner necessary to effect delivery which requires a change in billing or an additional movement of the car, or both (See section *b* of exceptions.)

Conditions

(a) Orders for reconsignments or diversion will not be accepted under these rules at or to a station or to a point of delivery against which an embargo is in force.

(b) Request for diversion or reconsignment must be made or confirmed in writing, and be accompanied by satisfactory evidence of ownership.

(c) *Prepayment or guarantee of charges:* All charges accruing under these rules must be paid or guaranteed to the satisfaction of the carrier by the person or persons requesting the diversion or reconsignment or reforwarding before shipments are forwarded.

Exceptions

No charge will be made:

(a) For a single diversion or reconsignment if order for such diversion or reconsignment is received at initial billing point before car leaves the yard at such initial billing point, provided the change involves no extra movement of the car.

(b) Where a car is placed for delivery at destination, and an order for the delivery of the contents thereof to other than the billed consignee is or has been presented to and accepted by the agent of this company at destination, and no change is involved in billing records, nor additional movement of car required.

(c) Where a change in route is made necessary by embargo placed against the billed destination or route thereto subsequent to acceptance of the shipment by carrier at point of origin.

Rules and Charges

Rule 1. Transfers and waybills covering shipments which have been diverted or reconsigned under these rules, should bear separate notation stating where and when the diversion or reconsignment was effected, and charges if any were made.

Rule 2. Freight rate applicable: These rules and charges will apply whether shipments are handled at local rates, joint rates, or combination of intermediate rates. The through rate to be applied under these rules is the rate from point of origin via the diversion, reconsigning, or reforwarding point to final destination in effect on date of shipment from point of origin. If the rate from original point of shipment to final destination is not applicable through the point at which the car is diverted, reconsigned or reforwarded, in connection with this line, the Tariff rates in effect to and from the diversion reconsigning or reforwarding point will apply, plus diversion or reconsigning charges.

Rule 3. Demurrage and track storage rules: Shipments stopped, diverted, reconsigned or reforwarded under these rules will in addition be subject to demurrage and track storage charges lawfully in effect at point where stopping, diversion, reconsignment or reforwarding is accomplished.

Rule 4. (a) Application The rules published herein are applicable while the shipment is in possession of this company also when it has reached billed destination on this line and has been delivered to switching road for placement.

(b) *Switching charges additional:* If diversion or reconsignment is made after arrival of car at billed destination and the car has been delivered to a connecting road, all switching charges of connecting road will be in addition to any other charge named herein.

(c) *Diversions or reconsignments beyond rails of this company:* When shipment has been delivered to connecting line before diversion or reconsignment can be accomplished, request to divert or reconsign should be made direct to such connecting line, except as provided in section *a* of this rule.

Rule 5. (a) Only one change in destination will be

permitted under these rules by this company, except as provided in section *b*, and then only provided the car has not had a previous change in destination after leaving the initial billing point.

(b) If the consignor, consignee or owner requests a subsequent change necessitating movement of the car, the shipment will be treated as a reshipment from point of reforwarding, and will be charged at the tariff rate therefrom, plus \$5 per car.

(c) If a car is stopped short of billed destination after it has had one diversion or reconsignment under these rules, charges will be made on basis of the tariff rates to and from the points at which the first diversion or reconsignment was accomplished plus five dollars (\$5) per car in addition to the other diversion or reconsignments charges previously accrued.

Rule 6. Change in name of consignor: The charge for a change in the name of consignor with no further change in billing instructions, will be \$1.00 per car, except as provided in section *a* of Exceptions.

Rule 7. Diversion or reconsignment in transit: If a car is diverted or reconsigned in transit prior to arrival at original destination, or if the original destination is served by a terminal yard, then prior to arrival at such terminal yard, a charge of \$2.00 per car will be made for the service.

Rule 8. Stopping in transit: If a car is stopped for orders for the purpose of delivery or reconsignment or diversion or reforwarding prior to the arrival at original billed destination, or if such destination is served by a terminal yard, then prior to arrival at such terminal yard, on request of consignor, consignee or owner, a charge of \$2.00 per car will be made for such service and the point where the car is stopped will be considered the destination of the freight. If the car is subsequently forwarded from point at which held, the provisions of Rules 9, 10, 11 or 12, as the case may be, will also be applied. The service of stopping as provided in this rule will not prevent one change of destination under the provisions of section *c* of Rule 5.

Rule 9. Changed at destination on orders given before arrival: If order for diversion or reconsignment is placed with local freight agent at billed destination, or other designated officer, in time to permit instructions being given the yard employees prior to arrival at such billed destination, or if the original destination is served by a terminal yard, then prior to arrival at such terminal yard, a charge of \$2.00 per car will be made for such service.

Rule 10. Diversion or reconsignment to points outside switching limits before placement: If a car is diverted, reconsigned or reforwarded on orders placed with local freight agent or other designated officer after arrival of car at original destination, but before placement for unloading, or if the original destination is served by a terminal yard, then after arrival at such terminal yard, a charge of \$5.00 per

car will be made if car is diverted, reconsigned or reforwarded to a point outside of switching limits of original destination.

Rule 11. Diversion or reconsignment to points within switching limits before placement: A single change in the name of consignee at destination and (or) a single change in or a single addition to the designation of his place of delivery at destination will be allowed:

(a) Without charge, if order is received in time to permit instructions to be given yard employees prior to arrival of car at destination, or if the destination is served by a terminal yard, then prior to arrival at such terminal yard.

(b) At a charge of \$2.00 per car if such orders are received in time to permit instructions to be given to yard employees within twenty-four (24) hours after arrival of car at destination, or if the destination is served by a terminal yard, then within twenty-four (24) hours after arrival at such terminal yard.

Except that on shipments of coal originally consigned to accredited terminal coal pool associations and ordered delivered to final consignee within twenty-four (24) hours after arrival of car at terminal yard, there will be no charge.

(To be published only by roads reaching such pool points.)

(c) A charge of \$5.00 per car if such orders are received subsequent to twenty-four (24) hours after arrival of the car at destination, or if the destination is served by a terminal yard, then subsequent to twenty-four (24) hours after arrival at such terminal yard.

Note.—In computing time, Sundays and legal holidays, (national, state and municipal) will be excluded. When a holiday falls on Sunday, the following Monday will be excluded.

Rule 12. Diversion or reconsignment to points outside switching limits after placement: If a car has been placed for unloading at original destination and forwarded therefrom without being unloaded to a point outside of the switching limits, it will be subject to the published rates to and from the point of reshipment, plus five dollars (\$5.00) per car reconsignment charge, except that in no case shall the total charge be less than the charge based on the through rate from point of origin to final destination, plus \$5.00 per car reconsignment charge.

Rule 13. Diversion or reconsignment to points within switching limits after placement: Cars that have been placed for unloading and which are subsequently reforwarded without being unloaded to a point within the switching limits of the billed destination will not be subject to diversion or reconsignment charge, but will be subject to the switching or local rate in addition to the rate from point of origin to billed destination.

Note.—Where no switching tariff is in effect, the charge will be ten cents a ton of 2,000 pounds, minimum five dollars a car.



Photograph from Underwood & Underwood, N. Y.

A British Working Party on a Light Railway

General News Department

The station of the Southern Railway at Sheffield, Ala. was destroyed by fire on the night of April 6. Estimated loss \$50,000. Two men suspected of setting the fire have been arrested.

Express companies, it is understood, are negotiating with the government on a plan by which instead of being taken over they will be allowed to consolidate and enter into a contract with the government.

Garland P. Robinson, assistant chief inspector of locomotives for the Interstate Commerce Commission has been appointed assistant manager of the locomotive section of the Railroad Administration.

The Interstate Commerce Commission has announced that it will make an investigation to determine the proper limits of the first, second, third and fourth zones of standard time created by the Daylight Saving law.

The Minneapolis, St. Paul & Sault Ste. Marie offers land free to persons who desire to cultivate it—more than 50,000 acres in small parcels—along its lines. Applications from employees will receive first consideration.

The ten women train auditors who have been working on the trains of the St. Louis-San Francisco during the past six months are said to have found the work too hard, and the company intends to set them at work in some other department.

Employees of the Chesapeake & Ohio have given to the Red Cross two army ambulances to be sent to France. The money for this gift, about \$3,600, was contributed at various points on the company's lines all the way from Old Point Comfort to Chicago.

The senate committee on territories has announced that it will hold hearings on charges of mis-management in the affairs of the Alaska Railroad before taking action on the nomination of Thomas Riggs, Jr., a member of the Alaskan Engineering Commission, as governor of Alaska.

The Ann Arbor Railroad announces that it will resume carry service between Frankfort, Mich., and Menominee, Mich., and Marinette, Wis., on April 15. Connecting lines are requested to supplement their tariffs immediately as provided for by Rule 12, L. C. C. Tariff Circular No. 18A.

A. H. Smith, regional director, has issued an order to the presidents of the eastern railroads calling for advice as to the amount of their payments in 1917 for subscriptions to magazines and periodicals for distribution to officers and employees, showing the names of the publications, to whom furnished, and total cost.

At the request of the director general, the Interstate Commerce Commission has addressed a circular to the presidents of Class 1 carriers, asking them to furnish promptly information as to the deposit balances and cash on hand as of March 31, together with the amount of interest and dividend maturities on April 1 which were to be paid out of the balances reported as of March 31.

The railroad engineers in France are to be armed. In recognition of the excellent showing made by American railroad engineer troops in the battle of Cambrai and in recent engagements in Picardy, the War department has announced that special and auxiliary units of the army hereafter are to be armed. The railroad engineer units will be provided with rifles on the basis of 20 per cent of their enlisted personnel.

At Brunswick, Ga., the three principal railroads have consolidated both passenger and freight stations. The large freight houses of the Southern Railway are to be abandoned. The freight station of the Atlantic Coast Line will be used exclusively for outbound freight, and that of the Atlanta,

Birmingham & Atlantic for inbound. The three roads will use the passenger station of the Atlantic Coast Line, and that of the Atlanta, Birmingham & Atlantic will be abandoned. T. J. Wright, general agent of the Atlantic Coast Line has been appointed general agent of all three lines. A similar consolidation has been made at Waycross, Ga.

Representative Esch, of Wisconsin, has introduced in Congress a bill, H. R. 11243, to amend section 5 of the interstate commerce act, (the Panama Canal act), in accordance with the recommendations made by the Interstate Commerce Commission in its annual report, to authorize the Commission to permit continuance of the railroad ownership, control or operation of water lines when the commission finds that the discontinuance of such service will be of substantial disadvantage to the convenience and commerce of the people and localities affected. As the law now stands the commission, before authorizing the continuance of such control, must find that it will not reduce competition.

A fine of \$8,420 was ordered by a jury in the county court at Lexington, Ky., April 4, as a penalty to be paid by the Louisville & Nashville Railroad for maintaining a common nuisance; this was the result of a trial of the road for allowing its trains to be run through the town of Shepherdsville at uncontrollable speed. It appears that there is no statute under which a satisfactory prosecution of the road could be made, and this suit was brought under common law procedure. The case against Engineman Wolfenberger, who was the runner of the express train which caused the Shepherdsville collision, was continued until the August term of the court, as some of the witnesses could not be brought into court at this time. The charge against Wolfenberger is involuntary man slaughter. The suit against the road was heard before Judge McCandless, and a motion for a new trial has been made. Acting on instructions by the judge, the jury dismissed the indictments against officers of the company.

Purchases of bituminous coal for the railroads, according to an announcement made at Washington this week, are to be managed exclusively through the office of the director general, at Washington, in co-operation with the Fuel Administration and with Bernard Baruch, chairman of the War Industries Board. How soon action will be taken is a question which, however, is left in the dark, as a difference of opinion is said to have arisen as to what prices should be paid. It is understood that when, recently, a number of railroads endeavored to renew their coal contracts at prices lower than those now prescribed by the government, Dr. Garfield took the position that the regular government prices should be paid. John Skelton Williams, director of purchases for the Railroad Administration, is said to have asked the coal operators to make new contracts with the railroads on the basis of about ten cents a ton above the cost of production.

Western Railway Club Meeting

At the monthly meeting of the Western Railway Club, which will be held at the Hotel Sherman, Chicago, on April 15, C. A. Greenough of the Baldwin Locomotive Works will present a paper on "Economy in Maintenance and Operation of Locomotives."

New York "Return-Loads Bureau"

The Merchants' Association of New York city is to establish a bureau for the benefit of long distance automobile truckmen and the merchants and manufacturers for whom they carry freight. Following the example which has been successfully carried out at Hartford and some other places, the bureau will provide telephone facilities so that a truckman bringing a load to New York can, with the least loss of time,

learn where he can find a load back to his starting point. The bureau will be simply a means of communication; it will have nothing to do with prices for transportation, and will not be liable either to truck owners or to merchants for safety of goods, insurance or anything else.

Car 302

The headquarters of the government railroad administration for the next couple of weeks will be in Car No. 302, in which Director General McAduo is touring the country speaking on behalf of the Third Liberty Loan. Mr. McAduo will be kept in constant touch by wire with the general headquarters in Washington, the car being fitted up as an office.

Webb Bill Passed

The Webb export trade bill, permitting American exporters to form combinations for the purpose of extending their foreign commerce, has finally been passed by both house of Congress and was sent to the President on April 5. Export associations are made subject to the supervision of the Federal Trade Commission, which is given power to prosecute those guilty of unfair practices.

\$2,500,000 in First Three Days

Although the Liberty Loan campaign inaugurated by the western regional directors' committee was not yet in full swing, in the first three days of the campaign seven roads reported subscriptions for \$2,500,000, or an average of 85 dollars per employee. There are approximately 800,000 railroad employees in the western regional district. If this subscription average keeps up, the total for the western lines should reach close to \$70,000,000.

Conferences on Railroad Compensation

The proposed standard form of contract for the compensation to be paid by the government to the railways is still the subject of numerous conferences between the lawyers representing the railroad companies and the representatives of the legal department of the Railroad Administration. Last week the conferences were on the proposed draft submitted by the railroad counsel. Beginning on Monday conferences have been held on another draft by Nathan Matthews, assistant to John Barton Payne, general counsel of the Railroad Administration.

Railroad Administration Safety First Section

H. W. Belnap, manager of the safety section, is perfecting his organization to supervise, correlate and organize the safety first work on all railroads utilizing the organizations already in existence and calling on safety officers of various railroads to cooperate in a consulting capacity. Rufus F. Jarnigan, assistant to the general safety agent of the New York Central; C. M. Anderson, safety superintendent of the Nashville, Chattanooga & St. Louis, and Harry J. Bell, safety inspector of the Chicago & Northwestern, have been appointed supervisors of safety for eastern, southern and western regions. A questionnaire has been sent to all railroads to ascertain the extent of safety first work, and reports sent in by the roads are being studied. The principal safety first officers recently were called to Washington and held an all-day conference with Mr. Belnap.

Questionnaire on Equipment Construction and Repair

At the request of the Director General of Railroads the Interstate Commerce Commission has addressed to the railroads a questionnaire asking for complete detailed information relating to repairs to and construction of equipment. Roads are asked to report whether their present shop facilities permit, in addition to properly making all necessary repairs to the present equipment, the construction of new locomotives, freight cars and passenger cars, whether they own or operate under subsidiary companies shops at which locomotives or cars are built or repaired, together with the normal monthly capacity of such shops and the period for which the capacity is engaged on work now in hand or authorized. Information is also desired as to whether it has

been the practice to build any portion of the new equipment necessary to replace destroyed or retired locomotives or cars, the present monthly capacity of the shops for the construction of new equipment by classes, whether all necessary current repairs are made at company shops or by other railroads or at other than railroad shops. If such repairs have been made by other railroads during the past three years information is desired as to the terms under which the work was done. If they have been made by contractors information is requested as to the names of the contractors, the amount of work done and the detailed costs. If the repairs have been performed under express contracts complete information is asked regarding the contracts and in addition relating to prices of materials, labor costs, supervision of work performed, etc., which affect the aggregate costs of the work and will enable a comparison to be made with ordinary railroad shop operations, for the purpose of indicating economy on such repair work. Information is also asked as to repairs made at company shops for other railroads.

Government Investigating Railroad Insurance

Possibilities that the government may take over the business of insuring railroad property are seen in Circular No. 21, issued on April 8, by the Director General of Railroads, calling for information, covering the past three years, as to the general practice followed in the matter of insurance against loss or damage by fire both to railroad property and to other property in railroad custody. Pending a decision on this question, carriers are ordered not to negotiate any contracts of fire insurance covering a longer period than has heretofore been customary, nor in any event covering a period of more than one year, without special authority.

Extensive Use of Borrowed Locomotives

The following table while not strictly up-to-date will give some idea of the extent to which the railways are using other than their own locomotives:

Name of road	Number of Locomotives borrowed from other roads	U. S. A. Locomotives	Name of road	Number of Locomotives borrowed from other roads	U. S. A. Locomotives
B. & O.	38	..	T. & O.	22	..
B. & A.	12	..	Virginian	4	10
C. R. R. of N. J.	17	11	W. & L. E.	11	..
C. & O.	6	7	Hocking Valley	..	10
C. C. & St. L.	6	5	A. C. L.	..	2
D. & H.	3	..	Mobile & Ohio	2	..
Erie	27	25	N. C. & St. L.	3	..
G. R. & I.	2	..	S. A. L.	1	10
Grand Trunk	3	..	Southern	3	10
I. E. & W.	3	..	C. & E. L.	18	..
Long Island	3	..	C. M. & St. Paul	5	..
Mich. Cent.	2	..	C. R. I. & P.	5	..
N. Y. C. Lines	2	..	E. J. & E.	6	..
N. Y. N. H. & H.	3	..	St. L. & S. F.	1	10
N. & W.	12	15	St. L. S. W.	2	..
Penn. Lines West	64	11	S. P.-P. Sys.	11	..
Penn. R. R.	35	28	Tex. & Pac.	3	..
P. & R.	1	45	Union Pacific	5	..
P. & L. E.	12	..			
			Totals	359	199

North Western's Contributions to Men Abroad

In a recent announcement to all officers and employees of the Chicago & North Western, R. H. Aishton, president, states that total contributions to the Christmas fund for the men of Company E, Thirteenth Engineers, made up of former North Western employees, amounted to \$3,165. The cost of the Christmas presents forwarded to the men totaled \$1,247. At the suggestion of the commanding officer of the company \$1,005 additional was remitted to his credit to be used in buying extra kitchen equipment and to supplement the company mess. A more recent letter from him advises that a ballot has been taken of the men in the company and that a large majority voted favorably on the proposition that the balance of the money be placed to the credit of "Company Fund, Company E, Thirteenth Engineers, order of the Commanding Officer, and used to supplement the mess and in purchasing things not furnished by the Government." In accord with that request the balance of the fund amounting to \$2,913 has been remitted to the men. In conclusion, Mr. Aishton says, "I have received word as to the receipt of the articles sent them (Company E) at Christmas, ex-

pressing the great pleasure and comfort afforded to them by this Christmas remembrance, and I take pleasure in extending to every subscriber of this fund on behalf of the men of Company E, thanks and appreciation."

New Quarters for the Railroad Administration

The United States Railroad Administration expects to have more commodious office quarters by the fall of this year. The government has bought the Arlington building in Washington, now under construction at the corner of H street and Vermont avenue, which will be used for the offices of a number of departments affiliated with the Treasury Department, and a considerable portion of the space is to be used by the Railroad Administration. Director General McAdoo and his staff are now located temporarily in the Interstate Commerce Commission building, but the space available is insufficient for the rapidly growing organization. In his letter to the President, recommending the purchase of the building, Mr. McAdoo said that the administration is seriously hampered even now for want of space and that this condition will grow more acute each day.

Regulation of Damage Suits Against Railroads

Director General McAdoo has issued an order designed to put a stop to the practice, so frequently resorted to by damage suit lawyers, of bringing suits against carriers in distant places. The order sets forth that the railroad control law provides (Section 10) "That carriers while under federal control shall be subject to all laws and liabilities as common carriers, whether arising under State or federal laws or at common law, except in so far as may be inconsistent with the provisions of this act or with any order of the President. . . . But no process, mesne or final, shall be levied against any property under such federal control"; and continues:

"Whereas it appears that suits against the carriers for personal injuries and freight and damage claims, are being brought in States and jurisdictions remote from the place where plaintiffs reside or where the cause of action arose; the effect thereof being that men operating the trains engaged in hauling war materials, troops, munitions, or supplies, are required to leave their trains and attend court as witnesses, and travel sometimes for hundreds of miles from their work, necessitating absence from their trains for days and sometimes for a week or more; which practice is highly prejudicial to the just interests of the government and seriously interferes with the physical operation of the railroads; and the practice of suing in remote jurisdictions is not necessary for the protection of the rights or the just interests of plaintiffs—

"It is therefore ordered, That all suits against carriers while under federal control must be brought in the county or district where the plaintiff resides, or in the county or district where the cause of action arose."

Circular on Relations with Labor

Director General McAdoo has issued the following circular to all railroads:

"My attention has been called to a report in reference to my General Order No. 8, in which it is stated that many officials of the railroads are filing strong protests with the Director General of Railroads because of the position he has taken in Official Order No. 8.

"It is only just that I should say that I have not received any protests from railroad officials because of Order No. 8.

"I feel that it is most important in this new era of railroad-ing in America that railroad officials and railroad employees shall not live any longer in an atmosphere of suspicion and distrust. I earnestly desire to see them brought together upon a plane of mutual understanding and helpfulness because I believe that it is to the interest of both that this shall be accomplished and because I know that it will promote the efficient and safe operation of the railroads, and, more than all, that it will help the country immeasurably in this time of national peril. In my Order No. 8 I emphasized my desire that the old enmities of the past should be obliterated and that the common peril now confronting America should make friends and comrades of us all.

"I deeply appreciate the assurances of loyalty and patriotic

support I have been receiving from railroad employees connected with all kinds of railroad work since the government took possession and control of the railroads. With the spirit of high purpose animating us all, from the humblest to the highest, I know that we can do a mighty work for America, and that we can win this war for liberty and democracy.

"Please bulletin this circular."

States Asked to Tax Roads Lightly

Director General McAdoo has addressed a letter to the governors of all the states, asking them to see that the tax burden on the railroads be made as light as consistent with the necessities of the states and their sub-divisions. He also made a plea for economy in state and local public expenditures requiring new capital. An effort was made to secure a provision in the railroad control bill prohibiting an increase of taxation during the period of federal control, but it was defeated in Congress. "Heretofore," wrote the director general, "railroad taxes have been paid entirely by the private owners of the railroads, but now these taxes will be paid by the government. * * * Manifestly in such circumstances the imposition of unnecessary state and local taxation on the railroads will be a distinct impediment to the carrying on of the war and an added burden upon the government."

Asks L. & N. Men to Be Good Soldiers

In an open letter to officers and employees of the Louisville & Nashville under date of March 29, Milton H. Smith, president, points to the importance of the railroads as carriers of troops and supplies during the war, and urges every employee to serve the government as loyally and as efficiently as he did the company under former conditions. The letter reads in part as follows:

"The property of this company will belong to the government as lessee . . . and every dollar now received or expended is the government's money. But with the property there passed as an asset of equal value the efficiency of an army of trained railroad men. Accordingly, the old organization of our company—its officials and employees—now constitutes a governmental agency engaged for the time being in the operation of this particular railroad system, but entirely subject to the supervision and direction of the director general or his duly constituted representatives.

"Necessarily, things will not be as they were. Mistakes, too, may occur as heretofore; but let there be no adverse criticism or disloyal spirit. If you have any suggestion which, in your opinion, will improve the service, tell it to your superior officer, who will report it to this department. If meritorious it will be brought to the attention of the regional director. The government will doubtless effect combinations of positions and adopt other methods of consolidation and retrenchment, which may necessitate dispensing with the services of some persons now in the company's employ. Regrettable as this would be, it should be accepted as one of the exigencies of the war, for the winning of which each one of us must make whatever sacrifice is required.

"My chief pride in administering the affairs of this company in the past has been the splendid loyalty and efficiency of its officials and employees. It is still my earnest desire that, in this new relation, you maintain these distinctive characteristics to the highest degree. . . . The one great necessity that stands out pre-eminent above all others at this time is an adequate transportation system. In undertaking itself to supply this the government has entered upon a huge experiment, the success of which is of vital importance. It must succeed, but it can do so only by the complete operation, absolute loyalty and devoted service of you and men like you."

"Exceptional Fictional Instruction"

The railway folder go: The director of railways has ordered that "folders must be purely informative and contain no advertising of luxurious trains, claims of superior service or extraneous matter of any description." Thus another of the works of peace feels the blight of the war. The railway folder was a characteristic and highly developed expression of American literary genius. It was in the best sense educational as well. Many persons learned most of what they knew of American geography from a rapid perusal of railers while traveling or waiting for trains. And it was possible from a judicious selection of them to gain a liberal education in pictorial art and literature and American history as well as exceptional fictional instruction. It is to be hoped that their educational uses will save them from complete denaturing. Railway folders have contributed too much to the gaiety of travel and the increase of popular intelligence to be sacrificed to anything but the most urgent of economies.—*New York World*.

Dictator General on Relations with Labor

Director General McAdoo has given out the following letter written by him on April 2 to President Wharton of the Railway Employees Department of the American Federation of Labor:

"My attention has been called to a circular sent out by you in which it is stated that it has come to our knowledge that many officials of the railroads are filing strong protests with the director general of railroads because of the position he has taken in Official Order No. 8.

"It is only just that I should tell you that I have not received a single protest from any railroad official because of Order No. 8. I should be glad if you would let your membership know that this is true.

"I feel that it is most important in this new era of 'railroading' in America that railroad officials and railroad employees shall not live any longer in an atmosphere of suspicion and distrust. I earnestly desire to see them brought together upon a plane of mutual understanding and helpfulness, because I believe that it is to the interest of both that this shall be accomplished and because I know that it will promote the efficient and safe operation of the railroads, and, more than all, that it will help the country immeasurably in this time of national peril. You will recall that in my Order No. 8 I emphasized my desire that the old enmities of the past should be obliterated and that the common peril now confronting America should make friends and comrades of us all.

"I need not tell you how deeply I appreciate the assurances of loyalty and patriotic support I have been receiving from railroad employees connected with all kinds of railroad work since the government took possession and control of the railroads. With the spirit of high purpose animating us all, from the humblest to the highest, I know that we can do a mighty work for America, and that we can win this war for liberty and democracy.

"Will you now be good enough to circulate this letter among all the members of your organization? I shall also direct the officers of the railroads to put it on the bulletin boards of their respective systems."

The I. C. C. and the Overman Bill

Possibility of the exercise by the President of the powers conferred by the Overman bill to destroy the Interstate Commerce Commission was discussed in the Senate during the debate on the bill on April 3 and 4. The bill would authorize the President to co-ordinate or consolidate executive bureaus, agencies and offices in the interest of economy in the more efficient concentration of the government by making a redistribution of their functions. Provision is made that the act shall remain in force only during the continuance of the war and for a year after its termination. Senator Cummins declared that under this bill the President could transfer all the powers and functions of the Interstate Commerce Commission to the Federal Reserve Board or the Federal Trade Commission, or to any officer, agency or department of the government; and that he might transfer the functions of the Interstate Commerce Commission in the valuation of railroad property to any person he might select for that purpose. It was intimated during the debate that since the Interstate Commerce Commission by the provisions of the railroad control law was specifically given final authority in rate-making matters, the President might desire to have the power over the commission which the bill would provide. Senator Cummins had introduced an amendment to confine the possible reorganization under the bill to the executive departments, with the exception of the department of justice, but it had been voted down in the committee, as had an amendment proposed by Senator Reed of Missouri, specifically excluding the Interstate Commerce Commission. Senator Overman, who defended the bill, insisted it was necessary to give the President the power to take such action as necessary during the war, although he would not say that it would be necessary for the purposes of the war to interfere with the Interstate Commerce Commission. He declared that in the railroad bill Congress has given the President much greater powers than it is proposed to give him in this bill, but so far as the valuation is concerned, he said that \$12,000,000 had been wasted. Senator Reed insisted that no reason had been offered for granting

the President the power to transfer the authority of the Interstate Commerce Commission to some individual, and referred to the significance of the fact that members of the committee had voted against an amendment specifically intended to exclude the Interstate Commerce Commission from the operation of the bill. Senator Lewis of Illinois declared that the Interstate Commerce Commission had reached the end of its usefulness when the government took over the railroads, and that in many instances the commission might be an obstruction which would defeat the very object of the law putting the railroads in the hands of the President.

"I wish to express my concurrence in the view of the Senator from Minnesota," he said, "that the privilege that remains in the hands of the President under the bill presented by the Senator from North Carolina should not be interfered with by any power previously granted to the Interstate Commerce Commission."

International Railway General Foremen's Association

At a meeting of the executive committee of the International Railway General Foremen's Association it was decided to postpone the annual convention for 1918. This action was taken in consideration of the great demand for locomotives and cars and the need under present conditions of constant and increased supervision in the railroad shops. In order to maintain the continuity of the annual publications of the society, it was decided to compile and publish a year book. Five questions have been submitted to the members, each of whom is requested to express his opinion or give his experience on each question in writing to the secretary.

Foreign Trade Convention Next Week

One of the interesting facts in connection with the organization of the Fifth National Foreign Trade Convention, which will be held at the Gibson Hotel, Cincinnati, Ohio, April 18, 19 and 20, will be the further organization this year of the group sessions idea, with a view to having as many subjects handled by the case method as possible. By this group session method it is planned to make further use of the practical and personal experience of participants in foreign trade, and also to interest a larger number of the smaller manufacturers in the opportunity for foreign trade.

Another special feature in connection with the convention this year will be the greater use of the volunteer trade advisers and of the government representatives. There will be a special committee in charge of the work of the government and volunteer trade advisers, who will be available for consultation during the period of the convention.

The theme of the convention is "The Part of Foreign Trade in Winning the War," and the program as announced gives many speakers of national prominence, including: James A. Farrell, president of the United States Steel Corporation; Edward N. Hurley, chairman of the United States Shipping Board; Fred I. Kent, of the Bankers Trust Company, New York; J. J. Donovan, of the Blodel-Donovan Lumber Mills, Bellingham, Wash.; E. A. S. Clarke, president, Lackawanna Steel Company; C. A. Hinsch, president of the American Bankers Association; A. C. Bedford, Standard Oil Company of New Jersey; M. E. Farr, president, American Shipbuilding Company, Cleveland; George H. Charls, American Rolling Mills, of Middletown, Ohio; John Clausen, of the Crocker National Bank of San Francisco; George H. Smith, president of the American Manufacturers' Export Association; J. K. Armsby, president, California Packing Corporation; W. D. Wheelwright, president, Pacific Export Lumber Company, of Portland, Ore.; Frederick J. Koster, president, Associated Chambers of Commerce of the Pacific Coast; J. Louis Schaefer, of W. R. Grace & Co.; W. E. Tarlton, of the Brown Shoe Company of St. Louis; Percival Farquhar, president of the Brazil Railways Company; Thomas L. Chadbourne, counselor to the War Trade Board; Burwell S. Cutler, chief of the Bureau of Foreign & Domestic Commerce, and F. W. Tausig, chairman of the United States Tariff Commission.

Merchants and manufacturers who are desirous of receiving invitations to attend the convention at Cincinnati are requested to send their names and addresses to O. K. Davis, secretary, National Foreign Trade Council, 1 Hanover Square, New York City.

Traffic News

The eighteen passenger and freight agents of American railways having offices in Toronto have called in their traveling agents; it is expected that shortly their offices will be closed.

Complying with the order of the director general of railroads, calling for the discontinuance of outside traffic agencies, the Texas & Pacific and the International & Great Northern have closed all offices off their lines.

The Long Island Railroad has announced that freight in less than carload lots will be received on only three days a week. This rule applies at all of the company's stations, the days for receiving at different stations being announced in circulars to all interested. Where a shipping day falls on a legal holiday freight will be accepted on the day preceding.

The Fuel Administration officials are again complaining of a shortage of cars, although the Geological Survey reports show an increase in production compared with last year since the early part of February, and an almost steady increase since January 19. In the week ended March 23, the percentage of full time output lost on account of car shortage was 20.6, which is no greater than it has been for a long time.

The car service section of the United States Railroad Administration has issued a bulletin to all railroads calling their attention to the fact that the situation in the Southeast with respect to ventilated and refrigerator cars for the transportation of the early perishable crops is fast becoming acute and that energetic measures must be taken in order to keep up the supply of suitable cars. The necessity for returning promptly the cars owned by roads in that territory is strongly urged.

The production of bituminous coal and lignite (including coal made into coke) in February, 1918, according to the bulletin of the Geological Survey, is estimated at 42,438,000 net tons, an increase of 2,126,000 tons, or 5 per cent, compared with February, 1917. The production in the first two months of 1918 was, however, approximately 3,000,000 tons less than in the same months of 1917, because of the very low production in January, 1918, compared with the record month of January, 1917. The estimated average production per working day in February, 1918, was 1,783,000 net tons, compared with 1,643,000 tons in January, 1918, and 1,753,000 net tons in February, 1917. The average daily production in February, 1918, was slightly greater than the average for all 1917.

General Travel Conditions

In these days the traveler is jostled on every hand. Street cars seem everywhere filled to strap-hanging capacity; elevators are speeded to care for unusual numbers; automobiles, public and private, rush through crowded streets in increasing volume; sidewalks seem to have rush-hour crowds at all hours of the day; stores are filled with bargain counter patronage; theatres offer standing room only to late comers; railway coaches and Pullmans often have no space for belated passengers. Such is the traveler's barometer of the speed to which our national life has attained.

No doubt we are, as a people, going the pace that exhausts if it does not kill, but luckily, the usual vacation season, with its customary temptations to leisure, will be upon us soon, and in the meantime our social and economic life has been in large measure readjusted to the new conditions which the war has thrust upon us. The new grooves are being worn to a point where some sense of stability is acquired, and we shall dare to relax and accept the opportunity for necessary respite. The interest of the transportation world is naturally centered upon the development of the railroads under government control. The public has evinced not only a lively but a sympathetic and helpful interest in the government's work. The government has moved with skill and rare good judgment, carrying with it the confidence and the loyal support of the railway officials and employees and of the traveling public. —*American Express Co.'s Travel Bulletin.*

Commission and Court News

Interstate Commerce Commission

The application proposes increases in the present rates on lumber to Omaha, South Omaha, Lincoln, Neb., Council Bluffs and Des Moines, Iowa, and to certain intermediate points.

The commission has issued an amended order outlining the procedure to be followed in filing fifteenth section applications for permission to file tariffs containing increased rates.

The Commission has further postponed its order in the re-assignment case from April 1 to May 1 on account of the inability of the carriers to get their tariffs ready for filing.

Fifteenth Section Application No. 4829, filed by F. A. Leland in behalf of Southwestern Lines for authority to make increases in rates on lumber in order that petitioners may comply with the order of the commission in Docket No. 8301, has by direction of the commission been assigned to the formal docket under Docket No. 10121.

Fifteenth Section applications filed by the Michigan Central for authority to file increased switching charges at Detroit, Mich., and to establish a charge of 25 cents per 100 lb. on 1 c. l. shipments of freight between stations in the Detroit, Mich., switching district have been consolidated and assigned to the formal docket under Docket No. 10116.

The Pennsylvania Railroad has filed applications with the Commission for permission to cancel its special-train excursion fares from Philadelphia and Camden to Atlantic City, Egg Harbor and Ocean City, N. J., also its special one day excursion fares from New York to Asbury Park, Ocean Grove, Point Pleasant or Sea Girt, N. J., also to cancel the week-end roundtrip excursion rates of \$1.50 between Washington and Baltimore.

The Pennsylvania has also filed an application for permission to file a tariff establishing an excess train fare of 5 cents, to be retained by the railroad, in addition to the usual one-way ticket fare, for passengers boarding trains without valid tickets or equivalents, in lieu of the present charge of 10 cents in addition to the regular tariff fare, which is redeemable on presentation of the excess check. The proposed excess fare would not be collected from stations where tickets could not be bought.

Court News

Twenty-eight Hour Law

The Circuit Court of Appeals, Third Circuit, holds that, under the Twenty-eight Hour Law, a railroad company which, knowing that its lines were congested and delays were imminent, took a chance when the margin of safety was small, in attempting to transport cattle through to their destination without unloading and feeding, must, the animals having been confined beyond the prescribed time before they reached the destination, be deemed to have knowingly and wilfully violated the act, and so was liable for the penalty.—*P. & R. v. United States*, 247 Fed., 466. Decided January 16, 1918.

Conductor's Power to Arrest

The West Virginia Supreme Court of Appeals holds in an action against a railroad for false arrest that a conductor, as a conservator of the peace, has authority under the West Virginia statute to arrest without a warrant and eject from a car conveying passengers any person who in his presence and the presence of passengers contends with angry words to the disturbance of the public peace and tranquility; and an instruction telling the jury a conductor has no such right is erroneous. The passenger arrested had twice attempted to force his way into a coach while the vestibule, platform and

steps were occupied by passengers in the act of alighting, and on being detained by the conductor used the abusive language which led to his arrest. Judgment for the plaintiff was reversed.—*Marcucci v. Norfolk & Western (W. Va.)*, 94 S. E., 979. Decided January 29, 1918.

Loss of Valuables in Dining Car—

Contributory Negligence

In an action to recover for jewelry left in a dining car the plaintiff claimed that she put the jewelry, of the value of about \$1,500, in a handkerchief and tied up the handkerchief, and while in the dining car put the package on the dining table. She previously had it in a mesh bag, but had taken it out, apparently to use the handkerchief, although it contained the diamonds. She swore that when she left the dining table she left the handkerchief, with the diamonds in it, on the table, having thrown her napkin over it without noticing it. In about 20 minutes she discovered her loss and came back. She claimed to have shown that no one else could have come near this table, or taken these diamonds, except the defendant's servants, and therefore theft was shown on their part; and that, as well as the defendant's negligence, was the basis of a verdict and judgment in her favor. This has been reversed and a new trial granted by the New York Appellate Division for the following reason: "There is no sufficient proof of theft. No man is presumed to have committed a crime—the presumption is otherwise. Even if there be some evidence of the defendant's negligence, it is very slight, and I doubt if there be enough here to charge defendant with the loss of the diamonds. It is not at all impossible that she may have taken the handkerchief back with her into the other car and lost it on the way, or dropped it, or that the handkerchief may have been taken by the woman companion, even after she got back into the other car. The plaintiff's only cause of action here is for negligence, and I am unable to see why the contributory negligence of the plaintiff is not a complete defense; if not so as matter of law, certainly shown by the great weight of evidence. The jury might say that it was contributory negligence on her part to place a handkerchief containing \$1,500 worth of jewelry on the table and leave it in the dining room upon returning therefrom."—*Barden v. New York Central*, 168 N. Y. Supp., 742. Decided January 18, 1918.

Hours of Service Act: Effect of War

In an action under section 2 of the Hours of Service Act it appeared that enginemen and firemen employed on pushing engines, had much unoccupied time, and the plan was adopted of relieving them entirely, between trains, from all work or care of their engines. Though subject to call they were given opportunity to recuperate in rest houses, and in some places were allowed, though subject to call, to go to lodgings and elsewhere. The Circuit Court of Appeals, Third Circuit, held that, though the Hours of Service Act is remedial and for the benefit of travelers, yet, in view of the adoption of the plan while the United States was engaged in the prosecution of a war, making great demands upon its railroads, and of the fact that the crews of the pushing engines were relieved of all duties while awaiting other trains, it cannot, as a matter of law be declared that the defendant violated the act, although such employees, if the rest periods during which they received pay and were subject to call be counted, worked more than 16 consecutive hours a day; but that question can only be determined by consideration whether the periods off were restful. As the act declares that it shall be the duty of the Interstate Commerce Commission to enforce its provisions, and all powers granted to the commission are extended to it in the execution of such act it was said that the commission should promulgate a practical working scheme for compliance with the act, instead of leaving railroad companies to determine at their peril whether their plan violates the act; and such procedure should be followed in preference to prosecutions under the act; this being particularly true where, as a war measure, a railroad company is attempting to operate at maximum capacity. Judgment against the railroad was reversed and the cause remanded for further proceedings.—*Pennsylvania v. United States*, 246 Fed. 881. Decided December 19, 1917.

Equipment and Supplies

Railway supplymen will be particularly interested in the following articles in this week's issue:

Standard Locomotives Will Mean a Waste of Material, page 959.

Express Your Views on Standardization, page 959.

George A. Post and the Railway Business Association, page 960.

Two Great Industries—An Analogy, page 961.

Railroad Business Association Discusses Problems, page 963.

Railroad Administration's Motive Power Problems, page 965.

Our Foreign Trade in Railway Supplies, page 983.

Government Cars and Locomotives

The placing of contracts for government cars is being somewhat delayed by conferences with the War Industries Board as to the possibility of using steel and lumber which may be needed for ship building. The War Industries Board has the determination of priority on such matters. The question of prices for cars is also still under consideration between the builders and the division of purchases.

It was expected that contracts for approximately 100,000 freight cars, to be ordered by the Railroad Administration from the standard specifications which have been described in these columns, might be placed by the end of this week, but there have been some delays incident to the negotiations as to prices between the car builders and the Division of Purchases, which apparently is making an effort to drive a close bargain, and to the conferences which have been held with the War Industries Board regarding the procurement of the steel and other materials. The War Industries Board has charge of the co-ordination of the demands of various departments of the government for raw materials and the requirements of lumber and steel for the cars must be considered in connection with the requirements of materials for shipbuilding, as 100,000 cars would require approximately 575,000 tons of steel plates alone, to say nothing of the shapes, bars, etc.

Tentative prices were submitted by the car builders, and a meeting to consider them was held between the builders and John Skelton Williams, director of the Division of Purchases, last week. Another meeting was held on Tuesday of this week at the call of Mr. Williams, who, it is understood, made numerous inquiries as to the profits and cost of the various companies.

A conference with the manufacturers of car specialties is expected to be held at an early date at which they will be asked to submit figures as to their costs. At a similar meeting held last week with the manufacturers of locomotive specialties at the call of the central purchasing committee of the Railroad Administration, they were asked to pool their patents and allow various plants to turn out patented devices without royalties. This idea aroused considerable opposition at the meeting and information was asked as to whether the suggestion came in the form of a request or whether it represented a definite policy. A final answer to the question was not forthcoming and it is understood that the matter has not yet been definitely determined, but it is said that Mr. Williams expects to take advantage of the fact that the government is now practically the sole purchaser to depress prices to a minimum—6 per cent above cost has been suggested. Some manufacturers have raised the point that they are under contractual obligations to pay royalties to the inventor, while others own their own patents and make no calculation for any royalty except as is represented by a return on their capitalization.

Whether the purpose of the Administration extends to cases where the manufacturer is under contract to pay royalties or whether it contemplates merely a plan by which the owners of patents would be required to permit their devices to be manufactured in a number of plants without the payment of royalties, has not been announced, but it is believed that the first example was not taken into consideration. The various builders of cars and locomotives submitting their bids were asked to state their profits for the last year, the previous year and the most profitable

year in their business, and other detailed costs as separated between material, labor and general expenses, together with a statement of the profit desired. They were also asked to express their attitude in case the government should furnish all materials. Later in the week the builders were asked to submit bids on 50-ton all-steel box cars in addition to the cars for which specifications had already been issued and bids will be asked later on refrigerator, flat, and general service cars.

The car builders were in session with Mr. Williams late Tuesday evening and adjourned to meet again Monday. The demands of the shipping board for priority in the use of steel may bring about a decision to decrease the number of steel cars and to use wood instead.

Locomotives

THE NEVADA NORTHERN is inquiring for a number of Consolidation locomotives.

THE PARIS, LYONS & MEDITERRANEAN has ordered 100 Mikado locomotives from the Baldwin Locomotive Works.

THE CENTRAL RAILWAY OF BRAZIL has ordered from the American Locomotive Company three Consolidation locomotives, weighing 165,000 lb.; one mallet (0-8-8-0) type locomotive, weighing 280,000 lb., and two Consolidation locomotives, weighing 167,000 lb. All these locomotives will be equipped with superheaters.

Freight Cars

THE DELAWARE & HUDSON is inquiring for 50 steel caboose underframes.

THE FINKBINE LUMBER COMPANY, Wiggins, Miss., is inquiring for 5 tank cars.

THE AMERICAN BRIDGE COMPANY, Pittsburgh, Pa., is inquiring for 108 50-ton trucks.

THE ACME PETROLEUM COMPANY, Tulsa, Okla., is inquiring for 25 to 50 tank cars.

THE ANACONDA COPPER MINING COMPANY, New York, is inquiring for 3 90-ton ore cars.

THE AMERICAN NITROGEN PRODUCT COMPANY, Seattle, Wash., is inquiring for 8 to 10 tank cars.

THE GREAT WESTERN CONTRACTING COMPANY, Kansas City, Mo., is inquiring for 100 to 200 tank cars.

THE HOUSTON RAILWAY CAR COMPANY, Houston, Tex., is inquiring for 25 to 50, 50-ton, 8,000-gal. tank cars.

THE NEW ORLEANS INDUSTRIAL ALCOHOL COMPANY, New Orleans, La., is inquiring for 18 40-ton, 8,000-gal. capacity tank cars.

THE HAZEL ATLAS GLASS COMPANY, Washington, D. C., is inquiring for 3 to 4 8,000 to 10,000-gal. steel underframe tank cars.

THE EVANS-THWING REFINING COMPANY, Kansas City, Mo., has ordered 50 8,000-gal. capacity, 40-ton tank cars from the American Car & Foundry Company.

Signaling

THE BALTIMORE & OHIO has ordered from the Union Switch & Signal Company a Saxby & Farmer interlocking, 48 levers, for Outville, Ohio.

THE ATCHISON, TOPEKA & SANTA FE has ordered from the Union Switch & Signal Company a Saxby & Farmer interlocking, 16 levers, for Floyd, Mo.

THE PENNSYLVANIA LINES WEST will have a new interlocking at Smithville, Ohio, 32 levers; Saxby & Farmer machine, furnished by the Union Switch & Signal Company.

THE CENTRAL OF GEORGIA has completed the 9 miles of automatic signaling Hapeville to Atlanta, reported three months ago as under construction; and now has under construction 3 miles between Cuthbert, Ga., and Cuthbert Junction, single track, and one mile from Macon, Ga., to Macon Junction, double track.

Supply Trade News

Frank O. Bolton, chief inspector for Robert W. Hunt & Co., at the Edgar Thomson Steel Works, Pittsburgh, Pa., died in that city on April 1. He had been connected with Hunt & Co. for over 17 years.

D. B. Clark, who was formerly superintendent of the shell department at the American Brake Shoe & Foundry Company at Erie, Pa., is now general superintendent of the Watervliet Arsenal, Watervliet, New York. This Arsenal is the largest and oldest Arsenal in the United States and Mr. Clark has charge of the entire production of this plant.

The H. W. Johns-Manville Company announces that after April 1, its Youngstown, O., office will be located at 520 Market street. The same company has also found it necessary, owing to increased business on the Pacific coast, to open new offices at Tacoma, Wash. The office will be located at 1015 A street and will carry a complete stock of Johns-Manville products.

The rapid expansion of the business done by the **W. J. Crouch Company**, steel exporters, of 253 Broadway, New York, has necessitated the company's taking larger and better equipped quarters than those now occupied. It has leased for a period of years, the whole of the fifteenth floor at 68 William street, corner of Cedar street, where it will be located as and from April 29.

The Abell-Howe Company, 332 South Michigan avenue, Chicago, has been appointed representative of the Standard Malleable Iron Company, Muskegon, Mich., for the sale of malleable castings through its several offices located at Chicago, Pittsburgh, Cleveland and New York. The company has also been appointed representative of the Northern Engineering Works, Detroit, Mich., builders of electric overhead traveling cranes, electric hoists and foundry equipment, for the sale of these products in the territory tributary to Chicago.

Carnegie Steel Company Changes

Effective as of April 1, 1918, Colonel Henry P. Bope has resigned his position as vice-president and general manager of sales with Carnegie Steel Company to devote his time to private interests.

Colonel Bope was born and educated at Lancaster, Ohio, and devoted himself at first to stenographic reporting in the Ohio legislature. In November, 1879, he became connected with Carnegie Brothers & Co. and has remained continuously in the sales work of that company and its successors up to the present time. His period of service has thus covered the wide expansion of the use of steel and the growth of great commercial and business organizations, in all of which he has had a most active part. In addition to these commercial activities he has been active in the social life of the community.

He has been succeeded in his office with Carnegie Steel Company by William G. Clyde. Mr. Clyde was educated in the Pennsylvania Military College, at Chester, Pa. He first entered the employ of Ryan & McDonald, contractors of Baltimore, Md., was then associated with Robert Wetherill & Co., machinists and founders, and was later superintendent of the plate mills of the Wellman Steel & Iron Company, in Thurlow, Pa. His connection with the United States Steel Corporation and its subsidiaries dates from 1894 when he became superintendent of the plate mills of the Illinois Steel Company at South Chicago.

On the formation of the American Steel Hoop Company he became traveling salesman for that company in Chicago, and five months later was made manager of sales at Philadelphia where he remained until 1902, when, after the formation of the United States Steel Corporation, the American Steel Hoop Company was merged with the Carnegie Steel Company. For the next three years Mr. Clyde was traveling salesman for the Carnegie Steel Company at Cleveland. In September, 1905, he was made assistant general manager of sales at Pittsburgh in charge of the bureau of bars and hoops, which office he retained until his

present promotion. Mr. Clyde by the promotion has also become a member of the board of directors of the company.

While Mr. Clyde belongs to the younger generation of steel makers his experience in the actual manufacture of steel, his wide experience in sales work, grasp of details, indelible energy and strength of character indicate that he will be a potent factor in the commercial activities of Carnegie Steel Company and the steel industry.

Charles L. Wood, long assistant to Mr. Clyde, has been promoted to be assistant general manager of sales in charge of the bureau of bars and hoops. Mr. Wood was born in Youngstown, Ohio, in the atmosphere of iron and steel manufacture. He was educated as a mining engineer at the Ohio State University and his first employment was with the Calumet Furnace Company, of Chicago, as chemist, followed by several years' experience in the practice of mining engineering in Colorado and the West.

Mr. Wood became associated with the American Steel Hoop Company on its formation, first in the order department. On the merger of the Hoop Company with Carnegie Steel Company his abilities caused his transfer to the sales department where, in the bureau of bars and hoops, he has long been Mr. Clyde's most efficient assistant. His promotion, therefore, comes as a logical recognition of his large experience in the sale of bar mill products and his wide acquaintance with their users.

Trade Publications

JOURNAL PACKING.—A new kind of car waste that is kept elastic and in contact with the journal, by means of interwoven brass spring wire, is described in a pamphlet issued by the Elastic Car Waste Company, Philadelphia, Pa.

FREIGHT CAR APPLIANCES.—The Wine Railway Appliance Company, Toledo, Ohio, has recently issued three circulars describing devices manufactured by the company for use on freight cars: A-40 Square Shaft Hand Brakes; A-41. Ratchet Lever Hand Brakes and A-50 Drop Door and Hopper Door Mechanism.

MILLING CUTTERS.—The "Stock List of Cutters," issued by the Cleveland Milling Machine Company, Cleveland, Ohio, under the date of March 15, 1918, contains a list of the different kinds and sizes of milling cutters made by that company. Various kinds of angular cutters, end mills, slotting and concave cutters are also listed.

TOOL HOLDERS.—Under the title of "How to Save Money on High Speed Steel," the Gisholt Machine Company, Madison, Wis., has issued a pamphlet showing three kinds of tool holders which may be used to advantage with high speed tool bits made by drawing out pieces of high speed steel which would otherwise have been scrapped.

DYNAMIC BALANCE.—The Norton Grinding Company, Worcester, Mass., has issued "A Treatise on Dynamic Balance" which will be of interest to all who do not understand the difference between the standing and running balance of machine parts which revolve at a high speed. The need of a running balance and a special machine to test it is very evident.

HEATING APPLIANCES.—The Macleod Company, 213 East Pearl street, Cincinnati, Ohio, has issued Buckeye Catalogue E, describing several appliances now manufactured by the company, which use crude oil in the heating of locomotive parts. These appliances include a Buckeye flood-light locomotive fire kindler, paint sprayer, locomotive tire heater and several kinds of furnaces. The Buckeye oxy-acetylene welding outfit is also illustrated.

CAR INSULATION.—The Union Fibre Company, of Winona, Minn., has issued a booklet, entitled "Insulation of Railway Equipment," which takes up in considerable detail the insulation of refrigerator and other cars. The front of the booklet contains an interesting account of the beginning and evolution of the refrigerator car and a development of the theory of insulation. Further on a description is given of the manufacture of Linofel, which is composed mostly of flax fibre and is a good insulator. The lack of the booklet is devoted to the discussion of a series of actual tests, conducted in 1908 by several railroads, with a view to determining the best practice in refrigerator car construction.

Railway Financial News

ALBANY, TOPEKA & SANTA FE.—W. D. HIGGS has resigned as chairman of the board of directors. Carl R. Gray has also resigned as director.

CHICAGO, MILWAUKEE & ST. PAUL.—For the third time since the first of the year, the directors have voted to defer action on the regular common and preferred stock dividends.

DENVER & RIO GRANDE.—It is understood that this company will file with the director general of railroads an application for an advance of \$2,500,000 to pay the interest, due February 1 and April 1, on its bonds. This represents about ninety per cent of the government guarantee for January, February and March.

ILLINOIS CENTRAL.—The State Public Utilities Commission of Illinois held a hearing on April 9 at Chicago to consider the petition of the Illinois Central for an order authorizing the acquisition of the capital stock of the Golconda Northern, a new road between Golconda, Ill., and Elizabethville, Hardin county, about 12 miles.

NEW HAVEN, NEW HAVEN & HARTFORD.—Director-General McAdoo, after conference with officials of the New York, New Haven & Hartford, has announced that the government would lend the road \$43,564,000 for one year at 6 per cent to enable it to meet a like amount of its one-year collateral trust notes which mature April 15. The funds for this purpose will be advanced out of the \$500,000,000 appropriation in the railroad bill. The notes will be discounted through the Federal Reserve banks. The government will accept as security the same collateral as was pledged under the original issue, which consists of stocks and bonds of various subsidiary companies, totaling about \$85,000,000 par value. Under the terms of the loan, the government reserves the right to sell any part, or all of the collateral, at such price as the Secretary of the Treasury may determine and apply the proceeds to the retirement of the notes. This action on the part of the government relieves the New Haven of the necessity of selling the collateral pledged under the original notes, the sale of which in the present market would involve a heavy sacrifice on the part of the road. Efforts to meet the notes at maturity, it is understood, met with but little encouragement in banking circles, and although an issue of preferred stock was authorized by stockholders it was thought that the full amount of the notes could not be readily absorbed in this way. The director-general also announced that the road would receive a rental sufficient to pay all fixed charges and leave a substantial surplus during the period of government control. In making the announcement, Mr. McAdoo said: "The director-general has investigated this subject carefully and has given due consideration to past and present records and earnings and to the future prospects of the New Haven system, whose gross operating revenues for the calendar year 1917 amounted to more than \$85,000,000, exclusive of the earnings of several allied companies. Realizing the high importance of maintaining the physical and financial integrity of this railroad system, which controls so largely the entire transportation facilities of several leading industrial states, which are essential to the war-making functions of the nation, and whose lines are already being taxed to perform service which is now more important than ever, and having a proper regard to the security offered for the loan desired, the director-general has decided to extend the relief needed. The road will have the right to renew the loan for one year more on the same terms."

SAN DIEGO & SOUTHEASTERN.—In a recent order the Railroad Commission of California has authorized the San Diego & Arizona to purchase the capital stock of the San Diego & Southeastern, a 68-mile line running out of San Diego, California, and to issue bonds for \$1,500,000 to cover the purchase.

WABASH.—Action on the dividend on the preferred stock A has been delayed.

Railway Officers

Executive, Financial, Legal and Accounting

H. Doescher has been elected secretary and treasurer of the Western Allegheny, with office at Pittsburgh, Pa., vice **C. A. Young**.

John T. Reid has been elected treasurer of the Charleston & Western Carolina, with office at Wilmington, N. C., succeeding **J. F. Post**.

E. C. Mann, auditor of disbursements of the Lehigh Valley, with office at Philadelphia, Pa., has been elected treasurer to succeed **C. J. Kulp**, deceased. Mr. Mann was born in 1868 at Altoona, Pa., and was educated in the public schools of his native town. He entered the service of the Pennsylvania Railroad as a clerk in the motive power department in 1896. Three years later he went to the Lehigh Valley as a clerk in the accounting department in the general offices at Philadelphia, Pa. He was steadily promoted through various positions in that department until in March, 1912, he was appointed auditor of disbursements which position he held at the time of his recent appointment as treasurer of the same road, with headquarters at Philadelphia as above noted.

C. C. Higgins, whose appointment as assistant to the vice-president of the St. Louis San Francisco, with office at St. Louis, Mo., was announced in these columns March 22, was born at Aurora, Ill. He graduated from the mechanical engineering course at the University of Minnesota in 1900, following which he entered the employ of the Chicago, Burlington & Quincy as a special apprentice. He remained with that road for five years, serving consecutively as assistant in the laboratory, roundhouse foreman and general foreman at various division points on the line. He was with the American Brake Shoe & Foundry Company, Chicago for the following four years, serving as sales engineer and salesman. Subsequently he was employed by the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., for three years, doing special work in connection with the bonus schedules in the mechanical department. After leaving the Santa Fe he became associated with **J. W. Kendrick**, consulting railway expert, Chicago, and during the following six years was engaged in making reports on various railroads in connection with valuation and rehabilitation. His present position with the Frisco was newly created and became effective March 15.



E. C. Mann



C. C. Higgins

A. W. Amis has been appointed auditor, of the Gulf & Ship Island and **G. R. Kemp** has been appointed claim agent; both with headquarters at Gulfport, Miss.

Edwin M. Kindler, chief clerk in the office of the secretary of the Union Pacific, at New York, has been elected assistant secretary of the Union Pacific and subsidiary companies.

J. B. Andrews, assistant secretary of the Denver & Rio Grande, with headquarters at Denver, Colo., has been appointed assistant to the president with the same headquarters.

E. H. Radcliffe, general accountant of the Lehigh Valley, with office at Philadelphia, Pa., has been appointed auditor of disbursements, with headquarters at Philadelphia, to succeed **E. C. Mann**, promoted.

E. E. Lloyd, auditor of stores and mechanical accounts of the Canadian Pacific, with office at Montreal, Que., has been appointed auditor of disbursements, vice **W. H. Mouler**, promoted, and **W. H. Langridge** succeeds Mr. Lloyd; both with headquarters at Montreal.

Lawrence Greer, vice-president and general counsel of the Western Maryland, with headquarters at New York, has been elected president and chairman of the board to succeed **Carl R. Gray**, who has been appointed director of the division of transportation in the United States Railroad Administration.

George T. Slade, first vice-president in charge of operation of the Northern Pacific, having been granted an indefinite leave of absence to enter military service, **John M. Rapelje**, general manager of the lines east, with office at St. Paul, Minn., has been appointed acting vice-president in charge of operation.

Operating

G. F. Morse has been appointed general superintendent of the Mississippi Eastern, with office at Quitman, Miss., vice **G. H. Fordham**.

L. L. Lamar has been appointed assistant superintendent of the Waycross & Southern, with office at Waycross, Ga., vice **F. S. L. Grundy**, resigned.

J. S. Reddock has been appointed superintendent of transportation of the Missouri & North Arkansas, with office at Harrison, Ark., succeeding **H. S. Baumgardner**, resigned.

E. Ramey, supervisor of trains of the Baltimore & Ohio, with office at Philadelphia, Pa., has been appointed supervisor of fuel consumption of the same road, vice **W. L. Robinson**, resigned.

A. M. Burt, chief engineer maintenance of way, of the Northern Pacific, with office at St. Paul, Minn., has been appointed acting general manager of the lines east of Paradise, vice **John M. Rapelje**. (See Executive, Financial, Legal and Accounting.)

Charles P. Angeli, trainmaster of the New Castle division of the Baltimore & Ohio, with office at New Castle Junction, Pa., has been appointed assistant superintendent in charge of terminals, on the Pittsburgh division, with headquarters at Pittsburgh.

F. W. Taylor, superintendent of motive power of the Missouri, Kansas & Texas, with headquarters at Denison, Tex., has been appointed general manager, with headquarters at Parsons, Kan., succeeding **H. F. Anderson**, who was transferred to San Antonio, Tex., as superintendent of terminals of the Missouri, Kansas & Texas of Texas, effective March 1.

George Masten, who has been appointed superintendent of the Tennessee Central, with headquarters at Nashville, Tenn., as has already been announced in these columns, was born on December 6, 1874, at Lincoln City, Del. He began railway work in October, 1891, with the Atlantic & Danville, now the Norfolk division of the Southern Railway and subsequently served first as agent and then as dispatcher. From 1898, to 1902, he was consecutively dispatcher and chief dispatcher on the Denver & Rio Grande and in 1904 became chief dispatcher on the El Paso & Northeastern, now a part of the El Paso & Southwestern system, at Alamogordo, N. M. In 1906, he went to the Seaboard Air Line, as dispatcher and

the following year was appointed chief dispatcher on the Florida division. He subsequently served as trainmaster on different divisions of the same road until his recent appointment as superintendent of the Tennessee Central as above noted.

E. E. Regan, superintendent of the New London division of the New York, New Haven & Hartford with office at New London, Conn., has been appointed superintendent of the New Haven division, with office at New Haven, vice F. S. Hobbs; **F. M. Clark**, superintendent of the Old Colony division, with office at Taunton, Mass., has been appointed superintendent of the New London division, with office at New London, vice Mr. Regan, and **F. S. Hobbs** has been appointed superintendent of the Old Colony division with office at Taunton, vice Mr. Clark.

A. J. Dimaline, car accountant of the San Antonio & Aransas Pass, with headquarters at San Antonio, Tex., has been appointed division superintendent, with the same headquarters, and with jurisdiction over all employees of the transportation department, north and south of Kenedy, and including Kenedy Yard. **H. C. Franks**, general agent of the freight department, with headquarters at San Antonio, has been appointed assistant superintendent, with the same headquarters and with jurisdiction over the entire line. The territory of **J. H. Smith**, division superintendent, with headquarters at Yoakum, Tex., has been extended to Kenedy, exclusive of Kenedy Yard. The above changes were made following a grant of a leave of absence to **C. A. Maxwell**, division superintendent at Kenedy, to enter government service, and became effective March 27.

G. W. Nelson, whose appointment as superintendent of dining cars of the Northern Pacific, with headquarters at St. Paul, Minn., was announced in these columns on March 29,



G. W. Nelson

was born at Monroe, Iowa, on May 16, 1868. At the age of 17 he learned telegraphy and he entered the service of the Chicago, Rock Island & Pacific as an operator in July, 1887. He stayed with the Rock Island during the subsequent six years, being promoted to ticket clerk and later to agent. Later he completed a course at Hess Business College, following which he was employed for one year by **G. M. Kenyon**, railway supply broker, St. Paul, Minn. He entered the service of the Northern Pacific in 1894 as stenographer and operator for the superintendent of dining cars and in April, 1903, was appointed assistant superintendent of that department. Upon the appointment of **H. J. Titus** as superintendent in July, 1908, Mr. Nelson was placed in charge of the headquarters' office at St. Paul and upon the resignation of Mr. Titus, he was promoted to superintendent, as above stated, effective April 1.

Engineering and Rolling Stock

T. Boles has been appointed chief engineer of the Ft. Smith & Western, with office at Ft. Smith, Ark., succeeding **B. F. Beckman**, resigned, effective March 1.

W. H. Winterrowd, assistant chief mechanical engineer of the Canadian Pacific, with office at Montreal, Que., has been appointed chief mechanical engineer in place of **W. E. Woodhouse**, who has resigned.

A. L. Roberts, mechanical engineer of the Lehigh Valley, has been promoted to master mechanic, with office at Wilkes-Barre, Pa., vice **M. R. Smith**, resigned. **W. I. Cantley**, assistant mechanical engineer, with office at South Bethlehem, has been appointed mechanical engineer; **J. P. Laux**, master me-

chanic, with office at Sayre, has been transferred to South Easton, Pa., vice **D. D. Robertson**, resigned, and **E. J. Kleinkauf**, general foreman at South Easton, has been promoted to master mechanic, with office at Sayre.

William Earle Barnes, whose appointment as general master mechanic of the Canadian Government Railways, with headquarters at Moncton, N. B., has already been announced



W. E. Barnes

in these columns, was born on July 24, 1879, at Shediac, N. B., and was educated in the public schools. He began railway work on April 20, 1899, as draftsman apprentice on the Canadian Government Railways. In 1902 he served as draftsman, and in 1906 first as machinist and later as draftsman. In October, 1907, he was appointed fitter and in January, 1909, again served as draftsman. In April, 1910, he was appointed enginehouse inspector and the following January became acting master mechanic. He was appointed master mechanic, in September, 1912, and since August, 1917, was acting general master mechanic until his recent appointment as general master mechanic as above noted.

The offices of chief engineer and chief engineer maintenance of way, of the Northern Pacific, have been consolidated in charge of **H. E. Stevens**, chief engineer, with headquarters at St. Paul, Minn. (See Operating Officers.)

M. J. Powers, master mechanic of the Denver & Rio Grande, Colorado lines, with headquarters at Denver, Colo., has been appointed superintendent of motive power of the Colorado Midland, with office at Colorado Springs, Colo.

George A. Kirley, assistant signal engineer of the Boston & Albany, has been appointed signal engineer, with headquarters at Boston, Mass., vice **F. E. Whitcomb**, resigned to go with the Federal Signal Company; **E. I. Gardiner**, draftsman in the signal department, succeeds Mr. Kirley.

H. S. Wall, superintendent of shops of the Atchison, Topeka & Santa Fe Coast Lines, at San Bernardino, Cal., was appointed mechanical superintendent, succeeding **S. L. Bean**, deceased, with headquarters at Los Angeles, Cal., effective April 1. **A. B. Armstrong**, master mechanic at San Bernardino, Cal., has been appointed superintendent of shops, succeeding Mr. Wall, with the same headquarters, and **John Pullar**, master mechanic at Fresno, Cal., has been transferred to the Los Angeles division, with headquarters at San Bernardino, succeeding Mr. Armstrong, effective April 1.

Traffic

F. W. Robinson has been appointed general agent of the Chicago, Indianapolis & Louisville at Milwaukee, Wis., succeeding **F. A. DeZotell**.

G. H. Dougherty, general agent of the Kansas City Southern, with office at Tulsa, Okla., has been assigned to other duties, and the general agency at Tulsa has been abolished.

J. A. S. Wallace, commercial freight agent of the Western Maryland, with office at Pittsburgh, Pa., has been appointed general western agent, with office at Chicago, vice **E. B. Webb**.

W. D. Burr, assistant general freight agent of the Chicago, St. Paul, Minneapolis & Omaha, with office at Minneapolis, Minn., has resigned and his office was abolished, effective April 1.

A. R. Malcolm, general agent for the Missouri Pacific,

at San Francisco, Cal., has been appointed acting assistant traffic manager, with office at New Orleans, La., succeeding **B. M. Flippin**.

J. P. Harkins has been appointed general agent of the Western Pacific at Stockton, Cal., succeeding **E. L. Gamble**, resigned to go with another company.

C. T. Slauson, foreign freight agent for the Missouri Pacific, with headquarters at Chicago, was promoted to manager of foreign freight traffic, with headquarters at St. Louis, Mo., effective March 25.

S. L. Parrott, general New England agent of the Chicago, Rock Island & Pacific, with headquarters at Boston, Mass., has been appointed commercial agent at St. Joseph, Mo., succeeding **J. I. Johnson**.

J. T. Wray has been appointed acting division freight agent, of the Central and Northern divisions of the Pennsylvania Railroad, with office at Erie, Pa., vice **E. S. Neilson**, who was division freight agent of the Central and Northern divisions.

E. S. Center, assistant general freight agent of the Atlanta & West Point and the Western Railway of Alabama, with headquarters at Atlanta, Ga., has been appointed general industrial agent of the Georgia Railroad, with headquarters at Atlanta, and his former position has been abolished.

E. R. Cobb has been appointed traffic manager and acting auditor of the Valdosta, Moultrie & Western, with office at Valdosta, Ga. The traffic and accounting departments have been removed from Albany to Valdosta, and the office of general freight and passenger agent at Albany has been abolished.

E. J. Carland, general agent of the passenger department of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at Duluth, Minn., was appointed acting general agent, succeeding **J. D. Mahon**, who was returned to Superior, Wis., in charge of freight and passenger traffic, effective April 1.

E. A. Donnelly, commercial agent of the Chicago, St. Paul, Minneapolis & Omaha, at Minneapolis, Minn., was appointed general agent of the freight department, with same headquarters, effective April 1. **T. J. Kenniff**, commercial agent at Minneapolis, has been assigned to other duties and the office discontinued, effective April 1.

Railway Officers in Government Service

Charles Barham, who has been appointed regional director under the National Food Administration, with headquarters at Atlanta, Ga., as has already been announced in these

columns, was born on April 16, 1867, and began railway work in 1887 on the Richmond & Danville, now a part of the Southern Railway. He then served as stenographer to the commissioner of the Associated Railways of Virginia and the Carolinas, and then was soliciting freight agent of the Southern Railway at Richmond and later at New York. He subsequently was foreign freight agent of the same road at Norfolk, Va., until August 1, 1898, when he went to the Nashville, Chattanooga & St. Louis as chief clerk to traffic manager at Nashville, Tenn. From January, 1900, to September, 1906, he was assistant general freight agent, and then was made general freight agent of the same road, which position he held at the time of his recent appoint-



C. Barham

ment as regional director under the National Food Administration as above noted.

B. L. Swearingen, assistant general freight agent of the Missouri Pacific, has been appointed supervisor of oil traffic by the regional director of western roads, with headquarters at Kansas City, Mo.

John J. Sullivan, formerly in the office of vice-president and general manager of the Southern Pacific, and until March 1, 1918 general agent of the American Railway Association at Camp Cody, Deming, N. Mex., has received a commission as first lieutenant, and has been assigned to duty with the Thirty-sixth Engineers, at Camp Grant, Rockford, Ill.

Purchasing

G. H. Robison, general storekeeper of the Oregon Short Line, with office at Pocatello, Idaho, has been appointed acting purchasing agent in addition to his duties as general storekeeper, with headquarters at Salt Lake City, Utah, succeeding **A. E. Hutchinson**, deceased.

Obituary

L. D. Davis, supervisor of scales and weighing of the Baltimore & Ohio, with office at Baltimore, Md., died on April 2.

W. G. Neimyer, general agent for the Southern Pacific, with headquarters at Chicago, died in that city on April 4, aged 64 years.

Joseph H. Meglemry, assistant general freight agent of the Michigan Central, with office at Buffalo, N. Y., died in that city on April 2.

A. E. Hutchinson, general purchasing agent, of the Oregon Short Line, with headquarters at Salt Lake City, Utah, died in that city on April 3.

Dennis C. Zook, who was for the last 20 years master car-penter on the Western division of the Pennsylvania Railroad, Lines West, with headquarters at Fort Wayne, Ind., died on March 28, 1918.

Warren P. Taylor, traffic manager of the Richmond, Fredericksburg & Potomac, and secretary and treasurer of the Freight Claim Association, died on April 4 at Richmond, Va. He was born in September, 1868, and began railway work in 1884, as a clerk on the Richmond & Danville, now a part of the Southern Railway. In December, 1889, he entered the service of the Richmond, Fredericksburg & Potomac as chief clerk to the traffic manager, and since September 1, 1898 had been traffic manager of the same road. He was traffic manager also of the Washington Southern operated in connection with the Richmond, Fredericksburg & Potomac. He had served as secretary and treasurer of the Freight Claim Association since May, 1897.

S. H. Hardwick, who was passenger traffic manager of the Southern Railway from May, 1904 to June, 1915, died on March 26, at Montgomery, Ala. Mr. Hardwick served for several years prior to January, 1889, as general eastern passenger agent of the Virginia, Tennessee & Georgia Air Line, at New York. In August, 1889, he was appointed general passenger agent of the Georgia Pacific. From September, 1891 to June, 1892, he was assistant general passenger agent of the Richmond & Danville in charge of the Second division of the Central of Georgia. Then to January, 1901, he was assistant general passenger agent of the Richmond & Danville and its successor, the Southern Railway, at Atlanta, Ga. From January, 1901, to May, 1904, he was general passenger agent of the same road and then was appointed passenger traffic manager resigning from the latter position on account of ill health in 1915. He was then appointed general agent of the passenger department of the same road, with office at Montgomery, Ala.

MUKDEN-ANTUNG LINE CUT-OFF.—The South Manchuria Railway plans to construct a new ten mile line between Suchiatun on the main line and Chenhsiangtun on the Mukden-Antung Line in the next fiscal year.—*The Far Eastern Review*.

EDITORIAL

Railway Age

EDITORIAL

Power! Power!—More Power!

WHILED POWER to win the war. Make existing power do more work.

Make it work longer hours.

Shop facilities must be improved so that the power may be promptly repaired.

Engine terminals must be improved so that the power may be promptly turned.

Existing power must be improved so that it will do more work at less cost and with less physical demands on the engine crew.

Be sure the power is carrying its full load.

Improve the utilization of the power by better despatching.

Locomotives must be ordered *now* for next winter! Further delay will be dangerous.

The two principal arguments put forth by the Railroad Administration for standard locomotives are *tremendous* increase in locomotive production and a liquid reserve of power. We have it on good authority that *no* increase in production of locomotives can be expected this year if standard locomotives are adopted and that *perhaps* next year it may be possible to increase the output 10 per cent. There is every possibility of a *decrease* in locomotive production this year if orders for new locomotives are not placed immediately, and *now* is the time we need locomotives. By building locomotives to existing designs and by bringing the same pressure to bear on their production as would be brought to bear on the standard locomotives, the output of locomotives this year will be *increased*. The 10 per cent increase in locomotive production next year is open to question, as we are informed that a large part of the builders' manufacturing capacity will be taken up in making repair parts, with their new jigs, patterns and templates, for the roads on which the standard locomotives are to be used. We are also told the builders will have to provide space for repairing locomotives due to the lack of railway shop facilities! By building locomotives to existing designs and permitting the roads to supply their own repair parts, the builders' plants can concentrate on building new locomotives. The 10 per cent increase in production is, therefore, open to question, but the largest question is, will any increase justify the increased burden which will be placed on the railroads in maintaining and operating these standard locomotives. A liquid reserve of power has its advantages. Some 600 locomotives have been interchanged between roads, including the U. S. A. and Russian engines. Why?—Because the railways have found it impossible properly to maintain their own power. At no time, particularly if the roads had their power in shape, should there be a very great demand for such locomotives. Would it, therefore, not be more logical to build only that number which would answer the purpose of a liquid reserve, rather

than ask every railroad to operate locomotives of a design which is foreign to its line and which will complicate both the repair and operating problems? Increased production of locomotives and liquid reserve of power are not the only things to be considered in standardizing locomotives.

A practice which the railroads can justly be criticised for following in the past is the purchasing of large and heavy locomotives without providing proper facilities for housing and maintaining them. A few years ago the president of an eastern road consulted the officer in charge of the mechanical department

The Cart Before the Horse

on the matter of purchasing some of this heavy power, calling attention to the fact that one of the neighboring roads, which, by the way, had shop facilities far inferior to those on his own road, was purchasing such equipment. The mechanical department officer argued strongly against such a program until the road's shop facilities were improved to maintain the larger power. His advice was followed. Today the president, watching the results of the heavy power on the other road, has become fully convinced that the decision was wise. The poorly equipped road with the heavy power is repairing it at a cost twice what it would be had it been provided with proper facilities; indeed it is having some of the work done by outside plants equipped to handle repairs to heavy locomotives. Is the Railroad Administration going to make the same mistake? It is of vital importance that provision be made for maintaining new and additional power before it is received. Let us not put the cart before the horse.

The facilities for repairing and maintaining locomotives must be improved immediately. It is of the greatest importance that the improvement work be started at once in order that the railways will be in shape to handle the necessary repairs to equipment next winter. Every railroad mechanical man in the country will agree that his shop facilities are not adequate. The Erie and the Baltimore & Ohio, for instance, have found it necessary to send some of their locomotives to the locomotive builders to be repaired because their facilities are inadequate. This not only takes up valuable space of the locomotive builders' plants which should properly be used in building new locomotives, but it also increases the cost of repairs some two or three times, as the builders cannot repair power as economically as the owning roads. With the new and heavier locomotives that will be introduced this year the repair problems will become more serious. Much has been done already to increase the output of locomotive repair shops by working longer hours. Reports from 101 of the principal railroads of the country show that during February, 1918, the shop output was 8,390 as compared with 6,824 during the same month of 1917, an increase of 1,566. While this figure does not represent accurately the increase in production because of the classifications used in the different shops, it does represent the actual increase in locomotives which were repaired and put into service during that time. The return on the investment in improved shop and round-

Shop Facilities of Paramount Importance

house facilities will be much greater now than ever before. The engine terminals particularly are sadly in need of improvement. Lack of facilities here was responsible to a very large extent for the condition of the motive power last winter. Let everyone concentrate on providing facilities properly to maintain the power. It is far more important to the railways at this time than the development of standard locomotives.

For the past week the Fuel Administration has been renewing its complaints that coal production is being retarded by the shortage of the car supply. No one can deny the fact but the way in which the Fuel Administration handles the facts seems calculated for the purpose of placing the blame on some one else rather than as an effort to explain what the true situation is. The Railroad Administration apparently has refrained from engaging in a controversy on the subject, but on Monday of this week, after Dr. Garfield had issued a statement based on a sharp reduction during the first week in April, it issued figures showing the number of cars of coal of all kinds loaded since the first of the year, which indicate a rather creditable performance in overcoming the handicap of the unprecedented weather of January. During the week ending April 6, according to the Geological Survey preliminary figures, there was a reduction of 14 per cent in the production of bituminous coal as compared with the previous week. This was attributed in the report largely to the holiday on April 1. Dr. Garfield attributes it largely to shortage of transportation. The report shows that with the exception of that week coal production had been above last year's average since the middle of February and the Railroad Administration's figures show that although there was a decrease of 79,000 earloads in the volume of coal loaded in January, there was an increase of 31,000 cars in February, of 46,000 cars in March, and of 7,750 cars in the first week of April. There has, therefore, been an increase of 6,441 cars so far this year. While the increase is small, it should count for more than the figures for one week's loss to which Dr. Garfield calls public attention.

No organization has been more emphatic in its expressions of loyalty to the government in the prosecution of the war than the Chamber of Commerce of the United States, which held its sixth annual meeting at Chicago last week. No class of men recognize more keenly the necessity for unified support of the administration in whatever policy it pursues than the business men of the country. Nevertheless, the transportation problem is such a vital one at this time and so far-reaching in its effects on the life of all interests in the nation that the business world has come to recognize it as a question intimately connected with its affairs and one demanding its closest attention and study. It was therefore not in the spirit of criticism but in the hope of offering helpful suggestions to the Railroad Administration in meeting the complex difficulties confronting it that the Chamber of Commerce of the United States passed certain resolutions voicing the sentiment of the organization on the railroad problem as it exists at the present time. The resolutions point out that railroad equipment is inadequate for present traffic and threatens to become so insufficient during the coming autumn and winter as seriously to restrict the industries and trade of the country. While standardization of cars and locomotives is recognized as important and meriting careful consideration, the Chamber urges the imperative necessity of placing orders for equipment at the earliest possible moment so that the increasing

traffic resulting from war demands may be handled expeditiously and without hindrance to the steady flow of supplies to seaboard for shipment to Europe. In questioning the advisability of further delay to locomotive and car manufacture through standardization, the Chamber has courageously struck at the crux of a problem which is weighing heavily upon the minds of both railroad officers and railway supply manufacturers at the present time. Its recommendations should and will, no doubt, gain the attention of the director general of railroads.

A meeting of various representatives of short line railroads was held with John Barton Payne at Baltimore on April 11. Mr. Payne, as the general counsel to the director general of railroads, discussed with the representatives of the short lines some of the problems that are involved under the bill as finally passed, providing for the government taking over the railroads. When the bill was under discussion, Director General McAdoo made it plain that his intention was to take over only such short line railroads as would prove necessary or profitable to the government. Congress then amended section 14 with the evident intention of providing that the government must take over the short lines as well as the larger roads. It would appear, however, from the somewhat general and rather indefinite statements of Mr. Payne, that the government believes that under the clause which provides that it can give up roads which it does not need if action is taken before July 1, in practice the government can avoid being burdened with the short lines. Under private management the short lines were able to drive a fair bargain with the larger roads with which they connected for a division of rates by threatening to divert traffic or to appeal to the Interstate Commerce Commission. With the government in control of the large roads, neither of these alternatives would be available. Quite a number of the short lines are now unprofitable and, if the present comparatively fair division of rates were to be abandoned, as Mr. Payne implied would probably be the case, many more would be unprofitable. Is the government going to prevent the owners of these roads from tearing them up and selling them as junk? To refuse to support them and yet to refuse to permit their abandonment would seem less than just. This is the question which ought to be decided at once. It would appear only fair that the government make some equitable arrangement with the short lines in accordance with the spirit of the amended section 14, or else, if the roads are not necessary to the government, permit their abandonment and sale as junk.

C. A. Greenough, vice-president of the Baldwin Locomotive Works, in a paper on Economy in Maintenance and Operation of Locomotives read before the Western Railway Club, presents in a diplomatic manner arguments in favor of and against locomotive standardization. The parts of his paper which deal directly with the subject are published elsewhere in this issue. For standardization he says: "Interchangeability between railroads, the possibility of some rapidity of construction, interchangeability of parts, and a somewhat lower cost." His arguments against standardization deal with the inadequacy of the standard locomotives to meet some requirements. He suggests the possibility of "discarded power" being purchased to meet conditions requiring lighter locomotives than those contemplated in the standardization program. He classes as "negative economy" the use of the

Increase in Coal Loading

Hard on the Short Lines

Chamber of Commerce on Railroads

Another Baldwin Man Speaks on Standardization

heavy government standard locomotives for roads which have been in the past and are now equipped to use heavier locomotives than those considered by the government. He speaks of the radical changes that will be necessary in the construction of the standard locomotives for roads burning anthracite coal. He also mentions the fact that the standard designs have necessarily been cramped to conform to the minimum clearances of all roads. He says standardization ignores the various physical and climatic conditions which exist in this country. He tells of how standardization on the Pennsylvania and the Harriman Lines has not been entirely successful "because growing needs for larger and more efficient power and the improvements in the permanent way have invited and made possible increases in the sizes and capacity of locomotives." The *Railway Age* joins with him in his final statement: "The problem now before the administration is to decide whether or not the criticisms in favor outweigh those against the proposed standardization, and we all await the decision with the keenest interest and we all hope the decision, whatever it may be, will prove for the best." We sincerely hope that as much consideration will be given arguments against standardization as for it. We sincerely hope that the whole problem of standardization will be considered from the broadest angle, and that the decision will be governed by the part the railways are to play in winning the war.

Stand to the Colors!

THE GERMANS, as if by pre-arrangement with the Liberty Loan Committee, are staging today history's most impressive demonstration of the price of liberty. While we at home are being importuned to invest to our individual limits in a third Liberty Loan, the super battle in Flanders is lighting the eastern sky with letters of flame. "Liberty needs every man and every dollar. Stand to your colors now, children of light, or forever lie prostrate in the muck of Prussian dominion."

It is impossible to exaggerate the crisis before us; it is impossible to overestimate the value in such a crisis of huge oversubscription to the Third Liberty Loan. For the purposes of the present battle it will provide an irresistible moral stimulus so vital in that last quarter of an hour in which battles are won. For future battles, possibly even for this one if it lasts as long as some military experts are predicting, it will furnish an abundance of the men and materials without which we must wage war with gestures.

We do not need to go about wringing our hands in apprehension of the doom that threatens in Flanders and Picardy, nor need we permit our anxiety to interfere with food or sleep. A stiff upper lip and a serene attention to the task in hand are the American's duty in the present hour. But at the same time he should face the facts like a man and not like an ostrich. And the facts are grave.

Germany is plunging for the channel ports as she did after Antwerp, only with vastly greater force and a more desperate determination. Could she gain control of these she could so seriously interfere with further British efforts in France as to render them negligible. She might then turn her military steam roller to the business of crushing the unspcakably heroic French army, and from her multiplied bases she might unleash such a cloud of U-boats as would starve the United Kingdom and sever America from Europe.

These are the immediate possibilities of German victory in the present offensive. Like the desperate military gambler he is, the Kaiser is playing for huge stakes. He is pyramiding his bets in men with every reverse. He is committed irrevocably to a triumph on the western front, and

he will not cease to dash his hordes against that barrier of brave men which stands between us and the hideous night of Prussian tyranny until his defeat is too conclusive to permit of further argument.

The United States has its own men in that first line of defense. General Foch, commander-in-chief of the forces of liberty and civilization, has brigaded them with the British and French. The forces of the Allies at the front have been pooled to meet the shock, and now we at home are asked not only to back up our boys in the hell of Picardy and Flanders but to pool our unimpaired resources with the vast accumulation of Allied material built up through more than three years of the kind of pressure which we are experiencing today. We cannot be blind to the urgency; we cannot resist the plea.

"Our hearts, our reason," said Kipling recently to the people of Folkestone, "every instinct in us that lifts us above the mere brute, show us that the war must go on. Otherwise earth becomes a hell without hope. The men, the ships, the munitions must go forward to the war, and behind them must come the money, without which nothing can move. Where our hearts are there must our treasure be also."

The Rising Flood of Railroad Expenses

BEFORE GOVERNMENT CONTROL was adopted the operating expenses of all the railways of the country were increasing at a portentous rate. It was anticipated that this increase would continue, whether private control was continued or government control was adopted.

This anticipation is being fully verified. In January 172 roads had a decrease of \$13,605,871 in operating revenue and an increase of \$54,368,138 in operating expenses, as compared with the same month of last year, resulting in a decrease of \$67,974,009 in net revenue. Both the decrease in earnings and the increase in expenses were largely due to weather conditions, but a large increase in expenses would have been shown if the weather had been normal. In February 117 roads, for which statistics are available, had an increase of \$14,127,521 in operating revenues. This indicates that these roads handled more business than in February, 1917. The weather in February, 1918, was better than it was in the same month of 1917. Nevertheless, in February of this year the operating expenses of these roads were \$31,430,210 more than in the same month of last year, the result being that their net revenue was \$17,302,689 less than last year. In the two months 117 roads had an increase in operating expenses of \$64,300,000.

It is a significant fact that in both months large increases in expenses were shown by the railways in each territory—eastern, southern and western—the result being that in eastern territory the railways failed by large amounts to earn their operating expenses, while in both the south and the west there were heavy reductions of net revenue.

Everybody agrees that the main thing for the railways to do now is to move as much business as possible, and it is gratifying to find that they actually did move more in February, 1918, than in February, 1917. But second only to the moving of the maximum possible business is the importance of keeping down operating expenses. With expenses mounting as they have been, and with large advances of wages impending, it is evident that the Railroad Administration is in danger of being confronted with a huge deficit. The Railroad Administration has ordered various changes which will tend to save money. The most important of these, from the standpoint of economy, is the abolition of the outside traffic agencies, which have been maintained for competitive purposes, and which have cost the railways about \$25,000,000 a year.

But in the face of the rising flood of expenses, such sav-

ings as can be made by eliminating advertising, closing outside agencies, and requiring the companies to pay corporate and financial expenses from their guaranteed compensation will be comparatively negligible.

The really large economies always have been effected in this country by increasing carloads and trainloads. The Railroad Administration can continue to do these things; and it also has the advantages, which the railway managements under private control did not have, of being able to operate terminals jointly and to send traffic over the most direct routes.

For the last twelve years the railway managements have been engaged in an incessant struggle to effect economies which would offset the enormous advances in wages. Within recent years, to continued advances in wages, there have been added great increases in the prices of fuel, equipment and materials. The railway managements long were largely successful in effecting the needed economies. Before government control was adopted, however, the increases in expenses had begun to come so fast as to be overwhelming. The railway managements repeatedly appealed to the government regulating authorities for assistance and relief, but they either did not get adequate assistance and relief, or they always failed to get them in time. Now that the government itself has assumed control of and responsibility for railroad operation, perhaps government officers will come to a fuller and juster appreciation of the ever-increasing difficulty of the problems with which railway officers have been wrestling.

Meantime, railway officers, as far as they are given opportunity, should apply themselves with their old-time energy and efficiency to fighting expenses. That a large advance in rates will be required to save the government from having a heavy deficit appears certain; but railway managers should and undoubtedly will strive to make the advance in rates required as small as possible. The well-being of the public, the reputations of railway officers themselves, and the future welfare of the railways demand that they shall do so. As to the Railroad Administration, it should recognize the fact that the railway managers cannot do their best without adequate incentive and full opportunity.

Expedite the Rail Program

IN NORMAL YEARS, at this time, most of the roads have a large part, if not all of their season's purchases, of new rail on hand and distributed and have gangs at work putting it into the track as fast as possible. This year almost nothing is being done in this direction at present, although there is a greater need for prompt action than ever before. As the ordering of new rail and the authorization of programs of renewals involving charges to capital of any magnitude are now concentrated in the hands of the director general, the railways are unable to proceed with much of this urgent work until permission is received from Washington.

The roads have emerged from one of the most severe winters in their history, as a result of which the wear and tear on tracks has been particularly heavy. Furthermore, for the last year the roads have been handling an enormous traffic and as wear on rail is largely proportionate to the tonnage passing over it the depreciation has been more rapid than normal. This condition follows several years of inadequate rail replacements. As indicated in our issue of April 5, page 912, the rails rolled for domestic consumption during 1914, 1915 and 1916 averaged over 825,000 tons, or 28 per cent less than the average for the period of 1902 to 1913 inclusive. Considering the fact that the latter part of the period ending with 1913 was one of reduced railway earnings and that the mileage of tracks is increasing each year, it is evident that there is now an accumulated deficiency of several million tons of rails. One close student of this subject has placed

this figure as high as 10,000,000 tons, or more than the normal tonnage rolled in three years.

The present inactivity is disquieting in view of this large accumulation of deferred maintenance. The steel mills still have on their books a considerable tonnage of rails contracted for 1918 delivery. However, many roads have no rails on order and the director general has issued instructions that all rails will be ordered though the central purchasing department so that these roads are now without authority to order the rails so sorely needed. Furthermore, the steel mills themselves are working very largely under priority instructions, which determine the products to which they shall give attention. As a result, in spite of the fact that this is the season at which they should normally be rolling rails to capacity in order that the roads might get them into the tracks, they are now turning them out only to about 25 per cent of their capacity.

It may be worth while in this connection to call attention to steps which Canada has been forced to take to meet a similar, although somewhat more aggravated, situation, which has resulted from failure to make the normal renewals during the last three years. Following the outbreak of the European war in 1914 the Canadian steel mills came under the direction of the Canadian government to the extent that the products which they should turn out were specified. As a result attention was concentrated almost entirely on war materials to the exclusion of rails and other railway supplies. Last year the roads secured an emergency order for the rolling of a small tonnage of rails to tide them over. However, conditions have continued to become so acute that many tracks have been taken up to supply materials for service in others. Within the last few weeks the Canadian Minister of Railways has bought 37,375 tons of steel rails of 67.5 lb. section which were rolled in the United States for the Russian government, but which have been held at the eastern seaboard undelivered for some time. Although these rails are of a different section from any now used in Canada, they are being taken to relay branch lines from which heavier rails may in turn be released for main line use. Likewise the Canadian Minister of Railways has ordered 100,000 tons of 85-lb. steel rails from the Dominion Iron & Steel Company, which will be divided between the four principal roads of Canada, and has instructed this mill to work on them continuously until the order is completed.

While the railways of the United States have not yet been reduced to such sore straits a continuation of the present inactivity will hasten this condition very speedily. If the delay in ordering rails, in rolling those which are now ordered, and in granting authority for the laying of those which are now available is long continued it will be extremely difficult if not impossible to get the requisite tonnage into the tracks this year.

Furthermore, with the prevailing shortage of labor which will become more acute as the season advances, it will be impossible for the roads to build up and retain adequate forces if they come into the market after other employers have secured the best, if not all of the men. Even where it may be possible to recruit the necessary forces later, the decreased efficiency of the men then available and the more adverse working conditions during the hot summer months will add materially to the cost of the work.

Maintenance of way work of all classes is being allowed to lag this year, when of all years it should be pushed to the maximum. While the time already lost cannot now be recovered it is imperative that every possible step be taken to expedite the work from now on in order that the roadway and tracks may be placed in as good condition as possible to handle the abnormally heavy traffic which it now has and probably will continue to be called upon to carry. A large part of the more important maintenance of work is seasonal in character and a day lost now is more important than a week in the fall or winter.

Chamber of Commerce of U. S. Sounds Warning

Points to Danger of Further Delay to Manufacture of Railroad Equipment Through Standardization

RESOLUTIONS PASSED by the Chamber of Commerce of the United States at its annual meeting at Chicago last week indicate that business men recognize the railroad problem as a vital one in our national life and that they are taking a keener and more intelligent interest in transportation than ever before. They see the necessity of providing against a repetition of the railway crisis of the past winter and urge that standardization is secondary in importance to the prompt placing of orders for locomotives and cars. They also recommend the unified operation of railway terminals and the calling of a conference at some future date at which representatives of all interests affected by transportation can voice their views on the proper organization and control of the railways following the termination of government operation. All of the resolutions passed which bear on the transportation question follow:

Transportation Necessities

Resolved. That the Chamber of Commerce of the United States urge upon the Director-General of Railways the favorable consideration of the following suggestions relating to present pressing transportation problems:

(1) The efficiency of the railroads depends in large measure upon the unified control and operation of terminal facilities. To accomplish this effectively it is recommended that the operation and use of the railroad terminal facilities in each large city be placed under the supervision and control of a single competent individual.

(2) Railroad equipment, including motive power and car supply, is inadequate for present traffic and threatens to become so insufficient during the coming autumn and winter as seriously to restrict the industries and trade of the country. The public interests urgently require the promptest possible placing of orders for locomotives and cars in sufficient numbers to provide the transportation that the country must have in order to prosecute the war vigorously.

(3) While the standardization of railroad equipment is important and merits careful consideration, it should be recognized that standardization is secondary in importance to securing as quickly as possible the locomotives and cars required to handle the increasing traffic that must be transported in order to keep the industries of the country in full operation and to maintain the steady flow of materials to the seaboard for shipment to Europe.

Railroad Conference

Whereas. The Chamber of Commerce of the United States recognizes the vital importance of developing a definite public opinion as to the best methods of conducting the transportation service of the Nation, after the conclusion of the present government control;

Resolved. That the Board of Directors of the Chamber of Commerce of the United States be requested to call a conference which shall be truly representative of all the interests of the Nation—financial, industrial, commercial, agricultural, civic and social—affected by transportation, such conference to be called for such time and place as in the judgment of the Board seems advisable.

The purpose of this conference shall be to consider the broad aspects of the transportation problem and the formulation of a basis for the control and operation of the transportation facilities of the United States after the conclusion of the present government control.

Waterways and Highways

Whereas. It is apparent that the present traffic burden is beyond the capacity of the railroads, and that the vigorous and successful prosecution of the war is hampered thereby; that it is therefore imperative that our great rivers, canals and inter-coastal water routes, as well as our main highways, should be worthwhile used to move freight;

Be it therefore resolved by the Chamber of Commerce of the United States that the government, through the President and the Director-General of Railroads, be petitioned

(1) To organize and operate existing equipment and construct new equipment for use upon the inland and coastwise waterways in accordance with the authority recently conferred by Congress in the Transportation bill.

(2) To complete trunk highways for heavy traffic where they can be useful in relieving railroad congestion.

(3) To adopt a permanent policy, assuring co-ordination of railroads, water routes and highways for traffic service.

The meeting of the transportation section of the Chamber of Commerce of the United

States took place in the Elizabethan room of the Congress hotel, Chicago, on April 11, with an attendance of about 250. Harry A. Wheeler, chairman of the Committee on Railroads of the Chamber, presided at the session devoted to railway transportation, and F. A. Seiberling, president of the Goodyear Tire & Rubber Company, was chairman of the subsequent session on highway transportation. Four papers were read at the railway session, one of which, on "Motive Power" by Alba B. Johnson, president of the Baldwin Locomotive Works, was published in the *Railway Age* of April 12, page 965. The other addresses were on "Terminals" by John F. Wallace, chairman of the Chicago Railway Terminal Commission; "Car Supply" by Samuel O. Dunn, editor of the *Railway Age*, and "Extensions" by Francis H. Sisson, vice-president of the Guaranty Trust Company, New York, and formerly assistant to the chairman of the Railway Presidents' Advisory Committee at Washington, D. C.

Supreme Devotion An Inspiration Buy Bonds! Sacrifice Till It Hurts!

Washington, D. C., November 21, 1864.

Mrs. Bixley,
Boston, Mass.
Dear Madam:

I have been shown in the files of the War Department a statement of the Adjutant General of Massachusetts that you are the mother of five sons who have died gloriously on the field of battle. I feel how weak and fruitless must be any words of mine which should attempt to beguile you from the grief of a loss so overwhelming. But I can not refrain from tendering to you the consolation that may be found in the thanks of the Republic they died to save. I pray that our Heavenly Father may assuage the anguish of your bereavement, and leave you only the cherished memory of the loved and lost, and the solemn pride that must be yours to have laid so costly a sacrifice upon the altar of freedom.

Yours very sincerely and respectfully,
Abraham Lincoln.

Francis H. Sisson's paper on Extensions is given below:

Laying the Rails for Future Business

By Francis H. Sisson,

Vice-President, Guaranty Trust Company of New York.

For a period of 30 years, with an increasing intensity of action, this country has pursued the policy of constriction and starvation towards its arteries of commerce, through which the life blood of the body economic must flow. Sclerosis and paralysis inevitably followed.

The present government control of the railroads, while representing a progressive step, cannot be considered as offering a solution; it is a temporary and extreme measure, forced by the exigencies of a great crisis for which there had been no preparation.

The incalculable importance of the railroads in every phase of our individual and national existence was dramatically, I might even say tragically, demonstrated last winter, when the grim spectres of cold, hunger and want stalked in the wake of transportation paralysis. Never before in our history have we so thoroughly appreciated the importance of distribution as an economic factor. It is to be hoped that we shall never forget this costly experience.

The demands of war, sudden and colossal as they are, have not been responsible for this deplorable state of affairs; they merely accelerated and accentuated the inevitable result which would have come sooner or later under existing conditions. We are simply reaping the harvest of a decade of railroad baiting born of ignorance, prejudice and political expediency, which, as a people, we did not understand, and the consequences of which we did not anticipate.

Punishment visited on the many for the sins of the few, the reduction and limitation of rates, the multiplication of regulations and regulating bodies, the increase of taxes and impositions, the rising costs of labor and material, have for the last 10 years added new bonds to bind this modern Gulliver of ours, until he lay helpless, the victim of those he should live to serve. The strong hand of the government, in taking over the railroad situation, has released many of these shackles, and by co-ordinating direction and operation is restoring that ability to serve which had been denied the achievement of its purpose.

But the foundations for the unprecedented economic struggle which inevitably will follow the present armed conflict must be laid now. We were woefully unprepared for war; we dare not be equally unready for peace. And one of the chief factors in preparing for the future unquestionably is that of railway extension; for the carriers will play as important a part in helping to win the battles of the prospective international combat in trade fields as they are today in speeding our military strength to the battleline of freedom for the victory which democracy must and will win.

Are these great weapons in our commercial warfare to be privately or publicly owned and operated? Why have they not been equal to the occasion and how can they be made so? Can preparations for the future be made in the light of the past?

It is certain, if we are to have private ownership of transportation, the cornerstone of the foundation of our future facilities must be the restoration of railway credit. The companies must be enabled to raise the means to develop those much needed facilities adequately. The folly of the government's attitude toward the railroads in the past has been strikingly exemplified in the policy of restricting the earnings of the roads without any guarantee of return to them. Naturally the result was to undermine railway credit and to rob the companies of the only source at their disposal for increasing their services to the public.

The increase in the population of the country in the ten years from 1908 to 1916 was a little less than 20 per cent. A commensurate increase in commercial and industrial ac-

tivity to meet this growth and the new conditions we face will require a proportionate increase of ton mileage per capita which can only be made possible by an increase in railroad trackage. Such extension can be made possible only with private capital, which will not be attracted to the railroad field until that field is put on a par with others.

The demands of war must be met at whatever price they exact, and there is no doubt that the government will proceed as far and as rapidly as possible to meet them. It is imperative to do so. But one cannot help thinking of the incalculable advantage which the government would have at present in speeding up our martial activities if the roads had been allowed sufficient return on the capital invested in them to have made the proper extensions and to have provided the necessary equipment. Money, materials and men which now could be devoted to the production of munitions will have to be allocated to the improvement of our transportation facilities. And every productive resource, every minute, is precious.

But this unfortunate state of affairs should have a beneficial effect. It ought to impress upon us the need for wiser provisions, particularly with reference to intensive development in order to cope with the problems which will be created as soon as peace is declared.

Unless the government's future policy toward the railroads is such as to insure fair regulations and just returns, which will be absolutely essential if new capital in sufficient quantity is to be attracted to the extension of our transportation facilities, the development of our great resources in the West, Northwest and Southwest will be arrested. And the retarding of such development now, of all times, would be a national economic disaster.

During the remainder of the war, the government and industry will not be able to spare the productive energy to make these extensions. At best there will be an increase in the amount of equipment, and a co-ordination of railway lines and of terminal facilities will undoubtedly increase the ability of the railway system to carry a larger amount of traffic.

Under-maintenance of the existing roads is likely to be the characteristic feature of the operation of the railroads during the war, and it will mean that on the return of peace American railways will have to put a great deal of money into improvements and betterments and into extensions of the lines in order to catch up to the demands of the business of the country. It is roughly estimated that for every dollar of increased gross return, \$5 should be spent in extensions and improvements.

Construction work of any character at the present time would draw money, materials and labor from the more pressing and immediate needs of war. But we can and should plan for them at the earliest possible moment, and in the meantime we should make adequate provision for the maintenance of the roads, for unless the roads are properly maintained, new extensions would be almost futile.

The government should definitely protect holders of American railway stock by providing that the money equivalent of maintenance expenditures, plus a deferred maintenance reserve (which ought to be established) for each year of government operation, should bear a relationship to the average monetary expenditures of the railways for maintenance for 1915, 1916 and 1917, as indicated by the increased cost of maintenance materials in each year of government operation, as compared with the average cost for those three years.

One vital fact is apparent today above all others; the scepter in the railroad world has passed out of the hands of the railroads' executives and the bankers who financed them. The American people control the situation through their political representatives, and they will determine the whole course of the future. The burden of right decision

ties with them, and they will suffer, or prosper, in accordance with the wisdom shown.

No class of people will exercise so powerful an influence in reaching this decision as the shippers; they must learn, if they have not learned already, that the thing of most vital importance to them is getting their goods to market. The prices at which this service is rendered are incidental to having such service prompt and adequate. The long struggle of the shippers to hold down rates in defiance of the economic trend of the times, and the obvious necessities of the railroad situation, has worked the undoing of the shippers, as well as of the railroads, and they are suffering under the situation they themselves have largely caused. To serve their own ends in the future, they must take a constructive attitude toward the transportation question, and lend a hand in the successful solution of the problem.

It is obvious that we should adopt a definite, comprehensive and adequate policy for developing our railroad extensions, a policy based upon definite, determining factors. Our railroads must keep pace with our industrial expansion; it is imperative that this relationship be strictly maintained. Our transportation facilities must not be outstripped by the growth of our population; they must, in fact, respond fully to the increasing needs of our people. In other words, if we would avoid a repetition of the economic strain through which we have just passed as a consequence of the transportation situation, our railway extension policy must be directly predicated upon the increases in our population and our business.

Various suggestions of a central federal corporation, regional holding companies, government guarantees and plans calling for profit sharing with the government above a fixed return have been frequently made. Somewhere along this line of thought lies a rational solution. It is very certain that the old days of enforced competition, anti-trust laws, anti-pooling laws, conflicting state regulation, wasteful competition, duplication of service, would not be permitted by a public alive to its own interests.

It seems equally certain that government ownership would not be permitted if the public were equally alive to its real interests. The hour has arrived for the suggestion of some plan which will be ready for adoption when the crisis of war has passed, and the pressing needs of business demand the return of normal business conditions, and the operation of economic, rather than martial law. Somewhere, within the meaning of the words "co-operation" and "partnership" lies the answer. The public interest in transportation is paramount and must be protected, but public interest and

private interest need not be in conflict if intelligently regarded.

Regional companies representing both private and public capital under private operation with governmental participation in the management and earnings above a just guarantee would seem to assure the necessary extension of railroad facilities. In unity of interest and understanding progress towards the desired goal should be possible.

Problem of Car Supply Serious

Mr. Dunn spoke on the subject of Car Supply as follows:

Business men naturally are profoundly concerned at this time regarding the question of how nearly adequate to the demands the supply of railroad transportation will be the rest of this year, and, in fact, during the rest of the war. The subject assigned to me, as it appears on the program, is "Car Supply." I assume it was intended that I should discuss this subject in its broader rather than in its narrower aspects.

During the last 11 years we have become accustomed to the use of the terms "car surplus" and "car shortage." The transportation conditions denoted by these terms have not, however, been solely conditions of car supply. They have been conditions of transportation supply in the broadest sense. Paradoxical as it may seem to the uninitiated, you might actually have an excessive supply of cars upon the railways, and at the same time have reports and complaints of car "shortage" throughout the country. You may theoretically have sufficient cars for all transportation purposes, and yet have so many accumulated at seaboard ports or in terminal yards, or in the hands of shippers, for loading and unloading, that the total requisitions made by shippers will exceed the number of cars the railways can furnish to them. These conditions may be due to inadequate facilities for loading and unloading cars, or to inadequate locomotive power, or to inadequate track or terminals. Such conditions actually have existed repeatedly.

In other words, car supply is not transportation supply. It is, however, an indication of the condition of transportation supply, and, in fact, is the best indication of it that we have. Now, it is hardly necessary to tell this body that, as indicated by the freight car supply, there has been in this country for two years a serious deficiency of railroad facilities. On March 1, 1916, for the first time in 21 years the American Railway Association reported a net shortage of cars. This was due mainly to weather conditions and to an acute congestion at the eastern seaports. It soon disappeared and did not return for five months. On September 1, 1916,

Railway Men will Do Their Share

By William Sproule

President, Southern Pacific

The Third Liberty Loan is the third line of reinforcements in money for the support of the fighting fronts. The rank and file of railroad men know that it costs daily an immense sum for the upkeep of a railway system, and a railway system is not unlike an army system. A railway system combines large organization and healthy discipline with commercial flexibility; hence to railroad men the appeal is specially strong that money is the sinews of war. It is further enforced by the constant lessons they receive and practice in operating economies to avoid the waste of money. It finds them ready to perceive that it takes money to organize and maintain armies. As trained men in a system of highly developed organization intended for the pursuits of peace they are quick to realize the importance of adapting the organization now to pursuits of war also, and they are quick to see that military organization for purposes of war is akin to railroad organization, but on a complex, vast and strenuous scale.

By natural process, therefore, the mind of the railroad man gives easy access to the idea that underlies the Liberty Bond; namely, that we are fighting for our personal and industrial freedom and that it takes money in continuous flow to win the fight. The railroad man travels freely by virtue of his calling and knows the great extent and resources of this nation better than the average man, and he is a dullard who does not soon acquire for his country that admiration which is the essence of love.

The men of the rail have volunteered for the railway regiments and have met their country's call in a way that shows they will do their share in the Third Liberty Loan and will do it heartily.

however, a net shortage was reported again; and net shortages varying from 34,000 to 149,000 cars have been reported in every month since. This unbroken continuance of car shortage for over 20 months is without precedent in the history of American railroads.

The reasons for it become apparent when the records of increase in traffic, on the one side, and of development of facilities, on the other side, are compared. Never were there known such augmentations in the volume of business offered to the railways as have occurred since the fall of 1915. The freight traffic actually moved in the calendar year 1916 exceeded that handled in 1915 by 25 per cent, and exceeded that handled in the previous record year, 1913, by 20 per cent. Never before had there been an increase in one year exceeding 16.5 per cent. In 1917 there was a further increase over 1916 of about 10 per cent. The increase of 1917 over 1915 was 40 per cent and over 1913, 23 per cent.

What changes were occurring, meantime, in the car supply? As you know, there was a heavy decline in railway traffic and earnings in 1914, and a further decline in 1915. Owing to the fact that this was accompanied by advances in wages and other expenses, the net return earned by the companies on their cost of road and equipment was reduced in 1914 and 1915 to the lowest basis that had been reached since 1899. This reduction in net return caused the railways to buy such a small amount of equipment that in 1915 there were 7,343 less cars in service than in 1914, while in 1916 there were 22,292 less than in 1915. The average capacity per car advanced meantime, and in each year there was an increase in the total tonnage capacity of all cars. But the increase in the total tonnage capacity in 1916 over 1914 was less than 2 per cent, while the increase in 1916 over 1915 was less than 1 per cent. It was not a coincidence, but a correlative development that in 1915 the number of locomotives in service was 815 less than in 1914. In 1916 the number was 946 less than in 1915. There was a small increase in the aggregate tractive power of locomotives.

Considering the tremendous increase in traffic in 1916, and the actual two years' decrease in the number of cars and locomotives in service, it was not surprising that there developed in 1916 an acute congestion of traffic and shortage of cars. In the latter part of the year 1916 and the early part of 1917 there was considerable activity in the construction of equipment, and consequently the statistics show that on the average the number of cars and locomotives in service in 1917 was greater than in 1916; but, compared with the increases in volume of traffic, the increment in cars and locomotives was almost negligible. In 1917 there were only 3 per cent more freight cars and 1 per cent more locomotives in service than in 1916. After this country entered the war, for reasons which all know, it became impossible for the railways to get many new cars and locomotives. It is almost strictly accurate to say that the roads handled the enormous traffic of 1917 without any more cars and locomotives than they had three years before. Furthermore, many of the cars and locomotives used were such as under normal conditions would have been sent to the scrap heap.

We come now to the conditions of 1918. At this point we open a new chapter in the history of American railways, for here their operation was placed under government control. There are not as yet available any statistics showing the amount of traffic which has been handled thus far this year. We do know, however, that owing to weather and other conditions, the business handled in January was less than in January, 1917. We also know that on March 1, the net shortage reported was over 138,000 cars. This is one of the largest net shortages ever reported. Furthermore, it existed in spite of the fact that numerous embargoes are being enforced which cause shippers to refrain from ordering cars which they otherwise would requisition. In other words, if it were not that many shippers know that it would do

them no good to ask for cars, it is probable that the number of cars asked for would be much larger than it is, and that therefore the net shortage reported would be much greater.

Are we going to get any relief from this situation, and if so, how and when? Theoretically, relief might be obtained by operating the present facilities more efficiently, or by providing additional facilities, or by both means.

It would seem that it ought to be possible under government control and unified operation to utilize the existing facilities more efficiently. If more efficient utilization is secured, it must and will be expressed in terms of more traffic handled with each locomotive and each car. You may secure this greater service from each locomotive and car either by moving traffic over routes which are shorter between the points of origin and of destination than those heretofore used, or by loading each car and each locomotive heavier without reducing the average speed with which they are moved, or by both means. Many people believe that a large increase in efficiency will be secured by moving traffic over the shortest practicable routes. But in periods of heavy traffic the shortest routes between important terminals can handle only a comparatively small part of the total business; and the bulk of the business must be allowed to overflow into longer and longer routes until all routes may be filled up. While a gain may be made by re-routing traffic it would be easy to exaggerate the increase in efficiency which will or can be obtained by this means.

It probably is still true, as it has been in the past, that the most sure and feasible means of increasing the efficiency with which facilities are utilized is to load and unload cars as promptly as practicable, and to load both cars and locomotives as nearly as practicable to their maximum capacity. Doubtless more can be done along this line, but those who have closely followed the tremendous efforts which have been made year by year, and especially during the last two years, to increase the amount of traffic handled with each car and locomotive are likely to conclude that it is going to be a very difficult matter to so operate existing facilities as to cause them to handle any considerable larger amount of traffic in the near future. The facts appear to be that, as a result of developments during the last dozen years, and especially within recent years, with which you are all familiar, the growth of the country's transportation capacity has been much less than the growth of its productive capacity, and that there is no real remedy for the conditions resulting except an increase of transportation facilities.

What are the prospects of an early increase of facilities? Let us survey especially the situation with respect to freight cars. Cars, like most other things, wear out, and the statistics bearing on this matter indicate that in order merely to prevent an actual reduction in the number of really useful cars in service it is necessary to build at least 125,000 cars a year. The number built in 1917 was 119,000. Consequently, there are just about as many cars in service now as there were last year. Under normal conditions our car building plants could, perhaps, turn out upward of 250,000 cars in a year, but practically their capacity is limited at present by their ability to get materials and labor, especially materials. As I have already remarked, we have a large car shortage at present. The crucial period in every year's railroad operation comes in the fall and winter. Will there be before that critical period comes this year any considerable increase in the number of cars available? Since January 1 only 5,000 cars have been ordered, and they have been ordered to be built in the shops of one of the railways which has not yet financed the undertaking. The car builders have been working thus far this year on orders, both foreign and domestic, received last year. Practically all orders will soon be filled. The total cars built under them for domestic use this year may amount to 25,000.

The Railroad Administration, as you know, is preparing

to place an order for 100,000 cars. The material situation is such that if this entire order were placed today it would be practically impossible for the builders to begin to turn out the new cars before August 1. It would take them three months to procure their materials and get to work. They would then have six months of the year left. It has been estimated to me by a very high authority that it is highly improbable that all the car builders can build more than 8,000 or 10,000 cars a month. It would appear then that if they should be given the order for 100,000 cars now they could hardly build more than 50,000 or 60,000 of them before January 1. This would make the total year's output of cars for domestic use 75,000 to 85,000, as compared with the minimum of 125,000 which it is necessary to build merely to maintain the existing supply of equipment. It would appear, therefore, that there is likely to be during this year, as there was in 1915 and 1916, an actual reduction of the number of cars in service. Furthermore, not more than 30,000 to 40,000 of the new cars the Railroad Administration is planning to order can possibly be built in time to be available for service when the crisis in the transportation situation comes in the late fall and early winter. Similar general conditions prevail in the locomotive field.

Very soon after government control was adopted it was forcibly and repeatedly pointed out by persons familiar with conditions and with the normal course of events, in the transportation and the railway material fields, that it was extremely desirable for orders for locomotives and cars to be placed as early as practicable. The reasons for this were pointed out. What actually has been done? The Railroad Administration has prevented individual railroads from ordering cars and locomotives, and has spent several weeks in considering the question of standardization of equipment.

Having formulated its standard specifications, it is now spending additional weeks in negotiating with the railway equipment and supply manufacturers regarding the relinquishment of patents, the foregoing of royalties, and kindred matters which it seems neither right nor necessary to raise at this time. These delays in ordering cars are going to have a serious effect upon the number of cars built this year unless the orders for locomotives are placed soon. A similar effect will be produced in the locomotive field. If at the start the Railroad Administration had authorized the individual railroads to purchase their normal requirements of locomotives and cars in the usual way, giving them the backing of the government's credit, the prospect of an increase instead of a decline in the amount of available equipment during the year would be much brighter. The builder, before he can begin to build, must assemble his material and get his labor, and before he can do these things he must

know how many cars or locomotives he is expected to build. These things take time, and never did they take so much time as at present. Whether the Railroad Administration will in the long run save any money to the public by taking precious time to consider such questions as locomotive standardization and the relinquishment by manufacturers and inventors of their patent and royalty rights, is extremely doubtful; but that by doing so it is going to cause a slowing down rather than a speeding up of the transportation machine, when speeding up will be most necessary,

While I have dwelt chiefly on the car situation, because that is the subject specifically assigned to me, the locomotive situation is fully as serious.

A large part of the delays and congestions last winter was due to shortage of serviceable locomotives. Everything that ought to be done, but which is not done, to speed up the production of locomotives adapted primarily to the conditions under which they are to be operated will tend to cause a recurrence of the conditions which existed on our railways last winter.

We are in the midst of a revolution in the transportation business. Government control was adopted to save the railways from financial disaster and to speed up their operation and development so that they should be able to handle all traffic essential to carrying on the war and in addition as much other traffic as practicable. Perhaps it is unfair to say so, but to some observers it appears that in certain high places more effort is being made to effect a drastic and permanent change in the organization and methods of the railways than to so equip and operate them as to make them as rapidly as possible the most efficient transportation instrumentality possible for helping win the war.

What I have said about present and prospective conditions with respect to car supply is not adapted to cause

optimism regarding the transportation situation which is going to exist the rest of this year and in the early part of next year. It has not been intended to inspire optimism, but to present the facts. The two outstanding points with regard to the transportation situation seem to be that, first, the available freight traffic of the country is vastly larger than the railways can handle with present facilities and that, second, we cannot reasonably hope that under present conditions and with present methods the facilities will be materially increased for months to come.

In these circumstances it is necessary to do two things, first, for the railways and the shipping public to co-operate as closely and vigorously as they can to secure the best possible utilization of existing locomotives, cars and other facilities, and second, for the Railroad Administration, by vigorous use of embargoes and other methods, to give preference to traffic essential to carrying on the war and to providing

"Fight for Liberty"

By A. M. Schoyer

Vice President of the Pennsylvania Lines West of Pittsburgh, and Member of Liberty Loan Committee of Western Regional District

The Third Liberty Loan gives us another opportunity to show our President and our leaders that the railroad men—officers and employes alike—are behind the Government in this great "Fight for Liberty" to the limit of their resources and ability.

This Loan appeals to us even more than the others, because now we have our brothers and our friends at the front in engineer corps and fighting lines alike—because we cannot go ourselves, but must stay behind to keep the wheels moving in our efforts to move the food and munitions they need—and, because, being now ourselves cogs in the machinery of the United States, we are helping to make our own Government successful in its supreme effort.

From a selfish standpoint, the Third Liberty Loan offers us an opportunity for a solid investment with an adequate interest; and the Government's arrangements for subscription from railroad employes are so liberal that having saved the money through our economies we can pay it through the payrolls.

If we could make the railroad men's contribution to this Loan 100 per cent in point of number, and could see that every member of our families was represented in the list of contributors, we would be doing what must help encourage the Government and forward the great end of "Victory."

the public with commodities required for its subsistence and comfort. This will involve continuance of the denial of transportation to a large part of the non-essential businesses. The nation, by a narrow, unwise and unfair policy of railway regulation, prevented needed increases of railway facilities when they could have been made. It refused to listen to loud and repeated warnings as to the inevitable consequences. It must now in this terrible crisis pay the penalty for the injustices it has committed and the short-sightedness with which it has acted.

Now that the nation is paying the price of the policy of regulation it has followed, many persons who have a large and grave responsibility for having influenced the public to follow this policy are complaining that the railways have "broken down," and are attempting to put the entire blame for the alleged breakdown upon their owners and managers. Some of these architects of ruin are alleging that railway officers are "lying down" to discredit government control, an allegation equivalent under present conditions to a charge of treason, and advocating government ownership as the only solution of our railroad problem. The old order which they established having proved a melancholy and disastrous failure, they are becoming the prophets of a new, and as they contend, a holier dispensation.

It is rather difficult to believe that the American people will follow them farther. So long as the development of our railways under private ownership received encouragement instead of discouragement the expansion of railway facilities went on faster in this country than in any other in the world. In 1913 the freight cars of our railways had six times as much carrying capacity in proportion to our population as those of the railways of Germany, and they actually handled five times as much freight traffic in proportion to our population as did those of Germany—and the railways of Germany have relatively the greatest freight carrying capacity of any government-owned railways in the world. During the war we can do little to repair the harm our restrictive and repressive policy of regulation had done before the war. We can, however, inform ourselves of and disseminate the facts which demonstrate that private management is more conducive than government management to efficient operation and adequate development of railway facilities. We can insist that government control shall be used solely as a war measure, and not so as to make a return of the railways to private management almost impossible; we can apply ourselves to formulating a policy of private ownership and public regulation which, if adopted after the war, will cause the needed revival of the expansion of railway facilities; and we can devote some of our time to educating public opinion so that after the war there will be a chance to get a sane and constructive policy adopted.

Surely our transportation experience in the year before we entered the war, and in the year since we entered it, has taught us a lesson which we shall not forget after the war. This great body, representing all the large and important business interests of America, is ideally situated and ideally fitted to so educate and lead public opinion that the transportation conditions which now so greatly trouble us will be remedied, and their recurrence will be forever prevented.

Wallace on Terminals

Because of the unavoidable absence from the meeting of John F. Wallace, chairman of the Chicago Railway Terminal Commission, Edward L. Noonan, chief engineer of the Terminal Commission, read Mr. Wallace's paper on Terminals. An abstract of the address follows:

The terminal problem is really the big problem of our railroad transportation system and its solution will automatically solve most of our transportation complexities. While the total mileage of terminal tracks may not be too much—and in certain localities may even be insufficient—the rem-

edy lies not entirely in additional tracks but in a co-relation and readjustment of existing facilities and the operation within the terminal zone along lines that will secure the maximum of efficiency.

The investment in terminals more than equals the total investment in all of the railroad property outside the terminals. The investment in a recently constructed passenger terminal represented an amount sufficient to build a double track railroad—exclusive of secondary terminals—of a length equal to the length of all of the railroads entering that terminal.

Viewed from the standpoint of delays, the railway terminal becomes even a larger factor in the transportation problem. The average freight car travels about 25 miles a day. The average speed of a freight train between terminals is 10 or 15 miles an hour. It is therefore evident that the average freight car spends 12 hours in the terminal for every hour it spends between terminals.

Heretofore discussions as to the solution of the terminal problems of our country have been more or less academic. All of these discussions clearly pointed to the necessity of co-operative operation of railroad terminals and, in fact, of the railroad transportation system as a whole, but the railroads were without the legal authority to inaugurate this change. With the taking over of the railroads by the government it will now seem that if a proper treatment of the railroad terminal problem were worked out now the means were at hand to place this solution into practical operation. Important that the general public comprehend the fundamentals of the present transportation situation and the general nature of the changes in operation and control necessary to bring about a more efficiently operated transportation system. These changes will necessarily be of two kinds: First, physical changes in terminal facilities, and, second, changes in method of operation.

Following a discussion of the passenger terminal problem, Mr. Wallace took up the question of freight terminals.

In all modern city planning consideration has been given to the proper treatment of railroad properties. But more attention has been paid to the passenger than to the freight terminal. This has been due to the fact that the passenger station has always been more or less monumental and lends itself readily to harmonious architectural treatment in connection with other civic and governmental structures, while freight facilities have usually been accommodated in one-story, simple structures, intermixed with surface tracks.

Another reason has been—if this phrase can be permitted—that the passenger station has been in the front yard and the freight station in the back yard. Yet, as a matter of fact, in many localities existing superficial freight development has been the great barrier to the healthy and logical growth of municipalities.

The freight traffic of a railroad terminal is divided into c. l. freight and l. c. l. freight. Carload freight is divided into that which originates in or is destined to points in the terminal zone and that which is transferred from one railroad to another for hauling to points more or less distant from the terminal zone.

This interchange freight should receive first consideration. It frequently happens that a car of commodities consigned from a point in the West to a point in the East is handled successively by several railroads and at every place where it passes from one railroad to another it goes through a terminal, often passing through the hands of an intermediate company, occupying space in several yards, congesting interchange tracks and encountering days of delay.

The remedy for this condition is more direct routing—and a routing that will pass the car around rather than through the larger railroad terminals. Under present practice a car may be handled miles out of its direct course to destination in order to give a greater mileage to a preferential railroad. Frequently the shipper is equally guilty with the railroad for

this condition. The interest of economy demands that the car should pass in as direct a line as possible and with a minimum of delay from the point of origin to destination, over the most economic route.

The car originating in or destined to a point within the terminal zone is another problem, the solution for which is unified operation of railroad terminals. At present each railroad has its own system of tracks and terminals within the terminal zone and seeks to operate traffic to its individual advantage without regard to the ultimate economy of complete terminal operation.

To inaugurate unified operation it should be possible—even during the temporary period of government control—to provide that each railroad terminal zone should be operated as a unit by one local manager. This local manager should take over all of the railroad facilities within the terminal zone and handle all the traffic therein.

Railroads entering the terminal zone should turn over their traffic to the local manager at points designated by him, and he should proceed to handle this traffic to its destination within the terminal zone along the most direct and economic routes and with a minimum of switching and delays. Originating traffic should be handled in the same way.

If such a plan were put in operation—using only existing facilities—the beneficial results would be immediately apparent and future investment in terminal improvements should be along lines that would promote and not hinder this unified operation of terminals.

Competitive operation has been the principal factor in shaping the development of the present system of handling l. c. l. freight. Fundamentally, the application of the co-operative principle is the only solution of the present unsatisfactory condition, yet the application of this principle is most difficult because it involves a complete change in the present method of handling this class of business and requires the construction of facilities along radically different lines than now obtaining.

In the handling of l. c. l. freight three interests are involved: the shipper, the railroad and the municipality.

The shipper is interested in expedition of shipments, convenience of trucking and cost of service; the railroad is interested in the investment required to furnish the necessary facilities and economy of operation; the municipality is interested because facilities for handling l. c. l. freight are usually located contiguous to congested business centers and if not properly developed may restrict the logical growth of the city and cause congestion of street traffic.

Any solution that is put forward for handling this class of traffic must provide a well balanced scheme in which due consideration has been given to all of these interests.

This solution will require such an arrangement of facilities as will permit of a free flow of street traffic, economical railroad operation, expeditious handling of freight, and utilization of expensive real estate to the fullest possible degree.

With the possible exception of the freight facilities being constructed in Chicago at the present time by groups of railroads entering the Union station, there has been no advance in the past 40 years in the handling of the l. c. l. freight.

The railroads referred to occupy a restricted area and were prevented from expanding this area. As a consequence, they were compelled to resort to the utilization of more than one level, thereby marking the first real advance in this country in the method of handling l. c. l. freight.

The conditions which brought about these changes exist in other sections of this same city and in many of the larger terminals of the country, and it is believed that the operation of these freight facilities will be helpful in causing railroads to adopt similar treatment in other localities.

But this development in this particular territory would not be possible except through the co-operation of the railroads owning property in the district. It happened that these railroads did not serve competitive territory, so that while construction was along co-operative lines there was no necessity to take up the consideration of co-operative operation as applied to handling of freight to joint competitive territory.

These conditions will not exist in other localities so that ultimately the full principle of co-operative operation will have to be put into effect before a complete solution of the whole terminal problem can be brought about.

It is a safe general deduction that where a town situated some distance from a main distributing center is reached by two railroads, each of which reach the same distributing center, that one of these roads is the more economic—distance and grades considered. In other words, it will cost more to transport a car of commodities over one of these railroads than over the other to this particular town and in the interests of economy and efficiency the commodities to this town should be handled over the most economic route.

The full application of this principle cannot be made until there is unified operation

of transportation systems, either through government ownership, through the unified control of all of the railroad properties under one operating management or in groups serving natural traffic divisions, or until some form of pooling of earnings and expenses is legalized.

As an example: Under average conditions about 40 cars of l. c. l. freight are shipped each day from Chicago to Kansas City and these 40 cars are shipped over seven different railroads. All of these seven railroads are not of the same length between Kansas City and Chicago, nor have all of them equally low grades, nor are they all on a parity in regard to the other facilities which may make for economy of operation. It is therefore evident that the cars between these two towns that are not handled over the most economic route are handled at a loss and that this loss must be absorbed by all of the roads since, as a rule, advances in freight rates are predicated on the showing of groups and not of individual roads. This is but a single example. When it is remembered that, on an average, over 2,000 cars are shipped from Chicago daily and of these over 1,200 are shipped to competitive points, some appreciation can be had of the importance of applying a proper solution to this phase of the problem.

The average loading of l. c. l. cars is about seven tons, while the capacity of the car is usually several times this figure. By combining shipments, as outlined above, a

Why You Should Buy Liberty Bonds

By Howard Elliott

Chairman of the Executive Committee of the Northern Pacific, and Member of the Liberty Loan Committee for the Eastern Regional District

Every loyal citizen should subscribe as much as he or she can to the Liberty Loan.

The loyalty and patriotism of railroad employees is not excelled by any class of people in the United States, and I hope and believe this will be reflected in a prompt and generous response to the requests for subscriptions to the Third Liberty Loan now being made by the Government through the managements of the various railroads.

Only a few of us can go to the front and fight, but nearly all of us can practice self-denial and support those who do, and it is our duty to give this support to the limit of our ability.

heavier loading can be secured, which would be reflected in reduced operating expenses and relief in car shortage.

This heavier loading could be secured even under existing routing if, instead of loading cars to destination at the main terminal, shipments were grouped with reference to operating divisions of the railroad and handled in fully loaded cars to one or more division points distant from the main terminal and there sorted and reloaded in order of destination in the next division.

In conclusion it may be safely stated that the solution of all railway terminal problems as well as the operation of our transportation system as a whole must be predicated on a clear conception of the principle that there can be no conflict between the interests representing the railroads and the interests representing the public. Each is dependent on the other. An injury to one will be an injury to the other.

Existing investments in railroad properties are entitled to protection. The railroads must be permitted to make such a financial showing as will enable them to secure capital for future improvements at reasonable rates.

On the other hand, the public has a right to demand such reorganization of the transportation system as will permit the maximum of economy and efficiency. This can only be accomplished through joint or co-operative operation and such operation will eventually permit of a more scientific determination of freight rates and a readjustment of these rates along just lines. It is sincerely to be hoped that before the present governmental control is surrendered, a full discussion will be entered into on all of these matters and a method of treatment evolved that will be in harmony with these fundamental principles.

Discussion

There was considerable discussion of Mr. Wallace's paper. Emory R. Johnson, professor of transportation and commerce of the University of Pennsylvania, expressed the opinion that it was practicable to join roads in the large cities by laying connecting tracks and to introduce joint operation of terminals, but he believed that real unification in the physical sense of the term was not possible until the termination of the war. Mr. Noonan agreed with this view, but was confident that appreciable economies were available to the railways if they would place one local manager in charge of a terminal with authority to introduce unified practices regardless of the separate interests of the roads involved. Carload traffic destined to particular points could be concentrated and moved over a single line with less delay than under conditions of individual operation. Less than carload freight could be distributed among the various houses to prevent congestion on any line or lines. Certain stretches of track might be laid to complete existing belt lines, thereby facilitating the routing of freight around, rather than through, a city.

A. E. Beck, of the Merchants' & Manufacturers' Association, Baltimore, and N. B. Kelly, of the Philadelphia Chamber of Commerce, told of the unified practices which had been introduced in their cities. In both instances war emergency committees composed of business men and railway operating executives were formed previous to introduction of government control and freight traffic, both c. l. and l. c. l., was pooled to prevent congestion on one line while another line was open. The work of these committees has since been taken over by sub-committees of railroad officers reporting to the regional director of eastern railroads. In this connection, Mr. Kelly remarked that government control was, in effect, the legalization of pooling, and that pooling under private operation would have accomplished practically the same results that are now being achieved with the concentration of authority in the director-general.

F. C. Batchelder, president of the Baltimore & Ohio Chicago Terminal, stated that railway operation was now

unified in the Chicago terminal district and that while no one man was in charge, an equivalent result had been achieved by placing control in the hands of a single committee, made up of men thoroughly familiar with conditions in the city and with power to inaugurate any and all changes in practice that they deem advisable.

Discussion of Alba B. Johnson's Paper

The address of Alba B. Johnson, published in the *Railway Age* of a week ago, was followed by informal remarks which the speaker made in response to questions by his hearers. Chairman Wheeler inquired whether the capacity of locomotive shops in this country was adequate for the future needs of this country and her allies. On this point, Mr. Johnson stated that the total capacity of locomotive shops in the United States was roughly 7,000 locomotives per year. In the past the existing shops have rarely been taxed beyond capacity, and most of the time have been worked far below their capacity. The extraordinary expansion of the locomotive companies resulting from the increased foreign demands since 1915 would, he believed, provide capacity sufficient to take care of any probable demands by this country and her allies either for the present or for many years to come. These demands, however, will not be light. The wear and tear of the war has been particularly hard on motive power. The English have bled their roads of locomotives to supply the needs of their front in France. It will require the addition of 5,000 locomotives to put the French railways in good working order at the conclusion of the war. Disregarding a period of economic readjustment from war to peace conditions the productive capacity of the country will be taxed to the utmost for the next decade.

Nothing, he said, is more vital in war than an efficient transportation system, and good railroads are an impossibility without adequate motive power. The downfall of the Russian government was the direct result of its blindness in failing to maintain its railroads. While the needs of the Russian lines, according to their own engineers, demanded the construction of between 1,000 and 2,000 locomotives a year in the decade previous to the war, only about one-tenth of that number were actually built.

In reply to an inquiry as to the present output of the Baldwin plant as compared with its average production before the war, Mr. Johnson stated that in 1914 the company felt fortunate if it had orders for four or five locomotives per week, while in December, 1917, production averaged from 16 to 20 engines per day.

Water Transportation

At the conclusion of the Railroad Session Chairman Wheeler entertained the introduction of a resolution asking for more extended use of our waterway facilities, which was later passed and is published with the other resolutions in the forepart of this article. In the discussion of this subject it was pointed out that additional means of transportation of any and every kind should be used to insure a vigorous and successful prosecution of the war. The Erie canal and the Mississippi river between St. Louis and the Gulf of Mexico constitute two important existing waterways which, if properly utilized, can add 3,000,000,000 ton-miles to the freight movement of the country within 12 months.

Wheeler Speaks Before Chamber as a Whole

At a meeting of the Chamber of Commerce of the United States as a whole in the Auditorium theatre on April 10, Harry A. Wheeler, chairman of the Committee on Railroads, discussed the transportation problem from the point of view of the business man and the proper attitude to assume toward the question at the present time. He stated that the Chamber's advocacy of federal incorporation of carriers, federal regulation of securities and further centralization of rate regulation was for the time being unnecessary because

of the present scheme of railroad control by the federal government. While the immediate problem confronting the country was how to win the war, it is also imperative to look to the needs of the peace to come and to prepare a sound foundation upon which to build the scheme of transportation which will follow government control. Two groups of public men, he said, have been particularly active since Secretary McAdoo assumed the reins of railway management, one composed of those who insistently champion government ownership and the other comprised of those who just as strongly oppose it. The solution, he believes, must lie somewhere between government ownership and the old condition of private operation.

It is too early to urge any particular program and the Chamber of Commerce of the United States, representing American business men whose only interest is the most efficient system of operation, has the very definite responsibility of studying the problem carefully and assiduously with the sole purpose of championing such a course as seems to be to the best interests of the country. If it should appear that the adoption of government ownership is proper, the Chamber should have the courage to support it. If a return to private ownership, or the introduction of some new scheme of operation and control seems advisable, the organization should be equally outspoken in its favor. Preconceptions, prejudices, extraordinary conditions born of the war should be forgotten to the end that an open-minded, earnest and serious study of the problem may be undertaken and sound, practical conclusions may be reached.

Session on Highway Transportation

The group discussion of railroad transportation was followed by a session devoted to the subject of highway transportation. F. A. Seiberling, president of the Good-year Tire & Rubber Company, presided. In his opening remarks Mr. Seiberling expressed the opinion that motor truck service would dominate short haul transportation in the future. With good highways automobiles could, he thought, more than compete on even terms with the railroads within a range of from 50 to 100 miles. There are now approximately 400,000 motor trucks in the country and this number will be increased ten times within a few years unless highway development is unreasonably retarded.

Chapin on Motor Truck Transportation

Roy D. Chapin, chairman of the Highway Transportation Committee of the Council of National Defense, delivered an extended address on what is being done in the way of freight movement by motor truck at the present time and what steps are being taken to make this instrument of transportation a more important factor. He pointed to the experience of England which has found it necessary to conserve to the utmost every means of transportation. In that country, he said, all vehicles on the highways are registered

for the purpose of regulating and co-ordinating their activities to eliminate waste hauls. It is now almost a misdemeanor to operate a motor truck empty. Bureaus have been established which see to it that trucks bringing loads to a city are provided with loads to the points from which they come, and vice-versa. This plan was introduced in Connecticut during the transportation crisis of the past winter and also in Rhode Island, New Jersey and Philadelphia. In New York City particular attention has been directed to the problem of moving freight from the freight platform to the consignee and from the shipper to the platform. The store-door delivery plan, which will be introduced in that city, will have the effect of clearing the freight platforms every night and increasing the flow of business into and out of New York by 50 per cent.

Motor trucks can be of great service in moving the food supply from the country to the city. An efficient system of rural express lines is now in operation in Maryland.

These operate every day into Washington, Baltimore and other cities from points as distant as 47 miles. They are particularly advantageous because they reach many farms not on railroads or on inter-urban lines and permit the farmers to stay on the farm—a very important matter during a time of acute labor shortage. The U. S. Department of Agriculture now has a corps of investigators studying this rural express scheme and the possibilities of its extension.

Mr. Chapin cited the trains of loaded trucks destined for the front which are continuously plying our highways from points of manufacture to seaboard. In the middle of February, when the country was in the grip of unprecedented winter weather, a train of trucks made the trip from Detroit to Baltimore in 8 1/2 days. This record was made possible by the patriotism of the communities along their route who saw to it that the

highways were cleared of snow. A time is coming, Mr. Chapin prophesied, when main highways will be cleared 365 days in the year. The Council of National Defense he said, recently passed a resolution recognizing the value of motor truck transportation and recommending that all obstacles in the way of properly utilizing it be removed.

A. C. Bedford, chairman of the board of directors of the Standard Oil Company of New Jersey and chairman of the Petroleum War Service Committee of the Council of National Defense, addressed the group on the importance of oil conservation during the war. "Oil production," he said, "must meet the demands of the United States and its allies and will meet them."

M. H. G. Shirley, chief engineer of the state roads commission of Maryland, outlined the studies he had undertaken to determine the traffic passing over the various highways of his state and the extent of the improvement demanded by each to make for unimpeded and expeditious vehicle movement. Maryland, he said, was carrying out an extensive highway program because it believed good roads as important as good rail lines during the world conflict.

A Special Call to Duty

By C. E. Schaff

Receiver of the Missouri, Kansas & Texas

The citizen employed in an essential industry who makes steady savings from his earnings and lends them to the government adds steadily to the Nation's power to prosecute the war.

The Liberty Loan appeal should therefore meet with special response from the men who make up the rank and file of the American railroad army. We are specially favored in the fact that while serving at home posts devoting our time and talents to the pursuits we have followed in peace, enjoying the comfort, safety and opportunity of home surroundings, we daily render vital service to the Nation in keeping open the arteries through which supplies essential to military efficiency flow to the fighting front.

From those who enjoy special opportunity for service special contributions are due. The call to all citizens to participate to the fullest extent in making the Third Liberty Loan a tremendous popular success is to the railroad rank and file a special call to duty.



Hog Island Shipbuilding Yards in Course of Construction

A Big Transportation Problem at Hog Island

Rapid Construction of World's Greatest Ship Yard Dependent on Ability to Deliver Men and Materials

ON MARCH 20 the Philadelphia Rapid Transit Company executed a contract with the Emergency Fleet Corporation for the construction of an extension from Eastwick Avenue to the Hog Island shipyard on the extension of Island Avenue, to be constructed by the City of Philadelphia, and has undertaken that it shall be in operation by July 1, 1918. The contract provides for the operation of one hundred new cars between Hog Island and the subway and elevated terminals of the Philadelphia Rapid Transit Company. The Fleet Corporation will advance funds to the transit company to the amount of the cost of the new construction and equipment, and at the close of the war this property will be taken over by the Philadelphia Rapid Transit Company at the appraised value for operation. The fares to be charged will be settled by the Public Service Commission.

On March 28 the Philadelphia Railways Company agreed to rehabilitate its line from Third Street over the Penrose Ferry Bridge and put down double tracks from there to Hog Island; the new lines are expected to be in operation in sixty days. The Street Corporation is advancing the money for the new construction work of the Railways Company, which will consist of new tracks, new power station and 25 additional cars. The cars will not be as heavy as those used on the Philadelphia streets for the reason that the Penrose Ferry Bridge cannot stand the weight; but the new cars will be larger than those now in use. The Railways Company also agrees to take over all the property at the end of the war at its appraised value.

Both of the above agreements were executed by Rear-Admiral F. T. Bowles, assistant general manager of the Emergency Fleet Corporation, who is located in Philadelphia.

A Remarkable Feat of Transportation

Possibly it is not strange that in these days of great accomplishments, a remarkable feat of transportation, in the

very heart of the East, should have been almost overlooked, not alone by the public but by the railway world as well. In ordinary times the installation, within a few months and under extremely unfavorable circumstances, of a transportation scheme involving the building of between 70 and 80 miles of track, the furnishing of a complete railway equipment and the development of an organization to operate it would be a noteworthy task. When, in addition to this, it was necessary to secure co-operation from street railways, steam roads and steamers to carry back and forth each day, through congested freight districts and with inadequate facilities and equipment, from fifteen to twenty thousand men and to insure the delivery and handling of from 200 to 300, or even more, carloads of freight each day, the task would seem to be almost superhuman. Such was the situation which confronted the American International Shipbuilding Corporation in the construction and operation of the Hog Island ship building plant, located on the banks of the Delaware river about six miles south of the center of Philadelphia.

Almost immediately after the entrance of the United States into the war, it was realized that the issue depended on the construction of ships on a scale hitherto unthought of. It was realized that ordinary methods would not meet the emergency, and Americans naturally turned their thoughts towards quantity production of units of a single type. It was therefore necessary to break away from ordinary shipbuilding methods, and develop an organization, which would combine not only shipbuilding skill, but knowledge of the manufacturing resources of the country and ability to lay out a construction program on a really tremendous scale.

The government, therefore, through its Emergency Fleet Corporation, made a contract with the American International Corporation to build a yard, with 50 ways, so that 50 ships could be under construction at the same time. The original plan contemplated also the construction of 200 ships of a



Hog Island Shipbuilding Yards in Course of Construction

similar type to have a capacity of 7,500 tons dead weight.

The ships were to be of steel of standard construction, so that the parts would be absolutely interchangeable. In this way the thousands of different parts could be fabricated at manufacturing plants throughout the country and be rapidly assembled at a central plant. A great amount of time could thus be saved compared with the general method of building ships in which the different parts are fabricated at the shipyard and carefully and laboriously fitted into place. By concentrating on the building of a standard design in a shipyard especially constructed for this particular design, the problem would be largely to arrange for the steady supply and distribution of material, to provide special facilities for handling the work expeditiously and to supply an adequate number of properly trained workmen to assemble the parts. The parts being fabricated elsewhere would make it possible to secure a maximum output from a given size plant with a minimum amount of labor; or, in other words, an erecting plant could be designed which would, with a limited number of men, say, 30,000 or 40,000, utilize the work of several hundred thousand workers scattered in small groups throughout the country—a total force so large that it would be impossible to house and take care of it at a central point in the short time available for preparation.

The contract between the Emergency Fleet Corporation and the American International Corporation was signed on September 13, 1917, and called for the construction of the yard and fifty $11\frac{1}{2}$ knot, 7,500 ton cargo vessels, each 400 feet long. A little over a month later on October 23, it was decided to build also seventy 15 knot 8,000 ton combined transport and freight vessels, each 450 feet long.

This second type required some modifications of the plans of the yard, as will be noted hereafter, but did not greatly, if at all, delay the work, though it did materially increase the cost of the yard.

To build these ships will require a steady force of about 30,000 men; 25 acres of covered buildings; 50 shipways, each 500 ft. long; and 7 outfitting piers, each 1,000 ft. long. Each outfitting pier or wet basin will accommodate 4 ships so that 28 ships may be fitted out at one time. In the neighborhood of 1,000 shops throughout the country, employing over 300,000 people, will build the various parts. For in-

stance, 75,000,000 ft. of lumber will be required, 400,000 tons of steel, 40,000,000 rivets, 570 boilers, and over half a million horse power of turbines.

Hog Island at the time of the awarding of the contract was a rough desert, thickly overgrown with underbrush. The island is two miles long, a mile wide and contains 900 acres. There were no freight or passenger lines reaching it, and the nearest approach by trolley was a mile and a half distant. The only way in which one could travel about the island was on horseback and there was no water supply and no source of power. The problem which confronted the shipbuilding company was to build and get into operation in a few months a shipyard which would have to build ships on a larger scale and at a greater speed than ever before attempted. Remember too, that this was at a time when the freight congestion was acute, construction materials were scarce, and skilled or unskilled labor almost impossible to get. The contract was let late in the fall and it was necessary to carry it on at high speed throughout the coldest and most severe winter that has been experienced for years. When the contract was signed, no surveys had been made nor were any but general sketch plans of the layout available. Plans were developed, and surveys and office work pushed to such an extent that construction was under way by the middle of October.

Difficulties Encountered

The difficulties under which it was necessary to build up the transportation system may be realized to some extent when it is known that in some cases angle bolts for the track were put on by using ordinary monkey wrenches with the nuts 8 or 10 inches below the water. Under normal conditions, a contractor would not attempt for a moment to put through a big project such as the Hog Island shipbuilding yard in cold or unfavorable weather and yet it was necessary to do so in this case in spite of the fact that the ground during mid-winter was frozen several feet deep and had to be dynamited in order to lay the water pipes and wire conduits; it had to be stamed out before the piles could be driven. About 120,000 piles will be required for the completed plant; most of these being already driven.

When the work was first started, it was necessary to build a road $1\frac{1}{2}$ miles long to the nearest avenue and to bring

materials and men by auto truck from the city. As the work developed, a study was made of the location of the homes of the class of men who would be employed and of means to transport them to and from the work. The Philadelphia Railways Company, when the work started, was the only line that could be used and it required a walk of $1\frac{1}{2}$ miles to the island. This line, however, was entirely inadequate because of its physical condition, lack of equipment and the fact that only a single track could be operated over one of its bridges. By the end of September, 2,000 men were employed on the island and it proved necessary to call on the steam roads for help in spite of the fact that it would necessitate operating the trains through badly congested freight terminals.

The railroads finally consented to operate one train out of the Pennsylvania station at Broad and Washington Streets and one from the Philadelphia & Reading station at 31st Street and Girard Avenue. These ran over the Chester branch of the Philadelphia & Reading to North Essington and back over the Pennsylvania to a point near Hog Island. The Pennsylvania track was part of a branch being built by the P. B. & W. to Hog Island and connecting with the main line at Eddystone. The trains were operated with great difficulty because of the crowded condition of the Baltimore & Ohio tracks over which it was necessary to run for a short distance because the Chester branch was single track and because of the Pennsylvania branch to Hog Island being only partially completed. The arrangements for handling of trains at North Essington were also poor and the workmen were greatly discouraged by the loss of time and the poor service.

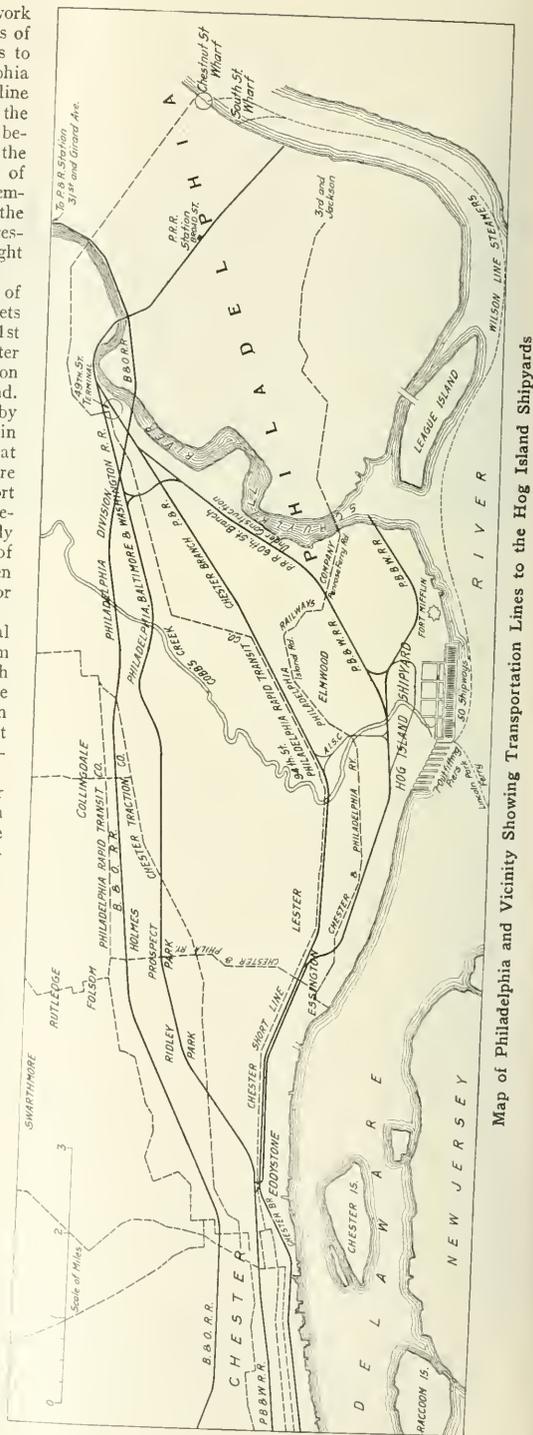
To meet this critical situation, the American International Shipbuilding Corporation built a track $1\frac{3}{4}$ mi. long from Hog Island to the Chester branch at 94th Street, over which the trains from the city could be operated and run to the center of the plant and over which shuttle trains were run to carry the passengers which came to 94th St. on the street cars. Meanwhile, the street car lines took measures to improve their service.

The transportation facilities still being inadequate, water service was investigated and arrangements were made with the Wilson Line to operate one of its steamers from the Chestnut street wharf—a run of about 40 min. Soon a second and later a third boat was added. Three boats being all the Wilson Line could spare, additional boats were leased at a high cost. Boats were also chartered for ferry service to Billingsport on the Jersey side of the river.

Additional trains were steadily added to the steam lines until five trains are now run out of the Broad and Washington street station, three from Girard avenue and two from 49th street on the Philadelphia & Reading. The extreme weather this winter interfered to a greater or less extent with the schedules on the steam and electric roads, and for the first time in 37 years it was impossible for steamers to operate in the Delaware river, operation being discontinued for a period of about ten days. Operation on the P. & R. has been greatly improved by the double tracking of that line and the P. B. & W. has under construction a line from Hog Island to 60th street which will add greatly to the present facilities.

Barracks have been erected at Hog Island which will house 6,000 men. In addition to this, the city of Philadelphia is working on a housing plan to provide for several thousand workmen within a couple of miles north of Hog Island. The facilities, however, will be crowded to the limit when the plant is completed and a full force is at work building ships; more than 30,000 men will then be required.

Material is brought in over the P. B. & W. branch which connects with the main line at Eddystone. Great difficulties were experienced in the earlier stages of the work, but the intra-plant system, supplemented by better roads and motor trucks, has solved most of the difficulties.



Map of Philadelphia and Vicinity Showing Transportation Lines to the Hog Island Shipyards

Intra-Plant Transportation

The Pennsylvania Railroad (Philadelphia, Baltimore & Washington) runs along the northern side of the island.* The passenger trains coming from the north over the A. I. S. C. shuttle line unload at a station near the center of the plant. At the west end of the yard are inbound and outbound interchange yards. Alongside of the inbound yard is a classification yard. The inbound interchange yard has a capacity for 282 cars; the outbound a capacity for 252; and the classification yard a capacity for 346 cars.

Two material storage yards have been provided; one for the 7,500-ton vessels, and the other for the 8,000-ton vessels. These are arranged in such a way that definite locations are specified for each piece of material. There are at least 20,000 important parts required on each ship so that the planning of the storage yard and facilities was no small task. The material yards have a capacity for a two-weeks' supply of parts. The material storage spaces are separated by groups of three tracks with single tracks alternating. The single track is used by 85-ton Brownhoist cranes, with sufficient reach (50 ft.) to unload the cars on the opposite sides of the material spaces. The loaded cars are placed on the two outside tracks in each set of three tracks; the middle track, with its cross-overs being used to pull out cars which have been unloaded, or which it is necessary to place elsewhere.

Some 30,000 tons of material will have to be handled weekly at the time of maximum production—five ships per week—besides the coal, lumber, commissary supplies, etc., for the operation of the yard.

This material comes from a thousand different sources, and while some of the manufacturers can deliver parts for 5 or 10 ships at a time, some can only arrange to make and deliver not less than the whole quota of 50 or 100 parts. The material storage yards, therefore, act as storage reservoirs to hold the material as it is received, and facilitate its distribution to the ships.

At the eastern end of the yard is what is known as a holding yard. Every day such material as may be required for use at the shipways on the following day is loaded on flat cars in the material storage yards and placed in the holding yard until it is needed. From the holding yard it can easily be switched to any one of the shipways. South of one of the material storage yards near the center of the plant are a number of warehouses in which material is stored which cannot safely be left in the open. A track extends to each one of these warehouses so that at the proper time the material may be loaded and sent either to the holding yard or to the shipways. The small shops directly back of the shipways and between this material storage yard and the holding yard are not provided for the fabrication of material but more or less as an emergency measure to take care of any work that may have to be done in the way of modifications to parts or repairs. In other words, they are largely an insurance against delay. A small holding yard is also provided for at the western end of the plant for cars containing material that is to be stored in the warehouses back of the wet basins or which is to be delivered direct to the piers alongside of the wet basins.

At the west end of the yard are the receiving and despatching yards for inbound and outbound cars from, and to, the Pennsylvania Railroad. From the inbound yard, the cars are classified and then distributed to the material yards and warehouses, where they are unloaded and returned to the outbound yard. The distribution from the material yards and warehouses through the holding yard to the ships, is done with the yard equipment. It is expected therefore that the railroad cars will be held for the minimum possible length of time.

An interesting feature of the yard layout is the provision

*It is regretted that the censor asked that the detail map which accompanied this article be left out.

of a double set of thoroughfare tracks, throughout the yard, two tracks in each direction. Ample provision for both storage and against delay in moving from one part of the yard to the other, is absolutely necessary in order to secure the necessary continuity of operation. The schedule of construction is so laid out that any break in the supply of materials will tend to more or less serious disorganization, so that ample provision to guard against this is an absolute necessity and has very largely controlled the design of the yard.

It was thought at first that some of the trackage provided might not be absolutely necessary, but in view of the seriousness of delay, either in case of an insufficient stock of parts on hand or in distributing them to the ships, much more ample facilities will be required than would be necessary under ordinary conditions.

There are 50 shipways arranged in 5 groups of 10 each and extending one mile along the water front. The first keel was laid about the middle of February and it is estimated that 25 of the ships will be ready for delivery about the first of November of this year. One ship will be delivered for every two days during the 8½ months following the delivery of the first ships; at the time of maximum production it is expected that 5 ships will be launched each week.

During the construction period it was necessary to have 22 locomotives in service; several of these being leased. The final equipment will include 14 locomotives, of which three are heavy six-wheel switching locomotives for use in the classification yard. These are being built by the Lima Locomotive Works. They weigh 170,000 lb., have 57 in. drivers, carry 180 lb. of steam and have 21 x 28 in. cylinders. The permanent equipment will also include four eight-wheel passenger locomotives, three saddle tank locomotives and four six-wheel switchers.

Automatic signals are provided and an interlocking plant has been placed at the intersection with the Pennsylvania Railroad. The rolling stock equipment consists of 20 passenger coaches, which were purchased from the Central Railroad of New Jersey, 300—30-ton, flat cars, 100 new 50-ton flat cars and 50—40-ton box cars. The passenger coaches are used for shuttle service. At present these shuttle trains are making the round trip in 25 minutes but another train is about to be added and the trains will be operated under a 5 min. headway. The passenger yard at West 4th street has a capacity for 125 to 130 coaches with facilities for cleaning and maintaining them. The engine house to the west of this yard has a capacity for twelve engines at one time and is equipped with small tools for making running repairs.

The following table shows the extent of the track facilities.

FREIGHT LINES		Miles of track	Turn out
Interchange yards—inbound		3.86	18
Interchange yards—outbound		3.35	15
Main classification yards		6.68	48
Hoisting yard		3.65	19
Shipways wet-basin tracks		1.88	12
Shipways tracks		13.87	59
Wet basin warehouse tracks		0.87	6
Wet basin pier tracks		6.65	31
Wet basin siding tracks		1.14	4
Machine shop tracks		1.29	6
Engine yard		2.24	30
Crane yard		1.11	7
School building		0.41	1
Total mileage of freight line tracks		77.4	
Total mileage of freight line turn out			498

PASSENGER LINES		Miles of track	Turn out
Shuttle line S. of P. R. R.		6.08	23
All tracks west of station gate 87th St. A. S. C. E. rail; ballast 6 in. below ties.			

While the road is not a very large one, it will operate under intense conditions and will probably have to live up to the size of its name: U. S.-F. C.-A. I. S. C. In other words, the equipment is in the service of the U. S. Government through the Emergency Fleet Corporation and the American International Shipbuilding Corporation.

"They Shall Not Pass"

By A. L. Humphrey

President, Union Switch & Signal Company; Vice-President & General Manager, Westinghouse Air Brake Company; President, Employers' Association of Pittsburgh.

These are days that try men's souls and afford a supreme test of the Nation's resourcefulness, loyalty and patriotism. At this writing the enemy's guns are hammering at the very gate-ways of Calais. Haig's valiant army is fighting with its back to the wall. The Hun hordes, drunken with lust and power, and with reckless disregard of human sacrifices, are pushing back the forces of civilization at practically every point on the Western Front. It is indeed a solemn hour for the friends of Liberty.

Optimism is a characteristic of the American people and is a quality of mind that has grown on us with the expansion of our population and with the increase in our industrial and material resources. It has as its basis also our fancied security from foreign aggression, and the historical fact that our flag has never gone down to defeat. Just the same, it behooves us to recognize that we are threatened by the most formidable foe of all times, one that in all history has not been surpassed in diabolical ingenuity and cunning and who is ready and willing to stake his all on the triumph of autocracy over democracy, of force over decency and justice. I do not want to be considered an alarmist or pessimist, but, at the same time, we might as well look the facts squarely in the face, and if my note of warning does nothing else than bring home to a single lethargic person the serious situation that would confront the Allies in case the battles of Picardy and Flanders went against them, I shall consider these words as not having been written in vain.

Those of us who live in security in the United States and comprise what may be termed the "third line of defense" will have to adopt the slogan of the gallant Frenchmen: "They shall not pass," and do all we possibly can, in our limited way, to back the boys in the front line, morally and financially. At the moment there is no better way to do this than to buy Liberty Bonds. Don't let us buy them perfunctorily, but in a "win the war spirit," which calls for actual sacrifice and hardship.

In this era of rapid transit we have learned to look upon the steam railroads of the world as a potent factor in the conduct of the war, and it is hardly necessary for me to dwell upon the splendid, the magnificent support given the Federal Administration by the American railroads, from the highest official down to the laborer on the track. Unselfish devotion to duty is the order of the day, and if their purchases of Liberty Bonds of the preceding series can be taken as a criterion, they will surely "go over the top" in the present campaign with flying colors.

Closely identified with and vital to the railroads of the country, the railway supply manufacturers are giving and will continue to give the best that is in them towards a successful prosecution of the war. Seriously crippled in man power, thousands of their employees having joined the military forces of the United States and of our Allies, the manufacturers may not be able always to render the high grade

service heretofore the rule. They ask the railroads to bear in mind the difficulties the railway supply manufacturers, in common with all other interests, are laboring under and that we are doing our utmost to keep the wheels going around and backing up those who are fighting our battles at the Front.

Speaking especially of conditions in large manufacturing plants of Greater Pittsburgh, I know from personal experience that in connection with the Third Liberty Loan campaign it is not a question of whether the quota is going to be subscribed, but rather, whether it is going to be doubled or trebled. The apathy in certain quarters which characterized the first campaign has given way to unbounded enthusiasm, and if shipments get somewhat behind in the next few weeks, it will be because every workman has temporarily left his workbench and constituted himself a committee of one to make the Third Loan a huge success.

Apreros of the resolution passed at the last annual meeting of the Railway Business Association to ask the Director General of Railways to designate April 20th as "Railway and Railway Materials Manufacturers' Liberty Loan Day," permit me to call the attention of those concerned to the patriotic and wonderfully effective work done by the so-called Liberty Loan Loyal Legion, which has for its purpose the promotion of loyalty among the subscribers to Liberty Bonds, teaching the value of the bonds as an investment and obtaining pledges from the purchasers that they will not offer government securities for sale at less than par and interest, until three months after peace has been declared. The pledge exacted from members is as follows:

"I, the undersigned, as Subscriber to the Liberty Loan, hereby solemnly pledge my word and honor not to offer for sale any bonds or other evidences of indebtedness of the United States owned by me, at less than par and interest, except in case of extreme necessity, until three months after peace has been declared."

On February 7, 1918, Liberty Loan Loyal Legion No. 1 was formed in one of the large railway supply plants of the Pittsburgh district and four-minute men were recruited from the shop to give impetus to the movement. Today Legion No. 1 boasts practically 100 per cent membership and has become the nucleus of dozens of similar organizations throughout the Greater Pittsburgh district. May I not then, by way of a message to fellow members of the supply fraternity, urge the formation among their employees of Liberty Loan Loyal Legions throughout the length and breadth of this land? Once duly organized and in working condition, the Legions are certain to give a splendid account of themselves and will work wonders not only in the encouragement of thrift and Liberty Bond purchases, but also in the promotion of loyalty and the "will to win the war."

Kultur—Bar its progress with Liberty Bonds.

Doings of the United States Railroad Administration

Coastwise Steamships Taken; Comprehensive Statistical Studies
to Be Made; Police Meet

Government Takes Over Coastwise Steamship Lines

PRESIDENT WILSON on April 11 issued a proclamation taking over for the government the property of the Clyde Steamship Company, the Mallory Steamship Company, the Merchants' & Miners' Transportation Company, and the Southern Steamship Company, which operate 65 vessels in coastwise service. The steamship lines owned by railroad companies had already been taken over under the proclamation by which the government assumed control of the railroads. The President, in his proclamation, also directs that the control and utilization of the steamship lines shall be exercised through William G. McAdoo, director general of railroads, who may perform the duties, so long and to such extent as he shall determine, through the boards of directors, officers and employees of the companies. The proclamation is similar to that under which the railroads were taken over and provides that the director general shall enter upon negotiations with the companies looking to agreements for compensation for the use of the properties. The government's operation became effective on April 13.

In General Order No. 19 the director general announces that pursuant to the proclamation of the President he has taken possession and assumed control of the steamship companies named, and until further order it is directed that all of their officers, agents and employees shall continue in the performance of their present regular duties, reporting to the same officers as heretofore, and on the same terms of employment; and that any officer, agent or employee desiring to retire from his employment shall give the usual and reasonable notice to the proper officer, to the end that there may be neither any interruption nor impairment of the service.

For the administration of the coastwise steamship lines the Coastwise Steamship Advisory Committee has been created, as announced in Circular No. 23, with office at 165 Broadway, New York City. L. J. Spence, director of traffic of the Southern Pacific, is appointed chairman with authority to form the committee from the officers of the following steamship lines: Clyde, Mallory, Merchants' & Miners', Ocean, Old Dominion, Southern Pacific, and Southern.

The chairman of the Coastwise Steamship Advisory Committee will report to the manager of the Marine Section of the Division of Transportation and will exercise supervision

over all coastwise lines under control of the United States Railroad Administration.

Wage-Adjustment Board

Railway Board of Adjustment No. 1, which is to adjust controversies between railroad companies and members of the trainmen's brotherhoods, has organized by electing Charles P. Neill, manager of the Bureau of Information of the southeastern railroads, as chairman, and L. E. Sheppard, vice-president of the Order of Railway Conductors, as vice-chairman. The board is now ready for the transaction of such business as may come before it, as provided in General Order No. 15. Circular No. 22 issued by the director general directs that every case submitted, except the unfinished business of the Commission of Eight, which is transferred to this board, should be accompanied by evidence that its submission is approved by the chief operating officer of the railroad upon which the controversy has arisen, and by the chief executive officer of the labor organization concerned. Where two or more organizations are jointly concerned, the submission should be joint, if practicable.

Article 11 expressly precludes a consideration by this Board of any matter unless officially referred to it in the manner prescribed in the memorandum of understanding.

Article 14 requires that in each case an effort should be made to present a joint concrete statement of facts as to any controversy. Statements of fact, whether joint or separate, should be sufficiently

comprehensive to give an understanding of the controversy that the board is called upon to decide. Where briefs, or additional evidence, are to follow, notice thereof should accompany the submission. Where additional matter is to follow the submission, the case will not be transmitted to the Board of Adjustment by the Division of Labor until the additional data shall have been received.

Monthly Statistics Called For

It is requested that three copies of the joint concrete statement be filed with the Division of Labor for matter of record and for the information of the board. Briefs and documentary evidence need not be furnished in duplicate, but whenever possible, should be attached to the three copies of the joint statement.

The Railroad Administration has taken steps to secure

Let Us All "Go Broke" Buying Liberty Bonds

By Frederick D. Underwood

President of the Erie Railroad, and Chairman of the Liberty Loan Committee, Eastern Regional District

To me it seems redundant to send to anyone exhortations to buy Liberty Bonds. The billboards, the daily papers, the moving pictures, and every other means of reaching the public, are charged with exhortations to that end. All of the invitations are good. Some of them should be preserved. This morning I noticed two in particular: "Come across, or the Kaiser will" and "If you can't shoot, buy Liberty Bonds."

It devolves on the railway fraternity to back up their fellows in France. The railway and engineering professions are almost in a class by themselves, in that they have recruited battalions. We owe it to our fellows abroad—and I am sure we will pay the debt, and without this reminder—to see that so far as money will buy the things they need, and crave beyond their needs, they are furnished them in abundance.

The rank and file of railroad men are free spenders, generous to a fault. Let us all further indulge our propensities in this direction, and for once feel proud of it. Let us all "go broke" for the time being in buying Liberty Bonds. Aside from doing our brothers good, we are doing ourselves good. The feeling of satisfaction from making a good sound investment is a thrill worth getting.

through the regional directors information on the performances of individual carriers to enable comparisons between railroad operation under government and under private control. Orders have been issued by the regional directors that monthly reports be sent to the director of transportation, including (a) detailed income reports showing comparisons with the previous year and indicating the expenses by primary accounts; (b) each report or statement used by transportation officers to measure efficiency and cost of operation; (c) reports used to measure efficiency and cost of locomotive performance, also (d) usual explanations provided for president or chief operating officer covering increases or decreases as shown in the above-mentioned statement.

Meeting of Railroad Police Officers

Chief special agents of some of the principal railroads of the country held a conference last week with P. J. Doherty, manager of the Section of the Railroad Administration which deals with the Protection of Railroad Property, with a view to co-operation in the work of theft-prevention at railroad yards and terminals. An advisory committee was selected, to cooperate with the representative of the Railroad Administration, consisting of Chief Special Agents J. W. Connelly of the Southern, W. G. Baldwin of the Norfolk & Western, T. T. Kelher of the Illinois Central, R. S. Mitchell of the Missouri Pacific, and J. R. McMahon of the New York, New Haven & Hartford.

Locomotive Service Data

Information with respect to locomotives and locomotive performances for the year ended December 31 and for the three months ended March 31 is called for from all railroads under federal control. This is by Circular D. C. E. No. 5, issued by R. S. Lovett, director of the division of capital expenditures, which asks for the number, weight and tractive capacity of locomotives owned or leased; number of serviceable locomotives, number contracted for and undelivered; locomotive miles in transportation and work train service, gross and net ton miles of revenue and non-revenue freight; pounds of tractive power available per 1,000 locomotive miles, per 1,000 gross ton miles and per 1,000 net ton miles.

The Short Lines

Officers of the short line railroads are greatly concerned because of the attitude of the Railroad Administration in its interpretation of sections of the railroad control law regarding the lines to be taken over by the federal govern-

ment. Section 1 provides that every railroad not owned, controlled or operated by another carrier company and which has heretofore competed for traffic with a railroad or railroads of which the President has taken the possession, or which connects with such railroads and is engaged as a common carrier in general transportation, shall be held and considered as within the federal control. Section 14 of the law, however, contains a provision that the President may, prior to July 1, 1918, relinquish control of all or part of

any railroad system of transportation, further control of which shall be deemed not needful or desirable.

The short lines had protested vigorously against the attitude taken by the Railroad Administration prior to the passage of the law, that many short lines would not be considered necessary and therefore would be excluded. These railroads declared that they would be placed in a serious condition if they were excluded. They were apparently satisfied with the provision of the law as it was enacted; but they have since learned that the Railroad Administration apparently does not intend to exercise jurisdiction over some of the smaller roads until the question as to whether they shall be retained under federal control after July 1 shall have been determined. Representatives of the short lines attended a meeting in Washington on April 11 and 12 at the call of the American Short Line Railroad Association, and they held a conference with John Barton Payne, general counsel of the Railroad Administration, on the subject. Many short lines have been released, both before and since the passage of the law, at their own request, but most of the officers of short lines take the position that all should be included under federal control and that that was the intention of Congress. Some of them say that if they are not to be included in the federal system their tracks should be taken up and operation abandoned; but they foresee difficulties

with state laws and state commissions in any attempt to do so. It is possible that a plan may be worked out by which the Railroad Administration can take over certain lines and then order their tracks taken up.

The decision of the Railroad Administration as to its course toward the short lines will be based mainly on information secured by the regional directors from the trunk lines in their territory; but the short railroad lines have been told that no line will be excluded without a hearing.

In order to insure that coal mines may be operated to capacity and to provide a store of coal for the winter months, R. H. Aishton, regional director of western roads, has re-

"As Sound As the Rock of Gibraltar"

By R. H. Aishton

President of the Chicago & North Western, and Regional Director of Western Railroads.

The government in floating the Third Liberty Loan is giving us all another opportunity to be of further service to the nation in the great and righteous cause we are fighting for. Every railroad officer and employee is now striving energetically for the government by satisfactorily and efficiently carrying out their duties in their line of work, in order that the transportation systems may successfully perform their part—and it is a large part—of the burdens that the nation is being called upon to face.

However, there is still a further duty that each railroad officer and employee owes to his country at this time and that is from the standpoint of a patriotic American citizen; namely, to preserve our great country inviolate from any invasion of a foreign foe, and to assist in the prosecution of the noble work now being carried on by our boys across the water, and to the end that those who have died fighting for our liberty, side by side with their British, French and Italian comrades and Allies, should not have died in vain, and to provide them with arms, ammunition and food.

We, who are left behind here at home, should each, individually, feel it our duty to subscribe to these bonds, which without a doubt, are the safest investment on earth, for the reason that they are safeguards of the future of the greatest nation in the world. It is indeed a privilege, as well as an act of wisdom, to put our money into an investment at an excellent rate of interest, when we know that this investment is as sound as the "Rock of Gibraltar."

Let us all, both officers and employees, without exception, stand shoulder to shoulder on this side, as are our boys on the other side, and subscribe to the greatest extent of our ability.

quested the lines under his jurisdiction to use coal cars only for coal traffic, except that they may be loaded locally in the direction of the nearest junction point of the owning line, or in the direction of the mines on the owner road, or to a destination on the owning line, provided that immediate loading is available. Cars must not be back-hauled to obtain loading. If it is found that loading coal cars in the homeward direction delays them to the extent that it is impossible to fulfill all requirements for coal loading, instructions will be issued to return the cars empty.

Recent Orders of Western Regional Director

In another communication Mr. Ashton points out that the movement of perishable freight from southeastern states is increasing rapidly and that every effort should be made to return promptly all ventilated cars belonging to roads in that territory.

The western regional director is taking steps to eliminate the service of one road where there is duplicate local freight service on lines jointly operated. Up to date, such reductions in service have resulted in a monthly saving of 8,080 train-miles.

All western lines have been asked to supply accurate information in detail concerning reductions in passenger train mileage (1) between June, 1917, and December 28, 1917, and (2) from December 29, 1917, to March 31, 1918. They are also requested to advise the regional director of western roads of further passenger train mileage which can be eliminated, having in view the operation of all roads as one system.

Plan to Expedite Oil Movement

Because of complaints that soldiers and sailors have been overcharged by railroad news agents and in hotels and lunch rooms, the lines in western territory have been requested to take steps to insure the discontinuance of this practice so far as it is within their control.

At a meeting between representatives of the railroads, the mid-continental oil interests and the United States Fuel Administration at the office of the regional director of western railroads on April 2 the importance of prompt movement of oil was given full consideration. It was disclosed that there has been a considerable reduction in the number of tank steamers available for the movement of oil from southern ports to the Atlantic seaboard. This condition, as well as a heavy increase in the consumption of oil by the government and various manufacturing plants engaged in war work, has greatly increased the demand for tank cars. In addition,

the oil producers are being urgently pressed by the government to make every effort to increase their output. Owing to the shortage of material and delays in deliveries it will not be possible to make any considerable additions to the available supply of tank cars in the near future. The only solution of the problem is the strictest economy on the part of all concerned in the use of tank cars.

To bring about the closest co-operation between all interested it was thought advisable that a representative of the regional director of western railroads be appointed to be associated with the representatives of the United States Fuel Administration and the oil interests in the so-called mid-continental field. To this end, B. L. Swearingen, assistant freight agent of the Missouri Pacific, was appointed supervisor of oil traffic, with headquarters at Kansas City, Mo., as mentioned in the *Railway Age* of April 12, page 1006. He will arrange to concentrate the oil movement so far as possible in trainload lots which will be moved intact via one destination or distributing center. The oil producers have agreed to discourage the reconsignment of oil, which is now the cause of considerable delay, to cars and will impress upon all receivers of oil the necessity for providing additional storage capacity to insure prompt unloading and a supply of oil for use during times of traffic interruption by winter weather or otherwise. The railroads have been requested to arrange for a systematic daily service for the return of tank cars and in solid trains, so far as is practicable, to distributing centers.

BRITISH PRISONERS ARE WORKING ON LIGHT RAILWAYS within six miles of the front, according to a correspondent of the Philadelphia Public Ledger.

BRITISH WRECK MEDINA RAILWAY.—British mounted troops have destroyed several miles of the track of the Hedjaz Railway, east of the River Jordan, on the Palestine border,

it was officially announced in London on March 30. The cutting of the Hedjaz Railway line severs the communication of the Turks with any of their forces that may be in the region southeast of the Dead Sea and with those in Western Arabia. The revolting Arabs in the Hedjaz district have been masters of the lower part of this railway for some time but the destruction of the line at this far more northerly point will, it seems probable, prove a far more serious blow to the Turks. The only rail route to Medina, just to the north of Mecca, the Mahometan shrine, is also destroyed by this blow.

Back Up the Boys "Over There"

To Railway Officers and Employees of the Western Regional District

By W. G. Bied

President of the Chicago & Alton, and Chairman of the Railroad Liberty Loan Campaign Committee, Western Regional District

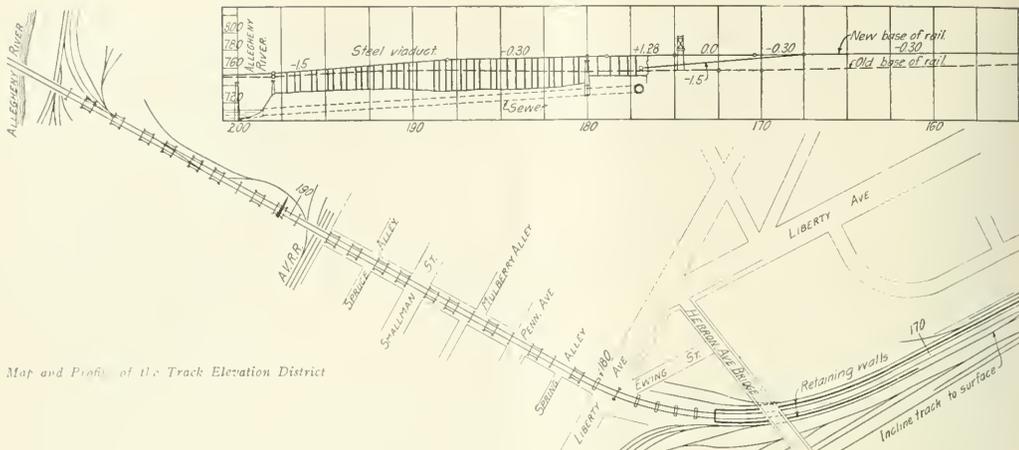
A crisis has come in the war which the United States and its Allies are waging for the highest ideals of humanity. Our very existence as a nation of freedom and liberty-loving people is at stake. We must win this war, no matter what the cost.

Those who are fighting "over there" must be maintained by the money of those who must stay here. This is why the government of the United States is offering Third Liberty Loan bonds with interest at 4½ per cent per year, on the best security in the world today.

In this crisis it is the patriotic duty of every American citizen to subscribe to this bond issue to the full extent of his ability. The Director General of Railroads has approved a plan whereby those in railway service are offered easier terms of payment than any other class of citizens.

In the Western Regional District there are in round numbers 800,000 railroad officers and employees whose yearly wages amount to \$850,000,000 a year. It is anticipated that a large share of a general wage increase impending will be devoted to the purchase of Third Liberty Loan bonds.

There are over 70,000 American railway men fighting in France today in this war for Freedom. They are offering a supreme sacrifice of life for their ideals, for their country, its people and its institutions. They and those fighting with them will not fail for lack of the financial support of the railway officers and employees at home. Everyone in the Western Regional District will be personally solicited to subscribe to this Liberty Loan. The response will be another demonstration of the unflinching loyalty and patriotism of the railway forces of the nation.



Map and Profile of the Track Elevation District

Baltimore & Ohio Grade Separation at Pittsburgh

The Main Tracks Are Raised on an Earth Fill and Steel Viaduct for More Than a Mile

WORKING THROUGH A DISTRICT subjected to a very heavy traffic and with the work complicated by the reconstruction at a new grade of a double-track steel viaduct, approximately one-half mile long, in a space so constricted as to make necessary the use of special construction equipment, the Pittsburgh Junction Railway, a subsidiary of the Baltimore & Ohio System, recently completed a grade separation project at Liberty avenue, Pittsburgh, Pa., which involved the expenditure of more than \$750,000. The work consisted of the elevation of the main line tracks from a point 4,150 ft. east of Liberty avenue to the east end of the railroad bridge over the Allegheny river, a distance of more than a mile. From the east end of the improvement to a point 350 ft. east of Liberty avenue, a distance of 3,800 ft., the tracks were raised on a fill supported by concrete retaining walls, while from Liberty avenue west they were raised on a steel viaduct which replaced an existing structure.

Reasons for the Improvement

The improvement was made primarily to renew the old steel viaduct west of Liberty avenue, which, if rebuilt at the old grade, would have committed the railroad for many years to come to the objectionable features of the old layout which can be best pointed out by a description of the old line.

Within the district affected by the improvement the old line occupied a private right of way from the eastern limits to Liberty avenue where it entered Thirty-third street, on which it continued to the river. East of Liberty avenue the line was built on earth cuts and fills, while west of Liberty avenue it was carried on a steel viaduct. The line involved excessive grades and curvature. Again, beginning at the east the grade descended from the level of the Pennsylvania Railroad crossing to a crossing at grade with Liberty avenue on grades ranging from 1.45 per cent to 0.06 per cent. Leaving Liberty avenue an ascending grade of 0.35 per cent was encountered for 800 ft.; then a level stretch for 200 ft., before descending on a 0.58 per cent grade to the level of

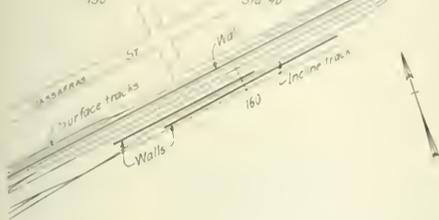
the Allegheny river bridge. The line also involved a 9 deg. and 30 min. curve across Liberty avenue.

East of Liberty avenue the only intersecting street, Forfar street, was carried over the tracks by means of the so-called Herron avenue bridge, while west of Liberty avenue all intersecting streets crossed under the elevated structure. Liberty avenue which crossed the railroad at grade with the tracks is the most important of any of the streets in the locality and one of the most important thoroughfares of the entire city, being the direct route from the center of the city to the Bloomfield and east end districts. At its intersection with the railroad it carries a double-track trolley line. The double-track main line of the railroad which crosses Liberty



Specially Designed Trestle Bents at the Carnegie Tracks

avenue carries all through freight and passenger traffic east and westbound between Pittsburgh and Youngstown, Akron, Cleveland, Chicago and all other points on the line west of Pittsburgh. For a 24-hr. period a traffic record taken for



one day showed 64 engines with trains and 41 light engines as passing over the crossing. During the same period 4,092 pedestrians, 1,703 vehicles and 358 street cars crossed the tracks.

By constructing the steel viaduct at a grade 7 ft. higher than the old one at the point of greatest change, it was pos-



A Section of the Retaining Wall

sible to eliminate the dangerous grade crossing at Liberty avenue, and secure an improved grade line for the entire distance. The plans were made accordingly. These plans also provided for a change in alignment to secure a better location for the main tracks and for the substitution of a 6 deg. 30 min. curve across Liberty avenue for the 9 deg. 30 min. curve in the old location. As built, the project involved 50,000 cu. yd. of fill, 50,000 lin. ft. of concrete piling, 25,000 cu. yd. of concrete and the erection of 4,000 tons of steel.

Unusual Conditions Encountered

In the district affected by the improvements numerous industrial plants join the right-of-way. A gantry yard also adjoins the main line just east of Liberty avenue. Interchange tracks were in service between the Pittsburgh Junction main line tracks and the Pennsylvania Railroad east of Liberty avenue and connection tracks with the Allegheny Valley Railroad, a part of the Pennsylvania system, and the river line of the Pittsburgh Junction Railroad west of Lib-

erty avenue. East of Liberty avenue the old main line tracks were at a level with the industrial and other tracks, while west of Liberty avenue ramp tracks formed the connections with the other roads, which crossed under the elevated structure in Thirty-third street.

East of Liberty avenue the plans for the improvement provided for 350 ft. of steel construction and raising the main tracks on an earth fill, leaving the yard and industrial tracks at the old level, making necessary the construction of 3,400 lin. ft. of retaining walls to sustain the fill under the main tracks. It also made it necessary to relocate the main line connections to the industrial and yard tracks. The maximum raise in grade in this section approximated 17 ft. and, to secure adequate overhead clearance, the grade of the Herron avenue bridge was raised. West of Liberty avenue the plans provided for the renewal of the steel viaduct in Thirty-third street at a grade above the old, the greatest grade change being approximately 7 ft. This change necessitated the reconstruction of the ramp connection tracks before mentioned and the raising of the track on the two easterly spans of the Allegheny river bridge. The construction plan adopted was hinged on the necessity of maintaining the heavy through traffic as well as the service to the various industries, yards, and connection tracks during the progress of the work. The restricted space in Thirty-third street added to the difficulties of construction under traffic and made necessary the use of special equipment.

The Improved Line

As is shown in the map and profile of the improvement, the new and old grades diverge just west of the Pennsylvania Railroad crossing. The connection between the two was made by means of a vertical curve, 1100 ft. long at the west end of which the new grade is 8.21 ft. above the old. The divergence of grades continues until the maximum separation of 17 ft. is made near Forfar street. Leaving Liberty avenue the grades converge gradually and join on the Allegheny river bridge. Only the two main tracks were raised to the new grades. On the north the main line connections to the industrial tracks were changed only in location, while on the south a ramp track was provided between the main and the low level yards at Liberty avenue.

To build the double-track line at the new grade it was necessary to provide a detour track and to operate a single track for a distance of 5,000 ft. during construction. Lack of space precluded the construction of two temporary tracks in Thirty-third street. Consequently the temporary track built by the American Bridge Company, contractors for the erection of the steel, from a point east of Liberty avenue to the river bridge was used for traffic purposes through this section. This track was constructed on the north side of the old tracks and of Thirty-third street, the detour being completed by building a temporary track about 600 ft. long between the American Bridge Company's high level track and the industrial tracks located on the north side of the main tracks. A ramp on a 1.5 per cent grade was provided between the high level track and the industrial tracks, and a gap was left in the north retaining wall to permit main track connections to be made with this detour track. The traffic over the single track detour was handled by an experienced telegraph operator stationed at

its easterly end who had control of train movements over the entire line. At the westerly end of the single track a switch tender and a signal operator worked under the direction of the operator at the other end.

Construction Progress

Work was begun on this project in September, 1915, and was continued without serious interruption till its completion early in 1917. As may be seen on the profile and map the change in the grade of the main track involved a maximum lift of approximately 17 ft. in the vicinity of the Herron avenue bridge. Approximately 50,000 cu. yd. of filling was placed by company forces in making this change in grade; 5,000 cu. yd. of which was secured from the excavation for the retaining walls and the remaining 45,000 cu. yd. was granulated slag and other materials secured from mills located along the lines of the system. In raising the main tracks to the new grade the traffic was diverted to the detour track and the tracks were jacked up in sections to permit the filling to be placed. No trestles were used.

In the old line, deck trusses were used to span the tracks at Herron avenue. These trusses cleared the top of the rail by only 24 ft. As the proposed raise in the tracks at the bridge was 16.8 ft., it was necessary to raise the bridge before the change in the grade of the tracks could be completed. In making the changes the clearance at the bridge was reduced to 21 ft., leaving a net raise of 13.8 ft. to be made. To avoid a corresponding raise in the roadway, through trusses were substituted in the span over the tracks.

Special Rigs Required for Driving Piles

In preparing the foundations for the retaining walls, bridge abutments and the pedestals supporting the steel via-

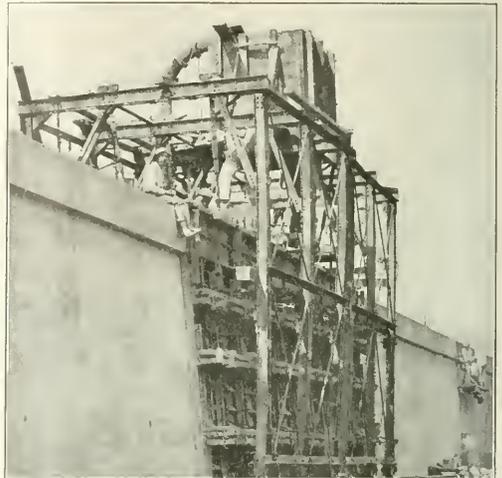


The Special Pile Driving Rig Used in Thirty-third Street

ducts, 50,000 lin. ft. of concrete piling was driven. The piles for the retaining walls and pedestals were cast-in-place and pre-cast piles were used in the piers and east abutment. The piles were driven for a 30-ton loading. The steel shells were furnished and driven by the Cranford Construction Company, Cincinnati, Ohio. The shells were withdrawn by means of six-way blocks.

The locating of the pedestals and the driving of the foun-

ation piling for the steel viaduct in Thirty-third street were complicated both by surface and sub-surface conditions. Beneath the surface were city water and gas mains and an 8-ft. circular brick sewer, while in the street were located the tracks leading to the Carnegie Upper Union mills and the substructure for the old steel viaduct which occupied nearly the entire width of the street. The surface conditions were further complicated by the necessity of maintaining the high level detour track trestle on the north side of the viaduct. The trestle consisted of single timber frame bents and I-beam stringers ranging from 20 to 30 in. in



Arrangement of the Receiving Hopper and Delivery Pipes in Building the Concrete Wall

depth according to the length of the span except at Liberty avenue where double bents were erected to carry the temporary girders used in closing the opening over the street, and at the crossing of the Carnegie tracks. At the last point it was necessary to relocate the tracks to clear the falsework and to erect specially designed bents. The special construction is shown in one of the photographs.

Before locating the pedestals for the new viaduct a complete survey and a map of sub-surface conditions were made. Once the pedestals were located their construction was hampered by the surface conditions. Because of the limited headroom available it was necessary to employ a special rig in driving the foundation piles. This rig, which is shown in a photograph, was provided with 12-ft. leads and handled the steel shells in 8 ft. sections, leaving only 4 ft. available for the hammer. The shells were driven to depths as great as 56 ft. and the rig was equipped with a 6,000-lb. hammer to increase the efficiency of the driving. Frequently the headroom was so restricted that it became necessary to dig pits for the rig to secure ample clearance for its operation.

Concrete for Retaining Wall Distributed by Air

The change in the grade of the tracks east of Liberty avenue made necessary the construction of 3,450 lin. ft. of retaining walls of the gravity type. In considering means of placing the concrete the length of the wall influenced the decision to adopt the plan of utilizing compressed air.

This plan was followed out with complete success. By referring to the map it will be seen that the north wall extends 2,800 ft. east from the east abutment of the viaduct, while the south wall is about 600 ft. in length. Including

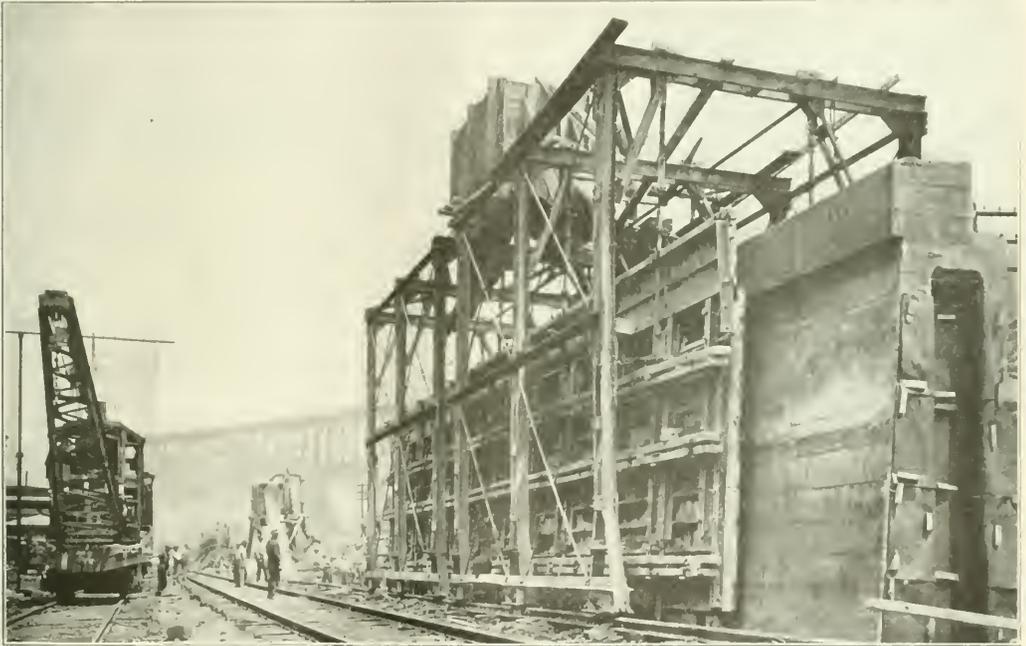
the length of the abutment the distance from end to end of walls measured along the wall is approximately 3,450 ft. To distribute the concrete through this distance by air pressure from a single central plant involved a maximum forcing distance of more than 1,500 ft.

The plant, which consisted of the mixers, boilers and the air compressor, was located on the north side of the main tracks near the center of the north wall. An 8-in. pipe was utilized to deliver the concrete from the plant to the forms. Blaw steel forms in 55-ft. sections were used throughout the work. These were mounted on wheels and were rolled forward by locomotive cranes as soon as a section of wall was sufficiently set to support the filling material.

The concrete was delivered to the forms under a pressure varying from 80 to 100 lb. At the start of the work the concrete was discharged directly into the forms, but the force of delivery was found to be too great for this practice and timber receiving hoppers were provided. These hoppers

The work was inaugurated under the general direction of E. J. Stuart, former chief engineer of the Baltimore and Ohio, and completed by R. N. Begien, his successor in office; W. S. Bouton, engineer of bridges, and Paul Didier, principal assistant engineer, were in direct charge of the work. The American Bridge Company was the contractor for the delivery and erection of the superstructure, the Cranford Construction Company, of Cincinnati, O., for the pile driving, and P. J. Joyce & Co., of New York, for the masonry.

ENGLISH "DOUBLE-HOME RAILWAYMEN."—A deputation of railwaymen was recently introduced to Lord Rhondda, the British Food Controller, by G. H. Thomas, general secretary of the National Union of Railwaymen, to point out the difficulties of about 43,000 trainmen, known as "double-home men," who had to sleep away from home probably every other night. In some few of these cases the



The Steel Forms Were Mounted on Wheels and Rolled to Place by a Locomotive Crane

were placed on the top of the forms and were fitted with flexible gravity discharge pipes by means of which the delivery of the concrete to the forms was controlled. The arrangement of the hoppers, and delivery and discharge pipes in reference to the forms is shown in one of the photographs.

The structural steel for the viaduct was delivered and stored in a storage yard just south of the west end of the viaduct, and, with traffic diverted over the detour trestle, the steel work between the east end of the river spans and the clearance line of the temporary structure was erected under traffic; that is, the old steel was removed and the new steel placed between trains. From this point to the east end of the improvement, the old structure was removed and the new structure placed without direct interference from traffic, by means of derrick cars and locomotive cranes, operating on the new structure, and removing the old steel and placing the new as they advanced.

men stayed in barracks or hostels provided by the railway companies, but the majority of the men stayed in lodgings. Ordinarily they took their food with them and had it cooked at the other end, but now there was a difficulty in their obtaining the food at home, and the landladies could not buy it for them, as they had not enough for themselves. Mr. Thomas suggested that the railway companies themselves might supply the men with food from their refreshment rooms, or from specially accumulated stocks. He also urged that, as a railwayman was frequently called upon to do nine or ten shifts a week, no system of rationing would be fair which did not take into account the necessary dividing up of his week into practically nine or ten days. Lord Rhondda, in reply, said that he fully realized the very exceptional circumstances and he hoped it would be possible to make arrangements to meet the difficulties of railwaymen who had to sleep from home.



General View of Ambulance Train No. 59 for the United States Army

An Ambulance Train for the United States Army

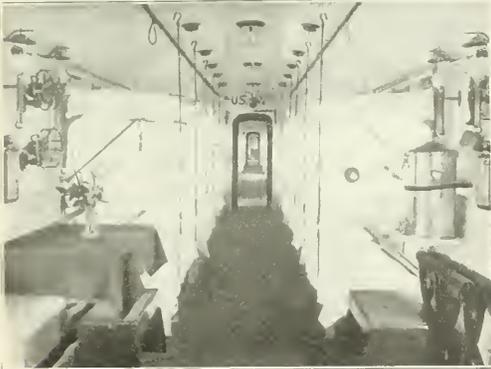
Runs Between the Front and Base Hospitals in France;
Built by Lancashire & Yorkshire Railway

THE LANCASHIRE & YORKSHIRE RAILWAY has just completed an ambulance train for the United States army, which is the sixth ambulance train constructed by this company since the war began. Two of these have been in constant use in Great Britain and four have been built for use on the continent. The company also has in progress two further trains for the United States army which will shortly be completed.

The latest train, which is intended for the conveyance of

The description of the train and the photographs which are here reproduced have been made available through the courtesy of Sir John Aspinall, general manager of the Lancashire & Yorkshire.

The train consists of 16 cars and has a total length of 948 ft. and weighs 442 (British) tons, when unloaded. It is vestibuled throughout and fitted with electric lights and fans, and there is a total water supply on the train of 3,100 gallons. The exterior of the train is painted khaki, with a Red Cross and the letters "U. S." on both sides of each vehicle, together with the car and medical numbers. The train is heated throughout by steam and each car is fitted with a hand brake and the Westinghouse automatic air brake. There are altogether 418 cots and berths in the train for patients and personnel, and when the bottom cots are used for sitting-up cases accommodation is provided for a total of 650 persons. Emergency salvage tools such as saws, axes, hammers and crowbars, are carried on the train, and extinguishers in all ward cars, kitchens, and the pharmacy. A set of workmen's tools is also provided in the stores van.



Ward Car, with Cots Arranged for Lying-down Cases

wounded United States soldiers from the front to the base hospitals on the Continent is similar in general design to the ambulance trains previously built for the British War Office, but as the result of experience gained in the construction of these trains improvements have been made with a view to adding to the comfort and alleviating the sufferings of the sick and wounded soldiers. Everything possible has been arranged for ease in the transport of the wounded men, and for their welfare and treatment while on the journey to the base hospital, the equipment of the train being of the most complete description, and the workmanship and finish of the cars of the highest quality. At the same time every attention has been paid to providing the best arrangements for the accommodation and convenience of the medical officers, nurses, non-commissioned officers, and orderlies who travel with the train to look after the patients.

Ward Cars

There are ten ward cars on the train, nine of which are fitted with .36 cots each for lying-down cases, or a total of 324 beds, and the other being divided into four sections with a total of 24 cots for infectious cases.

The cars are each 56 ft. long and 9 ft. wide, a pair of double doors being arranged on either side near the center of the car with ample space for the easy manipulation of stretchers. Each car has its interior finished throughout in white enamel which tends to give the wards a bright and cheerful appearance. A supply of water is carried on each car in tanks with a capacity of 150 gal. each, which are built in the roof of the vehicle, and a six-gallon tank for drinking water is fixed near the center of each ward.

For ventilation purposes both fixed and portable electric fans are provided; a small bracket and electric plug are arranged opposite each cot for the portable fans to be used for gas cases. Further ventilation of the car is secured by means of side drop windows and a large number of air extractors placed in the roof.

The cots in all the ward cars are arranged in three tiers, and owing to the variation in the cases received for transfer to the hospital bases, the cots have been designed so that the center tier may be hinged down to form a back to allow of the bottom cots being used as seats, thus doubling the accommodation; at the same time the top tier of beds may be

used for lying-down patients. All the mattresses are filled with wood fiber, and one flock and one feather pillow is supplied for each cot. In order to safeguard the transit of patients, two straps are fixed on the outside of each bed. The cots are numbered the same as in ordinary hospitals, and each ward is supplied with camp stools for the use of the nurses and portable stools for use when lifting patients



Ward Car, with Bottom Cots Arranged for Sitting-up Cases

into the top berths. A small drop table is fitted to the side of the car.

At the corners of the floor the linoleum is well rounded; this method is adopted throughout the train for hygienic purposes. Lavatory and cupboard accommodation are provided at the end of each of the ward cars. Ample provision has been made in the brake van and stores car for the conveyance of food, a desk also being fitted for the use of the storekeeper. Other little details have also been considered for the convenience of the patients, such as the provision of



Interior of the Pharmacy Car

paper racks, portable electric lamps, cuspidors and ash trays.

Pharmacy Car

This car is divided into five compartments consisting of a ward fitted with twelve cots, pharmacy, office, emergency room and stores. The car is placed in the center of the train with ward cars on either side. It has ample space for patients waiting to be dressed, and is fitted with cupboards, a folding table, hot water heater, sterilizer and sink.

One of the special features of the train is that patients can be carried on a stretcher from any of the nine ward cars into the pharmacy, the minimum gangway being 2 ft. 6 in. wide. The pharmacy car has water tanks of 500 gal. capacity, and two drinking water tanks each of six gallons capacity. The office is provided with a table, chair, cupboards, safe, and other necessary fittings. A soiled linen cupboard is fitted at the end of the car opposite the stores. The center electric light in the pharmacy portion of this car consists of a cluster of five lamps, all of which can be brought into use at once to give a greater amount of light when required for operations.

Kitchen Cars

There are two well appointed kitchen cars on the train, each 56 ft. long by 9 ft. wide, containing kitchens, 20 ft. long by 8 ft. 3 in. wide inside. One car has a linen store,



Nurses' Dining Room in the Staff Car

officers' pantry, cooks' room, sitting room for sick officers and bath room, and the other has, in addition to the kitchen, a personnel mess room, stores for officers' kits, and a mess room and lavatory for non-commissioned officers.

The kitchens are fitted with the French standard army range to burn coal, coke, or anthracite. This range has a copper boiler and hot water installation to keep a constant supply of 50 gal. of hot water. On the range are boiling pans recessed into the top plate and at the back over these pans is a water tap for filling purposes. A dresser, washing-up sink, hot and cold water supplies, and refrigerator are also fitted. A Sayer's stove is provided for use in case of emergency. The water tanks arranged in the roof have a capacity in each of these cars of 400 and 350 gal. respectively, and are fitted with gages, this feature applying to all water tanks throughout the train.

Electric fans are fitted in the kitchens, sitting room for

sick officers, cooks', personnel, and non-commissioned officers' mess rooms, the latter being provided with a seat which can be arranged to form two sleeping berths. The bath room has a white enamelled bath with hot and cold water supply, a folding wash basin, chair, sponge racks and other fittings. In addition, water may be heated by means of a steam jet from the engine.

Staff Car

This car gives accommodation for four medical officers and four nurses, and is provided with day and sleeping



Kitchen Car—Looking Towards the Range and Soyer's Stove

compartments. The medical officers' mess room at one end of the car is fitted with a dining table and chairs, together with cupboards and shelves, and an electric fan. At one end is a lounge which can be arranged as a bed if required. There are three compartments with berths for the medical officers immediately adjacent to their mess room and entered from a side corridor. The berths are arranged on one side



Kitchen Car—Sitting and Dining Room for Sick Officers

of each compartment, and a seat portion can be drawn forward to make up a berth. On the opposite side is arranged a wardrobe, writing table, net rack, book shelves and a chair. For the use of the nurses a mess room has been provided at the other end of the car.

One of the features in this vehicle is that in addition to

the ordinary heating apparatus a self-contained stove and hot water system is provided to heat the car when standing in sidings. This has been arranged on account of the staff being regularly on the train.

The remainder of the personnel has accommodation in a separate car, and 33 cots are provided of a similar design to those in the ward cars so that the car can be used for carrying patients in emergency. The staff car is also provided with a self-contained heating apparatus.

This train, as well as the other hospital trains which have been fitted up by the Lancashire & Yorkshire, was built under the supervision of Geo. Hughes, chief mechanical engineer, at the road's carriage and wagon works at Newton Heath, Manchester. The composition of the train, which is designated as No. 59, is shown in the table:

Number of cars	Accommodations for
1 Brake van with four infectious wards.	{ 24 Infectious lying-down cases
	{ 1 Train guard.
1 Staff car	{ 4 Medical officers.
	{ 4 Nurses.
1 Kitchen car with sitting room for sick officers	{ 3 Cooks.
	{ 10 Officers.
4 Ward cars	144 Lying-down cases.
1 Pharmacy car	12 Lying-down serious cases.
5 Ward cars	180 Lying-down cases.
1 Kitchen car	2 Non-commissioned officers.
1 Personnel car	33 Orderlies.
1 Brake van and stores car.	1 Train guard.
16 Cars	418 Persons.

With the bottom beds in the ward cars used for sitting-up cases, the accommodation is increased to 650.

The Most Remarkable Picture of the War

MANY STARTLING PICTURES have come to us from the war zone, but the one on the facing page, considering that it shows the activities behind the German lines as viewed by a French observer, is probably the most remarkable. The view shows a military railway destroyed by 420 mm. French shells and a new railway line which was built to replace it.

The following key is the identical information which was transferred to the French army staff. The photograph is practically the first of its kind to reach this country.

Key to Airplane Picture

1. Supply railway trains running on newly laid tracks.
2. Piles of supplies, chiefly timbers for use in building dugouts.
3. Rolls of barbed wire.
4. Piles of iron stakes for stringing barbed wire.
5. Steel roofing for dugouts.
6. Site of railroad station before it was destroyed by French artillery. Note the big shell craters (about 60 ft. across) caused by 420 mm. shells.
- 7-8-9. Remains of former railway tracks where they entered the station.
10. Broken ties of former railway tracks.
11. Other supplies piled up. Perishable goods covered with tent cloth.
12. Battery of four guns, with abris for the gunners.
13. Commander's dugout.
14. Ammunition park. Note the German soldiers standing around.
15. German soldiers standing in the road watching the French airplane.

The photograph is copyright by International Film Service.



The Destruction of a Railway Behind the German Lines as Viewed by a French Observer

Railway Personnel Under Government Control

Corporate Organizations Separated from Operating Functions; Policy of the Railroad Administration

WASHINGTON, D. C.

ONE OF THE MOST INTERESTING features of the plan of government control of the railroads is the effect that it is having and is likely to have on the personnel of the railroad organizations.

The process of railroad unification under government control has already progressed far enough to have an important effect in this respect and as the policies of the director general are being gradually developed and put into practice it is becoming apparent that some of the effects are likely to be even more far-reaching than was fully realized at the outset. While it has not yet been made entirely clear just how the policy is to be applied in specific instances, there have now been enough indications to give a fairly clear idea of what is to be expected in a general way, although there are many rumors as to still more drastic changes concerning which it is still impossible to speak with certainty.

The first effect on railroad personnel was the drawing into the government service of a considerable number of prominent railway officers as members of the organization of the Railroad Administration. Most of these appointments have been announced from time to time in the *Railway Age*, although there are several men who have been serving in the organization at Washington and elsewhere whose status has not been made permanent. In most cases the railroad officers who have been appointed to positions in the government organization have resigned all connection with their railroad companies and other corporations and in some instances the positions they formerly occupied have been filled by promotions.

Many of the other changes which are taking place or are under consideration result from the elimination of competition between railroads and their effect will be most noticeable in the traffic department. Others result from the separation of the financial and corporate organization of the companies from all connection with the operation of the properties, while still others result from the change in the relations of the roads to the government. Practically all of them are more or less influenced by the desire of the Railroad Administration to take advantage of the possibilities of unified operation to effect economies in operation, to offset in part, at least, the effect of the constantly increasing tendency toward increased expenses in nearly every direction, including the expected large increase in wages.

The fact that the government is directing the operation of the railroads has made unnecessary, from the govern-

ment's standpoint, many functions formerly carried on by the railway companies, and Director General McAdoo has made it clear that he does not intend to have the government pay for them. As the government is to pay the companies a fixed compensation for the use of their properties and is to collect the revenues and pay the expenses, it is apparent that all items of operating expense are in effect paid by the government. Mr. McAdoo's decisions on this subject, therefore, take the form of an order that the expense

concerned is no longer to be charged to operation, leaving the companies free to continue it, if they desire to do so, by charging it to the corporate accounts to be defrayed from the amounts they will receive from the government as compensation for the use of their properties.

It is assumed that the companies will consider it necessary to retain most of their general officers thus released, even though they may not be necessary to the purposes of the government. To the extent that they do retain them, the amount of their compensation from the government available for other purposes will therefore be reduced by the amount of the salaries and expenses involved that were formerly charged to operation. While the total expense of this kind would be smaller as compared with the total compensation it would be proportionately four times as large in comparison with a corporate income of \$950,000,000 as in comparison with total operating revenues of approximately \$4,000,000,000.

General Order No. 6

The first announcement of the policy of reduction of operating expenses by curtailing payments of salaries and expenses of officers and organizations came in General Order No. 6, issued in January, which provided that operating revenues should not be expended for the employment of attorneys not actually engaged in necessary legal work, legislative agents, or associations or organizations of carriers except as approved by the director general.

Because this order was not entirely specific and because of the difficulty of deciding what organizations were to be considered necessary most of them were authorized to continue until April 30, pending an investigation, which is still in progress, as to whether they are necessary to the operation of the roads under the circumstances.

The next manifestation of the same tendency was the issuance of a circular calling for information regarding the expenses of financial and corporate offices in New York and

A Liberty Loan Message

To Officers and Employees of Railroads
Southern Territory

By C. H. Markham

Regional Director, United States Railroad Administration,
Southern Territory

The honor and the resources of the richest government on earth are security for the Liberty Bonds and both are unimpeachable. Not only should we regard it as our patriotic duty to subscribe but we should consider it a great privilege to be able to contribute substantially toward sustaining our brave soldiers and sailors who are fighting for our safety and our honor.

We also owe it to our gallant Allies, who for four years have shed their blood and severely taxed their resources in defense of the liberties of the world, that they should be supported to the limit of our resources, not only in men but in money.

The obligation rests upon each and all of us to do and to contribute without stint. Do not stop with what you can readily spare. Only by united and constant sacrifice can we hope or shall we deserve to win.

There is no more important government service than rail transportation, and while you are faithful and efficient in this, the occasion demands more than mere performance of duty; it demands a sacrifice. I confidently appeal to you to subscribe to the fullest extent of your ability.

elsewhere. This was followed by an order on March 18 that the expenses of railroad offices, including salaries of officers devoted to financial and corporate affairs as distinguished from operation, should not be charged to operating expenses after April 1, except as expressly authorized by the Railroad Administration. The circular stated that carriers claiming that a part of such expense should be chargeable to government operation might file a statement of such claim for consideration.

It is understood that for a time the Railroad Administration contemplated a plan by which a part of certain office expenses or salaries might be charged to operation and a part to the corporate accounts, but that later this plan was deemed impracticable.

The policy as to the separation of the financial and corporate organization from the operating organization of the companies was further outlined in a general order that chairmen of boards of directors or of committees thereof shall not exercise functions connected with the operation of the railroads under federal control and in the circular stating that the director general is of opinion that the government ought not to pay the salaries and office and traveling expenses of officers whose services are not reasonably required for the operation of the railroads.

Corporations Separated from Properties

This makes it perfectly clear that the corporations are definitely separated from all control over their properties for the period of government control. Their situation has been illustrated by the analogy of a landlord who has leased his property to a tenant and who naturally expects to pay his own office and other operating expenses from his income from the rental. His contract or lease may provide for his making additions and improvements to the property

from time to time and also that the tenant shall maintain the property in good repair or pay for any failure to do so. In the case of the railroads the situation is somewhat complicated by the fact that the roads were taken over under the supreme war powers of the President, without any contract or conditions, and that the contracts are being negotiated after the property has been in the control of the government for over three months.

In some of the preliminary discussions of the subject, such as those which took place during the hearings before the congressional committees before the enactment of the railroad control law, some of the statements made to describe the situation were somewhat hazy. At one time Mr. McAdoo referred to his administration as having been superimposed upon that of the railroads and of the corporations as the agencies of the government to carry on the operation of the roads. He and other representatives of the administration consistently referred to the new regime as "government control" of railroad operation, rather than as government opera-

tion. Whether or not the term "control" was regarded as preferable to "operation" during the period when transportation was in a state of semi-paralysis caused by the unprecedented weather of January, it is now evident that the government is actually operating the properties. It is enforcing its own policies, it has formed its own organization, and instead of treating the corporations as its agencies it is treating them as landlords with which it has no relation except the obligation to pay the guaranteed compensation, (the amount of which is still to a considerable extent within its control, subject to the right of court review) and to adequately maintain the properties or pay for any failure to do so. In General Order No. 17 provision was made for keeping two sets of books for each company, one set to be known as federal books and to contain the operating accounts, and one set for the corporate accounts.

While the exact interpretation to be placed on the various orders that corporate expenses are not to be charged to operation has not been made clear, the administration has served notice that any expense which it considers to have been improperly charged may be charged back against the corporation after April 1. This indicates that it expects the companies, with their own knowledge of the facts in each case, to make the decision for themselves as to which officers and offices were reasonably necessary to operation, while reserving to itself the power of ultimate determination after consideration of the circumstances.

At any rate it would appear certain that the government does not expect to pay the expenses of such offices as stock transfer and bond registering offices or any of the expenses incident to the payment of dividends and interest, which in the case of an operating company were naturally included in operating expenses. It is also clear that the salaries of

chairmen of boards and of executive committees, and of the boards of directors themselves, are to be charged to the corporate accounts. In the case of roads that have financial vice-presidents it would naturally be assumed that they would also remain with the corporation and the same would be true of counsel with offices in New York whose principal functions were to advise the directors. There are numerous instances, however, where counsel located in New York in the case of eastern roads, were actually in charge of the legal work of the company pertaining to operation and where the general counsel or legal vice-president, although located at the headquarters of the road, devoted his attention mainly to corporate affairs and perhaps received a larger salary by reason of that fact than he otherwise would have been paid.

It is understood that many of these instances in the "twilight zone," as it were, have been decided by the companies themselves, with or without the advice of officers of the Railroad Administration, and that others are being con-

"While My Brother Suffered for Me, I, Too, Made Sacrifices"

By Wm. J. Harahan
President, Seaboard Air Line

The part the one and a half million railway employes with a daily wage of \$4,000,000 should play in the present crisis is to match with service and money the sacrifices of those from our ranks who with their bodies and brains shall free us from threatened autocracy and deliver us a guaranty of safety as a free people. The blow that is necessary to accomplish this end must be backed by the concentrated power of one hundred million people. The Third Liberty Loan is an arch stone upon which all else depends. Food, ships, clothing, ammunition, guns, aeroplanes and all those things of which our men must have a never-ending supply cannot materialize without money.

The third issue is for more than one-half the coined and paper money of the United States. The railroad employes must therefore give freely of their money and of their credit.

The offer made by the railroads of this country by direction of the Director General to purchase for employes bonds to be repaid in monthly payments from future wages should meet with such joyous and liberal response that each may say, "While my brother suffered for me, I, too, made sacrifices."

sidered by the administration. For example, word has occasionally been brought to Washington by railroad officers that this or that officer will probably remain with the corporation while certain others will remain with the operating organization; and Mr. McAdoo's circular has made it plain that he expects the counsel who are now representing the companies in the negotiations with the law department of the administration, regarding the form of contract covering the compensation, to be charged to the corporate accounts.

Executive Officers

As to the executive officers the question is raised as to what will be done in the cases where there is no chairman of the board or of the executive committee other than the president. Herewith is a list of 50 leading railroad companies with the names of the chairmen or presidents or both. Under Mr. McAdoo's order the chairmen are definitely separated from the operating organizations. Apparently it

Company	Chairman	President
Atchison, Topeka & Santa Fe.....	E. P. Ripley.	E. P. Ripley.
Atlantic Coast Line.....	Henry Walters.....	J. R. Kenly.
Baltimore & Ohio.....	.....	D. Willard.
Boston & Maine.....	.....	J. H. Hustis (Temp. Receiver).
Central of Georgia.....	C. H. Markham.....	W. A. Winburn.
Chesapeake & Ohio.....	F. Trumbull.....	G. W. Stevens.
Chicago & Alton.....	.....	W. G. Bied.
Chicago & Eastern Illinois.....	.....	W. J. Jackson (Receiver).
Chicago & North Western.....	.....	R. H. Aiston.
Chicago, Burlington & Quincy.....	Geo. B. Harris.....	Hale Holden.
Chicago Great Western.....	.....	S. F. Felton.
Chicago, Milwaukee & St. Paul.....	A. J. Earling.....	H. E. Byram.
Chicago, Rock Island & Pacific.....	John G. Shedd.....	J. E. Gorman.
Cleveland, Cin., Chic. & St. L.....	.....	A. H. Smith.
Delaware & Hudson.....	.....	H. Truesdale.
El Paso & Southwestern.....	James Douglas.....	L. F. Loree.
Erie.....	.....	T. M. Schunacher.
Florida East Coast.....	.....	F. D. Underwood.
Great Northern.....	L. W. Hill.....	W. P. Kenney.
Illinois Central.....	.....	C. H. Markham.
International & Great Northern.....	.....	James A. Baker (Receiver).
Kansas City Southern.....	L. F. Loree.....	J. A. Edson.
Lehigh Valley.....	E. B. Thomas.....	E. E. Loomis.
Los Angeles & Salt Lake.....	.....	W. A. Clark.
Louisville & Nashville.....	Henry Walters.....	M. H. Smith.
Michigan Central.....	H. B. Ledward.....	A. H. Smith.
Minneapolis & St. Louis.....	Chas. Hayden.....	W. H. Bremner.
Missouri, Kansas & Texas.....	.....	C. E. Schaff (Receiver).
Missouri Pacific.....	.....	D. F. Bush.
Nashville, Chattanooga & St. L.....	W. R. Cole.....	J. H. Peyton.
New York Central.....	C. M. Deneu.....	A. H. Smith.
New York, New Haven & Hartford.....	Howard Elliott (Com. Relations).	.....
Norfolk & Western.....	L. E. Johnson.....	N. D. Maher.
Norfolk Southern.....	M. J. Perry.....	Jos. H. Young.
Northern Pacific.....	Howard Elliott.....	I. M. Hannaford.
Pennsylvania.....	.....	Samuel Rea.
Pere Marquette.....	E. N. Brown.....	Frank H. Alfred.
Philadelphia & Reading.....	E. T. Stotesbury.....	A. T. Dice.
St. Louis San Francisco.....	.....	W. B. Biddle.
Southern Railway.....	W. G. Field.....	J. M. Herbert.
Seaboard Air Line.....	S. D. Warfield (Chmn. of Brd. and Ex. Com.)	.....
Southern.....	.....	W. I. Harahan.
Southern Pacific System.....	.....	Fairfax Harrison.
.....	.....	Kruttchnitt (Chmn. Ex. Com.)
.....	.....	Wm. Sproule.
Pacific System.....	.....	W. D. Scott.
Texas & Louisiana Lines.....	.....	F. Randolph.
Southern Pacific of Mexico.....	.....	J. L. Lancaster (Receiver).
Texas & Pacific.....	.....	.....
Union Pacific System.....	C. B. Seger.....	.....
Union Pacific R. R.....	.....	E. Calvin.
Oregon Short Line R. R.....	.....	E. Calvin.
Oregon Wash. R. R. & N. Co.....	.....	I. D. Earrell.
Wabash.....	H. Williams.....	F. Green.
Western Maryland.....	L. Greer.....	L. Greer.
Western Pacific.....	.....	C. M. Levey.
Wheeling & Lake Erie.....	.....	W. M. Duncan.

will be necessary for each company which has a president as its chief executive officer to decide whether it wishes to retain him as the head of the corporation or whether to allow him to remain as the operating head under Mr. McAdoo's control. At present such men are in what may sometimes be an embarrassing position of divided allegiance, to the company that engaged their services and to the government that is now operating the property and paying the salaries. Even before the director general issued any order

on the subject the opinion was expressed by some railroad officers that men working either in Mr. McAdoo's own organization or under his control in charge of a railroad would eventually find it necessary to separate themselves from their corporations. There have been some rumors, as yet without confirmation, that Mr. McAdoo would decide eventually to dispense with the services of the presidents altogether on the theory that he and his staff are assuming the executive responsibility and functions which formerly rested with the head of each company.

In some cases the boards of directors have elected chairmen to succeed men who have resigned to become connected with the Railroad Administration. The Union Pacific elected C. B. Seger, chairman of the executive committee in place of Judge Lovett, and the Western Maryland elected L. Greer both chairman and president succeeding Carl R. Gray. The Atchison did not elect a successor to Walker D. Hines. Marvin Hughitt has resigned as chairman of the Chicago & North Western and no successor was elected.

Many chairmen, such as George B. Harris of the Burlington, are men advanced in years who have served as presidents and have practically retired from active affairs. Others, such as Frank Trumbull of the Chesapeake & Ohio, are active but devote their attention primarily to the larger questions of finance and policy. Others, such as John G. Shedd of the Rock Island, are not practical railroad men but represent financial interests in the road. Julius Kruttchnitt is the active operating executive of the Southern Pacific with three presidents under him.

If the presidents should be displaced undoubtedly some of the inactive chairmen might retire and the presidents could be elected chairmen, but this would remove from the field of railroad operations some of the ablest railroad officers and would be a distinct loss to the service.

An article outlining the policy already indicated or expected to be followed as to the reorganization of the traffic department was published in the *Railway Age* of April 5. This policy has since been confirmed by the issuance of definite orders by the regional directors, ordering the discontinuance of all off-line traffic offices and the discontinuance or consolidation of city freight and ticket offices. A previous order had discontinued most of the advertising and publicity work. Orders were issued by Mr. McAdoo, that the employees released by these orders were to be assigned to other duties to the extent possible, but to what extent he expects to be able to continue the services of traffic officers has not yet been announced.

FRENCH RAILWAYS AID DEFENSE OF ALIENS.—The disapproval of Germany at the check to the offensive which was to end the war is considerable, says a correspondent of the *New York Globe* in a cable from Paris dated April 9. He says that the skill and rapidity with which the French troops were transported during those critical days is deserving of the highest praise. The camion service plied on all the roads day and night without a single hitch. The routing had to be done long before to meet every possible contingency. The chauffeurs drove night and day until they dropped from the seats. Even more important was the work of the railways, which were ready in advance for every emergency. The lines used by the Germans descend fanlike from Belgium into France, giving a considerable advantage over the French, whose roads parallel the front, and require transport for greater distances. The French roads were used to their absolute maximum, the equipment being supplemented by material borrowed from lines not immediately concerned. The railway men all worked at the greatest good humor for several days without sleep, carrying men, horses, guns, wagons, munitions, and supplies of every kind to the front and bringing back the wounded and the fleeing civil population.

Tentative Specifications for Standard Locomotives

General Dimensions of the Proposed Standards Have Been Issued with Request for Number Desired

WHILE THE DETAILS of the designs of the standard locomotives for the United States government have not been completed a tentative specification has been drawn up giving the general dimensions of the 12 locomotives proposed. These have been sent to the railway companies with a request for the number of each design the road will need to meet its requirements for new locomotives this

coal capacity of 16 tons. Unless some good and sufficient reason is given with the order for the different locomotives the tenders shown with the specifications of the locomotives will be provided. The circular accompanying the specifications included a statement to the effect that special design for extreme grades or other operating features which require heavier locomotives than those included in the specifications

General Dimensions of the Mikado, Santa Fe and Mallet Standard Locomotives for the Railroad Administration

Type	Mikado	Mikado	Mikado	Mikado	Mikado	Mikado
Axle load	54,000 lb	60,000 lb	55,000 lb	60,000 lb	60,000 lb	60,000 lb
Specification Number	1-A	2-A	3-A	4	5	6
Gage	4 ft. 8 1/2 in.	4 ft. 8 1/2 in.	4 ft. 8 1/2 in.	4 ft. 8 1/2 in.	4 ft. 8 1/2 in.	4 ft. 8 1/2 in.
Service	Freight	Freight	Freight	Freight	Freight	Freight
Fuel	Bit coal	Bit coal	Bit coal	Bit coal	Bit coal	Bit coal
Tractive effort	54,000 lb	60,000 lb	69,000 lb	74,000 lb	80,000 lb	84,000 lb
Weight in working order	90,000 lb	105,000 lb	100,000 lb	100,000 lb	100,000 lb	100,000 lb
Weight on drivers	90,000 lb	105,000 lb	100,000 lb	100,000 lb	100,000 lb	100,000 lb
Weight on leading truck	3,000 lb	7,000 lb	30,000 lb	30,000 lb	30,000 lb	30,000 lb
Weight on trailing truck	47,000 lb	58,000 lb	60,000 lb	60,000 lb	60,000 lb	60,000 lb
Weight of engine and tender in working order	466,000 lb	497,000 lb	532,000 lb	596,000 lb	646,000 lb	746,000 lb
Wheel base, driving	16 ft. 9 in.	16 ft. 9 in.	16 ft. 9 in.	16 ft. 9 in.	16 ft. 9 in.	16 ft. 9 in.
Wheel base, rigid	36 ft. 1 in.	36 ft. 1 in.	36 ft. 1 in.	36 ft. 1 in.	36 ft. 1 in.	36 ft. 1 in.
Wheel base, total	71 ft. 5 1/2 in.	71 ft. 9 1/2 in.	71 ft. 1 1/2 in.	81 ft. 10 1/2 in.	88 ft. 0 in.	93 ft. 6 in.
Ratios						
Weight on drivers ÷ tractive effort	4.0	4.0	4.0	4.1	4.5	4.7
Total weight ÷ tractive effort	5.3	5.4	5.2	5.3	5.5	5.1
Tractive effort × diam. drivers ÷ equivalent heating surface*	730.9	655.3	629.6	665.9	633.1	717.6
Equivalent heating surface ÷ grate area	79.6	81.7	82.5	79.4	96.3	87.3
Weight on drivers ÷ equiv. heating surface*	6.1	5.5	5.9	6.1	5.8	5.1
Total weight ÷ equivalent heating surface*	46.8	41.5	43.8	43.9	49.0	57.0
Volume both cylinders	18.4 cu. ft.	21.2 cu. ft.	17.2 cu. ft.	16.4 cu. ft.	19.9 cu. ft.	26.9 cu. ft.
Equivalent heating surface ÷ vol. cylinders	553.3	272.9	265.2	263.1	336.1	312.7
Grate area ÷ vol. cylinders	3.6	3.3	3.6	3.3	3.6	3.6
Cylinders						
Kind	Simple	Simple	Simple	Simple	Compound	Compound
Diameter and stroke	14 in. by 30 in.	27 in. by 32 in.	27 in. by 32 in.	27 in. by 32 in.	18 in. by 27 in. by 27 in.	18 in. by 27 in. by 27 in.
Pistons						
Kind	Piston	Piston	Piston	Piston	Piston	Piston
Diameter	14 in.	14 in.	14 in.	14 in.	18 in.	14 in.
Wheels						
Driving, diameter over tires	63 in.	63 in.	57 in.	63 in.	57 in.	57 in.
Boiler						
Style	Con. Wag. Top	Con. Wag. Top	Con. Wag. Top	Con. Wag. Top	Str. Cut. T.	Con. Wag. Top
Working pressure	200 lb. per sq. in.	190 lb.	200 lb.	200 lb.	250 lb.	200 lb.
Outside diameter of first ring	78 in.	86 in.	114 in. by 96 in.	114 in. by 96 in.	114 in. by 96 in.	176 in. by 96 in.
Firebox, length and width	114 in. by 84 in.	120 in. by 84 in.	114 in. by 96 in.	114 in. by 96 in.	96 in. by 74 in.	176 in. by 96 in.
Tubes, number and outside diameter	216—2 1/2 in.	247—2 1/2 in.	247—2 1/2 in.	271—2 1/2 in.	247—2 1/2 in.	271—2 1/2 in.
Flues, number and outside diameter	40—5 1/2 in.	45—5 1/2 in.	45—5 1/2 in.	50—5 1/2 in.	45—5 1/2 in.	53—5 1/2 in.
Tubes and flues, length	19 ft.	19 ft.	20 ft. 6 in.	20 ft. 6 in.	20 ft. 6 in.	20 ft. 6 in.
Heating surface, tubes	2,407 sq. ft.	2,752 sq. ft.	2,970 sq. ft.	3,258 sq. ft.	2,478 sq. ft.	3,078 sq. ft.
Heating surface, flues	1,090 sq. ft.	1,226 sq. ft.	1,323 sq. ft.	1,469 sq. ft.	1,349 sq. ft.	1,825 sq. ft.
Heating surface, firebox	286 sq. ft.	319 sq. ft.	373 sq. ft.	429 sq. ft.	429 sq. ft.	432 sq. ft.
Heating surface, total	3,783 sq. ft.	4,297 sq. ft.	4,666 sq. ft.	5,156 sq. ft.	5,476 sq. ft.	6,275 sq. ft.
Superheater heating surface	882 sq. ft.	993 sq. ft.	1,078 sq. ft.	1,220 sq. ft.	1,168 sq. ft.	1,475 sq. ft.
Equivalent heating surface	4,706 sq. ft.	5,287 sq. ft.	6,283 sq. ft.	7,091 sq. ft.	7,346 sq. ft.	8,420 sq. ft.
Grate area	66.7 sq. ft.	70.8 sq. ft.	76.3 sq. ft.	88 sq. ft.	76.2 sq. ft.	96 sq. ft.
Tender						
Tank	Wat. Bot.	Wat. Bot.	Wat. Bot.	Wat. Bot.	Wat. Bot.	Wat. Bot.
Weight	172,000 lb	172,000 lb	172,000 lb	172,000 lb	172,000 lb	172,000 lb
Water capacity	10,000 gal.	10,000 gal.	10,000 gal.	10,000 gal.	10,000 gal.	10,000 gal.
Coal capacity	16 tons	16 tons	16 tons	16 tons	16 tons	16 tons

*Equivalent heating surface = total evaporative heating surface ÷ 1.15 (factor for superheating effect)

year. No discussion of the designs was requested. The roads were cautioned to check the limiting dimensions carefully and to allow for axle loads slightly heavier than those shown, as an added precaution, for it may be possible that after the locomotives are built the axle loads will be higher than those shown in the tentative specifications.

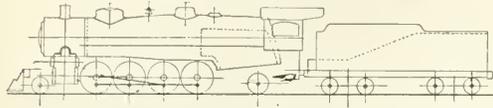
There are three designs of tenders to be used with the 12 different locomotives, one having a capacity of 8,000 gal., another 10,000 gal., and the third 12,000 gal., all having a

were too few and extreme to require standardizing. It was also stated that requirements for locomotives for roads which could not operate locomotives of the wheel loads of the standard locomotives would be filled with locomotives of lighter axle load, which would be released by the standard locomotives.

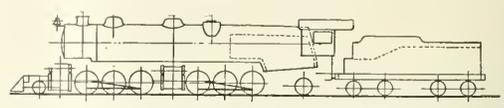
A general outline of the different types of locomotives proposed and a list of the general dimensions and data is given in the illustrations and tables. In the main it has been the

desire of the committee designing the locomotives to provide designs which will best meet average conditions. For instance, freight locomotives of the Mikado, Santa Fe and Mallet types

creasing the boiler pressure. The Pacific and Mountain type locomotives for passenger service have tractive efforts of 40,700 lb., 43,800 lb., 53,900 lb. and 58,000 lb. The six-



Outline of U. S. Standard Mikado Type Locomotive

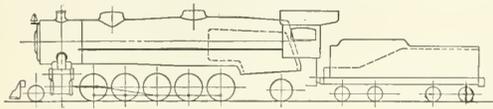


Outline of Standard 2-6-6-2 Mallet

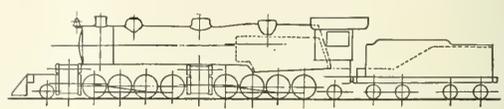
have been evolved which have the following tractive efforts: 54,600 lb., 60,000 lb., 69,400 lb., 74,000 lb., 80,300 lb. and 106,000 lb. This covers the range of tractive efforts for

wheel and eight-wheel switchers have tractive efforts of 39,100 lb. and 51,200 lb. respectively.

There are two sizes of drivers used on the freight engines:



Outline of Standard 2-10-2 Type Locomotive



Outline of Standard 2-8-8-2 Mallet

freight service fairly well. The boiler factors of the heavy Mikado and of both of the Santa Fe type locomotives are sufficiently high to permit increased tractive effort by in-

creasing the boiler pressure. The Pacific and Mountain type locomotives for passenger service have tractive efforts of 40,700 lb., 43,800 lb., 53,900 lb. and 58,000 lb. The six-

General Dimensions of the Pacific, Mountain and Switcher Standard Locomotives for the Railroad Administration

Type	Pacific	Pacific	Mountain	Mountain	0-6-0	0-8-0
Driving axle load	55,000 lb.	60,000 lb.	55,000 lb.	66,000 lb.	55,000 lb.	55,000 lb.
Specification No.	5-A	6-A	3-A	4-A	4-A	10
Gage	4 ft. 8 1/2 in.	4 ft. 8 1/2 in.	4 ft. 8 1/2 in.	4 ft. 8 1/2 in.	4 ft. 8 1/2 in.	4 ft. 8 1/2 in.
Service	Passenger	Passenger	Passenger	Passenger	Switching	Switching
Fuel	Bit. Coal	Bit. Coal	Bit. Coal	Bit. Coal	Bit. Coal	Bit. Coal
Tractive effort	40,700 lb.	43,800 lb.	53,900 lb.	58,000 lb.	39,100 lb.	51,200 lb.
Weight in working order	170,000 lb.	300,000 lb.	320,000 lb.	350,000 lb.	165,000 lb.	230,000 lb.
Weight on drivers	165,000 lb.	180,000 lb.	230,000 lb.	240,000 lb.	165,000 lb.	230,000 lb.
Weight on leading truck	5,000 lb.	60,000 lb.	50,000 lb.	50,000 lb.	.....	.....
Weight on trailing truck	53,000 lb.	60,000 lb.	50,000 lb.	55,000 lb.	309,000 lb.	364,000 lb.
Weight of engine and tender in working order	414,000 lb.	444,000 lb.	432,000 lb.	522,000 lb.	13,000 lb.	13,000 lb.
Wheel base, driving	13 ft.	14 ft.	18 ft. 3 in.	18 ft. 3 in.	11 ft. 0 in.	11 ft. 0 in.
Wheel base, total	34 ft. 9 in.	36 ft. 2 in.	40 ft. 0 in.	40 ft. 0 in.	11 ft. 0 in.	15 ft. 0 in.
Wheel base, engine and tender	68 ft. 7 1/2 in.	70 ft. 8 1/2 in.	75 ft. 8 1/2 in.	75 ft. 8 1/2 in.	48 ft. 10 1/2 in.	52 ft. 10 1/2 in.
Ratios						
Weight on drivers ÷ tractive effort	4.1	4.1	4.1	4.1	4.2	4.3
Total weight ÷ tractive effort	6.6	6.8	5.9	6.0	4.2	4.3
Tractive effort × diam. drivers ÷ equivalent heating surface*	656.7	674.1	668.2	637.0	607.6	700
Equivalent heating surface* ÷ grate area	67.8	72.5	78.6	82.4	79.0	80.1
Firebox heating surface ÷ equivalent heating surface*, per cent	5.8	6.1	6.4	5.9	5.6	5.7
Weight on drivers ÷ equiv. heating surface*	36.5	35.1	39.5	38.2	63.3	58.9
Total weight ÷ equivalent heating surface*	59.7	58.5	57.5	58.7	63.3	58.9
Volume both cylinders	15.9 cu. ft.	18.6 cu. ft.	19.9 cu. ft.	21.4 cu. ft.	11.2 cu. ft.	15.9 cu. ft.
Equivalent heating surface ÷ vol. cylinders	284.4	276.6	280.0	293.9	232.3	244.5
Grate area ÷ vol. cylinders	4.2	3.8	3.6	3.6	2.9	2.9
Cylinders						
Kind	Simple	Simple	Simple	Simple	Simple	Simple
Diameter and stroke	25 in. by 28 in.	27 in. by 28 in.	27 in. by 30 in.	28 in. by 30 in.	21 in. by 28 in.	25 in. by 28 in.
Valves						
Kind	Piston	Piston	Piston	Piston	Piston	Piston
Diameter	14 in.	14 in.	14 in.	14 in.	16 in.	14 in.
Wheels						
Driving, diameter over tires	73 in.	79 in.	69 in.	69 in.	51 in.	51 in.
Boiler						
Style	Con. W. T.	Con. W. T.	Con. W. T.	Con. W. T.	Straight top	Straight top
Working pressure, lb. per sq. in.	200	200	200	200	190	175
Outside diameter of first ring	76 in.	78 in.	78 in.	86 in.	66 in.	80 in.
Firebox, length and width	114 1/2 in. by 84 1/2 in.	120 1/2 in. by 84 1/2 in.	120 1/2 in. by 84 1/2 in.	114 1/2 in. by 84 1/2 in.	72 1/2 in. by 66 1/2 in.	102 1/2 in. by 66 1/2 in.
Tubes, number and outside diameter	188—2 1/4 in.	116—2 1/4 in.	216—2 1/4 in.	247—2 1/4 in.	158—2 in.	230—2 in.
Tubes and flues, length	36—5 1/2 in.	40—5 1/2 in.	40—5 1/2 in.	45—5 1/2 in.	24—5 1/2 in.	36—5 1/2 in.
Heating surface, tubes	2,091 sq. ft.	2,407 sq. ft.	2,598 sq. ft.	2,970 sq. ft.	1,233 sq. ft.	1,796 sq. ft.
Heating surface, flues	981 sq. ft.	1,090 sq. ft.	1,176 sq. ft.	1,323 sq. ft.	515 sq. ft.	773 sq. ft.
Heating surface, arch tubes	234 sq. ft.	284 sq. ft.	329 sq. ft.	346 sq. ft.	130 sq. ft.	190 sq. ft.
Heating surface, total	27 sq. ft.	27 sq. ft.	27 sq. ft.	27 sq. ft.	16 sq. ft.	22 sq. ft.
Heating surface, total	3,333 sq. ft.	3,808 sq. ft.	4,130 sq. ft.	4,666 sq. ft.	1,890 sq. ft.	2,781 sq. ft.
Superheater heating surfaces	794 sq. ft.	882 sq. ft.	872 sq. ft.	1,078 sq. ft.	475 sq. ft.	637 sq. ft.
Equivalent heating surface	4,524 sq. ft.	5,133 sq. ft.	5,283 sq. ft.	6,283 sq. ft.	2,607 sq. ft.	3,737 sq. ft.
Grate area	66.7 in.	70.8 sq. ft.	70.8 sq. ft.	76.3 sq. ft.	33 sq. ft.	46.6 sq. ft.
Tender						
Kind	Water Bot.	Wat. Bot.	Wat. Bot.	Wat. Bot.	Wat. Bot.	Wat. Bot.
Weight	144,000 lb.	144,600 lb.	172,000 lb.	172,000 lb.	144,000 lb.	144,000 lb.
Water capacity	8,000 gal.	8,000 gal.	10,000 gal.	10,000 gal.	8,000 gal.	8,000 gal.
Coal capacity	16 tons	16 tons	16 tons	16 tons	16 tons	16 tons

*Equivalent heating surface = total evaporating heating surface + 1.5 times the superheating surface.

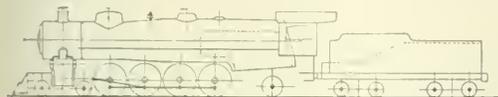
73-in. wheel, the heavy Pacific a 79-in. wheel and both the Mountain types a 69-in. wheel. The wheels of both switchers are 51 in. in diameter. Superheaters and brick arches are used on all of the locomotives, and it has been said that the Santa Fe and Mallet types will be equipped with stokers. All designs except the switchers are provided with combustion chambers. It may be said that with a possible exception



Outline of Standard Pacific Type

of the two Pacific type locomotives, the boilers are of ample capacity.

The locomotives are all designed to traverse 19 deg. curves and grades of two per cent. The clearance limitations are practically alike, the over-all height being 15 ft., with the exception of the heavy Santa Fe type and the 2-8-8-2 Mallet, which have height clearance of 15 ft. 9 in. The width over



Outline of Standard Mountain Type

cylinders is 10 ft. 4 in. for all designs, with the exception of the heavy Santa Fe type and the large Mallet, which is 10 ft. 9 in. and the smaller Mallet, which is 10 ft. 6 in. The width over cab body and over cab eaves, including the cab handles, is the same for all designs, being 10 ft. in the first case and 10 ft. 2 in. in the second.

A casual study of these limitations indicates that there



Outline of Standard Six-Wheel Switcher

will be some difficulties, particularly around terminals, due to low bridges. The Boston & Maine has three bridges around Boston with a clearance of 14 ft. 9 in. There are the same limitations on some bridges in the vicinity of the Union Station in Cincinnati; between the Chicago Terminal and the California yards of the North Western there is a



Outline of Standard Eight-Wheel Switcher

limitation of 14 ft. 10 in. and on the C. B. & Q. between St. Louis and East St. Louis the limitations are 14 ft. 7 in. On the Michigan Central at Detroit the minimum clearance is 14 ft. 3 in. On the main line of the Chesapeake & Ohio, between Charlottesville and Clifton Forge, Va., a distance of 116 miles, the minimum clearance is 15 ft. This is in a

mountainous territory and it will be impossible to use either the heavy Santa Fe type or the 2-8-8-2 Mallet. The 2-6-6-2 Mallet will, however, come within these limitations. The Hoosic tunnel of the Boston & Maine has a height clearance of 14 ft. 8 in., which will prevent any of these standard locomotives passing through this tunnel.

It has been said that all roads requiring new locomotives are to be supplied with these standard designs and that any change that will be required to meet local conditions, such as will be necessary according to the grades of coal used, will have to be made by the railroads, as the locomotives are received from the builders.

Electric Switch Machines With Distant Control

THE LOW-VOLTAGE SWITCH MACHINE is coming to be more extensively appreciated. The New York, New Haven & Hartford is installing these machines at about 25 switches which are approximately one mile distant from the nearest signal station, and in their use will be able to save from five to ten or more minutes' time for each of numerous heavy freight trains, every day, by doing away with the stops which hitherto have been necessary, for such trains, to allow a trainman to set switches by hand preparatory to entering side tracks. This time, say an average of 7 minutes, is the estimated loss every time that a train has to go into a passing track to make way for a faster train. The switch machines are to be placed at all of the passing-track switches between New Haven and Boston which are not already operated from towers.

This investment of the New Haven road, amounting with signal changes to perhaps \$100,000, affords an interesting illustration of careful adaptation of the best methods and facilities under rather unfavorable circumstances. The portion of the line on which these machines are to be installed is that from New Haven, Conn., to Readville, Mass., 147 miles; that portion of the main line between New York and Boston which has not been four-tracked. This section is operated by the controlled manual block system, the signal towers in most cases being in the same locations at which

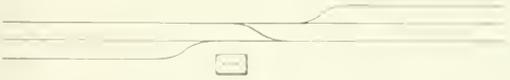


Fig. 1.—Signal Station with Two Passing Tracks.

they were placed when the system was put in operation about 25 years ago.

Nearly or quite all of the passing sidings on these divisions are so located that their outlets are at or near the block signal tower; and originally they were connected with the main track only at the outgoing end; all trains had to be backed in. (See Fig. 1.) As traffic has increased, these tracks have had to be lengthened and turn-out switches have been added, by which to let freight trains into the sidings; and to insure safety, under the manual block operation these switches, hand-operated, have been electrically locked the lock being controlled by the signal station in the rear.

These sidings, 20 or more in number, are now provided liberally for both eastbound and westbound trains. They are long enough to hold 100-car trains and their locations are roughly indicated on the large drawing. (A few of the switches were already electrically operated.) With hand-thrown switches the ordinary procedure, with a train having to make way for a passenger train, is to bring it to a stop before reaching the switch and to communicate by bell code

or telephone with the signal cabin; and, having got the switch unlocked, to move the train into the siding; the trainman at the rear of the train must then set the switch straight, and advise the signalman in the cabin that the main track is clear. With the long and heavy trains now common in through freight service this, of course, is a time-consuming process at best; and if, because of difficulty in starting, or for any reason, a coupling is broken, the delay may be considerable.

The stations at which these long sidings are situated, some stations having two and others having one, are as follows, the first six being in Connecticut, the next six in Rhode Is-

A typical station, that at East Haven, six miles from New Haven, is shown in Fig. 2. The switches remotely operated are those at the extreme left (or west) end of the drawing, about 4,200 ft. from the tower. The signals for these switches, A, B and F, are also operated by low-voltage machines. The Hayes derails, C and F, are operated with the switches, and the same is true of the three pot-signals at this location. These pot-signals, for westbound movements on track 6, westbound movements on track 2 and eastbound movements on track 1, are used very infrequently.

At electric interlockings, the new switches and signals to be added will be operated at 110 volts, the same as the ma-

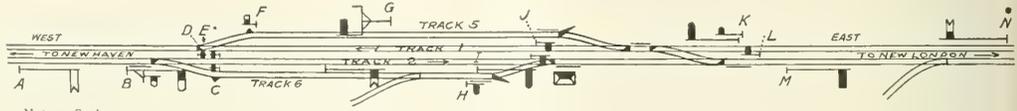


Fig. 2.—Passing Tracks at East Haven, Connecticut.

land and the other four in Massachusetts: East Haven, Madison, Clinton, Sound View, Midway, Stonington, Westerly, Bradford, Wood River Junction, Kingston, Wickford Junction, East Greenwich, East Junction, Attleboro, Mansfield and Sharon Heights. At Westerly there is an electric interlocking, but at all of the other cabins at which the long sidings are to be signaled the interlocking is mechanical.

A low-voltage switch machine has been in operation at East Greenwich for about two years, with satisfactory results. Electric power at 110 volts or higher is not conveniently available at this point and the use of a low voltage current, which can be supplied by either a primary or a storage battery, affords substantially all of the advantages of remote operation (making hand-throwing of switches unnecessary) at a reasonable cost. The only disadvantage, the slow movement of the switch, is no disadvantage at all, as the signalman has several minutes in which to make each movement.

chines and signals now in service, and power at 110 volts is available at one other place.

At all of the locations track circuits are to be installed to provide complete approach and detector locking. Whenever automatic block signals shall be introduced on this part of the road, the direct current motors, and other apparatus, can be replaced with alternating current equipment, and the arrangement of track circuits can remain practically unchanged. The switch-and-lock movements are operated at 20 volts, and they are about equally divided between the Union Switch & Signal Company's type M and the General Railway Signal Company's model 5. All of the signals are of the General Railway Signal Company's 2A type. Power for the low-voltage machines is supplied from three sets of four cells each of Exide storage battery. Facilities have been provided at division headquarters for recharging these batteries at stated intervals. It is cal-

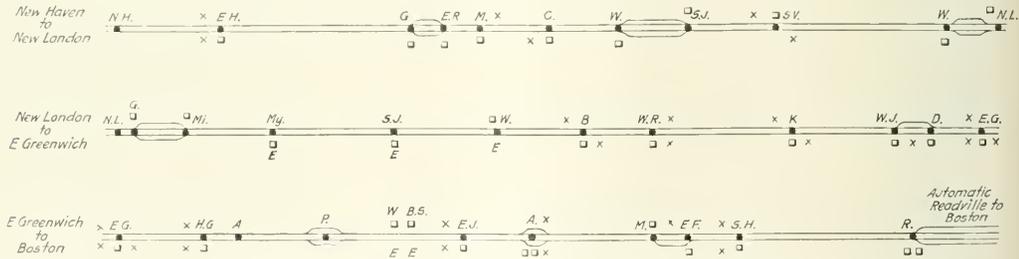


Fig. 3.—Distant Switch-Machines Between New Haven and Readville

Locations Indicated by Crosses (X).

Distances: New Haven eastward to New London, 51 miles; New London to East Greenwich, 50 miles; East Greenwich to Readville, 47 miles, and to Boston, 57 miles.

It is the favorable experience at this point which has led to the more extensive use here described. To secure the benefits of electrical operation of distant switches by any other means would be practically out of the question. To establish and maintain power plants at each station would involve prohibitive cost, while the purchase of power from local sources (where practicable) would introduce undesirable complications.

These long sidings do not comprise the whole of the facilities for running fast trains past slow trains, as there are several short sections of four-track line. The entrances to (and exits from) the sidings are in all cases through No. 20 turnouts, allowing speeds of 25 miles an hour and even faster.

culated that with the normal load—switch, switch lock, derail (pipe connected) and detector bar—a movement will be made in 35 seconds. The low-voltage machine will clear a signal in about 15 seconds.

The stations between New Haven and Boston, so far as they are of interest in connection with this article, are shown in the table, with the distances from New Haven.

The sketch of the line, shown below, is intended merely to show the relative locations of the passing tracks; and the stations are indicated by initials only. Each signal station (tower) is indicated by a small square, and the electric switch movements are indicated by small crosses. For example, at East Greenwich there are operated from the tower three low-

voltage machines; two on the west cone for eastbound trains entering the eastbound siding, one for westbound trains leaving the westbound, and one machine on the east for eastbound trains leaving). The letter *E* at a station, shown be

Pneumatic Tampers

Break Up Frozen Coal

By H. L. Hicks

New Haven Division	Miles	New Haven Division	Miles
New Haven	0	Kyle Rd.	80
East Haven	6	Wallingford Junction	80
Guilford	17	Mayville	8
East River	19	Van Greenboro	114
Morris	21	High Falls	96
Canaan	26		
Westport	29		
Savoy Junction	33		
South View	38		
Waterford	45		
New London Division	Miles	New London Division	Miles
New London	51	Acron	108
Greenwich	52	Princeton	114
Marysville	55	Wallingford	117
Mystic	60	East of Station	118
Stonington	67	East Junction	118
Westport	73	Acron	118
Breadford	78	Mansfield	132
Wood River Junction	82	East Junction	137
		Rockville	147
		Boston	157

DURING THE RECENT severely cold weather there has been developed a novel and very interesting adaptation of the pneumatic tie tamper to break up frozen coal in unloading hopper bottom cars, and it is said that excellent results have been obtained at coal depots around New York, Chicago and several of the lake ports where the scheme has been introduced. At Chicago the tampers have also been applied to picking frozen ore in cars, clearing mill scale from the chutes at steel mills and breaking up frozen scale in gondola cars. At one point where the tampers were being used the experiment was tried of putting the tamper against the side of a car of unfrozen soft coal. The vibration set up caused the coal to let go and move out of the car with a rush.

For this work the tamping machines have been fitted with pointed picks in place of the usual tamping bars. The tools are of sufficiently light weight to afford convenient handling regardless of the work or its location. The two center pho-

low the track line, indicates an electric interlocking, with all switches and signals worked by 110-volt motors. No sidings



The Tamping Points

(Top) Starting to Loosen a Car of Coal. (Bottom) Keeping the Hoppers Open

Emptying a Car of Coal

are shown in the sketch. Those sections where more than two tracks are shown on the drawing indicate short pieces of road operated as four-track from one signal station to another (or, as at Wickford Junction and Mansfield, a freight running track extending from one station to the next station)

tographs show the starting and the last stage in unloading a solidly frozen car of buckwheat anthracite after the usual steam thawing had been completed. At this coal dock it was found advantageous to station one man outside the car, as shown in the photograph at the left, to break up the lumps which clogged the chute. The general opinion is that the tampers are most effective in frozen bituminous and the smaller sizes of anthracite coal.

SWEDISH FUND FOR SUPPORTING FOREIGN TRADE AFTER WAR.—The Finance Minister has made a suggestion to the Swedish Parliament that the government create a fund for the operation and guaranteeing of a company to support foreign trade after the war, and especially to arrange for the import of necessary goods. It is proposed that the company have a capital stock of \$2,680,000, and that this stock be offered to a syndicate of banks which have already expressed a wish to subscribe. The stock is to be guaranteed by deposit of government bonds.—*Commerce Reports.*

FREIGHT CARS TAKE WOUNDED TO GERMANY.—Trains carrying wounded Germans from the battle front in France are proceeding continuously along the frontier between Germany and Holland, according to a despatch to the *Telegraaf* from Kerkrade. It has been necessary to replace hospital cars by freight cars, in which the wounded lie on straw and shavings.

Hughitt Retires as North Western Chairman

Resigns After 46 Years of Service, Including 7½ Years as
Head of Board of Directors and 23 Years as President

THE RESIGNATION OF MARVIN HUGHITT as chairman of the board of directors of the Chicago & North Western marks the close of a career of nearly half a century with that company, during more than 30 years of which he has directed its affairs. This alone is an unusual record, which is rendered more remarkable by the consistently sound and excellent management of the property during the period of his leadership. In fact, it may well be said that in guiding the development of the North Western System Mr. Hughitt has built a great living monument to his own genius,—a justifiable source of pride as he lays down the reins in favor of younger men.

While it is difficult to avoid the use of superlatives in passing judgment on his work, Mr. Hughitt has always entertained a distaste for overdrawn publicity and has preferred to discharge his duties quietly and energetically with the one end in view of serving the public and strengthening his road. He has never undertaken any project or initiated any policy for the purpose of firing popular imagination nor has he ever yielded to the pressure of the political passions or fads of the moment. He has never sought the public eye and has yet to learn the meaning of the word "expediency." The growth of the North Western System, he modestly explains, is nothing unusual, but represents a consistent adherence to a sound policy of financing and operation throughout a period of years. Neither does it represent the work of one man but rather the joint efforts of an aggregation of loyal and conscientious officers and employees. There is no doubt that the excellent esprit de corps of both the officers and the men in the ranks explains, in considerable measure, the high standing of the road today, but there is no discounting the quality of the leadership which encouraged that spirit of co-operation and unflinching fidelity to duty. Mr. Hughitt's personality is a strong one, and he has projected his ideals and his policies into the work of his subordinates.

A keen thinker, endowed with the power of clear analysis, he has never vacillated after working out the problems presented to him, but relying on his decisions once they were made, he has acted accordingly. While he has valued the opinions of his business associates and assistants he has never hesitated to stand alone if his judgment demanded such a course. He has carried on all his business dealings on the highest plane of honor. A prominent Chicago business man who has known him since the 70's, declares that

Mr. Hughitt's unflinching adherence to his word won the respect of all with whom he came in contact. While positive in the support of his conclusions, sometimes to the point of aggressiveness, his broad vision and lucid analysis have been generally justified by subsequent experience.

With a keen sense of responsibility to the owners of the North Western and an innate aversion to unclean practices, he protected his charge from the curse of stock speculation and manipulation. As a result, not one share of North Western stock has been issued during his administration except in exchange for hard cash. The wisdom of his course is vouched for by the high standing of C. & N. W. stocks today. Mr. Hughitt spent millions from both earnings and from capital to improve the physical condition of his line, a policy which cost him much criticism although time has proved the soundness of his judgment.

At the present time the North Western is one of the best maintained and equipped lines in the world. It has been double-tracked from Chicago to Omaha and almost all of the way from Chicago to St. Paul and Minneapolis, and has four tracks between Chicago and Milwaukee. The development of the road has been carried on carefully and steadily in conformance with the increasing transportation demands of the section of the country served. Extensions and improvements have been added from time to time to develop the maximum traffic and to enable it to be handled with the maximum economy, with the double purpose of giving the public the best service it is possible to render and of making the property as profitable as possible to those who invested in it. While the North Western has not made investments without prospects of increased business, its management has generally anticipated the need for increased facilities.

The company has felt that its responsibility consisted of performing the best possible service and providing such extensions and improvements as were justified by the growth in population and production of the territory it traversed. It has not initiated new projects when existing facilities sufficed. This sound business policy is illustrated by the fact that Mr. Hughitt never allowed himself to be tempted into building an extension to the Pacific coast. The North Western for years has had satisfactory through traffic arrangements with the Union Pacific and other Harriman lines; the construction of a line to the coast would have made it a competitor of instead of a connection with those roads.



Marvin Hughitt

While the policy of the North Western has been careful and sound from a business point of view, it has not been ultra-conservative. When Mr. Hughitt became president in 1887 the total operated mileage of the North Western was less than 4,000 miles, while that of the Chicago, St. Paul, Minneapolis & Omaha was 1,340 miles. At the present time the North Western operates 8,108 miles and the Omaha 1,753 miles, while other subsidiaries have an operated mileage in excess of 300 miles.

As a consequence of its steady but never sensational development, the North Western has never been to any considerable extent burdened by unprofitable branches. Hardly a railway in the United States has a finer dividend record. It has never failed to pay a dividend in any year since 1878. From 1887 (when Mr. Hughitt became president) to 1894, it paid 6 per cent on its common stock; in 1895 it paid 4 per cent; from 1896 to 1899 it paid 5 per cent; in 1900 it paid 6 per cent, and ever since has paid 7 per cent.

Although Mr. Hughitt has not yet resigned as chairman of the board of the Chicago, St. Paul, Minneapolis & Omaha, it is understood that he will take such action as soon as the annual meeting of the stockholders of that road takes place. While resigning as the head of the board of the North Western, Mr. Hughitt is not giving up entirely his active connection with the company. He will continue to be a

director and a member of the executive committee of the road. Although he has passed his eightieth birthday, Mr. Hughitt retains all his faculties unimpaired.

Mr. Hughitt was born in Genoa township, Cayuga county, New York, on August 9, 1837. He entered railway service in 1856 on the St. Louis, Alton & Chicago, now the Chicago & Alton, which line he served as superintendent of telegraph and trainmaster. From 1862 to 1864, he was superintendent of the Southern division of the Illinois Central, following which he was promoted to general superintendent of the same road. In 1870 he was appointed assistant general manager of the Chicago, Milwaukee & St. Paul, and from 1871 to 1872, was general manager of the Pullman Palace Car Company. In 1872 he entered the service of the Chicago & North Western as general superintendent. He was promoted to general manager in 1876 and to vice-president and general manager in 1880. From 1887 to October, 1910, he was president of the road, and from the latter date up to the present time has been chairman of the board of directors. He also served on the Chicago, St. Paul, Minneapolis & Omaha since 1882, when he was elected president. In 1907 he was elected chairman of the executive committee of that road, and from 1910 to date, has been chairman of the board of directors.

Arguments on the Standardization of Locomotives

Robert Quayle and C. A. Greenough Speak on the Question at the Western Railway Club

AT A MEETING of the Western Railway Club held in Chicago on April 15, Robert Quayle, general superintendent of motive power of the Chicago & North Western and C. A. Greenough, vice-president of the Baldwin Locomotive Works, took occasion to make a few remarks on locomotive standardization in connection with a paper on Economy in Locomotive Operation and Maintenance. Mr. Quayle spoke in part, as follows:

"I want to say a word about the standard locomotives. I was a member of the committee of nine that was called on to prepare these designs. It was a big job to reconcile every member of the committee to each particular thing that was adopted. All the roads represented had their own standards, and they were all different. Many had to give up the fancy notions they cherished and had to take up notions of someone else, in order that the committee might agree. As a member I want to say that each man on that committee did his job splendidly. We saw that we could not bring in localism or sectionalism; what we did had to be for the good of the nation. It was essential that we get together and do what we could to help out. It is such sacrifice that brings results, and when men are ready to give up in order that democracy may prevail, we will get results."

Mr. Greenough presented arguments for and against standardization, his remarks being given practically verbatim as follows:

"The recent change in the controlling power of railroads has brought about the possibility of experimenting along lines which have long been under contemplation, but have been deemed outside the realms of the possible. I refer to the proposed standardization of the locomotive as a unit. The railroad administration, primarily to reduce the first cost of locomotives and with a view to effecting an interchangeability in repair parts which would enable locomotives to be transferred conveniently from one section of the country where transportation might reach a low ebb to another more congested district has through conferences with the builders and the railroad committee proposed to bring about a series of standard locomotives. The committees appointed have done their work efficiently and there are under consideration twelve designs of locomotives, in some cases two of a single class, one heavy and one light. The heavy locomotive are designed to develop the greatest average efficiency possible with a weight limited to 60,000 lb. per driving axle, while the light locomotives are limited to 50,000 lb. per driving axle.

The arguments in favor of such standardization are in-

"Back Up Your Own"

By George A. Post

President of the Railway Business Association

"Back up your own by purchasing Liberty Bonds." That is what the Railway Business Association at its Chicago convention said to the railway supply craft, more than 50,000 of whose men are reported in the service of the United States.

Wherever American citizens are cooperating in projects for the common weal there will you find members of the railway supply craft. They are among the livest leaders and members of the community loan drive teams. It will be our pride to carry the subscriptions from our ranks up to the full measure of our means.

terchangeability between railroads, the possibility of some rapidity of construction, interchangeability of repairs and a somewhat lower cost. It is probable that the possibility of greater rapidity of construction has been lost for this year, because of the length of time which the administration has required to give consideration to the project. We could doubtless have built a larger number of locomotives, exact duplicates of those now on the railroads, had orders been placed two months ago, in a shorter time than we will be able to build the new types of locomotives, details concerning which are not yet settled.

"The arguments against standardization may be summed up as follows: The capacities of the locomotives are based upon average conditions; hence there is no provision for the extreme requirements which these locomotives do not cover. Where even the light locomotives are too heavy for service and where the heavy locomotives are not of sufficient capacity special locomotives will have to be provided unless those requiring lighter engines purchase from other roads discarded power, and those requiring the heavier locomotives change their system of operation so as to use the heavy standard government locomotive. In such instances where railroads have been equipped from one end to the other to use power of maximum capacity for the purpose of reducing train movements such action would prove a negative economy.

"The standard locomotives are designed for bituminous coal fuel and radical changes in their construction will be required for burning anthracite or an appreciable percentage of anthracite or for properly burning pulverized fuel. Oil fortunately requires no basic change. The limiting sizes of the locomotives of length, height and width must necessarily conform to the minimum to be found on the various roads over which the locomotives are designed to operate. These restrictions necessarily cramp the designs and limit their efficiency to the restrictions of the fuel. A limit of height of 15 feet has been proposed for all except the heavy Santa Fe and consolidation Mallet type locomotives; consequently steam space, domes and smoke stacks are mere shadows of what they would naturally be. In a country

as large as ours various physical and climatic conditions exist which the proposed standardization ignores; consequently the locomotives will afford maximum efficiency in some localities with a corresponding loss in others.

"No standardization of this extent has been dreamed of in the past; hence the task is relatively momentous. The Pennsylvania has for years given serious consideration and effort to the standardization of their equipment; likewise the Harriman Lines in 1905 proposed a series of standard locomotives for all roads controlled by them. Both of these efforts have resulted in an extensive standardization of parts, but not in a complete standardization of equipment, because growing needs for larger and more efficient power and the improvements in the permanent way have invited and made possible increases in the size and capacity of locomotives which have thrown to the winds any idea of standardization of locomotives which would extend over an appreciable period of time. In both instances the standard locomotives of today bear no comparison to the standard locomotives of ten years ago. The conservation of our resources will not permit of a system of standardization which is so inflexible as to choke further improvements and thus discourage the inventions which may now be in their incipency. Yet how can we maintain a standard which is permitted to change, and how can we progress without change. If standardization of locomotives as units is a war measure; if it will help us win, let us have standardization quickly and regard it as a war measure; but if it is an economic experiment the final net result may be the addition of just so many classes of locomotives to those now existing.

"The ideal standardization provides for the elimination of unnecessary diversity and progress invites and necessitates diversity, hence in spite of our ideals the standardization of locomotives may be limited to the standardization of the maximum number of parts.

"The problem now before the administration is to decide whether or not the criticisms in favor outweigh those against the proposed standardization, and we all await the decision with the keenest interest, and we all hope the decision, whatever it may be, will prove for the best."

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Central News Photo Service

Small Ammunition Train on the Western Front

General News Department

The use of coal from Alberta, by the Grand Trunk Pacific Railway, will this year be more than twice as extensive as last year, orders having been given recently for 600,000 tons.

The car builders held another conference with John Skelton Williams, Wednesday and adjourned to meet again on Thursday without reaching any settlement on proposed contracts for freight cars.

Several railroads have turned over to the Railroad Administration the excess revenue earned by them since January 1; that is to say, the net revenue above their estimate of the amount of compensation due from the government.

The United States War Department has ordered for use in France 80 light locomotives, 60 centimeter gage, weighing 35,000 lbs., from the Davenport Locomotive Works, also 67 50 h.p. and 70 35 h.p. gasoline locomotives from the George I. Whitcomb Co.

Twenty-four inches of snow, reported at Sand Patch, Pa., on April 11, is supposed to be the final kick of the winter. The reports say that gangs of workmen had to be sent out with shovels to release 150 cars of coal at several points on branches of the Baltimore & Ohio.

Floors, good and bad, are the subject of the latest "Safe Practices" pamphlet, issued by the National Safety Council, Chicago. This is an eight-page leaflet, numbered 11, with numerous illustrations. It gives in detail the requirements of a good floor, and the dangers of broken, obstructed, slippery or uneven floors.

The Chesapeake & Ohio Employees' Magazine has been discontinued. The March number will be the last to be issued for the present. The meetings of the Safety First committees and such other data as it may be found advantageous to distribute in the interest of safety-first work will be published in some other manner.

Thomas Riggs, Jr., has been confirmed as governor of Alaska. The Senate took this action on recommendation of the Committee on Territories, which had delayed action until it had investigated charges made by J. E. Ballaine, of Seattle, Wash., who had alleged that Mr. Riggs, as a member of the Alaskan Railroad Commission, had been guilty of mis-management in the construction of the Alaska railroad.

The United States Steel Corporation is expending from \$13,000,000 to \$14,000,000 a month on extensions to plants, almost all of which are for war work, according to the statement of Judge E. H. Gary chairman of the board of directors, at the annual meeting held in Hoboken, N. J., Monday. Mr. Gary said that the company would be able to continue the present dividends in addition to making the above expenditures from profits.

The quantity of rails needed by different important railroads has been under discussion both in the Railroad Administration and in the War Industries Board, and also the capacity of the mills to produce the rails in connection with other requirements of the government. It is understood to be probable that the amount of open-hearth rails must be reduced because of the amount of open-hearth steel required for munitions, and that the railroad companies have been asked through the regional directors to report as to what extent Bessemer rails can be used for all but important main track lines.

The Engineering Council, Engineering Societies building, 29 West Thirty-ninth street, New York, is compiling a calendar of conventions and other important meetings of engineering and related societies in order that information may be available in one place for the answering of inquiries and that the unnecessary conflict of dates be avoided. To assist in making this calendar complete and keeping it up to date, secretaries of engineering and scientific organizations are requested to send in-

formation about the time and place of proposed conventions and annual meetings to the secretary of the Engineering Council as early as practicable.

Charles M. Schwab, chairman of the Bethlehem Steel Company has been appointed Director General of the Emergency Fleet Corporation. At the suggestion of Charles Piez, the position of general manager, which he held, will be abolished in order that Mr. Schwab may be wholly unhampered in his control of production at all yards doing work for the Emergency Fleet Corporation. Mr. Piez still retains his position as vice president of the corporation. Mr. Schwab is said to have assured the President, at a White House conference preceding the announcement of his appointment that there would be no lack of steel for the carrying out of the ship-building program.

The Third Liberty Loan

Reports received up to noon, April 17, show that 281,958 officers and employees of western lines have subscribed for a total of \$21,817,835 in Liberty Loan bonds; this is an increase in subscriptions of \$4,153,150 in 24 hours, and an increase of 54,775 subscribers. The Rock Island System still leads the list with subscriptions amounting to \$2,487,200, representing 90 per cent. of its employees. W. G. Biers, chairman of the loan committee, western lines, predicts that by Saturday the western roads will have subscribed for \$30,000,000, or one per cent. of the total loan.

Valuation of Telegraph Companies

The Interstate Commerce Commission has instituted an investigation on its own motion of the property owned or used by the telegraph and cable properties of the Mackay system, the value of the property and the history and organization of the companies. The order covers increases or decreases of stocks, bonds or other securities in any reorganizations; moneys received by any of the corporations by reason of any issues of stocks, bonds or other securities; the syndicating, banking and other financial arrangements under which such issues were made and the expenses thereof; net and gross earnings; the expenditure of all moneys and the purposes for which the same were expended, and any other transactions which may give any information as to the history or present value of the property.

Publicity for Crossing Dangers

The expenditure of \$275,000, to carry on a campaign of publicity for the prevention of accidents at highway grade crossings, is the main topic of a circular which has been issued by the Steam Railroad Section of the National Safety Council, and the author of which is H. E. Reisman. Mr. Reisman presented his argument to a meeting of the Chicago Steam Railways Claim Conference on January 7 last. He would extend his campaign over a period of four months and would make use of 300 Sunday newspapers and 5,000 billboards. He estimates that about three-fourths of the population of the country live in 23 states and that by the use of the newspapers mentioned, together with two or three agricultural papers, he would reach a large portion of the population of the country. He says that the number of automobiles and auto trucks in use in the United States on December 31 was 5,148,063, and that about 86 per cent of these cars were registered in the 23 states, which contain over 72,000,000 of population.

Observing that the New York Central, the Union Pacific, the Southern Pacific and the Santa Fe spend annually from \$400,000 to \$600,000 each for advertising and that the estimated expense of his propaganda amounts to not much more than \$1 per mile of road, he thinks that the scheme should be accepted as very reasonable. He thinks that the saving will

be great, for the number of casualties at grade crossings is increasing. In 1917 the figures were nearly 100 per cent greater than in 1916, and he looks forward to nearly the same ratio of increase in 1918. Calculating the total number of casualties this year at between 3,000 and 4,000, he thinks that the railroads will have to pay from six millions to eight millions of dollars on this account; and any campaign which should reduce or check this loss, even in a small degree, would be a handsome success.

A Railroad Builder of 1830

The Baltimore & Ohio Railroad was opened for business (for 15 miles, Baltimore to Ellicott Mills) in May, 1830, almost eighty-eight years ago; yet the Baltimore & Ohio Employees' Magazine prints the portrait of a man, now living, who took part in the construction of the track! This man is John Bottomley, of Franklin, Ky. However, he is not a centenarian; his work on the road was carrying water and luncheons to his father, who was a stonemason, engaged in making and laying the stone blocks which served as supports for the rails; and the boy, now 92 years old, was then only four. It is not to be supposed that his name appeared on the payroll; but no one who is familiar with railroad officers' biographies will deny that then, as now, a water boy was an important figure in railroad construction work. Railroad managers, and presidents, whose first railroad position was that of water boy, are quite familiar figures in American railroad history.

Urgent Calls for Stenographers at Washington

The United States Civil Service Commission is making a nation-wide campaign to obtain candidates for typewriter operators and stenographers, numbers of new places being announced daily in connection with the great expansion of government work. Women are being engaged in large numbers and many more or wanted. Persons who need further training to fit them for the work are appealed to take, without delay, whatever instruction may be needed. Examinations are held in 450 principal cities of the country every Tuesday. The pay is from \$1,000 to \$1,200 a year, and competent operators are assured reasonably rapid promotion. Information in regard to the scope and character of the examination can be had from the Civil Service Commission at Washington, or from the examiners at Boston, New York, Philadelphia, Atlanta, Cincinnati, Chicago, St. Paul, St. Louis, New Orleans, Seattle, San Francisco, Honolulu and San Juan.

Machinery and Tool Convention

The enormous problem of manufacturing and supplying machinery and tools sufficient for the carrying out of the government program for the production of ships, shells, guns and aircraft will be the subject considered at the great "War Convention" of the machinery, tool and supply industry of the country to be held in Cleveland the week of May 13.

One thousand men who are bearing the brunt of the unprecedented demand for machinery will gather from all parts of the country to lay out a plan, with the aid of government officials, to keep the great munition program going at top speed. The big war convention will be a joint meeting of four great national associations, the American Supply & Machinery Manufacturers' Association, the National Supply & Machinery Dealers' Association, the Southern Supply & Machinery Dealers' Association and the National Pipe & Supplies Association, which will meet together in order to co-ordinate their efforts toward one goal, "More Ships, More Shells."

The Railway Regiments' Tobacco Fund

Samuel O. Dunn, secretary of the Railway Regiments' Tobacco Fund, has received a letter from R. L. James, first lieutenant and acting adjutant of the Seventeenth Engineers (Railway) Regiment, now in France, dated March 16, acknowledging receipt of a shipment of tobacco which has been distributed among the men. He said in part: "We appreciate very much the kindness of the different railroad organizations who are participating in making these tobacco shipments to the railroad men here in France. The supply of tobacco in France is limited,

and for that reason all tobacco received is all the more acceptable. We all thank you very much."

A letter has also been received from Morton Russell, captain adjutant of the Eighteenth Engineers (Railway) Regiment, written by order of Colonel Cavanaugh, acknowledging receipt of three cases which contained twelve 20-lb. packages of tobacco, which have been distributed to the regiment; and expressing the appreciation of the men in that unit.

Canadian Government Orders Rails

The Minister of Railways of Canada has ordered 100,000 tons of 85-lb. steel rails from the Dominion Iron & Steel Company, Sidney, N. S., for distribution among the four principal railways of Canada. Rolling was begun on April 1, and will continue at the full capacity of the mill until the entire order is completed. It is understood that the rails are being rolled on a cost plus percentage basis. The Canadian Pacific will receive 300 miles, the Canadian Northern 170 miles and the Grand Trunk and the Canadian Government 140 miles each of these new rails.

The Minister of Railways has also bought for the Dominion Government 37,375 tons of steel rails, which were rolled in the United States for the Russian Government, but which were not sent to Russia. These rails have been stored at the Atlantic seaboard for several months. They are of a section weighing 67½ lb. to the yard, and will be sufficient to lay approximately 355 miles of track. These rails will be laid in branch lines and sidings on the Canadian Northern and the Canadian Government Railways, to release heavier rails which will be transferred to main lines.

Railway Revenues for February

A preliminary bulletin of the revenues and expenses of 117 roads for February shows railway operating income of \$6,242,415 as compared with \$24,095,466 in February, 1917, which was one of the most unfavorable months in railroad history. In the month of January preliminary returns for 172 roads showed a deficit of over \$2,000,000. If a similar result is shown by the complete figures this will be the first time that the railroads have failed to pay operating expenses and taxes for a month since the monthly reports of the Interstate Commerce Commission were begun, in 1907. For the first two months of the calendar year the 117 roads for which the February returns are issued had operating income amounting to \$4,202,629 as against \$64,932,558 in 1917. To earn the compensation proposed to be guaranteed to the railroads on the estimated basis of \$945,000,000 for the year would require an average operating income of about \$78,000,000 a month, so that it is apparent that the Railroad Administration has begun the year with a heavy handicap. Operating revenues of the 117 roads, which operated 138,000 miles of line, amounted to \$166,034,510, as compared with \$151,906,989 in 1917. In January operating revenues showed a decrease. Expenses in February increased by over \$30,000,000, from \$129,089,920 to \$151,520,130. The two months' figures for the same roads show an increase in revenues from \$324,000,000 to \$329,000,000, while expenses increased from \$244,000,000 to \$308,000,000. The decrease in operating income of approximately \$60,000,000 in the two months is, therefore, practically due to increased expenses. The railroads of the eastern district show a deficit of \$4,869,418 for February and of \$14,038,785 for the two months. With a reduction of approximately \$6,000,000 in revenues, the eastern roads for the two months failed to pay operating expenses by nearly \$8,000,000.

Track Labor on Western Lines

As the result of a general conference of interested lines, the regional director of Western railroads has issued a number of instructions with reference to the employment of track labor during the present season. All lines are asked to make the fullest use possible of the United States government labor agencies. The standard day for all track labor will be 10 hours and the maximum rate of pay as follows: Central territory, 25 cents per hour; southwestern territory, 25 cents per hour; northwestern territory, 27½ cents per hour; all large terminals, 27½ cents per hour, and overtime pro rata. The present rates of pay will not be increased except in cases of necessity on account of the shortage

of labor, and when so increased will not exceed the maximum rates above specified. No allowances of any kind will be made for board or for any other reason that will have the effect of increasing compensation. Lines now paying higher rates in certain localities may, if they so desire, continue these rates, but there must be no extension of such excess rates. Laborers called for night service after being relieved from duty or performing Sunday inspection will be paid a minimum of five hours. Roads now paying or under contract to pay track men time and a half for Sunday and night work may continue this practice, and other roads in the same territory may adopt the same practice if they so desire.

It is essential for good service that clean, sanitary housing conditions for extra gangs or floating labor be provided. For this purpose railroads may provide at laborers' rates one man for every 75 men, or less, for the proper upkeep of the camps and also for one night watchman. For each gang of 10 men one cook may be allowed, and for each additional 25 men one water may be added. Railroads may transport free of charge food and essential camp supplies necessary, but this will not include food supplies for other than men employed in the camps, and does not include commissary supplies sold to the men.

Payment of the fare for laborers from the labor markets to the points needed and their return fare to the point where employed may be continued. The practice of labor agents recruiting laborers from the forces of any other roads is prohibited.

Preference List for Fuel Distribution

The War Industries Board of the Council of National Defense has issued a statement announcing the adoption by its Priorities Board of Preference List No. 1 for the guidance of all governmental agencies in the supply and in the distribution, by rail or water, of coal and coke. The board has not undertaken to classify any industry as non-essential or at this time to limit the quantity of fuel which any particular industry or plant shall receive; but it has listed certain industries whose operation is of exceptional importance, measured by the extent of their direct or indirect contribution, either toward winning the war or toward promoting the national welfare; and these industries will be accorded preferential treatment by the Fuel Administration in the shipment of coal and coke, and also in the transportation of such coal and coke by the railroads. The same plan will be followed in according preferential treatment to war industries and plants in the transportation of raw materials and supplies required by them in their manufacturing operations. The list as issued is not complete, but provision is made for certifying additional classes of industries and also individual plants whose operations are necessary as a war measure.

In determining what industries or plants are entitled to be certified, it is stated that two factors will control: (1) The relative urgency of the use or purpose for which the product is utilized, and (2) the per cent of the product utilized in war work or work of exceptional or national importance. No plant a very substantial per cent of whose product is not of exceptional importance can be accorded preferential treatment. No distinction is made between any of the industries or plants which are or may be included in the preference list, and no significance attaches to the order in which the industries or plants appear in the list. The list includes railways and shops making locomotives, freight cars and rails, and other plants engaged exclusively in the manufacture of railway supplies. It also includes the following: Aircraft, ammunition, army and navy cantonments and camps, arms, chemicals, coke plants, domestic consumers, electrical equipment, electrodes, explosives, farm implements, fuel, ferroalloys, fertilizers, fire brick, food, food containers, gas, guns, hemp, jute and cotton bags, insecticides, iron and steel, lumber, machine tools, mines, newspapers and periodicals, oil, oil production, public institutions and buildings, public utilities, railways, plants manufacturing railway supplies, refrigeration, sleds, ships, shipbuilding plants, soap, steel, tanners, tanning extracts, tin plate, twine and rope, and wire rope and rope wire.

WANTS ARMY OF SAVERS.—The purpose of the War Savings Committee is to create an army of savers who will, by saving, release labor and materials for the use of the Government in the war, and who will lend their savings to the Government to prosecute the war.

Traffic News

J. Van Dyke Norman, an interstate commerce attorney, addressed the Transportation Club of Louisville at a noon day luncheon on April 8, at the Henry Watterson Hotel, Louisville, Ky., on "Government Operation of Railroads."

In a circular under date of April 12, the regional director of Western railroads announces new routes and schedules for the movement of fruit and vegetables from California points to Chicago. This traffic will move in trains consisting of a minimum of 25 cars from various concentrating points in California. Under the plan, all carloads of fruits and vegetables loaded in time to reach the proper concentration point before the time of departure will arrive in Chicago in time for morning team track placement, including delivery to auction houses, on the ninth day from loading station.

The Department of Agriculture announces that United States standard containers must be used for fruits and vegetables shipped this year in interstate traffic. That is to say, all packages must conform to the provisions of the United States Standard Container Act. The baskets, crates, hampers and boxes must be in sizes containing half-pints, pints, quarts or multiples of quarts; though slight variations, either over or under size, may be allowed provided the average for any shipment conforms to the standards. Many manufacturers have arranged to make no containers except those that comply with the statutory requirements, and even shippers whose products are usually consumed in their own state are said to favor packages complying with the federal law.

Live Stock Receipts

Receipts of live stock at markets in the western district, as reported by the United States Railroad Administration for the month of March were approximately 44 per cent greater than during March, 1917.

The receipts in carloads, were as follows:

	1918	1917	Percent
Chicago	2,771	2,417	114.6
St. Paul	4,162	4,162	100.0
Omaha	2,445	2,322	105.3
Sioux City	4,113	2,770	148.5
St. Joseph	4,074	4,074	100.0
Kansas City	2,882	2,882	100.0
Denver	1,166	1,166	100.0
Milwaukee	1,166	1,166	100.0

Coal Production

A decrease of 1,500,000 tons in the total output of bituminous coal during the week ending April 6, or 14 per cent as compared with the preceding week, as reported by the Geological Survey, has brought out an exchange of statements from the Fuel and Railroad Administrations as to the coal situation. The coal production for the week including lignite and coal made into coke, was estimated at 9,365,000 net tons. The decrease was attributed by the Geological Survey partly to the observance of Mitchell day, April 1, the anniversary of the enactment of the eight-hour law, as a holiday. It is also understood that April 6, the day of the opening of the Liberty Loan campaign, was observed as a holiday in many districts. A chart showing the average total production per working day of bituminous coal, including coal coked, published with the report shows an almost steady increase from January 19 to March 30, but a falling off for the week ending April 6 to the lowest point since last June, with the exception of the week of December 12 and the week of January 19. The percentage of coal tonnage reported for the week ending March 30 was 62 per cent, and for the week 23.3 per cent was attributed to car shortage. Comments of the Fuel or increasing car shortage in the production of coal have been renewed by the representatives of the Year 1918 Committee during the past week. The statement was made by the railroad Administration and Mr. Day, who, after Mr. Gurnea had issued a

statement referring to the Geological Survey figures and attributing it to shortage of cars, the Railroad Administration issued a statement showing that up to April 6 the railroads had handled this year 6,441 cars of coal more than was handled during the corresponding period of 1917, in spite of the decrease of 79,172 cars in January.

At a conference of the state fuel administrators from all states east of the Mississippi, held at Washington on April 11, a resolution was unanimously adopted and presented to the United States Fuel Administrator, stating that due to the present over-burdened condition of the railroads, unless effective measures of relief are at once taken the supply of coal ore for the coal year beginning April 1 will fall seriously short of the needs of the country. All individuals, industries and communities were called upon unselfishly to endorse and support such acts of the government as may be needed to clear the railway tracks of any unimportant or unnecessary traffic congesting the railways and interfering with the prosecution of the war.

The National Coal Association also issued a statement stating that bituminous coal production during the first three months of 1918 has failed to keep pace with the growing demands of industrial and domestic users and that reports from virtually every bituminous field in the United States show that mine operations have been restricted by the lack of railroad cars.

In his statement Dr. Garfield said, "A large part of the shortage is due to the continued lack of transportation service as evidenced by the shortage of cars placed at the mines to be loaded. This is due to the general pressure of war traffic on the railroads. Continued shortage of cars at the mines in the fields supplying the eastern industrial territory has had the effect of keeping mine labor idle for days at a time and in some of the fields has cut the working time to one or two days a week. The Fuel Administration is gravely apprehensive lest this condition result in the complete demoralization of the labor supply of the bituminous mining industry. The Fuel Administration is convinced that unless there is immediate and material improvement in car supply efficiency the country faces the certainty of a serious shortage of coal." Among the causes of disturbance curtailing production, Dr. Garfield referred to the unsettled situation regarding contracts for railroad fuel. He said this question is under consideration by the Railroad and Fuel Administrators and will be settled at the earliest moment possible.

The Railroad Administration statement showed the number of cars of coal of all kinds loaded on all lines during the months of January, February, March and for the first week in April, for the years 1918 and 1917 comparatively, as follows:

Month of January—		1918		1917		Inc. or Dec.	
Anthracite	127,049	140,927	I	13,878			
Lignite	19,707	16,870	I	2,837			
Bituminous	658,236	726,367	D	68,131			
Total	804,992	884,164	D	79,172			
Month of February—		1918		1917		Increase	
Anthracite	143,766	136,882	I	6,884			
Lignite	17,475	15,300	I	2,175			
Bituminous	727,710	705,519	I	22,191			
Total	888,951	857,701	I	31,250			
Month of March—		1918		1917		Inc. or Dec.	
Anthracite	210,076	201,665	I	8,411			
Lignite	13,189	16,269	D	3,080			
Bituminous	960,202	918,920	I	41,282			
Total	1,183,467	1,136,854	I	46,613			
First Week in April—		1918		1917		Inc. or Dec.	
Anthracite	43,642	41,526	I	2,116			
Lignite	2,083	2,744	D	661			
Bituminous	187,463	181,168	I	6,295			
Total	233,188	225,438	I	7,750			
Year to date—		Decrease		Increase			
Month of January	79,172						
Month of February					31,250		
Month of March					46,613		
First week in April					7,750		
Total	79,172				85,613		

It was stated that the unprecedented weather conditions in January were responsible for the decrease in coal loading in that month and that notwithstanding the very heavy loss in loading in January, the loading since has increased until the production, at the end of the first week in April, shows an increase over last year of 6,441 cars.

Commission and Court News

Interstate Commerce Commission

The commission has approved the application of the Pennsylvania and Baltimore & Ohio to increase storage charges by reducing free time allowed on less than carload freight at Philadelphia.

The Interstate Commerce Commission has issued supplemental orders by which the increases of not to exceed 15 cents a ton on anthracite coal allowed in its orders of March 12 will apply to points in Official Classification territory and Canadian points not covered in the original order.

Fifteenth Section Application No. 3380 filed by Agent E. B. Boyd seeking authority to increase rates on hay and straw due to the cancellation of commodity rates in Western Trunk Line territory and the application of class rates in lieu thereof has, by direction of the commission, been placed on the formal docket and has been given docket No. 10100.

Application for a general investigation of the rates on petroleum and its products has been made to the commission by the National Petroleum Association, Western Refiners' Association and the Western Jobbers' Association, which also asked for a postponement of the operative date of the commission's decision in the supplemental 15 per cent case.

Fifteenth Section Application No. 3307 filed by E. B. Boyd as agent to increase rates on lumber and articles taking same rates, from points in Minnesota, Wisconsin, the Northern Peninsula of Michigan and Canada to Chicago, Racine, Milwaukee, Manitowoc, Sheboygan and related points, has, by direction of the commission, been placed on the formal docket and has been given docket No. 10099.

Fifteenth Section applications filed by western railroads for authority to establish the same rates on nut coal as applies on lump coal from Colorado, Wyoming and New Mexico mines on the lines of these carriers to all destinations in Nebraska, Iowa, Kansas, Missouri and Oklahoma, and to certain points on the Chicago, Burlington & Quincy in Nebraska, have been consolidated and assigned to the formal docket under Docket No. 10117.

Fifteenth Section Application No. 570 filed by Agent Gompf to increase rates on forest products from points in Oregon, Washington, California and Nevada to points on the Atchison, Topeka & Santa Fe, in California, has by direction of the commission been assigned to the formal docket to be considered and disposed of in connection with the record made in I. & S. docket No. 912, which proceeding has been reopened for further consideration.

The commission has ordered an investigation into the rates and practices of common carriers governing transportation of petroleum and its products between points in official classification territory, with a view to prescribing just and reasonable rates. The recent increases in the rates on these commodities include wide variance in the amount and percentages of increase as between various localities and complaint has come to the commission concerning both the amount of the increases and the changes in relationship.

Fifteenth Section Application No. 4560 filed by carriers, for whom F. A. Leland is agent, for authority to cancel the effective commodity rates on pressed cloth, in carloads from Houston and Houston Heights to Memphis, Tenn., and from Clinton, Fidelity, Houston, Houston Heights and Port Houston, Texas, to Algiers, New Orleans and other points, class rates to apply in lieu thereof, has by the direction of the commission been assigned to the formal docket and will be set down for hearing as soon as the engagements of the commission will permit.

The commission is to investigate carload minimum weights on lumber and lumber products in all parts of the United States. Carriers serving North Pacific Coast points and points in the "inland empire" have prescribed carload minima based on the

cubical capacity of the cars, while carriers serving other lumber producing regions use other minima. There have been numerous complaints as to discriminations caused by this difference and by difficulties as to the application of rules based on the cubical capacity; and the commission will seek to ascertain whether the variations are reasonable.

Fifteenth Section Application No. 2516 filed by the Pennsylvania Railroad Company for itself and on behalf of other carriers participating in its tariffs for authority to cancel the present water competitive rates on certain kinds of lumber, and to apply in lieu thereof the so-called normal lumber rates applicable on forest products, and Fifteenth Section Application No. 2530 filed by Agent Chalenor in behalf of Southern Lines, also seeking authority to cancel water competitive rates on certain kinds of lumber and to apply in lieu thereof the normal lumber rates, have, by direction of the commission, been consolidated under formal docket No. 10098, and will be set down for hearing as soon as the engagements of the commission will permit.

The Interstate Commerce Commission has ordered a hearing to be held at the Hotel Sherman, Chicago, on April 22, before Examiner R. H. Kimball, on the protest of the New Orleans, Texas & Mexico to the tentative valuation of its property made by the Division of Valuation. The hearing will be devoted to all matters drawn in question by the protest, except matters pertaining to land. At the conclusion the hearing will be adjourned to some point on the lines of the road where evidence will be received on values and classification of lands, but no evidence will be received as to cost of condemnation and damages or of purchase. All parties are expected to produce their entire evidence at these hearings.

State Commissions

The Railroad Commission of Georgia has authorized an increase of 2½ mills a mile in the prices of thousand-mile tickets, making the rate \$22.50. The new rate goes into effect May 1. A similar increase has been authorized in the prices of party tickets. Books of two thousand miles will no longer be sold. For interstate travel, the \$22.50 rate already prevails.

Court News

Excessive Damages

The Texas Court of Civil Appeals holds that where a conductor, on the ground that his ticket had expired, ejected an aged man, whose ticket was valid, at a point six miles from the station, on a dark night, in a driving rain, and he suffered mental anguish and fear, and was threatened with pneumonia, though not confined, a verdict of \$2,000 was excessive, and was reduced to \$1,000.—Houston East & West Texas v. Snow (Tex.), 201 S. W., 224. Decided February 15, 1918. Rehearing denied March 6, 1918.

Service of Process on Station Agent

The Kansas Supreme Court holds that where a railroad has been placed in the hands of a receiver under an order directing him to take into his possession and control all the assets and property of the corporation and to operate the railroad, service of summons, in an action against the railroad corporation, upon a station agent who is in the employ of the receiver and had formerly occupied the same position for the corporation, is not good service as to the corporation. The same question has arisen in a number of cases. The decisions, however, are controlled by statutes, some of which differ from the Kansas statute as to the manner of service on a railroad company.—Chilietti v. M. K. & T. (Kan.), 171 Pac., 14. Decided January 12, 1918. Rehearing denied March 15, 1918.

Employees Crossing Tracks; Contributory Negligence

The Indiana Supreme Court holds that the rule which exacts of a traveler or other person about to cross a track the precaution to look in both directions, and also to listen, in order to ascertain whether a train is approaching, is not applied in all its strictness to railroad employees who are required to be on

or about such tracks, and the failure of such an employee, while in the discharge of his duties, to look and listen for approaching trains, may or may not be negligence under the particular circumstances of the case. Those who are engaged in the active work of railroad operation are not only required to be watchful and vigilant to conserve their own safety, but owe a similar duty to all others whose duties expose them to the same dangers, and all such employees have a right to rely to some extent on the care of each other and to assume that each one thus employed will use reasonable care to avoid injuring the others.—Chicago & Erie v. Steele (Ind.), 118 N. E., 824. Decided February 27, 1918.

Expense of Crossing Another Railroad's Tracks

In an action by a street railway to recover from a railroad one-half the cost of renewing certain highway crossings where the tracks of the two companies crossed in a city, the Indiana Appellate Court holds that a contract whereby the railroad granted to the street railway right to forever maintain a single track across the tracks and right of way of the railroad in consideration that the street railway at its own expense maintain the necessary crossings, is invalid as against public policy, and in violation of the state statute providing that each company respectively shall keep and repair its own tracks so as at all times to provide a safe and convenient crossing. As the only consideration for the promise of the street railway to maintain the crossing was the privilege of crossing the railroad's tracks, a right which the former had without the latter's consent, there was no sufficient consideration to support a verdict.—Vandalia v. Ft. Wayne, etc., Traction Co. (Ind.), 118 N. E., 839. Decided February 26, 1918.

Pennsylvania Stop, Look and Listen Rule

In an action against a railroad company for damages for injuries resulting from a crossing accident, the United States Circuit Court of Appeals, Second Circuit, says that the law of Pennsylvania, where the accident occurred, and which law governs the right of action, "makes it an obligation to stop, look and listen before crossing the tracks of a railroad company. This is not a rule of evidence, but a rule of law, peremptory, absolute and unbending, which the jury should never be permitted to ignore or evade or pare away by disjunctions and exceptions. Not to stop, look and listen is negligence per se. The decisions of the Supreme Court of Pennsylvania fully establish this." The plaintiff was struck in the nighttime by a train coming down grade by force of gravity merely. The train bore no light and the locomotive tender first. It was held that the plaintiff's testimony that he did stop, look and listen could not be rejected as incredible and contrary to the physical facts, and a verdict by the jury based thereon overturned.—P. & R. v. Skerman, 247 Fed., 269. Decided December 11, 1917.

Federal Employers' Liability Act Decisions

A railroad company engaged in intrastate and interstate commerce accepted the Michigan Workmen's Compensation Act, which, in part 6, §4, declares that the provisions of the act shall apply to employees and workmen engaged in intrastate commerce, and also to those engaged in interstate commerce or foreign commerce for whom a rule of liability, or method of compensation, has been or may be established by Congress only to the extent that their mutual connection with intrastate work may and shall be clearly separable and distinguishable from interstate and foreign commerce, but that any employer or employee may, subject to the approval of the Industrial Accident Board, and so far as not forbidden by any act of Congress, voluntarily accept and become bound by the provisions of the act. A conductor on one of the company's interstate trains suffered injuries resulting in his death. His wife instituted proceedings under the state Workmen's Compensation Act. The Michigan Supreme Court holds that, in view of the federal Employers' Liability Act, which was passed prior to the Compensation Act, and by which Congress indicated an intention to govern the whole field of compensation or relief for injuries suffered by railroad employees engaged in interstate commerce, no award could be made. The fact that the railroad accepted the act did not show a consent that the statute should apply to interstate

commerce transactions. Obviously the act might have been accepted by the company as applicable only to injuries arising out of intrastate commerce.—*Carey v. Grand Trunk Western* (Mich.), 166 N. W., 492. Decided February 19, 1918.

Where an engine has been specifically designated for a certain interstate train, and a hostler was told to fire and prepare the engine for such train, and while doing so was injured, he was held within the act.—*Cincinnati, N. O. & T. P.* (Tenn.), 201 S. W., 128. Decided February 11, 1918.

A brakeman on a freight car loaded with cotton shipped to a point in another state, but to be taken to a point within the state to be compressed in transit, was held to be engaged in interstate commerce.—*Rock Island v. Hessenflow* (Okla.), 170 Pac., 1161. Decided March 5, 1918.

Condemnation Proceedings—Spur Track

Crossing Another Road's Right of Way

The Arkansas Supreme Court holds that damages in condemnation proceedings must be determined in the circuit court, the proceedings being strictly statutory and legal, and equity will interfere only when an attempt is made to take property for private instead of public purposes. In order to invoke equitable interference on this ground the cross-bill must state facts and not conclusions. A cross-bill in condemnation proceedings where a railroad was seeking to put a spur track across the right of way of another railroad, which stated that the purpose was only for private purposes and that the two roads were connected and had established switching charges, and that the defendant railroad could properly serve industries to be served by the proposed spur, merely stated conclusions, and did not give equity jurisdiction. It was also held that the evidence established the fact that the spur, when built, would be for a public use. It would serve several industries and the shipping public in a more convenient and expeditious manner. Decree dismissing the complaint was therefore reversed, and the cause remanded for the ascertainment by the circuit court of the damages to which the defendant railroad was entitled.—*Butler County R. Co. v. St. Louis, Kennett & Southeastern* (Ark.), 200 S. W., 1007. Decided February 11, 1918.

Duty to Record Delivery of Intoxicating Liquors

An express company was indicted for a violation of the Kentucky statute relating to the keeping of books recording particulars of the delivery of intoxicating liquors. The trial court sustained a demurrer to the indictment. The Kentucky Court of Appeals has set aside the trial court's order. The statute declares that the book to be kept shall be open to public inspection at any time during the business hours of the carrier and shall constitute prima facie evidence; failure or neglect to keep the record is a misdemeanor. An express company provided an appropriate book, but its local agent delivered liquors without requiring the consignee to sign his name. The Appellate Court holds that the carrier cannot avoid liability on the ground that its duty was fulfilled when it provided the book, and that the offense was committed only by the agent; the use of the disjunctive "or" in the penal provisions does not show any intent to relieve transportation companies and cast all burdens on their agents.—*Com. v. Adams Express Co.* (Ky.), 200 S. W., 648. Decided February 19, 1918.

State Commission's Authority at Crossings

The Oklahoma Supreme Court holds that the Corporation Commission has no authority to require the performance by railroads of public duties which have no bearing on or relation to the transportation of either persons or property, or which do not relate in any way to the transaction of business by the public with such companies. The attorney general complained before the commission that the defendant did not maintain safe and suitable crossings where its tracks crossed two certain avenues. It was not claimed that the condition of the crossing affected the safety of either persons or property on defendant's trains, or that the improvements sought were necessary for the use of the public in transacting business with the defendant company. The commission made an order requiring the defendant to build a viaduct across one or the other of the two avenues.

It is held that the commission had no jurisdiction to make the order, and the railroad's application for a writ of prohibition was granted.—*Atchison, T. & S. F. v. Commission* (Okla.), 170 Pac., 1156. Decided December 15, 1917. Rehearing denied February 26, 1918.

Methods of Acquiring Rights of

Way and Station Grounds

Under the act of Congress (Act March 3, 1875, c. 152, 18 Stat., 482), a railroad company may acquire right of way by the actual construction of the railroad over the public domain; or, under the fourth section, the right of way and station grounds may be acquired by (1) location of the road; (2) filing a profile of it in the local land office; and (3) the approval thereof by the Secretary of the Interior. If, at the time the railroad seeks to appropriate public lands of the United States, such land is subject to entry and sale, the road is entitled to the benefit of the act, notwithstanding that such land may have been reserved from entry and sale at the date of the law (March 3, 1875). The status of the land at the date the appropriation is sought controls the right of the railroad company; not its status at the date of such act. The Supreme Court of New Mexico holds that the provision of section 4, requiring a profile to be filed, is directory, and a railroad may file such map and secure the benefits of the act after the stipulated period (12 months) has elapsed, if it so elects. The fact that it has completed its railroad does not prevent it from obtaining station grounds under the act if the land is public land, subject to entry and sale, at the time it applies therefor. The approval by the Secretary of the Interior of the filed profile is conclusive against collateral attack.—*Jackman v. Atchison, T. & S. F.* (New Mex.), 170 Pac., 1036. Decided January 14, 1918. Rehearing denied February 23, 1918.

Trespass on Adjoining Land—

Cutting Brush and Diverting Water

In a suit by an abutting owner against a railroad to enjoin trespass the evidence tended to show that brush left on the plaintiff's land was cut with her permission along the right of way by the railroad's agents, in order that a better view of a semaphore signal might be obtained by locomotive engineers. The Oregon Supreme Court therefore held that the cutting of the brush was not a trespass. If by leaving it on the land when it should have been burned after it was cut the land owner was injured her remedy was the expense reasonably to be incurred in removing it and not the damages which might result by reason of her inability to use the land for grazing. An action at law to recover the outlay thus necessitated affords an adequate remedy and no exigency exists for resorting to a court of equity. In changing its roadbed the railroad diverted the water of a brook so that it seeped through the embankment and damaged the plaintiff's land. It was held that such act constituted a continuing trespass; but as the plaintiff for seven years asserted no rights and sought no relief her long delay precluded equitable intervention.—*O. W. R. & Nav. Co. v. Reed* (Ore.), 170 Pac., 300. Decided January 29, 1918.

Limiting Liability of Connecting Carrier

The Tennessee Supreme Court holds that an agreement by the agent of a carrier to pay damages, not occurring on its lines, to goods shipped under a bill of lading providing that no carrier shall be liable for loss other than on its own lines, is a discrimination against the uniformity of responsibility required of carriers of interstate commerce, and is unenforceable. The Carmack Amendment, making the initial carrier responsible for transportation to destination, does not preclude limiting the responsibility to the shipper by a connecting carrier to damages on its own lines, and such limitation is good at common law. A connecting carrier is not estopped by a promise to settle, to rely on a provision in a bill of lading limiting liability to loss occurring on its own lines, to defeat recovery on an unlawful contract made by its agent to pay such loss on interstate shipments. The carrier cannot waive the terms of the bill of lading contract. Under the acts of Congress it is unlawful for any shipper to receive any benefit or advantage to which all other

shippers are not entitled at the hands of a carrier. An estoppel cannot be invoked to obtain for a shipper an unlawful preference. —Southern v. Lewis (Tenn.), 201 S. W., 131. Decided February 11, 1918.

Government Control and State Commissions' Orders

The Oklahoma Corporation Commission made an order requiring the St. Louis-San Francisco to remove its present station in Miami and to replace it by a modern fireproof structure. The railroad appealed. Since the submission of the case in the Supreme Court the United States has taken control of the railroad, and the Supreme Court continued the cause until the further order of the court. The court said it knew judicially, as everyone knows, "that it will require the utmost conservation of the resources and energies of this country and will require vast stores of supplies and materials, such as will be required to comply with the order appealed from, to carry on the prosecution of the war to a successful termination, and that the revenues of the railroads, their rolling stock, and the services of their employees will be taxed to the utmost in the speedy and efficient transportation of troops, munitions, and other war supplies. Matters of this kind must and will have precedence over matters of private convenience and local ambition, and . . . we are of opinion that compliance with said order should be suspended until the further orders of this court."—St. Louis-San Francisco v. State (Okla.), 170 Pac., 1146. Decided February 12, 1918.

Reasonableness of State Commission's Rate Order

In response to a rule to show cause why the Oklahoma Corporation Commission should not issue an order providing that rates now charged for freight and passenger service shall not be advanced by any carrier until such advance is approved by the commission, several railroads appeared and filed a protest denying the jurisdiction of the commission to make such order. Thereafter, and without taking any extrinsic evidence tending to show the necessity for or reasonableness thereof, a final order was issued, providing that the railroads "shall not advance the rates now charged for freight or passenger service until such advance is approved by the commission and tariffs regularly filed with the commission." The Oklahoma Supreme Court holds that the order was a reasonable exercise of the power and authority conferred on the commission by the constitution and laws of the state, and invades no substantial right of the railroads, either state or federal. It also holds that the taking of extrinsic evidence is not necessary to support the order where its necessity and reasonableness are apparent from the mere statement of conditions contained in the record, of which the courts and the commission may take notice. The court adds: "Of course, this and all other general rules and orders of a similar nature promulgated by the Corporation Commission, prior to the taking over of the railroads by the federal government as a war measure, must be administered in the light of these changed conditions."—Michison, T. & S. F. v. State (Okla.), 171 Pac., 43. Decided February 12, 1918.

Right to Maintain Snow Fences Along Highways

Action was brought against a railroad for the death of the driver of a sleigh by being precipitated from the top of a load of straw on the sleigh which he was driving along the highway adjoining the railroad. The accident happened when the forward part of the sleigh descended into a hole in the snow in the highway, overturning the sleigh and its load. The railroad maintained a tight board fence, about 7 feet high, along the division line between its road and the highway, to keep snow from blowing on the track. The highway passes over an elevation, and the tracks are in a cut from 4 to 6 feet deep. Prior to the building of the fence the snow did not drift into the highway at this point, but the effect of the fence was to cause the snow to drift and to a considerable extent obstruct the highway, contributing to the development of pitch holes between the drifts. The complaint charged negligence in maintaining the fence and thereby creating a nuisance. The question left to the jury was as to whether the fence was a nuisance, in that it obstructed the highway by causing an accumulation and piling of snow which but for the fence would not have occurred. The precise question presented does not appear to have been

decided in any reported case, or to have been treated by any text writer. From a verdict and judgment for the plaintiff the defendant appealed. The New York Appellate Division has reversed the judgment and dismissed the complaint. It held that a railroad running alongside a highway may maintain snow guards on the line of the right of way, although they cause snow to drift in the highway, obstructing and making it dangerous, as anyone can erect structures wholly on his own land without incurring liability for its accidental effect on the adjoining highways or landowners. The court said:

"It would seem that the railroad companies would have the same right to erect fences and other structures upon their right of way as to raise embankments, although the effect of the embankment would be to cause snowdrifts in the adjoining highway. A farmer's barn may cause drifts in the highway, if it has never, so far as I am aware, been contended that this would subject the farmer to liability for creating a nuisance on the highway. All highway fences do tend to produce drifts, except, perhaps, the modern wire fence."—Cooney v. Northern Central, 167 N. Y. Supp., 865. Decided November 14, 1917.

Assignability of Contracts Between Railroad and Telegraph Companies for Maintenance of Wires

A telegraph company entered into a contract with a railroad company for the construction and maintenance of a telegraph line along the railroad right of way, the railroad company to furnish an easement over its right of way, furnish the labor and maintain and operate the line, giving office room at stations. Employees of the railroad were to act as custodians of moneys received for commercial messages. The railroad company became insolvent and the receiver operated the railway and telegraph systems, discharging the contract obligations of the railroad company. On the expiration of the receivership the property was sold to another railroad company and the court's order of sale, which included all rights of the railroad company as well as the rights of the mortgagees, gave the plaintiff 90 days in which to disavow contracts by its predecessors. After the purchaser took possession of the road it was notified by the telegraph company that it elected to terminate the contract on account of the foreclosure proceedings and threatened to discontinue service and remove its line. To prevent it from carrying its threats into execution the railroad company filed a bill for injunction. The questions involved were: (1) Was the contract between the telegraph company and the plaintiff's predecessor assignable? (2) Was the contract assigned?

The Michigan Supreme Court holds that as the contract was obviously made by the telegraph company to obtain a right of way for its telegraph system, and by the railroad to obtain a telegraph system for the operation of its trains, the contract was assignable; an executory contract not necessarily personal in its character being assignable when it can, consistent with the rights and wishes of the parties, be fairly and sufficiently executed as well by the assignee as by the original contractor. As the plaintiff did not within the 90-day period disavow liability on the contract, but instead used the telegraph system, which was essential to the operation of the road, the contract must be treated as having been adopted by the plaintiff, and hence the telegraph company could not after the expiration of the 90-day period rescind the contract on the ground that the insolvency of the original company destroyed the mutuality of the agreement. Moreover, as the telegraph company acted by the agreement while the road was in the receiver's hands, and made no attempt to disavow it on account of mutuality until he property had passed to the plaintiff, it would not, because inequitable, be allowed thereafter to disavow the contract on the ground of want of mutuality. Though the original railroad company had mortgaged its property before contracting with the telegraph company for the construction of the line, yet as the contract was assignable, and as the order for the sale of the railroad property contemplated not only the disposition of the rights of the mortgagees but of the rights of the railroad company and the receiver, the contract passed to the plaintiff, the purchaser at the sale. Decree for the plaintiff was affirmed.—Detroit Toledo & Eastern v. Western Union Tel. Co. (Mich.), 166 N. W., 494. Decided February 19, 1918.

Equipment and Supplies

Freight Cars

F. M. PEASE, Philadelphia, Pa., has ordered 500 tank cars from the Cambria Steel Company.

THE MUTUAL SALES COMPANY, Warren, Pa., is inquiring for 10 40-ton, 8,000-gal. tank cars.

THOMPSON & STARRET COMPANY, Charleston, W. Va., has ordered 400 gun cotton cars from the Kilbourne & Jacobs Manufacturing Company.

THE J. G. WHITE ENGINEERING CORPORATION, New York, is inquiring for 40 to 50 10,000-gal., 50-ton steel underframe tank cars for the Gulf Sulphur Company.

THE UNITED STATES GOVERNMENT has ordered 76 flat, 8 box, 4 narrow gage flat cars and 36 transfer trucks from the American Car & Foundry Company; and 10, 30-ton, insulated tank cars for the Ordnance Department from the American Car & Foundry Company. In addition the government is inquiring for 4, 75-ton steel flat cars for the Navy, and is asking for prices on 20, 40-ton flat cars.

Canadian Orders for Cars and Engines

A statement of recent orders for equipment, presented in Parliament at Ottawa on April 9, by Hon. J. D. Reid, Minister of Railways, gives the following contracts:

Canada Car & Foundry Company, 5,000 forty-ton steel frame box cars, \$13,750,000; National Steel Car Company, 1,000 cars, \$2,750,000; Eastern Car Company, 750 forty-ton flat cars, \$1,777,800; Eastern Car Company, 650 fifty-ton coal cars, \$2,066,675; Hart-Otis Company, 250 side-dump cars, \$760,000; Hart-Otis Company, 200 side and centre-dump cars, \$625,000; Pressed Steel Car Company, 25 general service tanks, \$134,956; Pressed Steel Car Company, 25 water service tanks, \$129,593; Canada Car & Foundry Company, 250 refrigerator cars, \$1,024,250; Pullman Car Company, 14 sleeping cars, \$502,460; Pullman Car Company, 7 dining cars, \$238,700; Montreal Locomotive Works and Canada Locomotive Company, 50 consolidation freight engines, \$2,900,000; 10 switching engines, \$405,000; 30 Pacific type engines, \$1,800,000; 60 Mikado type engines, \$3,720,000; Canada Locomotive Company, six switching engines, \$246,000; four narrow gauge engines, \$136,080. Total cost of all equipment ordered, \$32,966,515. This does not include the 100,000 tons of rails recently purchased.

In reply to a question, Dr. Reid said he might yet have to purchase ten or fifteen snow ploughs at a cost of \$100,000, while the National Railway Defense Association was asking him to buy 100 tourist cars for carrying troops. He might also have to purchase 19 baggage cars.

Iron and Steel

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA has ordered 112 tons of steel for the construction of deck and through plate girder spans for use at Palisade, Minn., and Waukesha, Wis.

Miscellaneous

CHICAGO, BURLINGTON & QUINCY.—This company has ordered six 150-ton steel coal chutes from the Ogle Construction Company, Chicago, to be installed at Clayton, Wyo., Powder River, Orin Junction, Echeta, Lysite and Seneca, Neb.

Signaling

THE SOUTHERN PACIFIC has ordered 50 automatic block signals, Union, style B, two-arm, to be kept in stock to fill short-notice requisitions for use on small jobs, such as additional signals where a side-track is lengthened.

Supply Trade News

H. Arnold Jackson, sales agent of the Bethlehem Steel Company, at Boston, has been elected president of the Chicago Pneumatic Tool Company, with office at Chicago, vice W. O. Duntley, resigned.

Major Warren R. Roberts, Quartermaster's Reserve Corps, president of the Roberts & Schaefer & Co., Chicago, has been promoted to lieutenant-colonel. At present he is an executive officer for the constructing branch of the construction division of the United States Army.

The Liberty Car & Equipment Company, 20 West Jackson boulevard, Chicago, has been incorporated with P. H. Joyce as president, and has bought the freight car plant of the Central Locomotive & Car Works, Chicago. The locomotive plant of the latter is being utilized for the manufacture of farm tractors.

M. F. Emrich, formerly of the Glidden Company, Cleveland, Ohio, has been appointed assistant general manager for Berry Brothers, Detroit, Mich. Mr. Emrich was with the Glidden Company for 28 years, having filled various positions, from the bottom up to the position of assistant to the president. He began his services with Berry Brothers on April 1.

Rufus Franklin Emery, secretary and treasurer of the Westinghouse Air Brake Company, died suddenly on April 11, in his office at Wilmerding, Pa. He was born in 1869 at Chatham, Mass., and was educated in the grammar and high schools of his native town. He entered business life at an early age and after service with several business interests in the Pittsburgh district, entered the service of the Westinghouse Air Brake Company in September, 1892, where he held various positions of trust and responsibility, until 1909 when he was elected secretary and treasurer. At the time of his death, Mr. Emery was an officer and director in a number of business and financial institu-



R. F. Emery

tions in the Pittsburgh district.

The International Oxygen Company, 115 Broadway, New York, announces the appointment of A. E. Ward as sales manager. Mr. Ward was formerly associated with the Prest-O-Lite Company, and in the course of years of association with the compressed gas industries has gained recognition as an expert in the industrial applications of oxygen, hydrogen and acetylene.

George W. Bender, assistant to the vice-president of Mudge & Co., Chicago, has been appointed eastern manager of that company, with office at 30 Church street, New York; and Clyde P. Benning, assistant to the vice-president, has been appointed western manager, with office in the Crocker building, San Francisco, Cal., and will have charge of the business of Mudge & Co. in the Pacific Coast states.

F. E. Whitcomb, whose resignation as signal engineer of the Boston & Albany was announced last week, has become special representative of the Federal Signal Company, with headquarters at New York. Mr. Whitcomb has been in railroad service about 21 years, having entered the employ of the Boston & Albany as a lineman in October, 1898. In 1902 he was promoted to foreman and two years later was made electrical assistant to the signal engineer. In February, 1905, he was appointed division foreman of the signal department of the Al-

bany division, with headquarters at Springfield, Mass. In 1910 he was again promoted, becoming engineer of maintenance of signals, with office at Boston; and the following year was made signal engineer, which position he has just resigned.

No Supply Exhibit at Convention of Fuel Association

At a recent meeting of the International Railway Supply Men's Association at the Hotel Sherman, Chicago, resolutions were passed suspending dues for the year 1918. This action was taken following a request by the International Railway Fuel Association that no exhibit be held at the coming convention of that organization. All entertainment features by the supply association will also be dispensed with.

The Haskell & Barker Car Company

The financial statement of the Haskell & Barker Car Company, Michigan City, Ind., for the year ended January 31, 1918, made public at the annual meeting of the stockholders held in New York last week, shows net earnings nearly three times those of the previous year. The balance, after making deductions for repairs, renewals, etc., reached the figure of \$2,340,859, as compared with \$829,617 in the previous 12 months. Applied to each of the 220,000 shares of the company's stock outstanding, the net earnings were equal to \$10.64, as against \$3.77 a share for the preceding fiscal period. After deducting reserves for extraordinary replacements the surplus was equal to \$9.27 a share, as against \$3.15 for the preceding 12 months.

The income account and balance sheet as of January 31, 1918, with comparisons, follow:

INCOME ACCOUNT		
	1918	1917
Gross earnings	\$,634,192	\$1,135,366
Repairs, renewals, etc.	293,333	305,749
Net earnings	2,340,859	829,617
Dividends	660,000	165,000
Balance	1,680,859	664,617
Reserve for renewals	300,000	135,000
Surplus	1,380,859	529,617
BALANCE SHEET		
ASSETS		
Cash	\$1,411,951	\$680,885
Accounts receivable	1,538,118	2,054,175
Employees' liberty loan subscriptions	133,450	—
Securities owned	984,815	45,578
Inventories	3,082,739	3,368,298
Property and plant accounts	5,121,121	5,067,045
Totals	\$12,272,197	\$11,215,983
LIABILITIES		
Capital stock	\$9,332,000	\$9,332,000
Audited vouchers, payrolls, taxes, etc.	552,788	1,189,794
Reserves	476,931	164,572
Surplus	1,910,275	529,617
Totals	\$12,272,197	\$11,215,983

At the annual meeting of the stockholders, A. J. McAllister was elected to the vacancy in the board. The retiring directors were re-elected.

Trade Publications

SELF-OPENING DIES.—A booklet, entitled "Wells Self-Opening Dies," has been issued recently by the Greenfield Tap & Die Corporation, Greenfield, Mass. It contains a detailed description and illustration of the self-opening die manufactured by that company and shows the tool to be very serviceable and adaptable to widely varying conditions. The different kinds of tripping arrangements, including the pull trip, rim trip, face and lever trip are illustrated.

THE BAKER LOCOMOTIVE VALVE GEAR.—Under this title a book of pocket size, bound in stiff paper covers, has been published by the Pilioid Company, 30 Church street, New York. This publication is a treatise on the Baker locomotive valve gear, which is completely described and illustrated and for which a large amount of data is given in tabular form as to valve events, proportions of parts, etc. About one-half of the book is devoted to a description of the methods of setting the valves, each step in the explanation being accompanied with an example. Several pages are also devoted to the Sentinel low water alarm, which is manufactured by the Pilioid Company. For general distribution a price of 25 cents is quoted.

Financial and Construction

Railway Financial News

CHICAGO & NORTH WESTERN.—E. D. Hulbert, president of the Merchants Loan and Trust Company of Chicago, and Henry C. McEldowney have been elected to succeed Zenas Crane and James Stillman as directors. Marvin Hughtit has resigned as chairman of the board.

GEORGIA & FLORIDA.—John I. Lewis, president of the Citizens Bank of Valdosta, has been appointed as one of the receivers of this road, to succeed Harry R. Warfield of Baltimore, resigned. A few weeks ago Mr. Lewis, with his brother, E. B. Lewis of Montezuma, Ga., purchased the holdings of the Baltimore Trust Company in the Georgia & Florida.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—J. B. Morgan of Nashville has been elected a director to succeed J. H. Hall of New York, resigned.

NEW YORK CENTRAL.—The directors have declared the regular dividend of 1 1/4 per cent payable May 1 to stock of record April 13. A special meeting of stockholders will be held June 5 to authorize or ratify an agreement between the company and the United States Railroad Administration. Special meetings of the companies controlled by the New York Central will be held on or about May 22 for the same purpose.

NORTHERN PACIFIC.—Howard Elliott and George F. Slade have been elected directors to succeed, respectively, William S. Tod, resigned, and Grant B. Schley, deceased.

OREGON SHORT LINE.—At the annual meeting of this company old board of directors was re-elected with the exception of Marvin Hughtit, who was succeeded by his son Marvin Hughtit, Jr. At the organization meeting of the directors the election of W. A. Harriman to the executive committee was to fill the vacancy caused by the retirement of Marvin Hughtit.

Railway Construction

CANADIAN NORTHERN.—Contracts have been given by this company for building a steel bridge, with concrete piers and abutments, over the St. Maurice river at Grand Mere, Quebec, as follows: For the foundations, to Joseph Gasselin, Quebec; and for fabricating and erecting the steel, to the Dominion Bridge Company, Lachine. The cost of the improvements, including grading approaches, steel and masonry work, will be about \$170,000.

CHICAGO, BURLINGTON & QUINCY.—This company has awarded a contract for the construction of a freight house at Scott's Bluff, Neb., to Harvey Wood, Aurora, Neb. The building will be a wooden frame, brick structure, 40 ft. by 120 ft., with asbestos shingle roof.

CHICAGO & NORTH WESTERN.—The stockholders of this company have authorized the directors to appropriate \$1,500,000 for completing the construction of the Milwaukee Connecting Railway, comprising a belt line of 12 miles on the western and southern sections of Milwaukee.

KANAWHA & MICHIGAN.—This company has started work on the first section of a 15-mile double-tracking project between Charleston, W. Va., and Nitro. The first work consists of building 1 1/2 miles of new line between Charleston and West Charleston, connecting with existing passing sidings. The work is being carried out by company forces and includes constructing a gauntlet over the Elk River bridge.

KANSAS CITY, MEXICO & ORIENT.—The Texas legislature recently passed a resolution asking the director general of railroads to authorize the extension of this line from San Angelo, Tex., to Del Rio on the Rio Grande border, a distance of about 155 miles. The resolution points out that the grading of the proposed line has been completed from San Angelo to a point 80 miles south and from Del Rio north 25 miles, leaving a gap of 50 miles yet to be graded.

Railway Officers

Executive, Financial, Legal and Accounting

E. M. Hyzer, vice-president and general counsel of the Chicago & North Western, with office at Chicago, has resigned.

The resignation of **Marvin Hughitt** as chairman of the board of directors of the Chicago & North Western is commented on elsewhere in this issue.

Operating

E. T. Campbell, general traffic manager of the Erie, with office at Chicago, has been appointed assistant general manager, with office at New York, and his former position has been abolished.

D. B. Fleming, superintendent of the Buffalo division of the New York Central, with office at Buffalo, N. Y., has been appointed superintendent of the Mohawk division, with headquarters at Albany, N. Y., succeeding **D. L. Sommerville**; **L. S. Emery**, superintendent of the St. Lawrence division, with office at Watertown, succeeds Mr. Fleming; **J. W. Evans**, superintendent of the Rochester division, with office at Rochester, succeeds Mr. Emery, and **D. L. Sommerville**, superintendent of the Mohawk division, with office at Albany, N. Y., succeeds Mr. Evans.

A. W. Brant, master of trains of the Louisville & Nashville, with office at Nashville, Tenn., has been appointed assistant superintendent of the Nashville division, with headquarters at Nashville; **J. P. Polk**, assistant master of trains, has been appointed master of trains, with office at Nashville, vice Mr. Brant; **B. F. Burrell** has been appointed assistant master of trains of the main stem second, Nashville & Decatur and Lewisburg divisions, vice Mr. Polk, and the territory of **T. C. Sullivan**, assistant master of trains, with office at Nashville, has been extended to the Nashville & Decatur and Lewisburg divisions.

Engineering and Rolling Stock

George A. Kirley, whose appointment as signal engineer of the Boston & Albany, with headquarters at Boston, Mass., has already been announced in these columns, was born on August 31, 1880, at Fairfield, Vt., and received his preparatory education at Brigham Academy, Bakersfield, Vt., following which he took a course in engineering at the University of Michigan, graduating in 1907. The same year he entered the service of the New York Central as a draftsman in the signal department at New York. In May, 1909, he went to the Boston & Albany, and since that time has been in the continuous service of the signal department of that road. He served consecutively as draftsman, as chief draftsman, and later as assistant engineer, until his recent appointment as signal engineer of the same road as above noted.

Traffic

Charles B. Irwin, livestock agent of the Union Pacific with office at Omaha, Neb., has been appointed general agent, with headquarters at Cheyenne, Wyo.

G. H. Corse, Jr., resigned on April 1 as foreign passenger agent of the Union Pacific System to become traffic manager

for G. Amsinck & Co., Inc., New York City, and the office of foreign passenger agent of the Union Pacific has been abolished.

The title of **Archibald Fries**, assistant general freight traffic manager of the Baltimore & Ohio, with office at Baltimore, Md., has been changed to general freight traffic manager.

The duties of **C. A. Gornally**, commercial agent of the Grand Trunk, with office at Chicago, and the duties of **H. W. Ploss**, commercial agent of the Grand Trunk, with office at Milwaukee, Wis., have been extended to include traffic, except bulk grain, via the Canada Atlantic Transit Company.

Lyman Sholes, division freight and passenger agent of the Chicago, St. Paul, Minneapolis & Omaha, at Omaha, Neb., resigned, effective April 15, on account of ill health, after 45 years of service with the North Western lines. The office of division freight and passenger agent at Omaha has been abolished. **Edgar A. Gray**, general agent at Helma, Mont., has been transferred to Omaha, effective April 16.

Special

W. J. Dudley, assistant superintendent of the relief department of the Baltimore & Ohio, with office at Baltimore, Md., has been promoted to superintendent of that department, succeeding the late **S. R. Barr**, and **W. M. Kennedy** has been appointed assistant superintendent of the same department.

Railway Officers in Government Service

George E. Tebbetts, bridge engineer of the Kansas City Terminal, Kansas City, Mo., has received a leave of absence to assume a civilian position with the Emergency Fleet Corporation, Washington, D. C.

Major F. E. Lamphere, Quartermaster's Reserve Corps, formerly assistant engineer of the Baltimore & Ohio Chicago Terminal, has been promoted to colonel. He is now stationed at Port Newark Terminal, Newark, N. J.

Obituary

Albert A. Burleigh, who was president of the Bangor & Aroostook previous to 1900, and then to January, 1907, served as vice-president of that road, died on April 8, at Houlton, Me., at the age of 77.

Frank L. Sheppard, resident assistant to vice-president in charge of operation, of the Pennsylvania Railroad, with headquarters at New York, died on April 13, at his home in New York. He was born in 1851 at Bridgeton, N. J., and entered the service of the Pennsylvania Railroad in 1868 as an apprentice at the Altoona (Pa.) shops. He subsequently served in various capacities until 1881, when he was appointed superintendent of the Sumbury division of the Philadelphia & Erie, and then was consecutively superintendent of motive power at Altoona, general superintendent of the Pennsylvania Railroad division, general superintendent of the United Railroads of New Jersey division, which was later changed to the New Jersey division and included the Pennsylvania tunnel and terminal line; also, as general superintendent of the West Jersey & Seashore. On May 1, 1916, he was appointed to the newly created position of assistant to vice-president in charge of operation.

CONTEMPLATED HIGHWAY DEVELOPMENT IN 1918.—Combined forces of the government, states and counties will spend for highway improvement in 1918 the amazing total of \$263,096,610. This is the announcement contained in the first detailed survey of the nation's road building plan issued by officials of the touring bureau of the B. F. Goodrich Rubber Company, who have been in contact daily for two months with highway commissioners of the states. While this sum seems staggering, eclipsing by eighty-two per cent the expenditures of any previous year and in money figures that of 1917 by \$118,797,750, road officials of the government and states said it represented merely a "drop in the bucket" of what should be spent before the war was concluded. Calculations by government officials are that with good highways, motor trucks and motor vehicles are capable of carrying approximately 200 per cent more freight than the railroads. In these same calculations they estimate the value of our highways at \$6,240,000,000.



G. A. Kirley

EDITORIAL

Railway Age

EDITORIAL

On another page we publish an article concerning the latest developments regarding the standardization of locomotives.

Standardization of Locomotives

The *Railway Age* has for some weeks been discussing the subject fully and earnestly. It has not been inspired in doing so by any spirit of antagonism to the Railroad Administration. The railways must be operated efficiently if America is to play its part in the war; the Railroad Administration now has the primary responsibility for the operation of the railroads, and it is therefore entitled to the loyal and energetic support of every concern, person or publication in a position to affect railroad operation. But if any person or publication believes the Railroad Administration is in danger of making a serious mistake, it is that person's or publication's duty to say so and give the reasons for the belief. The *Railway Age* has believed that the Railroad Administration has been in danger of making a serious mistake in the matter of locomotive standardization, and it has said so and told the reasons for its belief. The time has now come when the question should, for the present, be settled in some way, and that orders for some kind or kinds of locomotives should be placed. It is to be hoped, however, that the standardized locomotives will be treated as what they are actually, viz.: an experiment; that the number of them ordered will not be excessive; and that the individual lines which require other types will be given an early opportunity to obtain them.

Although the American Railway Engineering Association is primarily an engineering organization, it includes in its

An Opportunity for Operating Studies

membership a considerable number of railway men in operating and executive positions. Some of these are men who joined the association when in the engineering department, and who have since been transferred or promoted into operating positions. Others who have risen through the operating department have become identified with this organization in order to participate directly in the benefits resulting from membership. With the continually increasing necessity for the application of more scientific methods of operation there is a growing realization of the value of accurate analyses of grade lines, train loading, track capacities and other operating conditions. The American Railway Engineering Association has given consideration to the engineering phases of such problems in the past through its Committee on Economics of Railway Location, while other committees such as that on Yards and Terminals, have studied special phases of operation. Last year the association went a step further and created a new standing Committee on Economics of Railway Operation. It now has, therefore, an organization, through which studies of operating problems of other than an engineering nature may be undertaken. This committee offers a medium through which operating men can work together to solve the problems which are confronting them.

Furthermore, the activities of this committee will undoubtedly lead to the development of valuable information for inclusion in the proceedings. This in turn should prove an incentive to other operating men to enroll in its membership to secure access to this data. In covering this field of activity the American Railway Engineering Association is entering a sphere not occupied by any other organization. It is to be hoped that operating men will avail themselves generally of the privilege of membership in this organization in order that the investigations of an operating nature which are undertaken may be made the most valuable and may be placed in the hands of the largest number of interested railway men.

The matter of trespassing on railways is an important one at any time. It is especially important under present

Trespassing Under Govern- ment Control

conditions. About 5,000 persons are killed and 5,000 seriously injured annually as a result of this practice. At a time when the nation needs all its manpower as it never needed it before—and, let us hope, will never need it again—no reasonable effort should be spared to stop the careless or reckless conduct which results in the killing and maiming on the railways of an average of 30 persons every day in the year. With the railways being operated under government control, there is another phase of the matter which should appeal to public officials. Trespassers on the railroads in many instances interfere with operation and do damage to railroad property. In many cases the killing and injuring of them results in damage suits. While the railways are under government control the expense which directly and indirectly results from trespassing must be borne by the government itself. The Interstate Commerce Commission, before government control was adopted, recommended the consideration by Congress of federal legislation to prevent trespassing. The arguments for legislation on this subject and for its strict enforcement always have been strong, but they are stronger now than ever before.

Keeping highway crossing gates closed, except when the highway must be opened for traffic, has proved very satisfactory.

Increased Safety at Highway Crossings

This is the conclusion of the chief inspector of the New York State Public Service Commission (first district) after a review of six months' experimental operation of this rule at 144 crossings in New York City. The rule, which went into effect August 22, is in force from midnight to 5 a. m. One taxi-cab has broken through a gate, but the driver was called into court and pleaded guilty. No person has been injured, during the five-hour period, at any of these crossings. At the hearing given by the Commission, prior to the issuance of its order, some one presented the theoretical objection that to keep gates closed when no train was coming would invade the constitutional rights of travelers on the highway; but the only request received by the commission for a suspension of the rule was one from the Staten Island Civic League, saying that in their territory there are no scheduled trains after midnight, it was not granted

Whether the members of this league are particularly addicted to traveling in the "small hours" does not appear; but the commission called attention to the obvious fact that extra trains, though infrequent, introduce more risk than do the regular trains. The prevention of accidents to persons is a sufficient justification for keeping gates normally closed at night, for no one has discovered any better way of dealing with the sleepy attendant; but the rule has also proved a much-appreciated relief to enginemen; they have a feeling of security where, before, they frequently observed gates left open and attendants asleep or lazy. Now, the attendant who does not promptly open the gates for motorists, or others, not only risks being complained of by the travelers but also risks censure from his superior for not preventing damage to gates, as in the case noted. More than two-thirds of the 144 crossings covered by this rule are on Long Island.

A Good Record in Moving Coal

THE COMPLAINT of the fuel administrator, Dr. Garfield, that the railways moved less coal in the week of April 6 than in previous weeks has directed attention once more to the important problem of coal transportation. The statistics regarding the coal moved thus far this year which have been made public by the Railroad Administration show that while the complaint of the fuel administrator was based on facts it was also very unjust.

The *Railway Age* published in its issue for April 19 statistics showing that to the end of the first week in April the railways had moved a total of 6,441 more carloads of coal this year than they did during the corresponding period of 1917. Statistics regarding the coal movement for the second week in April are now available. They show that to the end of the second week in April the railways had loaded 28,660 carloads more than during the corresponding period of last year. In other words, while there was a decline in the amount of coal loaded in the single week ending on April 6, there has been in the entire period since January 1 an increase over last year in the total number of cars loaded of almost 29,000 cars.

The record made by the railways thus far this year is even better than these figures indicate. Nobody has forgotten that the weather of January, 1918, was the most severe that has been experienced in many years. Principally because of this there was in that month an actual decrease of 79,172 in the number of cars loaded. On the other hand, in the months of February and March and in the first two weeks of April there was an increase in the number of cars loaded over the same period of last year of 107,832 cars, or 4½ per cent. In other words, the net increase of 28,660 in the number of cars loaded in the first three and one-half months of the year was made in spite of a large reduction in the amount of coal moved in January.

In a statement regarding the decline in the amount of coal loaded in the week ending April 6, Dr. Garfield said, "A large part of the shortage is due to the continued lack of transportation service, as evidenced by the shortage of cars placed at the mines to be loaded." His statement referred especially to the situation in the bituminous coal fields. Since then statistics of the United States Geological Survey for the week to which he referred have become available. These do not support his statement. They show, on the contrary, that while the bituminous mines produced 38.1 per cent less than their maximum capacity, only 12.5 per cent of this failure was due to car shortage, while 25.6 per cent of it was due to labor shortage, strikes and other causes. The United States Geological Survey specifically says, "The exceptional loss of production in the week of April 6 is therefore to be attributed to labor shortage rather than car

shortage, in all fields reported with the particular exception of Ohio and New River districts."

It is unfortunately true that the railways are and long have been unable to transport as much coal as the mines can produce. It is probable that this condition will continue indefinitely. But neither the Railroad Administration nor the railway companies are responsible for the existing inadequacy of railway facilities. The present transportation situation is mainly the result of the nation's persistence for over ten years in pursuing a policy of repressive regulation which rendered it impossible adequately to increase railway facilities.

Furthermore, nothing is to be gained by picking out exceptional weeks, as was done in this instance, as a basis for criticising the railways, and ignoring the fact that, excepting in occasional brief periods, they are loading more coal than in corresponding periods of previous years. And certainly nobody is going to be benefited by attempts to put on the railways the blame for failure in exceptional weeks to increase the loading of coal when the facts show, as do those for the week on which Dr. Garfield based his complaint, that most of the failure to secure greater production of coal was not due to transportation conditions.

Railroad Influence in National Movements

A UNIQUE FUEL CONSERVATION CAMPAIGN now being carried on by the Northern Pacific is described elsewhere in this issue. This adds another item to the long list of worthy movements which the railroads have been active in fostering, not only as they affect the interests of the companies and their employees, but designed in a broad way to promote the best interests of the country and the public at large. In the past the railroads have lent their support to colonization work, to the movement for the conservation of natural resources, to the safety first propaganda, to public sanitation work and other similar activities. Although in their inception the work of the railroads in furthering these movements was in most cases undertaken because it was felt that it would be of advantage to the roads, in the majority of instances it has been carried to the point where it involved the interests of large classes of people, or whole sections of the country, or even assumed importance as a nationwide movement.

The advantages of a broad policy in such matters can hardly be overestimated. It is important for the railroads to know the attitude of the public and also to bring the people to see the viewpoint of the road. Such educational campaigns furnish one of the best means at their disposal for bringing home to the people the fact that in the broad questions of public policy, the interests of the railroads are identical with those of the country as a whole. Unselfish work for national movements is one of the best methods that can be adopted for promoting good feeling in the public mind toward the carriers. Public sentiment in matters concerning the railroads is less antagonistic than it was a few years ago, and this good feeling should be fostered in every way possible. It may be necessary to make reductions in passenger service and to use other means of saving fuel which may cause inconvenience to the patrons of the roads. Despite the fact that the responsibility for the operation of the roads has been assumed by the government, unpopular measures will still react on the carriers. Such campaigns as that now in progress on the Northern Pacific will do much to assure an understanding and a sympathetic co-operation by the general public under such circumstances and deserve the railroads' hearty support.

Prices of Coal for Railroads

THESE RECENTLY has been going on a controversy between Dr. Garfield, the head of the Fuel Administration, and John Skelton Williams, director of purchases of the Railroad Administration, regarding the prices which railroads should be required to pay for coal. Dr. Garfield has contended that the railways should pay the same prices as other large consumers. Mr. Williams has contended that the railways should be sold coal at lower prices than other large consumers.

Dr. Garfield bases his stand largely on theoretical considerations of equity. He seems to think it is morally wrong for railways to be given coal for less than other users. He also argues, it is understood, that the payment by railways of the regular government prices is necessary to keep all mines now operated open and to secure maximum output.

There seems to be an impression that Mr. Williams in asking for differential prices for the railways is asking for something new and even revolutionary. As a matter of fact, he is seeking a continuance of practices which have prevailed in the past and which always have been recognized as based on sound commercial principles. Just how much less railways should be charged for coal than other consumers is an open question, but that they should not be required to pay prices which have been fixed as reasonable for other consumers seems clear. The railways in the past have been made lower prices than other consumers for several reasons. In the first place, they are wholesale customers. They use from one-fourth to one-third of all the coal produced. Now, obviously, regardless of the matter of car supply, it does not cost a coal operator as much per ton to furnish coal to a single very large customer, such as a railway, as to furnish it to many smaller customers. Most of the selling and overhead expenses he incurs in furnishing coal to a railway are relatively less than those he incurs in selling to smaller customers.

Furthermore, the railway furnishes to the coal operator the means of transporting his product, and when he has a railway for a customer it can arrange to furnish him as many cars as he requires in order to fill his contract with it. With an ample car supply than he otherwise would have he can secure a larger output than he otherwise could obtain, and the larger and more regular the output he can obtain the cheaper he can produce the coal. It is argued that the railway should distribute its cars equitably among the mines along its line and should not be allowed to use its power to furnish cars as a means of forcing down the price. But each railway must, as a matter of public necessity, be furnished all the coal that it requires. If the railways do not get all the coal they need they will be rendered unable to operate to their maximum capacity; and if they are unable to operate to their maximum capacity they cannot haul the greatest practicable amount of freight, including coal. Since in order to enable the railway to handle the maximum amount of coal and other traffic for other persons it is necessary that it shall be furnished all the coal that it requires, and since when it furnishes a full supply of cars to a mine it becomes possible to operate that mine more regularly and therefore to produce coal from it more cheaply, it seems to follow that the coal produced for the railway should be sold to it at a lower price than coal is sold to other customers who are smaller purchasers and who do not furnish the car supply which makes it possible to operate the mine more economically.

If a railway were a concern which entered into competition with other concerns to which the coal was sold, the objection to selling to it at a lower price than to other customers could be urged with more force. But the railway is not a commercial competitor of other consumers of coal, and the actual effect of selling it coal cheaper than other consumers is to enable it to operate more economically, and

thereby to render transportation service cheaper than it otherwise could to other users of coal.

We do not understand that the present government prices for coal originally were fixed with the intention that they should be paid by the railways as well as by commercial consumers. They were fixed with a knowledge of the fact that the railways were getting and always had got their coal cheaper than other consumers. Therefore, to require the railways to pay the government prices would be to raise the cost of coal to them without reducing it to other consumers. The effect, while the railways are being operated under government control, would be to increase their operating expenses at the expense of the government itself.

It would seem that it ought to be possible for the Railroad Administration and the Fuel Administration to reach some agreement under which the railways would be granted reasonable, differential prices for coal. If, however, theoretical principles of equity rather than commercial principles of long standing are to prevail and the prices charged railways are to be made the same as those charged other consumers, it would seem that the increase in prices to the railways should be accompanied by some reduction in the prices to the public, provided this would not interfere with securing the largest output of coal which the railways can transport. So necessary is it to secure the maximum practicable output of coal that the question of prices ought, of course, to be subordinated to the question of the best means of securing maximum production.

Norfolk & Western

HAD IT NOT BEEN for the increase of over 100 per cent in taxes, the Norfolk & Western would have had almost as much available for dividends in the calendar year 1917 as in its banner year 1916. Briefly summarized, the reasons for this rather extraordinary result are the increase of 7.35 per cent in the average revenue per ton per mile and the increase of 4.21 per cent in tons carried per train; a slight decrease in the amount spent for maintenance of way; the large increase in the credit balance for hire of equipment and rent of other equipment; and an increase of nearly 18 per cent in passenger revenue with an increase of only about 2.28 per cent in passenger train mileage.

Norfolk & Western's cost of moving the business ran up in much the same way as with other eastern roads. Transportation expenses amounted to \$20,808,000, an increase over 1916 of \$6,030,000, or 40.81 per cent. Maintenance of equipment also cost more, the total in 1917 being \$12,052,000, an increase of 16.53 per cent over the previous year. These increased labor and material costs were nearly offset by the factors mentioned above. There was charged to taxes, however, \$5,095,000, or \$2,615,000 more than in 1916, an increase of over 105 per cent. It would appear that this charge to taxes makes ample provision for all new federal taxes imposed during 1917. After paying interest charges and rentals, Norfolk & Western had \$18,946,000 available for dividends, as compared with \$21,800,000 in 1916. The 4 per cent dividends on the preferred calls for \$20,000; the company paid a total of 8 per cent, which includes an extra dividend of 1 per cent declared in March, on its common stock, making a total dividend payment on both common and preferred of approximately \$10,500,000.

There was actually less coal carried by the Norfolk & Western in 1917 than in 1916, and the average length of haul was shorter. The bituminous coal carried in 1917 was 29,005,000 tons, or only 60.18 per cent of the total revenue freight carried. In the three years preceding 1916, bituminous coal has furnished more than 68 per cent of the total revenue freight tonnage and in the fiscal year ended June 30, 1915, it formed over 71 per cent of the total ton-

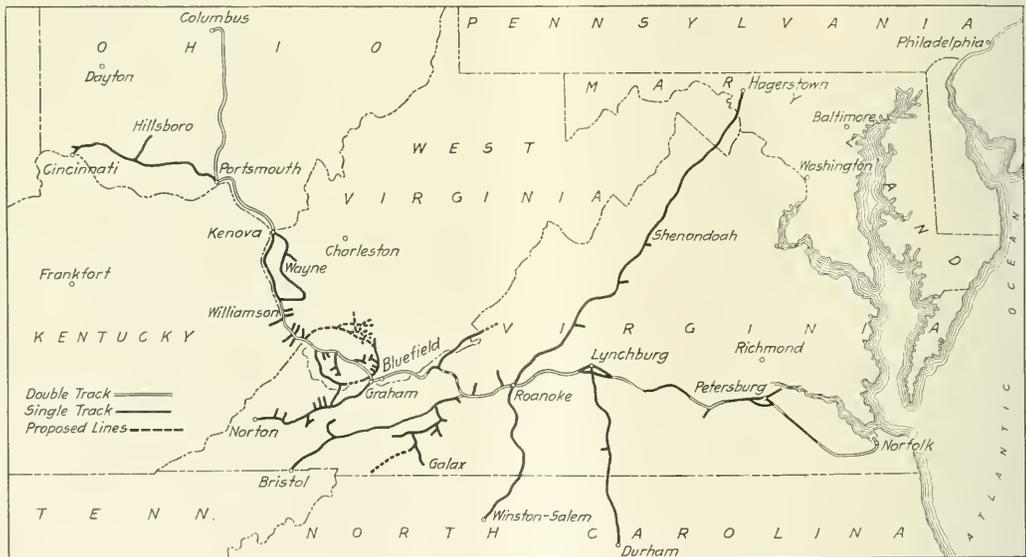
nage. In 1916 it was over 60 per cent of the total tonnage. The average revenue for coal per ton mile, however, was 4.53 mills in 1917, as against 4.43 mills in 1916. As an offset to the smaller coal traffic, there was an increase of 397,000 tons of coke carried—the total in 1917 being 2,359,000 tons—and of 440,000 tons of ore—the total in 1917 being 1,756,000 tons—and a very large increase in the tonnage of manufactured products, the total in 1917 being 6,987,000 tons, an increase of 1,357,000 tons over 1916.

These changes in traffic conditions gave the Norfolk & Western a better balanced freight movement, so that with an average freight train, excluding the caboose, of 45.77 cars in 1917, 29.27 of these were loaded and 16.50 empty; while in 1916, with an average train of 46.73 cars, 28.86 were loaded and 17.87 empty. This was a factor favorable to a heavier trainload, but, on the other hand, the fact that there was a smaller proportion of coal and a larger proportion of manufactures, made it more difficult to get an increased trainload. The Norfolk & Western, however, has now joined the class of the Chesapeake & Ohio, with an average revenue trainload of over 1,000 tons. In 1917 the revenue trainload averaged 1,021 tons and the loading per loaded freight car

division. On this division steam locomotive repairs average \$19.03 and fuel cost \$30.54, or considerably more than the average for all steam locomotives. The Norfolk & Western management figures the cost of repairs, retirements and depreciations of freight steam locomotives per thousand ton miles moved at 32 cents in 1917 and 29 cents in 1916 and the repairs, retirements and depreciations of the electric freight locomotives at 10 cents per thousand ton miles in 1917 and 8 cents in 1916.

In 1917 the Norfolk & Western spent \$8,573,000 on additions and betterments, which included \$2,584,000 for new equipment completed or under construction during the year. The new equipment received included eight steam passenger locomotives, 20 steam freight locomotives, fifty 90-ton steel flat bottom, gondola cars, and 438—57½-ton drop bottom, gondola cars. The largest single item of expenditure for roadway and track was \$886,000 for sidings and spur tracks. There was \$495,000 spent for block and other signal apparatus.

Norfolk & Western has bought the leasehold interests in 3,800 acres of coal lands in Mingo County, West Virginia, and Pike County, Kentucky. This will furnish about one-



The Norfolk & Western

mile averaged 34.87 tons. The Norfolk & Western's grades are not so good as the Chesapeake & Ohio's but it is believed that the electrified portion of the Norfolk & Western has greatly aided both in facility of movement and economical operation. It is estimated that the cost of freight movement on the electrified division in October, 1917, was 26 per cent less than if steam locomotives alone had been used. This does not presumably, of course, take into consideration any overhead (capital) charges.

It is rather interesting to note that the average cost of repairs of electric locomotives per 100 miles was \$38.96 in 1917, as against \$28.21 in 1916, and of steam locomotives, \$15 in 1917 and \$12.72 in 1916. Fuel cost per 100 miles for the electric locomotives was \$44.95 in 1917 and \$27.74 in 1916, and for steam locomotives, \$24.14 in 1917 and \$11.48 in 1916. It must be remembered, however, that these comparisons are not fair to the electric locomotive, because of the inclusion of a large number of light steam locomotives. The electric locomotives are used on the Pocahontas

sixth of the fuel coal consumed and this coal is especially adapted to the use of mechanical stokers.

There was a decrease of \$1,270,000 in the amount of available bonds outstanding, these bonds having been exchanged for stock. There was also \$1,300,000 equipment trusts which fell due and were paid off. At the end of the year the company had on hand \$4,214,000 and no loans and bills payable. The following table shows the principal figures for operation in 1917 and 1916:

	1917	1916
Average mileage operated.....	2,085	2,080
Freight revenues.....	\$56,381,036	\$51,114,186
Passenger revenues.....	7,023,153	5,956,081
Total operating revenues.....	65,910,242	59,449,982
Maintenance of way and structures.....	6,176,369	6,771,473
Maintenance of equipment.....	12,051,912	16,342,501
Traffic expenses.....	809,723	739,052
Transportation expenses.....	20,808,290	14,778,086
General expenses.....	1,217,101	977,998
Total operating expenses.....	41,161,503	33,508,732
Taxes.....	5,095,000	2,480,000
Operating income.....	19,651,816	23,459,266
Gross income.....	23,182,056	26,160,872
Net income.....	18,946,137	21,800,074
Dividends.....	10,552,297	10,013,856

The Fifth National Foreign Trade Convention

"The Part of Foreign Trade in Winning the War," the Theme of Meeting in Cincinnati Last Week

THAT NEXT TO WINNING THE WAR, the most important task before American business today is to prepare for the enormous foreign trade that will be open to America at the close of the war, was the sentiment of everyone of the thousand or more leaders of American business who attended the Fifth Annual Foreign Trade Convention in Cincinnati last week.

"The Part of Foreign Trade in Winning the War," was the theme of the most successful Foreign Trade Convention that has yet been held, but again and again in the sessions it was brought out that we shall have no more excuse for being unprepared for the coming of peace than we were for the coming of war.

Shipping, the part that industry is playing in helping win the war, the work of the War Trade Board, the assistance now being given to American exporters by the government Bureau of Foreign and Domestic Commerce, banking facilities, foreign credits, and co-operation in foreign trade, were among the important matters brought up for extended discussion at the convention.

Speakers brought out how American industry was lending every energy today in war work. They showed how much of this work would have a lasting value with the return of peace, particularly from the standpoint of foreign trade and pleas were made for a recognition of that fact by the American people and their constituted authority in Congress. Thus in speaking of the shipping situation, experts pointed with pride to the progress that has been made with our shipping program and to the rapid expansion that has taken place and to the more rapid expansion that will take place in America's merchant marine and in our shipbuilding capacity. Attention was drawn to the fact that this merchant marine will all be available after the war for American export trade, but it was shown that full use of this merchant marine could not be made with the present discriminatory laws against American shipping now on the statute books of Congress. It has been on account of these laws, said Robert Dollar, in his paper, that we have had to work with might and main to build ships enough in a few months to carry our men to France, whereas with more equitable laws a sufficient merchant marine would have been on hand when war began. Similarly so drastic have been the laws that American shipping has been practically driven from the Pacific, so that Japan now has an absolute monopoly of shipping on that ocean and is in a position to direct foreign trade over it as best suits her

own interests. For these reasons, urgent pleas were made for the repeal of the most obnoxious of these laws. That of Mr. Dollar's was one such plea. Another was made at the group meeting on Banking Facilities over which he presided, by C. A. Hensch, president of the American Bankers' Association, in which he said:

"We are in the midst of a shipbuilding program, which if carried forward to a logical conclusion will provide this nation with a tremendous fleet of ships, which will be of great benefit for and during the period of the war, in carry-

ing supplies of all kinds to our boys at the front and to our allies, but unless our laws are changed what is to become of this splendid fleet at the termination of the war? The La Follette Bill, known as the Seaman's Act, should be eliminated from our statute books, and a government subsidy in some form should be provided which will place the shipping of this country on a basis which will enable it to compete successfully with the shipping of other nations. Never again should we be placed in the embarrassing position in which we found ourselves when ships flying the flags of other countries were commandeered by those nations to carry supplies needed by them for the successful prosecution of the war thus leaving us completely stranded and at the mercy of other nations for the transportation of our products to all parts of the world.

There is no time like the present to take an inventory of our needs, and to proceed at once to place ourselves in an impregnable position so that we can hope to compete successfully with other nations when peace shall be re-established."

Particular attention was paid by several speakers to the urgent necessity of making plans now for foreign trade after the war, and in every case their arguments met with the most hearty approval. It was shown how England, France, Canada, Japan and Germany were already laying their plans despite the tremendous demands upon them for war time work. The argument was made that we must similarly prepare. The great sums of money that we have sent abroad the fact that we are now a creditor instead of a debtor nation the enormous increase in our factory production, far beyond our peace time needs, and the urgent demands that will be made upon us for the materials of reconstruction leave no doubt that we are going to have an export trade of great volume or of the great necessity of preparing now to expand and maintain that trade. The steps that England, France,



James A. Farrell

President of the United States Steel Corporation and Chairman of the National Foreign Trade Council

Japan and Germany are taking similarly to prepare for trade after the war leave no doubt that we are only going to hold our export trade against keen competition.

"At this critical time," said Mr. Hirsch, "a great many people do not see the necessity or desirability of discussing the subject of foreign trade, but there is an old adage that 'in time of peace prepare for war,' and I think we can, therefore, very properly reverse the saying, and 'in time of war prepare for peace.'

"This struggle has already been instrumental in bringing us to a full sense of realization of our inefficient, haphazard methods of doing business. If we would profit by our own experience, we should begin now to prepare for the struggle for commercial supremacy that will obtain when peace shall have been re-established in this troubled world."

Another important and similar aspect of this necessity of preparing now was brought by M. A. Oudin of the General Electric Company, speaking at one of the general sessions on "American Economic Interests in the Asiatic East." He said:

"In the United States there is a disposition to push aside all problems except the vitally important one of how to win the war. We are confident of the unselfishness of our motives and the disinterestedness of our aims. But no one can predict how far these policies and these principles will prevail at the peace conference. These principles must be backed up by more than a conviction on our part of their high moral character, by more than powerful naval and military forces. We will invite embarrassment if we do not take stock of our economic and industrial and of our agricultural and mineral resources. We will court disaster if we unduly delay taking the necessary constructive measures for the improvement of our economic position. It is certain that at the peace table a knowledge of the exact state of our resources and those of our Allies and the possession of a strongly fortified economic position will be trump cards. They will help us secure a better peace for ourselves and for the world, in which our role is that of a leader of democratic peoples."

General Sessions

The great importance that is being placed on foreign trade by the business men of America today is evidenced by the attendance at the convention of the representative leaders of American industry. Those who took part in the convention's deliberations included the leaders of all branches of American business, and despite the fact that so many of our industrial captains are now busily engaged on war work, the Fifth National Foreign Trade Convention was the best attended and most successful yet held.

The first session of the great meeting was called to order Tuesday morning, April 18, at the Hotel Gibson. The chairman of the Council is James A. Farrell, president of the United States Steel Corporation. Mr. Farrell attended all of the three days' sessions, but the work of presiding over the meeting was in charge of E. A. S. Clarke, president of the Lackawanna Steel Company, who was later assisted by George Ed. Smith, president of the Royal Typewriter Company, and head of the American Manufacturers' Export Association. O. K. Davis, secretary of the National Foreign Trade Council, was secretary of the convention.

The sessions of the convention were divided into three general sessions and eight group sessions, the latter to discuss particular problems of export trade. At the opening general session there were presented nine reports, detailing the war contributions of various factors of foreign trade. These papers were given by men high up in their respective industries and included reports on textiles, lumber, chemicals, automobiles, finance, metals, oil, agriculture and coal.

The second general session was devoted almost entirely to the activities of two government bodies—the Bureau of Foreign and Domestic Commerce and the War Trade Board. Burwell S. Cutler, chief of the Bureau, read a paper on

"American and Foreign Government Trade Encouragement Agencies," and another paper following detailed the trade promotion work of the consular service.

The work of the War Trade Board was explained in an exceedingly well received paper by Thomas L. Chaddourne, counselor to the War Trade Board, who was followed by three department chiefs of the Board, who explained the work respectively of the Contraband Committee, the Bureau of Exports and the Bureau of Imports. The meeting was enlivened by a period following in which the three department chiefs were called upon to answer questions concerning the work of the Board in licensing imports and exports.

The topic of the third general session, Friday morning was "The American Merchant Marine." Papers were presented on "The Relation of Inland Water Ways to the Development of Foreign Trade," by Walter Parker, general manager of the New Orleans Chamber of Commerce; on "American Economic Interests in the Asiatic East," by M. A. Oudin of the General Electric Company; on "Trade Follows the Flag," by Frank Waterhouse of Frank Waterhouse & Co., Seattle; on the "Development of an American System of Marine Insurance," by Hendon Chubb of Chubb & Son, New York. Robert Dollar was unable to attend but an able paper written by him was read by the secretary.

Group Sessions

The group sessions, four of which were held Thursday evening and four Friday afternoon, saw the presentation of several interesting papers.

Group I directed its attention to Banking Facilities for Foreign Trade and Investment. Several interesting papers were presented, that of Mr. Hirsch, who presided, having already been mentioned above.

Group II, dealing with Initiatory Problems in Foreign Trade, had as the feature of its meeting, the discussion by several members on "What Beginning in Foreign Trade Can Be Made with \$10,000, and How?" Some interesting facts were also brought out by the chairman, who, in opening the meeting, brought out some general suggestions with reference to foreign trade. He pointed out that it was necessary; first, to know the markets; second, to know the people; third, to know the seasons in foreign countries; fourth, to differentiate between different sections of comparatively large countries; and fifth, to know the language of the country to which it is desired to export.

Group III was devoted to Commercial Education for Foreign Trade.

Group IV's problem was Co-operation in Foreign Trade.

Reviews of the systems to be inaugurated in Great Britain and Germany for foreign trade after the war aroused the members present to the character of the competition that the United States exporters will have to meet in the struggle for the world's commercial supremacy. Papers, prepared by officials of the Bureau of Foreign and Domestic Commerce, on German and British organization, plainly indicated the care and attention which those countries have given to this matter.

In Germany there may be mandatory monopoly—government or otherwise; in England, co-operation which will perhaps be under governmental supervision and urged by the government. In this country we have no definite policy as yet.

The need for co-operation in foreign trade and of a concerted plan of action on the part of the exporters of this country in enlarging foreign trade activities, was strongly emphasized.

A great part of the discussion followed the suggestion as to the practical organization of an export association under the Webb-Pomerene Bill. A number of inquiries were made as to certain provisions of the bill, and much light was thrown on the probable working of this measure.

Group V dealt with Foreign Credits and Credit Informa-

tion and was held in co-operation with the National Association of Credit Men.

Group VI, held in co-operation with the American Manufacturers' Export Association, took up the Problems of the Smaller Manufacturer and Merchant.

After a thorough discussion of the export situation now and after the war, the session addressed itself in particular to a consideration of several of its more important phases. Attention was called to the difficulty of building up a successful overseas trade without extending to foreign purchasers the long-time credit to which they are accustomed, and the difficulty of obtaining accurate credit information through foreign sources.

Group VII, which discussed Pacific Overseas Trade Extension was brought sharply up against the replacement of American and other shipping on the Pacific by vessels under the Japanese flag.

The discussion of this subject brought out the fact that the steamship which transports products across the ocean very largely controls the commodity, not only while it is in its custody as freight but from its point of origin to its ultimate destination, and that it dictates who shall buy and who shall sell. And the ocean lines in the Pacific being principally in the hands of the Japanese, it has come to pass that the Japanese buy our cotton, for example at interior points in the South, and sell it to the user in Japan. They are thus doing the business that a few years ago was done by American commercial houses located in this country through their branches in foreign lands.

The only remedy for this situation lies in the maintenance of a substantial fleet of steamers operated under the American flag. Now the situation (prospectively at least) has changed. The United States will find itself possessed at the close of the war of a large fleet of merchant steamers, and the suggestion was made that the government retain that ownership and lease the ships to its citizens under the Government form of time charter.

Another of the features of Group VII was an able paper by Frank Rhea on "Transportation Facilities in the Far East." A detailed abstract of this paper will appear in an early issue of the *Railway Age*.

Group VIII dealt with Latin American Trade Relations. One of the best papers presented at this group meeting was by Robert H. Patchin of W. R. Grace & Co., on "Essential and Non-Essential Foreign Trade."

The Banquet

The feature of the entire convention, however, was the banquet held Friday evening. Over 900 were present, but the patriotic enthusiasm that was manifested for the remarks of the speakers would have done justice to twice that number. Taking their cue from L. A. Ault of Ault & Wiborg, Cincinnati, the toastmaster, the speakers directed their remarks to comment on the war with suggestions that a constructive plan for peace conditions should be in process of formation now. All laid stress on the necessity of a victorious peace and spoke against any compromise with those who had started the world conflagration.

Edward N. Hurley, who was to have been the leading speaker at the banquet, was unable to attend, but he sent the following telegram, which was read by Mr. Farrell:

"Please convey my sincere regret to the members of the National Foreign Trade Council that I am unable to be with them. I hoped until the last minute to be able to get away from Washington, but find now that it is impossible. I wanted to be with you because I knew that all of you are working for your country; that you are all helping the nation to win the war against Germany.

"In Washington we are all deep in this immediate task. We are so deep in it that some of us forget that if the righteous purposes of this war are to be achieved we must

fill our trade function in the future. America never again can return to the provincial attitude of the past. We have become a world leader in war, and we must maintain our world position in peace. The share of world commerce to which the United States aspires is that to which the resources, the skill, and the resourcefulness of our people entitle us in fair and friendly competition with the nations who are at once our customers, and our suppliers of materials and merchandise.

"We are building ships first and foremost for the war but they will be useful for the future world trade as well. Remember that once their part in the winning of the war is ended a large number of them will be engaged in bringing back to home and industry the victorious soldiers, and in transporting to Europe the materials necessary for reconstruction of normal life freed from the menace of avaricious autocracy. These vessels will serve the commerce of other nations equally with our own, their facilitation of the trade of the world will be the corollary of the freedom of the seas we fight to assure. And if there are any men among you who doubt that we are going to have a vast fleet I will simply ask whether you have heard of a well-known man in our organization whose name is Charles M. Schwab."

To make up for Mr. Hurley's absence also extracts from another of his speeches showing the recent rapid progress of the shipbuilding program were read by another speaker.

The most important paper read at the banquet was that of Mr. Farrell, the chairman of the Council on "Foreign Trade Aspects." An abstract of this paper is given below.

The closing session of the convention was on Saturday morning. The feature of this session was the presentation of a Declaration of Principles, prepared by the general convention committee.

Foreign Trade Aspects

By James A. Farrell

Chairman National Foreign Trade Council, President
United States Steel Corporation

When President Wilson declared that the freedom of the seas must be maintained and that the ocean-borne commerce of the United States must be allowed to be carried on without molestation, national recognition was given to the fact that our export and import trade was a controlling factor in our national existence. Then too, it quickly became obvious that the world was dependent as never before upon the products which we could send them. Exports which in any year prior to 1915 had not exceeded two and a half billion dollars, reached in 1916, before our entry into the war, an aggregate of four and one-third billions, while in 1917, notwithstanding the destruction of shipping and the reduced tonnage available for transport, they totaled nearly six billions three hundred millions of dollars.

Under the conditions that confronted this nation a year ago, it did not require a prophet to tell us that unless a comprehensive shipbuilding program should be adopted and pressed to completion at no distant date, our future participation in the commerce of the world would be negligible. It had, indeed, become patent, long before our entry into the war, that the future of our foreign commerce was indissolubly associated with the up-building of our mercantile marine. No discussions have figured more prominently at these Foreign Trade conventions during the past four years than those whose subject and motive have been the great question of American shipping. When the war has been won and a vast fleet of modern steamers return to the use of peaceful ocean commerce, the danger of our foreign trade being hampered by the lack of bottoms to carry it will have finally passed away.

But autonomous control of our foreign-going shipping is

only one of the requisites for the gaining and keeping of overseas commerce. By all the industrial nations of the world vast preparations are already being made for participation in the economic contest that will ensue for trade in the world's markets. There can hardly be a question that for a good many years after peace is restored the rehabilitation of the vast territory wasted by war, and the replacement in neutral countries of equipment which has necessarily suffered from deterioration while replacements have been impossible, will provide a large outlet for surplus production. Moreover, the creation of conditions hitherto non-existent of equal opportunity for international commerce and industrial enterprise, should so quicken the world's demand for manufactured products as to insure a long period of industrial prosperity.

America, it may be hoped, will maintain the position of offering to the world all its requirements which can be supplied here, on terms and conditions that are fair and just. There is no evidence now of any intention to take undue advantage of our economic and productive strength, and we shall in the future be as little disposed to turn to personal profits the necessities of a war-worn world, or the exceptional influence of our position as exporters and importers. The sacrifices that are being cheerfully endured today by men engaged in foreign commerce in the necessary curtailment of their business through the conservation of shipping, are an earnest of the elevation of method and of purpose which will control the conduct of our external trade in the near future. Now that Congress has at last recognized the necessity of legalizing combinations for export trade, the field ought to be open for the participation of hundreds of small manufacturers who have not hitherto been able to enter it. One of the greatest of after-war problems must be the employment of surplus labor and the utilization of the surplus products of industry. Organizations should be perfected in every line of American production seeking foreign trade so that no matter to what extent they may desire to co-operate under the provisions of the Webb-Pomerene law, they may at least co-operate to the fullest extent in securing information respecting foreign conditions and competition, in regard to the demand for our products abroad and the proper utilization in import and export trade alike of our enlarged merchant marine.

At the present moment, our foreign trade, both export and import, is inevitably restricted by the scarcity of steamers available for service other than that of transporting our armies to France and of keeping them and our Allies supplied with necessary food and munitions. This condition is likely to continue until the additional tonnage under construction becomes available. There are, however, certain commodities, procurable only from overseas countries, which are essential to the successful prosecution of the war. We constantly need as raw materials in our manufactures and particularly for the production in sufficient volume of munitions, as well as for the consumption of our own people, replacing domestic products which we send to our Allies: Meat, rubber, coffee, cocoa, hides and manganese ore from Brazil; wool, meat, hides and wheat from Argentina; copper, cotton (of the long stapled variety) and sugar from Peru; copper, tin and rubber from Bolivia; nitrates, copper, wolfram, tungsten and other ores from Chile; tin and rubber from the Malay peninsula; jute and jute bags from India, and this by no means exhausts the category. Such is the usual urgency of our need of these commodities, or most of them, that the government must provide, to the extent permitted by the other requirements of the war, steamers for the purpose of importing them. The possible export trade with the countries from which these products must come is, therefore, at present limited to the available space on such steamers as the government may be able to provide for the import trade, and until such time as new tonnage

becomes available, there can be no increase or expansion of our export trade with these markets.

We Should Prepare

In the meantime there is obvious necessity that we should prepare against the time when the present restrictions have been removed and adequate transportation facilities are again available. With our enormously increased capacity in manufactures, and the natural products of the mines, farms and forests, we shall have to spare, added to the necessity for the employment of our merchant marine which should amount by the end of next year to at least ten million tons of shipping, we shall be urgently in need of foreign markets. Our European competitors, past and future, notwithstanding the tremendous demands upon their energies and resources which the prosecution of the war involves, are not neglecting to prepare for the foreign trade of a time of peace. It is said that Germany has already taken steps, in the building of a new merchant marine, to render herself independent of the shipping of foreign countries, even though she should find herself at the end of the war bereft of that large part of her fleet which was interned in foreign ports. It is certain that the German organization of banks and mercantile houses which, before the war, was co-extensive with the world, is still practically intact in South America and other markets in which we are particularly interested. We may reasonably expect that to the extent she is able to recover, be it soon or late, her trade connections and to repair the diminished man power, Germany will be as potent a competitor for the markets of the world as she was before.

One imperative duty of gatherings like this is therefore to impress upon the people of the United States the immediate necessity of mobilizing their surplus resources as a preparation for the demands of the foreign trade of the immediate future. It may well be that after the war has been brought to a successful termination, we may be able to speak in terms of co-operation, on the broadest and most generous scale, with the manufacturers and producers of our present Allies, rather than in terms of keen competition. But effective co-operation can be rendered only if we have first organized among ourselves a co-operative system of foreign commerce.

It is reasonable to expect that with a secure peace established among nations divested equally of the power and the desire to make war on each other, great world enterprises will be undertaken under the stimulus of international combinations of capital, and of a common surplus of materials available for improvement and reconstruction. No longer should it be the case in future years, when it may become possible for us to lend financial aid to the present neutral countries of the world for the development of their enterprises, that America should withhold its proper participation and expect the European countries to carry the entire load of foreign financing. Neither would it seem just or equitable, should we emerge from this war with sufficient surplus capital to warrant generous investment in foreign enterprises, that we should selfishly disregard the claims of our present allies to that participation in such financing which insures an adequate share of resulting trade.

Whatever may be the eventual terms of peace, one conclusion would seem to be reasonably certain: We and our allies will have sacrificed our blood and treasure in vain if we have not succeeded in insuring hereafter conditions of peace under which we shall be free to carry on our domestic and foreign commerce without the fear of military dictation or aggression.

VENEZUELA IMPORTED RAILWAY MATERIALS in the six months from January to June, 1917, to the value of \$424,073.—*Commerce Reports.*

Modern Versus Standardized Railway Equipment

Provide Standard Equipment Only for an Emergency Fleet:
Speed Up Repair and Improvement Work

By J. E. Muhlfeld

IN YOUR APRIL 12 ISSUE you request an expression of views on the adoption of complete standard types of locomotives for all the railroads in this country.

At this time when we are waging a war of the transportation of tonnage against tonnage of men, munitions and supplies for the massing and protection of the battle fronts, it is well to carefully consider just how far the government and the railroads can safely go in a policy as yet untried by any country in the world, without the risk of failure.

Why should the mechanism of mobile power used as a means of transportation, such as water and air ships and locomotives, be selected for complete standardization and its progressive development throttled, any more than that of the automobile, stationary power plant and the machinery of industries which produce foodstuffs, wearing apparel, building materials and the other living necessities, all of which are dependent upon rail and water transportation for their distribution?

Had the mechanism essential to wire and wireless telegraph and telephone, lighting, heating, mining, agricultural and industrial equipment been standardized ten or even five years ago in what condition would the United States be today to combat Germany's machine power? And what would be the present state of the art of the automobile and auto truck had standardization been inaugurated even three years ago?

Cheap wood, coal, gas and oil have made us prodigal in the use and utilization of the energy generated by our natural fuel resources for transportation and industrial purposes, but this condition has now changed. The fuel bill has almost doubled itself during the past year; wood and gas are practically unavailable; oil is going, and coal will annually become of average poorer quality and higher cost. With either steam or electric locomotives converting only from 4 to 7 per cent of the heat value in the fuel into effective work at the track rail, how can we expect to keep pace with the economics of the situation without the daily development of the railway prime mover, particularly in this country where it consumes about one-third of all the coal produced?

Railway equipment orders have not kept pace with the locomotives and cars put out of service on account of obsolescence and inadequacy, to say nothing of meeting the requirements of expansion and increased business. This applies principally to locomotives and freight cars, as while those newly built have been of progressively greater capacity than the existing equipment, that factor has not been sufficient to meet the requirements, and *modernized freight locomotives and cars* must be provided as rapidly as the railway shops can repair and the builders can produce them if the war plans of the government are to be carried out expeditiously.

Would not the adoption of a single government standard Mikado type locomotive and box, coal, passenger, postal and baggage and express car—or a total of six (6) standard pieces of railway equipment—for the purpose of providing an "Emergency Fleet" of equipment for such distribution and diversion as the seasonal traffic and other abnormal conditions require on each railroad be the most feasible plan for government standard equipment? Then by per-

mitting the various railway lines and systems to order the most modern design that they have in use or for which the builders now have the necessary drawings, patterns, formers, dies and other shop equipment for their construction, and for which the railways have the necessary shop and engine-house equipment for their maintenance and handling, for their normal traffic requirements, the local conditions could be most successfully met with the least confusion, the properties could be continued in operation on the most effective and economical working and up-keep basis, the greatest productive capacity of the builders' plants could be obtained with the least cost for the output, and the time and waste in construction and maintenance, as well as the railway capital and operating expense, would be substantially reduced.

However, at the moment, there are many other factors beside the complete standardization of the various types of locomotives as units that must be given prompt consideration if a repetition of the past four months' rail traffic condition is to be avoided, as the immediate necessity is for *modernized production, maintenance and operation* of both existing as well as *new equipment*, rather than standardization, all of which can best be brought about by:

First.—Appropriations and authority for speeding general repair and modernization work on existing equipment at railway shops.

Second.—Appropriations and authority for producing maximum output from builders' plants of new locomotives from existing designs, patterns, templates, formers, dies, jig and shop equipment.

Third.—Authority for the use of the regional material most readily available and for such distribution of the orders for materials and devices entering into locomotive and car construction, renewals and repairs, that the capacity of the largest number of producing concerns will be utilized to the fullest extent.

Fourth.—An emergency fleet of a single modern design of government standard locomotive, box car and coal car suitable for any trunk line carrier which can be most expeditiously produced by the builders in the largest quantities with the least lost motion and waste from the most readily available and suitable materials and appliances, for distribution to those lines requiring assistance during abnormal traffic, maintenance or operating conditions.

Fifth.—An adequate supply of repair and renewal parts for the government standard equipment for the railways of which they will be operated.

Sixth.—Adequate and suitable locomotive and car handling, supplying, inspection and repair facilities.

Seventh.—Single, double and swing crew all locomotives practicable and provide for less arduous labor and greater convenience, cleanliness and comfort in their operation for engineers and firemen.

Eighth.—Provision for equitable compensation, stock ownership in property, fair and full adjustment of grievances and for proper standards of working, living, education and saving for employees.

Ninth.—Improvement in fuel and water supply and in equipment and methods for utilization for the purpose of eliminating avoidable delays, waste and expense.

Tenth.—Elimination of divided responsibility by concentrating authoritative direction, other than for the govern-

ment standard equipment designs, of the mechanical design, operation and maintenance of locomotives and cars in a vice-president in direct charge of both the locomotive and car departments on each railroad.

Alba B. Johnson, president, and Grafton Greenough, vice-president, of the Baldwin Locomotive Works, in their recent papers before the United States Chamber of Commerce and the Western Railway Club, respectively, have not only set forth the probable consensus of opinion of the officials of one of the largest locomotive building plants in the country; but also that of many other builders and railways with respect to standardization. Of the many reasons stated by them for and against complete locomotive standardization, the advantages are greatly overbalanced by the disadvantages.

The complete standardization of locomotives as applied to 500 or 1,000 mile regional units of railway may be consistent, successful and economical so long as progress is not retarded. The Virginian Railway—practically new built and equipped during recent years from the Atlantic tidewater to the West Virginia coal mines—had an ideal opportunity, and as I understand it, attempted to standardize locomotives and cars. A report as to what has actually been accomplished in that direction and the reasons therefor, would be most interesting.

As applied to any considerable mileage which involves different bridge limitations, tunnel clearances, track strength, gradient, alignment, climatic, fuel, water, labor, enginehouse, shop, length of run, train loading, passing track, divisional and terminal yard and other operating conditions, complete locomotive standardization is not consistent for the most effective and economical transportation or maintenance results, and standardization must then be limited to the interchangeability of the maximum number of detailed repair and renewal parts. The Harriman lines undertook the complete standardization of locomotives and cars in the most serious and drastic manner that this problem has ever been attacked in the United States, but soon found it necessary to deviate from the adopted complete unit standards and confine their practice to the interchangeability of detailed parts, or otherwise assume the burden of increased transportation and maintenance costs.

On the 120,000 miles of government, and 100,000 miles of privately owned or controlled steam railways in Europe no scheme of complete locomotive standardization has as yet been worked out. This applies as well to Canada, Australia, Brazil, Argentine and other countries where the steam roads are both state and privately owned or controlled.

Locomotives and cars for steam railways are usually a combination of the results of specialized invention, designing and development of types, materials and appliances that have been found to best meet the requirements of progress and to be most adaptable for the various needs, local requirements and conditions, and so long as advancement and progress along mechanical and operating lines is to be made, this same process in the development and building of motive power and cars must be followed out.

The factors of waste in construction and haulage of unnecessary material as compared with the use of locomotive types and designs best suited to the local height, width, length and weight limitations must certainly not be overlooked, as one of the most severe, and in many cases just, criticisms to which steam railway equipment designers have been subjected in recent years is that of too great a percentage of non-productive as compared with total weight. For example, why should Pacific or Mikado types of locomotives be used when Ten-Wheel and Consolidation types, respectively, would be more suitable?

While the first cost of the most modern, effective and economical designs of new equipment may be somewhat higher than that of less modern suitable equipment, the results from a railway operating and maintenance standpoint will many times over justify the increased cost for

the interest on the investment. In fact, the lesser depreciation for obsolescence and inadequacy will, in itself, more than make up the difference in the fixed charge. Therefore, the logical way to purchase new equipment is to disregard the item of first cost so long as extravagance is eliminated, and give due consideration to those factors that will best meet the requirements from an operating standpoint and give the greatest average effectiveness and economy for its entire life. Furthermore, if the builders, or rather the assemblers of the detailed designs, materials and devices are to provide for the greatest possible production it is essential that the parts entering into each completed piece of equipment shall be distributed among the greatest number of manufacturers practicable in order that the erecting capacity of the plants can be fully utilized.

If the traffic offering is to be moved safely and expeditiously and the operation is to be performed with any degree of economy, the railway situation must be improved, whether by an increase in rates, or by taxation or by both, and railway credit is government credit.

With the "transportation expense" making up about 55 per cent, a "maintenance of equipment" 25 per cent, "maintenance of way" 15 per cent, and "traffic and general" 5 per cent of the total United States railway operating expense, and with taxes equal to about 8 per cent of this total in addition, it is easy to recognize the importance of a high average revenue trainload if the railways are to meet with any degree of success in moving the traffic now offering with the existing facilities and at the present rates. During the last 10 years the average revenue freight trainload has increased about 40 per cent, and during the past 20 years it has increased about 140 per cent, while the revenue per passenger and ton mile has gradually decreased. Had locomotives been standardized such a record would have been impossible.

The Pacific, Mikado, Mountain, Santa Fe and Mallet types of locomotives, which make up 10 of the 12 proposed government standards, have all been originated and developed in the United States during the past 15 years, and many of these have had to undergo continued change in detailed equipment to maintain them in a modernized and effective condition for operation. This applies particularly to those devices that affect the work of the locomotive engineers and firemen who are certainly entitled to the results of progress in the way of developing practical improvements, and to as much, if not more, consideration in this regard as stationery power plant operators. The necessity for hazardous and arduous manual labor in the operation of steam locomotives can and should be substantially reduced, and while a great deal has been accomplished in this direction during the past 15 years, much more remains to be done.

As the relation between cost, weight and tractive power of locomotives is practically constant, the measuring stick to determine relatively what they are accomplishing in repayment for the money, labor and material that has gone towards their creation and maintenance, is available hauling capacity. It is a lamentable fact that the locomotives of the United States as a whole have depreciated in the revenue tons hauled one mile per pound of tractive power available, largely due to insufficient maintenance, modernization and mileage, all of which demands that adequate appropriations and authority for equipment repair and improvement work and maintenance of facilities shall be provided. The fact that the direct maintenance and operation of locomotives and cars makes up about one-half of the total railway operating expense justifies that each item pertaining to equipment upkeep and working shall be given full consideration and attention.

The practice of transferring other than the "emergency fleet" locomotives from one railway division, operating district, or shop to another must be avoided if the disadvantages resulting from different rail, fuel, water, engine-crew and like factors are to be minimized and the interest of the men responsible for their safe, effective and economical upkeep

and working is to be maintained. Furthermore, provision must now be made so that all possible locomotives will be in first-class condition for next winter's use, and as a proper safeguard, every existing and new locomotive as it is turned out of the shop, and can be spared from service, should be stored until that time.

Railway operating expenses, due to a combination of traffic, weather and physical conditions, have, during the

past few months, brought about heavy reduction in net revenues and in many cases operating expenses have not been earned. As the general and traffic expenses offer negligible opportunities for large savings, and maintenance must be increased, transportation expense, which represents about 55 per cent of the total, must be looked to for improvement through increased train and carloads and reduced fuel, water and non-productive costs.

Doings of the United States Railroad Administration

The Week Has Been a Notable One Because of Many Important Developments Which Have Taken Place

WASHINGTON, D. C.

Negotiations on Contract for Railroad Compensation

IN ACCORDANCE WITH THE PROVISIONS of the federal railroad control act of March 21, a committee representing the government, headed by John Barton Payne, general counsel of the Railroad Administration, and a committee representing the railways, headed by Alfred P. Thom, general counsel of the Railway Executives' Advisory Committee, have had several conferences respecting the agreement which the act provides the President may make with the railways for the compensation for the use of their property during the period of federal control. At these conferences various phases of the act and of the form which the agreement shall take have been under consideration. The general conditions which are to govern the agreement are provided in the act, but the entire subject is of such great importance, and there are so many complicated questions involved in the proposed terms of the contract, that the negotiations have been protracted and are likely to continue for some time before settlement is reached.

At the outset each side prepared and submitted a tentative draft of a standard form of contract intended to take care of a majority of the cases involved. Naturally, the original drafts were rather far apart as to some of the details of the provisions included, and to some extent as to fundamental principles, but as the conferences have progressed both drafts have been extensively modified.

One question under consideration is whether the certificate of the Interstate Commerce Commission as to the amount of the just compensation which the companies are to receive shall be absolute or whether the commission shall reserve the right to change the amount either in favor of the government or of the railways, provided on further examination of the reports of the companies it shall be found that wrong computations have been made or reports have not been made, either by mistake or otherwise, in strict compliance with the classification and rules of accounting of the commission. There are so many companies involved that if these certificates have to await the re-examination of all the reports it would be some time before the commission could safely certify the amount of the compensation which each company should receive under the act, and it is quite probable that an agreement will be reached reserving to the commission the right to make such corrections as are necessary.

Another subject as to which a great deal of consideration has been given involves the question as to what deductions are to be made from the just compensation, allowed any company, to reimburse the United States for the cost of any additions and betterments made to the property, which are considered not justly chargeable to the United States. Under the act the government is required to return the railroads in substantially as good repair and in substantially as complete equipment at the end of the period of federal control

as they were in the beginning, and in maintaining the property up to the required standard it is probable that in some cases the government will be obliged to expend money for certain additions and improvements, and such part of the cost thereof as is not considered properly chargeable to the government, but properly to be borne by the company, may be deducted from the compensation before the payment of any installment thereon. This problem involves particularly the case of a road having deferred maintenance according to its own standards, as in such case the net income of the road will have been increased by the amount which it failed to put into adequate maintenance.

Another question involves the rate of interest which should be allowed to any company in case any part of the annual compensation over and above what is necessary to pay interest charges, federal taxes, rentals, corporate expenses and the rate of dividends which had been paid during the three years ended June 30, 1917, is used by the government in making additions, improvements, road extensions, terminal improvements, etc., during the period of federal control. The act provides that the President may allow such reasonable rate of interest on the amount so expended as in his judgment may seem proper. There is also involved the question of expenditures for so-called non-productive improvements which do not add to the earning capacity.

There has been a proposal that the government should pay interest on the cost of additions or improvements made on order of the director general only up to a point not exceeding a certain percentage of the net income, which should be taken as representing the amount fairly to be devoted to non-productive improvements, and 15 per cent has been tentatively suggested.

A great deal of consideration has been given to the exact statement of what shall be charged to the corporate expenses. It is expected that the government will agree on the basis of compensation which will be sufficient to cover necessary interest, federal taxes, dividends and the corporate expenditures necessary to maintain the existence of the corporation, but that investments in non-operating property shall not be deemed proper corporate expenses unless approved by the President.

It has also been proposed that the government shall take care of the usual losses, such as those incident to fires and floods, but that an exception shall be made so that the government will not be held responsible for the results of extraordinary losses, such as would result from an earthquake, a great fire or an invasion.

There have been other questions of lesser importance respecting what shall be treated as a compliance by the government with its obligation to maintain the property during the period of federal control so that it may be returned to the carrier at the end of federal control in substantially as

good condition as when it was taken. This involves the question of depreciation charges and how they shall be made, reserve funds, etc. It is thought that if any controversy arises at any time between any railway company and the government as to whether this maintenance is being properly done, the question of fact may be referred to the Interstate Commerce Commission for investigation and decision. There are other questions arising from the adjustment of overlapping accounts which existed at the beginning of the period of federal control, and which will occur at the end of the period when the roads are turned back to their owners.

The latest form of the tentative draft of the contract as proposed by the government, and after many modifications had been made as a result of the discussion, is dated April 23. It contains a preamble and recitals of the fact that the government has taken over the railroads, etc., eight sections on alterations, definitions, controversies, etc.; property taken over; acceptance; accounts during federal control; upkeep; taxes; compensation; and final accounting, and forms for the execution of the contract, call for the stockholders' meeting to ratify the agreement and a certificate of the stockholders' vote.

Section one provides that the provisions of the agreement may be altered, amended or added to, but only by an instrument in writing signed by the director general and by some officer of the company duly authorized by the directors. It is also provided that in case of questions arising as to the interpretation of provisions of the agreement, the matter shall be referred upon application either of the director general or of the company, to the Interstate Commerce Commission.

In the section regarding accounts during federal control it is provided that "all salaries and expenditures incurred by the company during federal control for purposes which are incidental to the existence and maintenance of the corporation, or which are connected with any property of the company not taken over by the President, or which are connected with negotiations, contracts, valuations, or any business or controversy with the government or any branch thereof, and which are not specifically authorized by the director general, shall be paid by the company; except that all engineering, land and accounting expenses connected with the valuation now being carried on by the company in co-operation with the valuation bureau of the commission shall be paid by the director general and charged to railway operating expense, to the extent that said expenses are in the opinion of the commission necessary for the purpose."

Section 5 provides that the director shall provide for the maintenance of the property in order that it may be returned in substantially as good repair and complete equipment as on January 1, 1918, and that an annual expenditure for such purposes of an amount equal, subject to certain allowances, to the average annual expenditure for such purposes during the test period shall be taken as a full compliance with this covenant. In comparing the amounts expended with those expended during the test period, due allowance shall be made for any difference that may exist between the price of labor and materials and between the amount of property operated during federal control and the average for the test period, so that the comparison may be reduced as nearly as may be to a basis of relative physical reparation. The company shall have the right to inspect its property at all reasonable times during federal control.

One of the most important features of the proposed contract is the section relating to compensation. This, it is provided, shall be paid to the company quarterly on the first days of April, July, October and January, except that the first installment shall be due upon the execution of the agreement and shall include all prior installments then unpaid, but from each installment there shall be deducted such

amount as may then be due for excess payments or credits made by the director general for maintenance, repairs, renewals and depreciation. The net quarterly compensation, together with the company's other income, shall be applied by the company to sinking fund payments as may be required by any contract in force December 31, 1917, such as for leased roads and properties, interest, taxes and assessments payable by the company, dividends lawfully payable under the federal control act, and such sums as may be reasonably necessary to support the company's corporate organization or to carry out the lawful corporate purposes of the company.

It is provided, however, that no part of such compensation or income shall be invested without the approval of the director general and the balance of the compensation and other income shall be used to pay the cost of such additions, betterments and extensions as shall be made to the property of the company during federal control with the approval or by the order of the director general. During federal control the company shall not, without the approval of the director general, issue securities or make or take any lease of any railroad or system of transportation or enter into any contracts or agree to pay any larger amount of interest on its debt or for the rent of leased roads and property or for dividends on its stock than the amounts payable as of December 31, 1917. On additions, betterments and extensions made by the company interest shall be paid at rates fixed by the director general and on additions, betterments and extensions made by order or approval of the director general out of the fixed compensation or other income interested shall be paid the company at such rate, not exceeding 3 per cent, as the director general shall fix.

Universal Interline Way-billing

The director general has issued General Order No. 21 prescribing Simplified Bases for Apportioning Inter-road Freight Revenues to Carriers Performing the Service, as follows:

(1) Pursuant to the provisions of paragraph 13 of General Order No. 11, dated March 16, 1918, with respect to the adoption of universal interline way-billing, the following regulations will be observed beginning with the May, 1918, accounts in apportioning freight revenues to individual carriers subject to federal control which perform inter-road freight service.

(2) In cases where interline billing has been in effect covering all or a major portion of freight traffic interchanged between two or more carriers via the same route, although the interline waybill may not cover the movement from origin to final destination of the traffic:

(a) The waybill destination carrier shall determine, from interline division statements for the period of twelve months ended December 31, 1917, the aggregate freight revenue on interline freight traffic from each initial way-billing carrier separately via each route. There shall likewise be determined the amount apportioned to each individual carrier separately via each route. There shall be included in such aggregate freight revenue, and in the amounts due to each carrier, as their interests may appear, terminal allowances, bridge tolls, lighterage, insurance, and other arbitraries. If the interline method of accounting became effective via any route subsequent to January 1, 1917, the division statements for the longest period obtainable (not exceeding twelve months) prior to May 1, 1918, shall be used.

(b) From the aggregate freight revenue, and the revenue due to each carrier via each route, ascertained in the manner prescribed in the preceding paragraph, the ratio of the revenue allotted to each carrier via each route to the total revenue shall be determined and stated in two figure

percents; such percents shall be designated as "road to road" percents. The percents thus determined for each route shall be used for apportioning the revenue from the traffic moving over it on interline waybills to be accounted for beginning with May, 1918 accounts, until and unless otherwise ordered.

(c) When the accounts for commodities moving in large volumes, such as coal, have, as a matter of general practice, been kept separately, separate road to road percents, based on revenues from that class of traffic, may be determined as above prescribed and used in apportioning the revenues therefrom.

(3) In cases where interline waybilling has not been in effect or where it has been applied to only a small part of the traffic moved between two or more carriers via the same route:

(d) Destination carriers of the freight shall apportion and settle the revenues on interline waybills to be accounted for in May, 1918, accounts on bases of established divisions. From the totals of proportions thus settled, destination carriers shall compute two figure percents for traffic from each initial carrier via each route. Such percents are herein designated as "road to road" percents and shall be used thereafter to apportion revenues via such roads and routes respectively, on that class of traffic unless and until otherwise ordered. When traffic moves only in small volume, destination carriers may compute two figure station to station percents based on revenues produced by the application of established division bases, and use such station to station percents instead of the road to road percents.

(e) In the event freight traffic moves during the month of June, 1918, or thereafter via routes over which there were no freight movements covered by interline waybills prior thereto, destination carriers shall apply the established divisions in apportioning the revenue on such shipments during the month in which the traffic first moves. Thereafter, the revenue on such traffic shall be divided on either road to road or station to station percents as may be applicable.

(f) When the accounts for commodities moving in large volumes, such as coal, have, as a matter of general practice, been kept separately, separate road to road percents based on revenues from that class of traffic may be determined as herein prescribed and used in apportioning the revenues therefrom.

(4) In cases where freight traffic moves via unusual or diverted routes over which no divisions apply and via which no experience can be obtained, destination carriers shall apportion the revenues therefrom on a twenty mile block mileage basis, each carrier to be allowed at least twenty miles and originating and terminal carriers an additional twenty miles each as constructive mileage.

(5) The formulae prescribed herein for apportioning interline freight revenues to carriers performing the service, are intended to preserve, as equitably as practicable, the integrity of the revenues of individual carriers, and their use shall be generally observed. If by reason of new traffic developments, or the abnormal shifting of traffic, the continued application of the road to road percents herein provided for might seriously distort the revenues of interested carriers, the destination carrier may, upon its own initiative or by request, test apportionment of revenues for a specific month or period by applying the established division bases thereto. If results thus obtained vary substantially from the results obtained by the application of road to road percents as herein provided for, and the change appears to be permanent, application may be made to the Director of Public Service and Accounting to adjust the divisions to such bases as will produce more equitable results. Applications for changed apportionment bases based upon ordinary traffic fluctuations will not be considered.

Modification of Practices in Accounting for Freight and Related Revenues:

(6) Destination carriers shall completely revise waybills as to rates, classifications, extensions, footings, weights, etc., thus insuring the correctness of the revenues based on tariffs applicable, and they shall account to interested carriers for their respective proportions of such revenues in the manner hereinbefore prescribed. If flagrant or continued use of erroneous rates or classifications be observed by destination carriers, the attention of billing carriers must be specially called thereto. Where ordinary changes or corrections are made in waybilled revenue by destination agents, correction notices need not be made to intermediate or originating carriers, unless advances or prepaid charges be involved.

(7) Paragraph 10 of General Order No. 11 provides that settlements by destination carriers with all other interested carriers shall be accepted as final. This provision discontinues the adjustment among carriers of overcharges and undercharges in revenue, but does not prohibit the adjustment of differences in advances and prepaid items; clerical errors, in addition and divisions, or errors due to omissions-divisions, etc.

(8) Effective at once no apportionment shall be made among carriers of charges absorbed, such as switching, elevation, transfer charges, terminal delivery charges, icing, cost of grain and coal doors and other similar items accruing during federal control; such absorbed charges shall be borne by paying carrier.

The order also includes the following modifications and interpretations of General Order No. 11:

(9) Paragraph 11 of General Order No. 11 prescribes certain forms to be used in preparing Audit Office settlement accounts. Until further ordered, carriers may use such prescribed forms, or they may use those now in use by them in settlement of interline freight accounts until such time as a more complete study is made of the forms which will later be prescribed.

(10) Sub paragraph b, of Paragraph 8 of General Order No. 11, provides that: "Only the original and one copy of the waybill shall be made." This provision is hereby amended to the extent of permitting carriers taking such additional copies of waybills as may be necessary to maintain the integrity of the accounts. The first copy must be printed in the same form as the original, but may be on a lighter weight of paper. Any additional copies beyond the first may be prepared on blank paper.

(11) While Paragraph 8 of General Order No. 11 provides for a standard form of waybill, such order does not prohibit the continuation or adoption of a color scheme for waybills for specific or special traffic when such color scheme tends to expedite or protect the freight.

(12) If, under prevailing practices, freights originating on or destined to points on switching or tap lines are waybilled from or to trunk line junctions or connections with such switching or tap lines, and junction settlements are made at such points of connection, such practices may, until further ordered, be continued.

Many Railroad Associations Abolished or Reorganized

A large number of associations and committees heretofore maintained by the railroads and charged to operating expenses, but which the Railroad Administration does not consider necessary to operation under government control will go out of existence on April 30 or shortly thereafter, except such as the railroads may see fit to maintain and charge to corporate expenses to be paid out of the amounts they receive from the government as compensation. Others will be retained and may be charged to operating expenses, but in many cases will be reorganized or consolidated.

General Order No. 6, issued by the director general on

January 28, provided that operating revenues should not be expended "for the payment of the expenses of persons or agencies constituting associations of carriers unless such association is approved in advance by the director general."

This includes many organizations which were maintained by dues paid by individual railroad officers but which were charged by them to their expense accounts.

Most of the organizations were authorized to continue until April 30 pending an investigation of the circumstances in each case by the division of public service and accounts, of which C. A. Prouty is director, and Luther Walter, assistant director. Most of the cases have now been passed upon and letters have been sent out either authorizing the railroads to continue to contribute to the expenses of the organizations in the form of assessments or dues, or ordering that operating revenues shall be no longer expended for the purpose. In some cases the approval is temporary, pending the working out of plans for a reorganization.

The various traffic associations, tariff issuing bureaus, classification committees, weighing, inspection and demurrage bureaus, are approved from month to month, pending the working out of plans for a reorganization and simplification of their work by the division of public service and accounts and the division of traffic.

The American Railway Association and some of the other operating associations are also approved but will probably be subject to a reorganization that will fit in with the regional organization of the roads under federal control.

Railroads may continue to be members of chambers of commerce, commercial clubs and traffic clubs in communities reached by their rails on the same basis as industrial concerns, but may have only one membership. In the case of traffic clubs, if they desire to pay the dues of more than one officer the approval of the director general must be secured, but this will probably follow as a matter of course. A railroad may have one membership in the Chamber of Commerce of the United States. Special contributions to such organizations will not be allowed.

Industrial development bureaus are to be discontinued, but agricultural development bureaus are approved.

Local freight associations, collection bureaus, and car interchange associations and similar organizations engaged in working out the problem of unifying terminal operation are to be continued. Fast freight lines are to be abolished. The various superintendents' associations, the various general managers' associations, such as those at Chicago, New York, St. Louis and in Texas, all accounting committees except the national association, the Association of American Railway Accounting Officers, and the Committee of Railway Accounting Officers on Accounts of Express Companies, are to be abolished. Such organizations as the Railway Executives' Advisory Committee, the Bureau of Railway Economics, the Bureau of Railway News and Statistics may no longer be charged to operating expenses. The statistical bureau of the western lines will be discontinued except as to a part of its work, which will be amalgamated in some form with other organizations to maintain traffic statistics. The Presidents' Conference Committee on Federal Valuation is still under consideration. Coal pools are under consideration. The Freight Claim Association is approved from month to month pending reorganization. The Southern Iron Committee and the Coal Traffic Bureau are not approved. The Special Committee on Relations of Railway Operation to Legislation will be discontinued. The Eastern Railroad Association and the Western Railroad Association, which devote their attention to patent matters, are approved. Various other associations and organizations have not yet been passed upon, but will be within a few days.

Some of the organizations specifically approved are as follows: American Association of General Baggage Agents, Association of Dining Car Superintendents, American Association of Passenger Traffic Officers, American Association

of Railway Surgeons, American Railway Engineering Association, American Railway Perishable Freight Association, American Refrigeration Association, Association of Railway Electrical Engineers, Association of Western Railways, Bureau of Information of the Eastern Railroads, Bureau of Information of the Southeastern Railroads, Eastern Association of Car Service Officers, International Association of Ticket Agents, Master Car and Locomotive Painters' Association, Perishable Freight Association, Railroad Young Men's Christian Association, Railway Signal Association and Train Despatchers' Association.

Wage Commission to Report Soon

In Circular No. 24 Director General McAdoo announces that the Railroad Wage Commission appointed for the purpose of making a thorough investigation of the wages paid to all railroad employees, whether members of labor organizations or not, expects to submit its report on Mr. McAdoo's return to Washington upon the conclusion of the present Liberty Loan campaign on May 4, when he will promptly review the report and render a decision upon its findings and recommendations. Any increase in wages made as a result of the report will become effective as of January 1, 1918.

"The task confronting the Railroad Wage Commission was greater in magnitude than any task of a similar character ever undertaken," said Mr. McAdoo. "The commission immediately applied itself to the work with great energy and with unremitting labor to a study of the large and complex questions involved. In matters of such magnitude adequate time is essential to intelligent consideration and wise conclusions. Meanwhile, no employee's interest is being hurt or prejudiced, because whatever increases may be granted will accumulate in the form of savings and will not have been spent in the meantime as might otherwise have been the case."

The director general takes this occasion to appeal to railroad employees who will have several months' back pay coming to them in a lump sum to take advantage of the opportunity to invest in Liberty bonds.

"I hope," he says in the circular, "that every railroad employee in the United States will lend all the money he can, consistently with his individual circumstances, to his government by buying Liberty bonds; they pay four and one-fourth per cent interest per annum and are the safest investment in the world—as safe as the money of the United States and safer than deposits in banks. In lending your money to the government you not only save the money for yourselves, but you help every gallant American soldier and sailor who is fighting in this war now to save your lives and liberties and to make the world safe for Democracy."

Prices for Railroad Fuel Coal

President Wilson is understood to have settled the controversy between the railroad and fuel administrations regarding the prices to be paid for railroad fuel coal and although no official announcement has been made an order is expected by which the railroads will pay more for their coal than formerly, although somewhat less than the regular government price, while the Fuel Administration will be given complete jurisdiction over questions of distribution of fuel. Heretofore railroads have paid a much lower price for coal than other consumers, partly for the reason that a full car supply was guaranteed for such shipments and because the railroads were large consumers and there was no selling expense for the coal companies on the business. The railroads had made their contracts for coal last year before the general government prices had been fixed, but after the government took over the railroads the fuel administrator, Dr. Garfield, took the position that the railroads should pay the full price. This position was controverted by the Railroad Administration, represented by John Skelton Williams, director of finance and purchases, and numerous conferences on the subject were held with coal operators and representa-

tives of the Fuel Administration and the War Industries Board. The dispute was finally laid before the President at a meeting of the war council last week. The exact decision has not yet been made public, but it is understood that railroads will be required to distribute the car supply ratably among all mines, without preference for railroad fuel, and that they will be allowed a concession from the general price on account of their being the largest consumers. It has been estimated that at the government prices for coal the railroads' fuel bill would be increased by approximately \$40,000,000 annually.

Passenger Fares to Be Based on Mileage

The elimination of competition between railroads is going to result in an important readjustment of passenger fares throughout the United States. Passenger rate clerks representing roads in various parts of the country have been at work in Washington this week for the purpose of compiling a nation-wide table of distances as the foundation for a plan of basing passenger fares mainly on mileage without regard to the competitive conditions under which the rates have been made by the short line between any two points, regardless of the distance in many cases. This will result in many increases in fares for travel via circuitous routes. For example the rates from Chicago to Pacific Coast points have been in general the same via the Southern routes or Northern routes as via the direct lines but under the new plan the rate will be proportionately higher for the longer route. It is not proposed to adhere rigidly to the mileage plan but rates will be made the same via different routes which are of approximately the same length, as, for example, in the case of lines between Chicago and New York.

Express Companies to Be Consolidated

Plans for consolidation of the express companies into a single corporation, with a capitalization of \$40,000,000, which will make a contract with the United States Railroad Administration for handling express business on the railroads, are being worked out in a series of conferences between officers of the express companies and the division of public service and accounts. The companies will be given stock in the consolidated company in exchange for physical property on a dollar for dollar basis, and the combined company will handle the express business on the basis of a percentage of the earnings. The companies will be allowed to pay dividends of 5 per cent if the earnings warrant and they will be given an incentive to efficiency and economy by a plan for division of the net income above 5 per cent between the companies and the government. For example, if the company earns enough to warrant a 7 per cent dividend, it may be allowed to pay 6 and pay the government 1 per cent.

Checking of Inter-Road Bills Discontinued

The director general has provided for a large reduction in clerical labor in General Order No. 20, which provides that: "Effective at once, technical and arithmetical examination and checking of all operating bills such as bills for freight and other claims, joint facilities, car repairs, and other similar bills and all statements of accounts such as distribution of freight and passenger revenues and other similar statements, rendered by one carrier subject to federal control, or against another carrier subject to federal control, which accrued or which may accrue on or subsequent to January 1, 1918, shall be discontinued. The carrier rendering such statements, bills, etc., shall take the necessary measures to insure the correctness thereof."

Baltimore & Ohio Trains Use Pennsylvania Terminal

In accordance with an order issued by Director General McAdoo, to take effect April 28, Baltimore & Ohio express trains between Washington and New York will be transferred from the Central of New Jersey terminal in Jersey City and will run to and from the Pennsylvania terminal in

New York City at Thirty-third street and Seventh avenue. Trains will use the Philadelphia & Reading, as at present between Philadelphia and Bound Brook, N. J.; from Bound Brook to West Newark Junction, 22 miles, they will run over the Lehigh Valley, and from West Newark Junction to New York, 12 miles, over the Pennsylvania. This rerouting of the Baltimore & Ohio trains is ordered for the purpose of utilizing them to capacity, thereby relieving the Pennsylvania between New York and Washington and affording the public greater facilities. There are six trains each way, daily.

General Manager Canal Operations

General Order No. 22 issued by the director general announces the appointment of G. A. Tomlinson as general manager of the New York Canal section of the United States Railroad Administration in charge of the construction and acquisition of equipment for use upon the New York State Barge Canal, and, as an incident thereto, for use upon the waters connecting with the canal. He will operate such equipment for the director general, and he is empowered to enter into contracts either in his own name as general manager or in the name of the director general for the construction, acquisition or chartering of such equipment, for the purchase of supplies needed in operation, and for the transportation of property upon the canal and other waters.

Cars for War Department

In Bulletin No. 11, issued by the car service section, H. M. Adams, director of inland transportation of the War Department, calls attention to the fact that some misunderstanding exists with respect to the placing of orders for cars to load for account of the War Department. Mr. Adams states that his department does not undertake to extend its jurisdiction to the ordering of cars, this being the function of the individual shipper. It should be made plain, however, the circular states, that cars must not be furnished for loading to destinations against which restrictions are placed by the War Department, as indicated in Order No. 2, unless transportation orders are presented to cover such shipments.

Adjustment Board No. 2

Plans for the organization of Board of Adjustment No. 2, to handle controversies between the railroad managements and members of the shop craft organizations, are being worked out under the direction of W. S. Carter, director of the division of labor. The board will be similar to that formed to handle similar controversies with members of the brotherhoods and will consist of six railroad mechanical officers and six officers of the shop craft unions.

Protection of Railroad Property

Willard Robinson has been appointed assistant manager of the Section for the Protection of Railroad Property, and H. L. Van Sicker has been appointed attorney for the section.

Administration to Operate New York Barge Canal

The Railroad Administration has decided to take over the operation of boats on the New York State Barge Canal. Director General McAdoo has announced that, acting upon the recommendations of the committee on inland waterways of the Railroad Administration, which has been negotiating for some time with the state authorities he will build as quickly as possible and put into operation a line of barges to be operated by the government on the canal. The barges will be of modern construction of the most approved type and will be operated in conjunction with and as a part of general railroad and waterways transportation of the country under the control of the director general. This will insure the complete co-ordination of the canal facilities with the railroad facilities and, it is hoped, will greatly enlarge the available transportation facilities in the eastern territory. The title of the canal property remains with the state. G. A. Tomlinson of Duluth, Minn., a member of the committee on

inland waterways and a man of large practical experience in lake navigation, has been appointed general manager of the canal operations, including the construction of the barges and general equipment. He will report to the Eastern regional director. Under government control there can be diverted to the canal from the railroads all of the traffic that can be handled to the best advantage by water. Many delegations have been to Washington since the government took over the railroads to urge that the Railroad Administration take over the operation of the waterway.

Chesapeake & Ohio Canal

The Railroad Administration announces that it has not found it necessary or advisable to undertake the operation of the boats on the Chesapeake & Ohio Canal, for which there has been considerable agitation.

However, the statement says, the Railroad Administration is interested in bringing about the transportation of the largest possible tonnage of coal from the coal fields to Washington by way of the canal. It is to be assumed that under private management the railroads reaching Washington preferred to handle the coal by rail, but under existing conditions the Railroad Administration is anxious to relieve the railroads reaching Washington, to the greatest possible extent, of the burden of carrying the coal tonnage needed by Washington and its vicinity. To accomplish this purpose the Railroad Administration has arranged to co-operate to the fullest extent with the companies maintaining and operating the canal and expects that as a result a substantially increased tonnage of coal will be carried to Washington by the canal during the current year.

Service on the Great Lakes

The Railroad Administration on April 18 established a lake line service between Chicago and Milwaukee and Buffalo under the name of the Lehigh Valley Transportation Company. Seven large modern electric-lighted steamships have been assigned to the service, using as a nucleus two of the ships owned by the Lehigh Valley Railroad, whose right to continue the operation of the lake line service is now in litigation, and five ships chartered from the Great Lakes Transit Corporation, which purchased a number of the railroad-owned boats after they were required to give up their operation of lake line service. It is stated that additional ships will be added as the service requires. The purpose is to relieve the car situation as much as possible. Cars that have been held up on western railroads by the congestion on central railroads will be released with the opening of lake navigation and the loads may be moved east by the way of the lakes and railroad lines east of Buffalo, thereby relieving the railroads in the Central Freight Association territory by a saving of power, fuel and cars that can be devoted to other business. It is expected that shippers of heavy staple commodities from the east, such as sugar, coffee and manufactured articles, will also take advantage of the service. It is intended to work night and day shifts at the terminal points so that the boats can be turned rapidly and afford the greatest possible relief to the railroads. The eastern trunk lines will be served over a common terminal at Buffalo. All-rail rates will prevail in both directions so that in case of congestion on the railroads the freight can be immediately diverted through the lake and give continuous movement to destination. The lake rates, however, will include marine insurance.

Suits Against Carriers

Director General McAdoo has issued General Order No. 18-A, amending General Order No. 18, which was issued on April 9, to read as follows: "It is, therefore, ordered that all suits against carriers while under Federal control must be brought in the county or district where the plaintiff resided at the time of the accrual of the cause of action, or in the county or district where the cause of action arose."

Progress in Locomotive Repairs

Rapid progress is being made in the repairing of locomotives, toward which special efforts have been directed by the Railroad Administration, according to reports received by Frank McManamy, manager of the Locomotive Section. Locomotives have recently been put through the shops at the rate of about 4,500 a week, or at the rate of about 800 a week more than during the corresponding weeks of last year. During February 1,641 more engines were repaired than during February, 1917, and recently a series of weekly reports has been started. These show that during the week ending March 23 there was an increase of 560, during the week of March 30 it was 954, and during the week of April 6 the increase was 946.

These results are being obtained largely as a result of the agreement reached by the Railroad Administration with the shopmen's organizations by which the employees agreed to work longer hours. The shop hours have been increased from schedules of 48 or 55 hours a week to 60, 65 or 70 hours, varying with the conditions at different shops, and the increase in hours for 225,000 men on 45 roads for which figures have been compiled amounts to about 14 per cent.

Another factor in the improved record is the practice of sending locomotives for repairs to the shops of other lines which have more available capacity. About 80 locomotives a week are being sent to foreign line shops, particularly from eastern roads to the shops of western roads at Chicago. About 400 locomotives are now undergoing repairs at foreign shops, and for a little over three weeks locomotives that were earlier sent to the foreign shops have been coming out in sufficient numbers to have an appreciable effect on the transportation situation.

There have also been more locomotives requiring repairs this spring than last year because of the fact that the roads got behind with repairs during the winter. On March 23 there were 4,465 locomotives due for shopping as compared with 4,161 on the corresponding date in 1917.

The Locomotive Section has prepared a standard classification of repairs to locomotives and tenders to be used beginning June 1 by all carriers for reporting repairs made at their various shops and roundhouses, as follows:

CLASS 1.

New boiler or new back end. Flues new or reset.
Tires turned, or new.
General repairs to machinery and tender.

CLASS 2.

New firebox, or one or more shell courses, or roof sheet.
Flues, new or reset.
Tires turned, or new.
General repairs to machinery and tender.

CLASS 3.

Flues all new or reset (superheater flues may be excepted).
Necessary repairs to firebox and boiler.
Tires turned, or new.
General repairs to machinery and tender.

CLASS 4.

Flues part or full set.
Light repairs to boiler or firebox.
Tires turned, or new.
Necessary repairs to machinery and tender.

CLASS 5.

Tires turned, or new.
Necessary repairs to boiler, machinery and tender, including one or more pairs of driving-wheel bearings refitted.

General repairs to machinery will include driving wheels removed, tires turned or changed, journals turned, if necessary, and all driving boxes and rods overhauled and bearings refitted and other repairs necessary for a full term of service.

Running repairs unclassified.

Suffix "A," to any class of repairs, will indicate that the repairs are required on account of accident.

Suffix "B" will show the initial application of stoker.

Suffix "C" will indicate the initial application of superheater. Suffix "D" will indicate initial application of outside valve gear.

Suffix "E" will indicate locomotive was converted from compound to simple, or from one type to another.

Mallet locomotives will be indicated by a star following classification.

Locomotives receiving class 1, 2 or 3 repairs must be put in condition to perform a full term of service in the district and class of service in which they are to be used.

Locomotives receiving class 4 repairs must be put in condition to perform not less than one-half term of service in the district and class of service in which they are to be used.

Locomotives receiving class 5 repairs must be put in condition to perform not less than one-fourth term of service in the district and class of service in which they are to be used.

The purpose of the standard classifications is to enable comparisons to be made readily and fairly between the results accomplished at different shops. It has heretofore been difficult to compare the work of different shops of even the same capacity and number of men because of the different classifications under which the roads recorded the work done; an effort was made to put them on a fairly comparable basis by reports based on the time required for shopping. It is expected that having reports which may be checked against each other will have a good effect on performance.

Circular C. S. 7

In order that a car supply for shipments of lake coal and ore during the season of navigation may be provided, the manager of the Eastern Railroads Car Pool is instructed in circular No. C. S. 7, issued by the Car Service Section, to all railroads not members of the Eastern Open-Top Car Pool, to assemble all hopper or so-called self-clearing cars of Eastern Car Pool (designated in the Official Railway Equipment Register under M. C. B. Classes "II" and "GD") and confine them to that service to the extent that all like coal and ore carrying roads may transport lake coal and ore which will offer for movement during the season of navigation. To accomplish this purpose, all roads not members of the Eastern railroads car pool are directed that all hopper or so-called self-clearing cars (M. C. B. Classes "II" and "GD") of the member railroads must, until further notice, when released from original loading on railroads other than members of the Eastern Railroads Car Pool, be returned empty by the most direct route to the nearest pool-member road. Any "member" road will be considered the "home road" for cars included in this arrangement.

Emergency Rule 1 of General Order C. S. 1, dated April 26, 1917, is modified in accordance with the above.

Seventeen Years Life From Treated Ties

Seventy-Three Per Cent of Those Installed on Burlington Line in Western Nebraska in 1900 Are Still in Service

IN 1900 when the Chicago, Burlington & Quincy built the line from Bridgeport, Neb., to Sterling, Colo., forming a part of what is now the Sterling division of the Burlington, a considerable mileage of the new track was laid with treated ties. One section of a mile laid with treated ties and another of two miles were later designated as test sections, and a careful record has been kept of all tie renewals within these limits. It is now 17 years since the ties were laid, a sufficient time to develop the effectiveness of the treatment, and the results of an inspection recently made constitute a most conclusive demonstration of the value of tie preservation. In addition to the efficient control on the part of a well-organized timber-treating department, these test sections of ties have been under the continuous supervision of one man, James Toohey, who has been roadmaster on this line ever since it was placed in service.

Between Sidney, Neb., and Peetz, a distance of 14 miles, all the ties laid in 1900 were 6 in. by 8 in. hewn Black Hills or bull pine ties, treated with zinc chloride. In the two miles just north of Peetz where a careful record of all renewals has been kept, 77 per cent of the original ties are still in the track, the 23 per cent of replacements including renewals for all reasons—breakage and cinder burning as well as decay, tie cutting, etc. There are still many continuous stretches of 20 or more of the old ties in place, and, in one case observed, 65 successive ties of the original lot were noted.

Near Bridgeport, Neb., records have been kept on a mile of 6 in. by 8 in. by 8 ft. sawed Douglas fir ties also treated with zinc chloride. There were 3,200 of these ties in all and now, after 17 years, 2,703 of them, or 84.5 per cent, are still in service. In this case a more emphatic demonstration of the value of timber treatment was obtained through the fact that a mile of untreated Douglas fir ties was laid at the same time in the track directly south of the mile of treated ties and under as nearly duplicate conditions as it is possible to provide. The untreated ties commenced to come out of the track within five years after they

were laid, most of them had been removed after 7 years, and the last one was replaced in the eighth year. In other words, 100 per cent of the untreated ties had less than half the life of 84½ per cent of the treated ties.

Further details of these tests are of interest. All of the ties were treated at Edgemont, S. D., with 0.33 lb. of zinc chloride per cu. ft. of timber, the condition of treatment being such that the actual content of the preservative varied from 0.19 lb. to 0.6 lb. While this treatment is less than that usually given at the present time it was the standard treatment at the Edgemont plant previous to July, 1900. The amount of preservative was changed at that date to 0.4 lb. per cu. ft., and in 1902 to 0.5 lb., which is the regular treatment at the present time. It is also to be noted that the ties were subjected to steaming before treatment under a pressure of 15 to 20 lb. per sq. in. for several hours, a much more severe heat treatment than is considered good practice at present.

The ties were placed 18 to a 30-ft. rail in gravel ballast. The rail weighed 75 lb. per yd. and no tie-plates were used. The roadbed has been in a generally good condition, no trouble being experienced in this territory with soft embankments or cuts. The annual rainfall is about 15 in. The rail on the bull pine ties was renewed in 1910, and that on the Douglas fir ties in 1913, the new rail being 90-lb. A. R. A. type A rail laid with tie-plates. The ties were respaced with the rail renewal and there are now 20 ties to the 33-ft. rail. Several ballast raises have been made during the 17 years.

While the traffic was light during the first few years of operation, it has grown steadily and now includes a considerable ore tonnage hauled in 100,000-lb. capacity cars overloaded 20 per cent and handled by Mikado locomotives, the heaviest of which weighs 303,400 lb.

One of the most important factors in the value of this record of tie service is in the system of inspection under which the condition of the ties has been observed. In addition to the personal attention of the roadmaster, the

ties are under the care of the superintendent of timber preservation, in connection with the study of some 26,000 ties now under observation on various parts of this railroad. These ties are installed in sections of a 1,000 or more, each section containing ties of various species treated by one or more processes, or placed in the track without treatment. Through the agency of a system of numbering, marking and records, it has been possible to keep an accurate account of the ties in these sections which are inspected by the superintendent of timber preservation, the roadmaster, the section foreman and usually the division superintendent or general superintendent.

These inspections have taken place annually since 1909, when the first section of test ties was installed. The two special sections of treated ties on the Sterling division described above are also examined in the course of each of these annual inspection trips and receive the same careful attention according to the regular test sections. The ties on the Sterling division were installed under the direction of F. J. Angler at that time superintendent of timber preservation on the Burlington, now superintendent of timber preservation, Baltimore & Ohio, Baltimore, Md. He also originated the system of special test sections and their annual inspection, and this work has been continued by his successor, J. H. Waterman, superintendent of timber preservation, Chicago, Burlington, & Quincy, Galesburg, Ill.

Eighth Annual Report of the Test Sections

Since the regular 1,000 tie test sections on the different lines referred to above were eight years old at the time of the inspection last fall, a sufficient age to develop the full life of a large part of the untreated ties, a study of the records obtained with the various species of timber and the different forms of treatment during this period is instructive and indicative of the final results. Accordingly the summary of Mr. Waterman's report is abstracted below, showing the result of these tests in the eight states of Wisconsin, Illinois, Missouri, Iowa, Nebraska, Colorado, South Dakota and Wyoming.

SUMMARY

Total ties, various kinds, various processes, placed in experimental tracks, 1909 and 1910. C. B. & Q. Railroad.

Process	Total placed	Total removed to date	Percentage removed account decay	Percentage removed account other causes
Straight creosote	3,264	64	0.3	1.6
Card process	15,817	730	0.6	3.9
Burnettizing	2,488	162	2.7	3.8
Untreated	3,270	2,740	80.2	3.4

NOTE—These percentages include only the ties placed in the thousand lots on various divisions.

Mr. Waterman's remarks regarding the service being secured from various classes of timber are also of special interest and are abstracted below.

"Kind of treatment—I am of the opinion that the best treatment for the lines east of the Missouri river is a mixture of creosote and zinc chloride or of water-gas tar and zinc chloride, while for the dry territory supplied with ties from Sheridan, Wyo., we get splendid service out of ties treated with zinc chloride only.

"I list the ties which will give the best service treated, after giving this matter a great deal of thought and close observation as follows: (1) Red oak, (2) fir, (3) cypress, (4) pine, (5) various other inferior woods, as follows: Elm, soft maple, hard maple, beech, birch, hickory, red gum and tupelo gum. These latter-named woods are never to be considered unless they can have personal supervision from the time they are cut in the woods until they are delivered in the tie plant yard for seasoning. I am in favor of using only 7 in. by 9 in. by 8½ ft. red oak ties for our principal main lines. For branch main lines and passing tracks where we have reasonably heavy traffic, I would use the standard 6 in by 8 in. by 8 ft. red oak ties when I can get them. There is no question about the service that we

can get out of red oak ties properly treated—that is past the experimental stage. The red oak ties at Mystic, South Dakota, have now given us 17 years' service and 71 per cent are still in the track.

"I am disappointed in our pine ties. I do not believe their average life will be over 10 years. Last year I saw indications which led me to believe that we are not going to get results from our sap pine ties that we had hoped. I am afraid the trouble is that many of our sap pine trees are banked on the river in the hot months, during which time the sap becomes more or less sour and the ties are partially decayed before we get them. The Santa Fe overcomes this by sawing the ends off every tie before treating it. Decay is very easily detected if the ties are sawed.

"We are getting most excellent results from ties bought in the Black Hills, and there is no question but that the



A Section of the Track Built in 1900

Black Hills pine ties give us as good results as the fir ties. There is no bug infested Black Hills timber today and we have thousands of these ties in the track and they will give us 15 years' life.

"Ties deteriorate in a few days or weeks at the most, if they are not properly handled. If these ties become dotey, the best treatment in the world will not do them any good. If I were in authority and accepted ties of the woods named, I would have an inspector to look after them and have him thoroughly trained what to look for, and what to expect, if I expected to get the best possible results out of them. The summary shows wonderful results obtained from some of these woods, and yet they are dangerous to handle unless we are willing to pay two or three times as much for inspection and care as we pay for red oak, cypress, fir and pine.

"I would not take a white oak tie at any price unless I treated it. In my judgment, it is a waste of money to buy white oak ties and put them in track without treatment.

"I have carefully watched the results obtained from treated bridge ties and I have come to the conclusion to recommend that we discontinue treating bridge ties with zinc chloride, because they check badly, even worse than they would if they were not treated. I believe we will get very little longer service from bridge ties treated with zinc chloride than untreated. I believe that if we treat bridge ties with creosote, we will get 20 to 25 years' life out of them.

"Few of us appreciate the full value of seasoning ties before treatment. (1) You can treat more ties in a given length of time when they are properly seasoned. (2) I believe the ties will give better service after treatment. (3) Ties properly air seasoned will not check as badly as ties treated green.

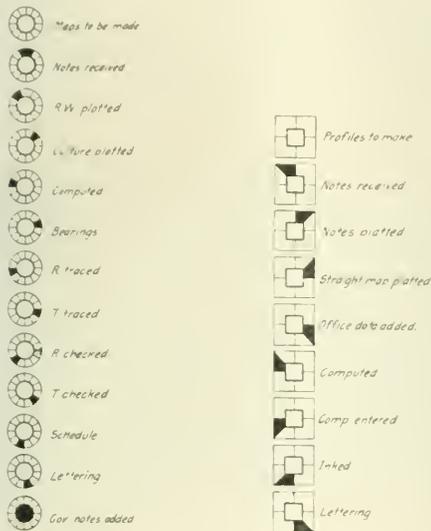
"Red oak ties and other similar kinds of hardwood ought to season one year, fir ties ten months and pine ties from six to eight months."

Keeping Progress Records

By Wm. P. Munger

IN MODERN ENGINEERING, as in modern manufacturing, progress charts are not only used to make the condition of the work quickly apparent to the man higher up, but are frequently so designed as to be of great assistance to the man who must keep the work in balance. When the work is of a simple nature, such as laying out a water pipe along the track, a map or profile colored with various colored pencils as each of the operations progress is adequate.

In rebuilding a series of culverts a number or description



Key to Progress Records for Maps and Profiles

of the culverts written across the top of a sheet of paper ruled off in squares and the name of the operation written in the column on the left hand side of the page is a good form for a chart. In use, the squares opposite the various operations are filled in under the culvert numbers as the operation in question is performed on that culvert. This filling in may be done in various ways according to the units of operation written in the column at the left and the detail desired. If "concrete" was the operation then the square under the proper culvert would be outlined when the mixing started and filled in solid when complete. Greater detail could be shown by making one side of the square when the materials were ordered, one side when delivered, one side when machinery was ordered, one side when delivered, one diagonal when forms were set up, one diagonal when pouring started, the solid filling showing completion. If the operation was "stone," the top half of the square would contain the date ordered, and the bottom half the date when delivery was begun, and solid filling or the outlining of the square would indicate that the delivery was complete. Again, if the square is large enough it can be filled in from day to day so as to represent the percentage of required stone which has been delivered.

For a long and complex job, like a valuation map of a railroad system, a chart should be devised which requires the minimum of special training to understand, is compact, easy to operate, and yet impressively tabulates the progress. The operations follow no set order and in some cases there

is a necessary delay of several months between the beginning and the end of one operation. Two number systems are essential as the map sheets are numbered independent of the mile posts by which all of the available information is generally indexed.

To cope with these conditions a chart on the order of Fig. 1 is desirable. Here the valuation section number and name is shown in columns at the left and the number of the valuation sheets composing each section stretch across the top. At the intersection of the name line and the sheet number column there is plotted an outline ring better shown in the first entry in Fig. 2 and indicating a map to be made. The number of these outline rings following the section name depends directly on the length of that section. The Pine Branch, 3.6 miles long, requires four sheets, and hence four outlines were plotted in the first four positions. Similarly with other sections.

The small figures in the center indicate the high mile posts shown on that sheet. Index maps and certain terminals would be shown in a space between the line column and column 1. Other than right of way maps and track maps no distinction is made between those miles requiring one sheet and those requiring several sheets. The outlining shown as the first entry in Fig. 2 consists of a heavy black line circle about 5/16 in. in diameter and concentric with this, a light printing ink (red or blue) circle about 9/16 in. in diameter with radial lines between the two, dividing the ring into the desired number of parts. The heavy ring or circle is the convention for maps to be made

No	Name	1	2	3	4	5	6	7	8	9	10	11
1	Main line											
2	Pine branch											
3	Lane br											
4	Kane br											
5	Mire line											
6	Transfer											
7	River br											

Typical Progress Record

and serves as a base on which to build the ring as the segments are added. The light ink circle and radial line serve as a guide when filling in the various segments. It is also a help to the eye in observing quickly the various segments filled in. The chart should be made on tracing cloth and posted periodically, the daily posting from the time cards being carried on a print by a clerk. This print is filed when it has been posted on the tracing and the print filled to show the progress during the given period. A new print is taken for the clerk's use after each posting of the tracing.

In using the chart when an operation on a certain map is begun the outer circumference of the segment for that operation is filled with a heavy black line, and when the operation is shown to be complete by the time cards, the whole segment is filled in.

In choosing the number, value and meaning of each segment considerable judgment must be shown, and the learning of the key can be greatly facilitated by a proper grouping of the operations. In Fig. 2 all operations pertaining to plotting are shown above the center line and those pertaining to the tracing below the center. The right of

way work is shown to the left and the track to the right. There are five divisions above and six below, the notes received being split if required. The government notes can be split if required. This item can well occupy the central circle because the mile post numbers are of no further value. Fig. III shows the same built-up system developed on a square and worked out to show the progress on valuation profiles. Although these systems can be used with any time card system which tells much of anything about the work, the printing of a few outlines on the time cards and

Freight Operations in January

THE EFFECTS OF SEVERE WEATHER and the results of accumulated congestion during the month of January, the first month of government control of the railways, are strikingly illustrated in the report of freight operations for the month compiled by the Bureau of Railway Economics for the American Railway Association. The revenue ton miles of freight handled decreased 17.2 per cent as compared with January, 1917, and the average mileage per

FREIGHT OPERATIONS OF STEAM RAILWAYS FOR JANUARY, 1918.

Item	UNITED STATES*				EASTERN DISTRICT			
	1918	1917	Increase or decrease		1918	1917	Increase or decrease	
			Amount	Per cent			Amount	Per cent
Freight train-miles	47,553,554	54,602,555	d 7,249,001	d 13.3	18,015,216	22,603,764	d 4,588,548	d 20.3
Loaded freight car-miles	923,062,084	1,237,790,541	d 314,728,457	d 25.4	353,973,516	543,875,284	d 189,901,768	d 34.9
Empty freight car-miles	394,879,768	529,079,975	d 134,200,207	d 25.4	172,634,965	253,518,111	d 80,883,146	d 31.9
Total freight car-miles—loaded and empty	1,317,941,852	1,766,870,516	d 448,928,664	d 25.4	526,608,481	797,393,395	d 270,784,914	d 34.0
Freight locomotive-miles	55,432,425	63,551,810	d 8,109,385	d 12.8	22,497,465	27,738,041	d 5,240,576	d 18.9
Revenue ton-miles	24,665,552,565	29,777,603,746	d 5,112,051,181	d 17.2	10,599,132,795	14,186,805,748	d 3,587,672,953	d 25.3
Non-revenue ton-miles	2,637,487,835	2,875,012,727	d 237,524,892	d 8.3	814,574,887	847,340,856	d 32,765,969	d 3.9
Average number of freight locomotives in service	30,110	29,947	163	0.5	12,824	12,700	124	1.0
Average number of freight locomotives in shop or awaiting shop	4,713	4,416	297	6.7	1,989	1,961	28	1.4
Average number of freight cars in service	2,320,591	2,251,697	68,894	3.1	1,215,595	1,198,801	16,794	1.4
Average number of freight cars in shop or awaiting shop	117,657	126,906	d 9,249	d 7.3	65,970	71,883	d 5,913	d 8.2
Home	82,302	96,066	d 13,764	d 14.3	45,018	53,842	d 8,824	d 16.4
Foreign	35,355	30,840	4,515	14.6	20,952	18,041	2,911	16.1
Tons per train	577	598	d 21	d 3.5	634	665	d 31	d 4.7
Tons per loaded car	29.6	26.4	3.2	12.1	32.2	27.6	4.6	16.7
Average miles per locomotive per day	59.4	68.5	d 9.1	d 13.3	56.6	70.5	d 13.9	d 19.7
Average miles per car per day	18.3	25.3	d 7.0	d 27.7	14.0	17.5	d 3.5	d 34.9
Per cent of empty car-miles	30.0	29.9	0.1	0.3	32.8	31.8	1.0	3.1
Per cent of freight locomotives in shop or awaiting shop	15.7	14.7	1.0	6.1	15.5	15.4	0.1	0.6
Per cent of freight cars in shop or awaiting shop	5.1	5.6	d 0.5	d 8.9	5.4	6.0	d 0.6	d 10.0
Revenue ton-miles:								
Per freight locomotive	819,181	994,343	d 175,162	d 17.6	826,508	1,117,071	d 290,563	d 26.0
Per freight car	10,629	13,225	d 2,596	d 19.6	8,719	11,834	d 3,115	d 26.3
Average miles operated—single track	220,661.02	220,834.35	d 173.33	d 0.1	57,637.37	57,948.88	d 311.51	d 0.5

Item	SOUTHERN DISTRICT				WESTERN DISTRICT			
	1918	1917	Increase or decrease		1918	1917	Increase or decrease	
			Amount	Per cent			Amount	Per cent
Freight train-miles	8,882,212	9,307,739	d 725,527	d 7.8	20,756,126	22,691,052	d 1,934,926	d 8.5
Loaded freight car-miles	157,000,980	208,675,283	d 51,674,303	d 24.8	42,087,588	485,239,974	d 73,152,386	d 15.1
Empty freight car-miles	79,596,983	93,009,719	d 13,412,736	d 14.4	142,647,820	182,552,145	d 39,904,325	d 21.9
Total freight car-miles—loaded and empty	236,597,963	301,685,002	d 65,087,039	d 21.6	554,735,408	667,792,119	d 113,056,711	d 16.9
Freight locomotive-miles	9,642,988	10,477,271	d 834,283	d 8.0	23,301,972	25,336,498	d 2,034,526	d 8.0
Revenue ton-miles	4,324,392,816	5,309,230,980	d 984,838,164	d 18.5	9,742,026,954	10,281,567,018	d 539,540,064	d 5.2
Non-revenue ton-miles	481,505,389	509,033,676	d 27,528,287	d 5.4	1,341,407,559	1,518,638,195	d 177,230,636	d 11.7
Average number of freight locomotives in service	4,962	4,926	36	0.7	12,324	12,321	3	a
Average number of freight locomotives in shop or awaiting shop	6,667	593	74	12.5	2,057	1,862	195	10.5
Average number of freight cars in service	328,900	279,924	48,976	17.5	776,096	772,972	3,124	0.4
Average number of freight cars in shop or awaiting shop	13,878	14,077	d 199	d 1.4	37,809	40,946	d 3,137	d 7.7
Home	9,708	11,116	d 1,408	d 12.7	27,576	31,108	d 3,532	d 11.4
Foreign	4,170	2,961	1,209	40.8	10,233	9,838	395	4.0
Tons per train	560	625	d 65	d 10.4	534	520	14	2.7
Tons per loaded car	30.6	27.9	2.7	9.7	26.9	24.3	2.6	10.7
Average miles per locomotive per day	65.7	68.6	d 5.9	d 8.6	61.0	66.3	d 5.3	d 8.0
Average miles per car per day	23.2	34.8	d 11.6	d 33.3	23.1	27.9	d 4.8	d 17.2
Per cent of empty car-miles	33.6	30.8	2.8	9.1	25.7	27.3	d 1.6	d 5.9
Per cent of freight locomotives in shop or awaiting shop	13.4	12.0	1.4	11.7	16.7	15.1	1.6	10.6
Per cent of freight cars in shop or awaiting shop	4.2	5.0	d 0.8	d 16.0	4.9	5.3	d 0.4	d 7.5
Revenue ton-miles:								
Per freight locomotive	871,502	1,077,798	d 206,296	d 19.1	790,492	834,475	d 43,983	d 5.3
Per freight car	14,448	18,967	d 5,819	d 30.7	12,553	17,048	d 4,495	d 5.6
Average miles operated—single track	35,854.84	35,725.90	128.94	0.4	127,168.81	127,159.57	9.24	a

d Decrease a Less than one-tenth of one per cent. * The returns included in the monthly statement represent about 98 per cent of the total operated mileage of the roads of Class I, and about 99 per cent of their total traffic.

having the men fill in segments representing the operation on which they work will undoubtedly save many mistakes.

WAR WAGES OF ENGLISH RAILWAYS.—According to the speeches of the various chairmen at the recent annual meetings of the English railway companies, the war wages paid to their employees is costing as follows: Great Western, \$17,500,000 a year; Midland, \$20,000,000; Great Northern, \$8,500,000; Furness, \$450,000; Taff Vale, \$110,000; and Highland, over \$500,000. Nor is this in some cases all, as the sums do not include the consequent increase for overtime and Sunday duty, which are now taken into account when calculating war wages.—*The Engineer, London.*

locomotive per day was only 59.4 as compared with 68.5 in January, 1917, a reduction of 13.3 per cent, while the average miles per car per day fell from 25.3 to 18.3, or 27.7 per cent. There was also a reduction of 3.5 per cent in the average trainload, but an increase of 12.1 per cent in the tons per loaded car.

In the eastern district the reduction in revenue ton miles handled was 25.3 per cent. The locomotive mileage per day was only 56.6 and the mileage per car per day was reduced to 14. In the southern district the ton mileage was reduced 18.5 per cent and in the western district 5.2 per cent.

The comparative summary for the month for the railways as a whole and for the three districts is shown in the table.

Determining When Rail Should Be Renewed

A Description of the Methods in Use on the Santa Fe to Secure Uniformity in Practice and Proper Standards

By C. W. Baldridge

Assistant Engineer, Atchison, Topeka & Santa Fe, Chicago

WHEN IS A RAIL WORN OUT? This is a question, the answer to which is the same as the answer to many other questions of similar portent—"it depends." In the case of rail, it depends upon the class of the track in which the rail happens to be in use; the standard of maintenance attempted by the company, and also upon what other use the company has for the rail and how urgent that other use may be. With some companies, insufficient earnings, or insufficient returns on the business handled, may compel the postponement of the renewal of rail, which, judged by all other conditions, should be renewed. Other factors may

the rail ends are low to show the amount of permanent set and of batter at the ends of the rails; measurement of the width of opening (space left for expansion) between rails, and the gage of the track.

The number of locations at which measurements are taken varies of course with the length of the stretch of rail to be renewed. Usually not less than eight locations are taken for measurements, and as many more as may be required to show the average condition of the rail. Ordinarily, the measurements are taken at one point on each mile.

The contours of the rails are taken by means of the rail contour instrument shown in Fig. 1. This instrument is so designed that the face of the base of the instrument is in contact crosswise and on the underside of the base of rail, also with a guiding shoulder on the instrument in contact with the edge of the base of the rail, thus insuring that the contour or section is taken perpendicular and at right angles to the axis of the rail, thereby getting a true section of the rail. The contour is drawn by the instrument upon white paper, which is carried in a roll in the paper magazine on the instrument, and with the end stretched tightly across the drawing plate and clamped in position while receiving the pencil record of the rail. After removal from the instrument, each contour sheet is labeled with the location and such other information as may be desired for making up the report. Upon receipt in the office, these contour sheets are sent to the drafting room and are spread under tracings of theoretical original sections of the particular type of rails under investigation. The field contour is then traced into the original section, the difference of the two showing the amount of wear.

The amounts which the rail ends are low are measured by means of a 30-in. straight edge (Fig. 2), equipped with a multiplying indicator pivoted near the end of the straight



Fig. 1—Two Views of the Rail Contour Instrument

enter into the answer, and, indeed, sometimes none of the factors determine, as rails occasionally become so worn out that safety compels their renewal.

On the Atchison, Topeka & Santa Fe the practice has been established for several years of purchasing no new rail for use on branch lines, but to supply the requirements of branch lines and new lines constructed from rail released from the tracks of main lines. This practice does not control the removal of rail from main line tracks, but is one of the factors to be considered.

The method followed in determining when the rail in main line tracks shall be renewed, is to have each roadmaster make an inspection of his district each spring and report the rail which will require renewal the following spring. The roadmasters pass their lists to their superior officers by whom, after such checking and inspection as is deemed necessary, they are consolidated into a list for each grand division and forwarded to the general officers of the company.

The chief engineer of the system then sends out an assistant to make a careful inspection of rail shown on the list for renewal, in order to determine its physical condition to the end that the rail most in need of renewal may be given preference. The method of inspection consists in going over the track on a motor car at a speed slow enough so that the rail can be looked over carefully, and of stopping at occasional locations where measurements of the rails are taken. These consist of contours of the rails to show the amount of wear; measurements of the extent to which



Fig. 2—Measuring the Batter at Rail Ends

edge, as shown. The short end of the indicator blade is pushed down into contact with the face of the rail and the amount the joint is low is shown in hundredths of an inch, by the scale under the long end of the indicator blade.

The amount of space between rail ends is measured by means of a taper gage (Fig. 3), which is graduated to hundredths of an inch, the taper gage being thrust between the rail ends, crosswise the rail, as far as it will go and the opening read on the gage.

The gage of track is measured by means of a two-piece extension rule (Fig. 4), sometimes called a glazier's rule.

The rule is placed against the head of one rail at the gaging point, and is then extended until it makes contact with the opposite rail at the gaging point. The width of track is then read on the face of the rule where the end of the top half cuts the scale on the bottom half of the rule.

Measurements of the amount that the rail ends are low, the amount of space left for expansion, and the gage of the track, are made on a uniform number of joints in each rail, following the point where rail contours are taken, in order

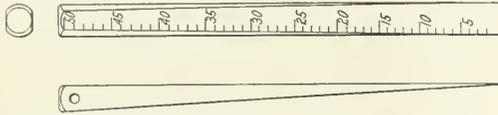


Fig. 3—Taper Gage to Measure Openings Between Rails

to determine the average condition of the rails in these respects.

The results of the measurements thus made and of the inspection also serve as a check upon the maintenance of the tracks, which naturally is a large factor in the life of rail. Another factor bearing on rail renewals and which cannot be measured or arrived at in any similar manner is worn spots, defective spots, and driver burns on the rails.



Fig. 4—Measuring the Gage of the Track

The condition of the rail in this respect can only be judged through observation by an experienced man.

After the inspection is complete and the rail contours plotted are in the drafting room, a report is prepared giving the location of the rail under consideration, a history of the rail as to date laid, etc., the approximate tonnage carried by the rail, the characteristics of engines in use over the rail, a tabulation of the joint measurements described above, prints of the rail contours taken, and a statement of the condition of the rail as found by the assistant who

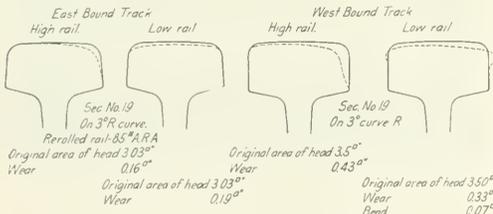


Fig. 5—Typical Rail Contour Sections

made the inspection, with a conclusion as to the necessity for renewal or otherwise based on the physical conditions only.

These reports are then forwarded to the chief engineer of the system, who takes up the question of rail renewals with the general managers and the situation is discussed by all concerned. In addition to the physical condition of the rail, the requirements for relayer rail for use on branch lines, for the construction of new lines, and for the renewal

and construction of yards and sidings, the advisability of anticipating future renewals in order to avoid too much work on one roadmaster's district in a single year, and all other factors are considered. The results and conclusions are reported to the vice-president, by whom the final decision of allotments is made.

Figure 5 shows a sheet of rail contours as worked up in the drafting room for enclosure in a report. This sheet covers rail on double track, both tracks of which were listed for renewal. The rail sections were taken by commencing on the left-hand rail and working across both tracks. By this method, the paper in the contour recording machine is advanced for each section, but is not torn off until all four rails are traced. This arrangement aids in keeping the rail contours in order and saves repeating notes.

Train Accidents in March¹

THE FOLLOWING IS A LIST of the most notable train accidents that occurred on the railways of the United States in the month of March, 1918:

Collisions						
Date	Road	Place	Kind of Accident	Kind of Train	Kil'd	Inj'd
4	Atlanta, E. & A.	Talbotton	xc	F. & F.	2	0
17	M., K. & Texas	Huber	bc	P. & F.	1	3
21	Balt. & Ohio	Youngstown	bc	P. & F.	1	0
*23	Penn.	Trenton	re	F. & F.	1	2
Derailments						
Date	Road	Place	Cause of Derailment	Kind of Train	Kil'd	Inj'd
4	Pennsylvania	Canton, O.	neg.	F. & P.	1	2
9	Louisville & N.	Boulevard	acc. obst.	P.	2	1
14	Pennsylvania	Portageville	washout	P.	3	0
15	Pennsylvania	Ritzschtown	slide	P.	2	24
17	M., K. & Texas	Schell City	d. switch	P.	0	1
25	Chesapeake & O.	Buffalo Creek	acc. obst.	P.	2	1
26	Del. & Hudson	Singerlands	d. journal	F.	0	1
30	Del. & Hudson	Cadysville	washout	P.	6	3
Other Accidents						
Date	Road	Place	Cause of Accident	Kind of Train	Kil'd	Inj'd
22	Fort Worth & D.	Electra	boiler	F.	3	0

The trains involved in the collision near Talbotton, Ga., on the night of the 4th were eastbound extra freights No. 207 and No. 212. The last named train had been stalled on an ascending grade and a part of the cars had to be taken forward to a side track and set off. The engine, on its return to the rear part of the train accidentally started the standing cars down grade, without coupling to them, and they became uncontrollable, although there were two men on them, and collided with train 207. One engine, one caboose and 10 loaded cars were wrecked, and the conductor and engineman of 207 were killed.

The trains in collision on the Missouri, Kansas & Texas, at Huber, Tex., on March 17 were southbound passenger No. 25, and a northbound extra freight, which was standing on a side track. The passenger train, drawn by two engines, ran over a misplaced switch and into the head of the freight, badly damaging three locomotives, one baggage car and one coach. Four trainmen were injured, one of them fatally. The collision occurred at 1:25 a. m. A brakeman of the freight, sent to the switch to turn it after the passage of the passenger train, turned it immediately in front of that train, thus causing the collision. It appears that, while waiting for the passenger train, the brakeman had been asleep in the caboose; and that he turned the switch while his mind was not clear.

The trains in collision at Youngstown, Ohio, on the night

¹ Abbreviations and marks used in Accident List: re, Rear collision—bc, Butting collision—xc, Other collisions—b, Broken—d, Defective—unf, Unforeseen obstruction—wrx, Unexplained derail. Open derailing switch—ms, Mismatched switch—acc. obst., Accidental obstruction—malice, Malignant obstruction of track, etc. boiler, Explosion of locomotive on road—fire, Cars burned while running—P, or Pass., Passenger train—F, or Ft., Freight train (including empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly destroyed by fire—Dagger, One or more passengers killed.

of the 21st, were westbound passenger No. 5 and an eastbound yard train consisting of a locomotive and two cars, one of which, an empty baggage car, was ahead of the engine. The engineman of the yard engine was fatally injured. The yard engine was moving in an eastward direction across the westbound main track. The baggage car was crushed for half its length by the locomotive pushing it. It appears that a signalman had admitted train No. 5 to the block section after having given the yard engine permission to cross the main track.

The trains in collision at Trenton, N. J., on the 23d were eastbound through freights. One engine, one caboose and five cars were badly damaged; a flagman was killed, and two other trainmen were injured. The caboose took fire and was consumed. The leading train had become stalled and the engine of the other had been detached from its cars and had been coupled to the standing train, but the cars of the second train, which had been left standing on a descending grade without having sufficient hand brakes set to hold them, ran forward, and crashed into the locomotive.

The train derailed at Canton, Ohio, on the 4th, was an eastbound freight. The engine and three cars were thrown off the track at a derailing switch. Two of the cars fell so as to foul the westbound track, and westbound passenger train No. 1405 ran into the obstruction. The engine and four cars of this train were overturned. Three employees on the passenger train were injured, one of them fatally.

The train derailed near Bonnieville, Ky., on the 9th, was a northbound freight. The derailment was caused by a push car loaded with scrap rail, and the locomotive and six cars were overturned and fell down a bank. The engineman and fireman were killed and one trainman was injured.

The train derailed north of Portageville, N. Y., on the 14th, was a southbound freight. The engine and four cars fell into a washout caused by a flood; and the engineman, fireman and one trainman were killed.

The train derailed near Elizabethtown, Pa., on the 15th, was westbound passenger No. 19. Three steel sleeping cars were wrecked and both main tracks were blocked. Two passengers were killed and 21 passengers and 3 trainmen were injured. The cause of the derailment was a fall of a rock, which fell from a ledge at the right of the roadway just at the moment when the train was passing, the engine and two cars having cleared the obstruction in safety. This

accident was reported in the *Railway Age* of March 22 and March 29.

The train derailed near Schell City, Mo., on the 17th, was a special passenger carrying troops. One soldier was injured. The cause of the derailment was a loose driving-wheel tire.

The train derailed near Buffalo Creek, Ky., on the 25th, was an eastbound freight. The engine struck a tree which had fallen across the track and both engine and tender were overturned. The firemen and one brakeman were killed, and the engineman was slightly injured.

The train derailed at Slingerland, N. Y., on the 26th, was an eastbound freight. Twenty three loaded cars were derailed and, being set afire by chemicals in one of the cars, they were mostly burnt up. The cause of the derailment was the failure of a journal which had become overheated. Estimated loss, \$35,000.

The train derailed near Cadyville, N. Y., on the 30th, was an eastbound passenger. The tender of the locomotive and one passenger car fell into a washout about 40 feet deep. The car rested endwise on the tender, and was thereby kept from being partly submerged. The engineman, and one passenger were injured, and about 20 other passengers were considerably bruised. A westbound passenger train had passed over the road in safety only 30 minutes before this accident happened.

The train involved in the accident near Electra, Tex., on the 22d, was a northbound freight. The locomotive was badly damaged, but not thrown off the rails, by the explosion of its boiler. The train ran about 400 ft. after the explosion before it was stopped. The fireman and one brakeman were killed and the engineman was fatally injured.

Why Track Laborers Quit*

THE CHICAGO, ROCK ISLAND & PACIFIC has, for several years, maintained a record of the length of service, and reasons assigned by track and construction laborers for leaving its service in its Chicago district. Unfortunately, the true reasons are not always given and the figures can only be taken as pointing to the probable cause; the desire for ready money is more frequently the reason. Laborers will

*Abstract from the report of the committee on economics of railway labor of the American Railway Engineering Association, and published in Bulletin 262.

STATEMENT OF "HORO" LABOR
By Months from June 17, 1916, to December 16, 1916, and May 26, 1917, to October 20, 1917.

Months 1916	Number employed	Number time checked	Average days in service	Reasons given for leaving														Nationality							
				Sick	Need money	Need clothes	Four food	Poor water	Poor hot	Poor cold	Dissatisfied	Work too hard	Better job	Joined army or navy	Laid off	Discharged	Miscellaneous	American	English or Scotch	Irish	Swede	German	Slav	French	Italian	African
June	114	44	4.5	4	9	6	7	...	...	...	3	9	...	...	6	11	11	1	6	5				
July	525	286	4.5	47	69	115	86	...	...	...	25	18	...	...	97	139	45	59	43	40				
August	527	371	3.5	66	82	115	40	...	...	...	37	41	...	...	51	89	155	33	50	40				
September	527	251	5.9	59	33	11	8	...	...	...	57	16	...	...	74	68	87	13	22	33				
October	395	186	4.6	3	22	33	16	...	...	...	8	6	...	...	51	4	7	16	28	11				
November	415	183	5.1	30	21	2	5	...	...	...	14	17	...	...	6	24	60	25	26	26				
December	258	131	5.4	1	8	1	5	...	...	...	16	2	...	...	58	28	43	16	21	14				
Total	2,874	1,546	4.0	250	14	117	164	23	112	30	118	97	38	...	388	...	...	224	172	4				
1917																									
May	40	4	1.5	2	2	2	2	1	1	1	1	1	1					
June	435	190	12.6	2	3	7	...	...	...	...	21	3	28	4	2	4	2	9	7	1				
July	391	169	11.5	5	22	8	...	...	...	...	26	10	...	...	1	1	4	3	6	6				
August	408	119	20.4	4	13	1	...	...	...	...	20	1	18	...	1	1	4	1	8	8				
September	360	167	10.3	27	31	4	...	...	...	...	34	3	16	...	8	4	3	64	16	11	16	1	1	1
October	275	146	9.1	31	42	8	...	...	...	...	8	14	9	...	1	1	4	40	7	7	9	1	1	1
Total	2,749	786	11.0	120	142	...	...	...	...	...	115	10	81	11	17	17	11	48	4	4	4	4	4	4
Grand total	46,323,332	7,927	35.6	145	210	23	130	38	233	167	116	11	07	...	407	...	...	14	8	4	14	14	14	14
Per cent to "Number time checked"				15.1	15.3	6.2	9.0	0.9	5.6	1.7	10.0	4.6	5.1	...	5.2	10.9	4.9	4.7	11.4	9.1	9.4	...	...	...

leave and return to the same job in the course of a few days; the lost time being spent in idleness. Co-operation between railways and local authorities and better housing and working conditions would greatly ameliorate this condition. It will be noted in the statement that the average length of service for 1917 is materially increased over that of 1916. This is in part due to improved boarding and housing facilities.

A War-Time Fuel Conservation Campaign on the Northern Pacific

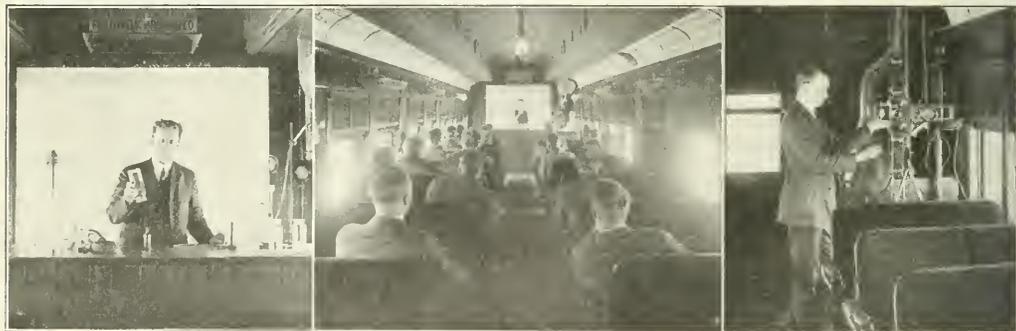
THE NORTHERN PACIFIC is now pushing a unique fuel conservation campaign, consisting of lectures with moving pictures and demonstrations, given daily to employees and to all others interested in the subject, in a car especially equipped for the purpose. From the large attendance and interest displayed this educational work has been found to produce good results. The present campaign will extend over a period of three months, during which time consumers of fuel in all the states through which the road passes, will be appealed to as well as employees of the railroad company.

At a number of cities, school children have been brought to the instruction car as a special feature in the course of their training. In many of the cities visited an open session for the public is held in a large hall, which is arranged for by the commercial clubs. Those attending the

fuel but make the work easier as well. The proper combustion of gases in the firebox is treated by demonstrations which leave no question in the minds of those who see them as to the conditions necessary for the best results. As from 35 per cent to 50 per cent of the heat value of soft coal may be derived from the volatile combustible matter (the gases) a great loss of heat occurs when any considerable amount of the gases escape unburned. Opportunity for saving fuel lies principally in the burning of the free hydrocarbon gases.

It is pointed out that the most efficient fireman is the man who carries a light, even fire, also that the popping of safety valves, loss of coal from overloading tenders, kicking coal from the gangways, etc., are willful wastes of fuel and unpatriotic acts. As fuel is war power required to keep munition factories running, armies and navies supplied and transportation units moving, all are under obligation to save it, because victory in the war depends just as much on those who remain at home as on the boys in the trenches. To add to the interest of the lecture and to appeal to the patriotism of those in attendance, moving pictures of soldiers are shown, including a number of moving-pictures of actual trench-life and battle scenes taken in France.

The public press in the cities visited has taken a lively interest in the work of the fuel conservation campaign and newspapers have unstintingly furnished space in their desire to place the necessity of fuel conservation before the public. This patriotic co-operation has greatly assisted the work of reaching the public effectively. Pamphlets prepared by the railroad concerning the economical use of



Views in the Northern Pacific's Fuel Conservation Car

meetings are impressed with the fact that our country will require, during the first year of the war, not less than 100,000,000 tons of coal more than we have ever produced in one year; that it is not expected the production will meet the demand; and that it is expected that every one will do his bit in saving fuel in order that our military operations and those of our allies may be successful.

For the benefit of the railroad men it is brought out that the roads in the United States will require about 130,000,000 tons of coal for this year's work and that probably 25 per cent of the total fuel tonnage handled by the roads will be used to operate the roads. It is explained that this offers a splendid opportunity for railroad employees who handle coal to contribute their share in winning the war by using as little coal as possible, not wasting any themselves nor permitting others to waste it.

The cinematograph shows good and bad practices in locomotive and stationary plant operation. Black smoke is clear evidence of waste, and employees are instructed to follow light firing methods, which not only save considerable

fuel in heating buildings are also freely distributed at the lectures.

When the Northern Pacific fuel conservation campaign is finished it will have given practical demonstrations and carried the message of fuel conservation by word and illustration to thousands of persons who handle millions of tons of coal each year.

NEW RAILWAY IN TRAVANCORE, INDIA.—A new line of railway, 38 miles long, connecting Quilon and Trivandrum, two small seaports in Travancore State, South India, was opened to traffic on January 1. This will link up the east with the west coast in a part of the country that has been more or less isolated from the rest of India. Quilon has heretofore been the terminus of the Travancore branch of the South Indian Railway, a trunk line from Madras extending over 1,700 miles in peninsular India. The peculiar engineering difficulties in the Paravoor and Kilimukku Lakes greatly increased the cost of construction of the line, which ultimately came to \$1,751,940.—*Commerce Reports.*

Short Line Railroads Object to Being Left Out

AT A CONFERENCE of representatives of the short line railroads from all parts of the country held at Washington on April 11 and 12, plans were laid for a vigorous campaign to have carried out what the short line representatives believe was the intention of Congress when it passed the railroad bill, that the independent short line railroads should be made a part of the federal railroad system. The law division of the Railroad Administration has taken the position that, under section 14 of the act, it may exclude such lines at any time before July 1.

Under resolutions adopted at the meeting, an executive committee representing the entire field of short line industry was appointed to carry out the directions of the conference and to sit at Washington continuously until July 1, or for as long as may be necessary, for the purpose of assisting interested lines in their negotiations with the government. The resolutions under which the committee is acting are as follows:

"Whereas, Congress, by an Act approved March 21, 1918, entitled 'An Act to provide for the operation of transportation systems while under Federal control,' has declared (in effect) that every railroad not owned, controlled, or operated by a trunk line was and is under federal control and thus, for the period therein fixed, made part of the trunk road or system line with which any such road connects, but conferred on the President power, prior to July 1, 1918, to relinquish control of any trunk or system line together with such short road or roads as may connect therewith, and

"Whereas, it was the intent and purpose of Congress to make all such independent, or short, roads a part of the federal controlled railroad system, so that such short lines might continue to exist and be enabled to perform important public service under war conditions, and

"Whereas, the Railroad Administration now construes said law as giving power to the President to exclude from federal control any or all short lines while continuing to operate the trunk line or lines with which they connect, and the said Railroad Administration has advised that it would not exercise jurisdiction or control over the short roads of continental America but, to the contrary, has informed the owners of such roads that the question of whether or not they shall be used as part of the federal railway system is yet to be determined, and

"Whereas, the short line roads are already suffering a great loss by being compelled to operate independently from the trunk lines now operated as the government railway and such losses, if continued, must and will force a great number of such roads now filling important economic positions in the transportation system of the United States to completely suspend operations so long as the government continues to operate the larger roads as a government utility, and such suspension will result in financial ruin to such roads and great and irreparable damage to the many communities and industries they now serve—

"Now, therefore, be it resolved, as the sense of this Conference—

"1st. That we hereby appeal to the Railroad Administration, both as representatives of the short line roads and as citizens loyal to the great cause in which our country is engaged, to reconsider the idea of releasing, save by mutual agreement, any short line road so long as the trunk line with which it connects is operated by the government. With our country at war there is and should be a place for every citizen and every industry able to perform any sort of substantial service. The ruin of the short line roads or any one of them when considered along with the loss to the communities served and the banks and citizens whose money

was invested on the faith of pre-war conditions, will go far beyond any loss the government might sustain from operating the short roads. Any other policy than one which shall earnestly and honestly seek to conserve these industries for their usefulness in the present as well as the future is unwise and shortsighted. The saving of a dollar which has been collected into the government treasury cannot justify the wastage of five dollars or ten dollars of the general wealth of the Nation.

"2nd. In order that this appeal to the Railroad Administration may be fully and fairly presented and the policy of said administration toward the short roads definitely ascertained; and, further, in order that all of the other short line problems may be handled as efficiently as possible, it is therefore further resolved, that an executive committee of five representatives of interested lines be appointed by the chairman of this conference, of which committee the chairman shall be a member ex officio, the duties of which committee shall be the following:

"(a) To confer with the Director General of Railroads, or such representative as he may select, and to ascertain and report definitely, the policy of the administration concerning short line railroads.

"(b) If it be ascertained that the fixed policy of the administration is to exclude from federal control without agreement, the short line roads or any number of them, said executive committee shall advise interested lines promptly and shall at once prepare and submit to the members of Congress a full statement of the facts and shall appeal to Congress to correct the manifest economic error involved in such dealings with the short line problem.

"(c) To sit in Washington, D. C., continuously until July 1, 1918,—or such portion of this time as may be necessary—for the purpose of assisting interested lines in their negotiations with the government.

"(d) To levy assessments equitably against interested lines for the purpose of providing for the reasonable expense of such committee, a statement of the receipts and disbursements to be furnished monthly for the information of interested lines.

"(e) To do all other things, herein not specifically mentioned, to the end that short line roads shall be of the greatest possible assistance to the government in this crisis, and in turn that the government shall omit no possible fairness in its handling of the short line problem.

"3rd. There is very great need of an officer or department in the Federal Railroad Administration to deal solely with the short line railroad situation. There are about 800 short line railroads in the United States, with problems and conditions peculiar to themselves. The great trunk line problems fall largely into well defined classes, whereas the short line problems cannot be dealt with in classes, and the solution of one problem of a short line would probably not be applicable to many other short lines. In addition to the wide variance between short line and trunk line conditions, there are such a large number of short lines in the United States that it is physically impossible for the federal railroad machinery as now organized to deal effectively and satisfactorily with the short roads. Coupled with this situation there are thousands of security holders and creditors of short line roads and a great number of communities served by such roads who are much concerned over the fact that their problems are being solved largely by trunk line representatives and we believe the appointment of an experienced short line representative would go a great way towards allaying this feeling of alarm now abroad in the Nation. There should be selected at once a man of extensive short line experience who should be made Director of Short Lines, or given some other similar title, with power to immediately organize an efficient department to the end that the short line situation may be handled as effectively, promptly and sympathetically

as the trunk line situation is handled. Very much doubt and uncertainty exists at the present time and if no new machinery is created for the disposition of the short line problem this doubt and uncertainty will probably continue for too long a period after settlement of the government problems with the trunk lines. Some of the problems peculiar to short lines that must be dealt with rationally and effectively are the question of just compensation for the use of short lines (which requires careful investigation and analysis in each case); the matter of wage adjustment in each case, and proper operation, bearing in mind consistent and sufficient service; and, most of all, the financial requirements of the short lines, which must have careful study and wise decision."

Pursuant to these resolutions, the committee has addressed a circular letter to the short line railroads of the country pointing to what is termed "the gravity of the economic error" involved in the relinquishment of any material number of short lines from federal control and the vital necessity of every short line railroad lending its unqualified and whole-hearted support to the cause of the short lines. Also a post-card questionnaire has been sent to the short lines asking whether they approve of the conference action and the appointment of the committee, whether they approve the committee's urging the appointment of a short line railroad man to the staff of the director general, and whether they will lend active moral and financial support to the movement. The executive committee is as follows: Ben. B. Cain, chairman, vice-president and general manager Gulf, Texas & Western, Dallas, Texas; John W. Powell, vice-president and general manager, Virginia Blue Ridge, Washington, D. C.; Henry I. Moore, vice-president, Salt Lake & Utah Railroad, Salt Lake City, Utah; Bird M. Robinson (chairman of the Short Line Railroad Conference), receiver, Tennessee Railway, Oneida, Tennessee; W. M. Blount, president, Birmingham & Southeastern, Union Springs, Alabama; C. D. Cass, general manager, Waterloo, Cedar Falls & Northern, Waterloo, Iowa.

The American Short Line Railroad Association, which has heretofore been leading the campaign of the short lines and which represented them during the hearings on the railroad bill before the congressional committees, was represented at the conference by its officers and 40 of its members. The Short Line Railroad Association was represented by its attorney and representative at Washington and by several delegates. The Western Association of Short Line Railroads

was represented by Henry I. Moore and a telegram pledging co-operation was received from the president. The conference held at the time of the meeting with John Barton Payne, general counsel of the Railroad Administration, was noted briefly in last week's issue. The official account of the proceedings of the conference, which has since been issued, gives the following statement of the position of the Railroad Administration as announced by Judge Payne:

Judge Payne stated that he construed the act to mean that all short lines and other railroads were under government control, but that Section 14 of the act gave the President authority to relinquish to its owners any railroad, prior to July 1, 1918, and in the meantime that the Railroad Administration will not exercise jurisdiction over any short line until the question as to whether they shall be retained under federal control shall have been determined.

In reply to questions propounded by Chairman Robinson, Judge Payne said that:

Some short lines had been relinquished at their own request, but that no decision had been reached as yet to eliminate any other line;

Instructions had been issued to the regional directors to investigate the conditions of every short line and the conditions surrounding it, and that they were now engaged in making these investigations;

When the recommendations of the regional directors were received, he would consider them carefully and notice of the decision as to each line would thereafter be sent to the owners.

He said further that it was the intention of the director general to retain all lines that would be serviceable to the government in the prosecution of the war, but that he did not intend to retain any line that was not serviceable for their purpose; and he would grant an oral hearing to any line that desired to be heard, in the event that it had been decided, or was about to be decided, to relinquish such road from federal control to its owners.

He could not express an opinion as to how independent short line railroads could hereafter purchase equipment, as that would depend upon the showing made by each road.

The divisions of through rates would not be disturbed except by affirmative action on the part of the Railroad Administration.

He could not now express an opinion as to whether shippers' routing of freight and traffic contracts would be recognized.



Central News Photo Service

A Busy Light Railway Terminal

International Railway Fuel Association Convention

THE INTERNATIONAL RAILWAY FUEL ASSOCIATION, an organization composed of the officers of American and Canadian railway fuel departments and coal operators, recently tendered its services to the government to aid in the effort to stimulate coal production and to enhance economy in its use. This offer has been accepted by the United States Fuel Administration and by the United States Railroad Administration, and those two government departments, in co-operation with the officers of the Fuel Administration, have arranged for a convention to be held in Chicago on May 23 and 24, 1918.

The two government administrations and the officers of the Fuel Administration believe that this convention will provide an opportunity to arouse renewed interest in the fuel problem and to stimulate greater effort on the part of all concerned in the production and use of fuel; and they hope to attain these ends through a series of inspiring addresses by representatives of the various interests involved, which, by appeals to patriotism, shall seek to stimulate enthusiasm and to enlist co-operation. The speakers on this occasion are all men of national prominence, whose previous experience or present contact with the fuel situation will enable them to speak with authority to mine operators, mine workers, railway officers, and railway employees. Through the co-operation of the two government bureaus there is certain to be in attendance at this convention a large audience composed of men, who, in their daily work, can directly affect the production of coal, both as regards quality and amount and its economical use on the railways of the United States and Canada. The fact that the railways use nearly one-third of all the coal produced is, in itself, an earnest of the importance which the government attaches to its conservation and to this convention.

Subsequent to the convention, it is intended to distribute very widely to coal operators, miners, railway officials and railway employees the substance of the various addresses, and in this way, as well as by the direct influence of those who have been able to attend, to reach back into the mining industry, and to men on the railroads, and to relay to them something of the inspiration and stimulus which is the chief aim of this meeting.

The general arrangements for the convention are going forward under the direction of C. R. Gray, Director of the Division of Transportation, United States Railroad Administration, and P. B. Noyes, Director of Conservation Division, United States Fuel Administration. The details of the program are being arranged by a committee consisting of E. W. Pratt, president, International Railway Fuel Association; J. G. Crawford, secretary of this association; Eugene McAuliffe, president, Union Colliery Company, St. Louis, Mo., representing the United States Railroad Administration; Major Edward C. Schmidt, representing the United States Fuel Administration and Morgan K. Barnum, assistant to the vice-president, Baltimore & Ohio Railroad.

The program for the convention, as tentatively outlined, is as follows:

Introductory address, E. W. Pratt, President International Railway Fuel Administration.

The Fuel Problem in the War, H. A. Garfield, U. S. Fuel Administrator.

The Railroads and their Relation to the Fuel Problem, C. R. Gray, Director Division of Transportation, United States Railroad Administration.

What Can Be Done for Our Northern Ally, Sir George Bury, Chairman, Canadian Railways War Board.

The Need for Fuel Conservation, P. B. Noyes, Director Conservation Division, U. S. Fuel Administration.

The Coal Operator and His Responsibilities in the Fuel Situation, Edwin Ludlow, vice-president, Lehigh Coal and Navigation Co., Lansford, Penn.

What the Men on the Locomotives Can Do, W. S. Stone, Grand Chief, Brotherhood of Locomotive Engineers.

What the Coal Miner Can Do to Help the Government, the Railroads, and the Men at the Front, John P. White, Labor Advisor, U. S. Fuel Administration.

The Motive Power Department and Fuel Economy, R. Quayle, general superintendent, Motive Power and Car Dept., Chicago & North Western Ry.

What the Coal Operator Can Do To Help Win the War, H. N. Taylor, vice-president, Central Coal & Coke Co., Kansas City.

The Railroad Industrial Army—a Component Part of the American Expeditionary Force and the Allied Armies, W. S. Carter, Director, Division of Labor, United States Railroad Administration.

The Supply and Distribution of Fuel, J. D. A. Morrow, Director, Distribution Division, U. S. Fuel Administration.

Relation of Locomotive Maintenance to Fuel Economy, Frank McManamy, Director, Division Locomotive Maintenance, United States Railroad Administration.

The Transportation Department and Fuel Economy, F. H. De Groot, Jr., Assistant Manager, Car Service Section, Division of Transportation, U. S. Railroad Administration. More and Better Coal, Eugene McAuliffe, president, Union Colliery Company, St. Louis.

Railway Engineers Commended for Part in Battle of Picardy

SECRETARY BAKER MADE PUBLIC last Friday a cable report from General Pershing, showing the importance of the work done by units of American engineers in the battle of Picardy, and showing that for the period of 13 days covered by the report these forces were almost continuously in action. They were among the forces hastily gathered by General Carey to stem the German advance.

The Americans were in the very thick of the hardest days of the great German drive, and the report from General Pershing embodies a communication from General Rawlinson, Commander of the British Fifth Army, in which the latter declared that "It has been largely due to your assistance that the enemy is checked."

General Pershing's report covers the fighting period from March 21 to April 3. The former date marked the beginning of the Hindenburg offensive along the whole front from La Fere to Croisilles. The text of the report follows:

In reference to mention in summary of activities, from March 24 to March 25, of American troops fighting with British armies, and to the daily cabled summary of the battle March 29, 1918, the following has now been established from official reports:

The commanding officer of a United States engineer regiment has received a copy of the following letter commending the action of the troops of his regiment:

"I have received the following from the commanding general, ——— Corps: 'I desire to convey to you and ranks under your orders my admiration of the splendid service which you and they have rendered in connection with corps light railroad. Thanks to the untiring energy of officers, non-commissioned officers and men, who have risen to the occasion in a manner beyond all praise, and their gallantry, much of what might otherwise have fallen into the enemy's hands has been saved.'

"I should like to add my own appreciation of the excellent

services rendered by the officers, non-commissioned officers and men of the light railroad service of this army directorate, in connection with the present operation. Will you be good enough to acquaint all ranks serving under you of the appreciation accorded to their untiring service?"

Details of the work done by the engineers are given in General Pershing's report as follows:

"Certain units of United States Engineers, serving with a British army battalion March 21 and April 3, while under shell fire, carried out destruction of material dumps at Chaules, fell back with British forces to Moreuil, where the commands laid out trench work, then proceeded to Demuin, and was assigned sector of defensive line which was constructed and manned by them, thence moved to a position on the line near Warfusee-Abancourt and extending to north side of Bois de Toillauw. The commands started for this position on March 27, and occupied it until April 3, during this time the commanding officer of a unit of United States Engineers being in command of the subsector occupied by his troops. This command was in more or less continuous action during its stay in this position. On April 3 the command was ordered to fall back to Abbeville.

"The casualties during the period March 21 to April 3 were: Officers killed, 2; wounded, 3. Men killed, 20; wounded, 52; 45 men reported missing, but it is believed by the British authorities that they were not all captured, and that many of them were separated from their command and are now with other British organizations. This report of casualties does not consider one detachment of 57 men from which no report has been received."

The commanding general of a British cavalry division sent the following commendatory communication after he had received the commendation of the army commander for the conduct of his division:

"Commanding Officer United States Engineer Battalion, ———— Engineers:

"As the United States Engineer Battalion was fighting

your command fought most gallantly alongside the British cavalry. I am most grateful to you and the unit under your command for the invaluable assistance you gave us on March 30, 1918. Please convey my thanks and congratulations to all ranks.

(Signed)

"Major General Commanding ———— Cavalry Division."

The Commanding General of the British ———— Army commended these troops in a communication as follows:

"Army, April 1st, 1918.

"Colonel ————, Lt. Col. Engineer, commanding ———— Regiment, United States Engineers:

"The army commander wishes to reconvey officially his appreciation of the excellent work your regiment has done in assisting the British army to resist the enemy's powerful offensive during the last ten days. I fully realize that it has been largely due to your assistance that the enemy is checked, and I rely on you to assist us still further during the few days which are still to come before I shall be able to relieve you in the line. I consider your work in the line to be greatly enhanced by the fact that for six weeks previous to taking your place in the front line your men had been working at such high pressure erecting a heavy bridge over the Somme. My best congratulations and warm thanks to you all.

(Signed)

"RAWLNSON,
"General Commanding."

Weekly Reports of Railroad Earnings

THE RAILROAD ADMINISTRATION has inaugurated a series of weekly reports of railroad operating revenues from some of the leading systems of the country for the purpose of obtaining prompt information as to the general trend of conditions. Two of these reports compiled by the Bureau of Statistics of the Interstate Commerce Commission

OPERATING REVENUES OF STEAM ROADS

Name of road	Operating Revenues, 2nd week in April			Operating Revenues, 1st and 2nd weeks in April combined		
	1918	Same period last year	Per cent of increase or decrease (D)	1918	Same period last year	Per cent of increase or decrease (D)
Eastern District:						
Baltimore & Ohio R. R.	\$2,588,000	\$2,315,000	11.8	\$4,960,000	\$4,620,000	7.4
Boston & Maine R. R.	1,262,000	984,000	28.3	2,353,000	2,094,000	12.4
Erie R. R. (including Chic. & Erie R. R.)	1,522,000	1,433,000	6.2	2,928,000	2,837,000	3.2
New York Central R. R.	4,359,000	3,908,000	11.5	8,182,000	7,785,000	5.1
New York, New Haven & Hartford R. R.	1,686,000	1,691,000	(D) 0.3	3,368,000	3,338,000	0.9
New York, Philadelphia & Norfolk R. R.	133,000	88,000	51.1	258,000	178,000	44.9
Pennsylvania R. R.	6,022,000	5,485,000	9.8	11,929,000	11,141,000	7.1
Pennsylvania Lines West of Pittsburgh	3,016,000	2,755,000	9.5	5,845,000	5,483,000	6.6
Philadelphia & Reading Ry.	1,293,000	1,138,000	13.6	2,553,000	2,176,000	17.3
West Jersey & Seashore R. R.	146,000	149,000	(D) 2.0	312,000	323,000	(D) 3.4
Total	\$22,027,000	\$19,946,000	10.4	\$42,688,000	\$39,975,000	6.8
Southern District:						
Illinois Central R. R.*						
Norfolk & Western Ry.	\$1,231,000	\$1,236,000	(D) 0.4	\$2,473,000	\$2,425,000	2.0
Seaboard Air Line Ry.	679,000	557,000	21.9	1,369,000	1,106,000	23.8
Southern Ry. System	2,521,000	2,183,000	15.5	5,061,000	4,356,000	16.2
Total	\$4,431,000	\$3,976,000	11.4	\$8,903,000	\$7,887,000	12.9
Western District:						
Atchison, Topeka & Santa Fe Ry.	\$3,458,000	\$3,184,000	8.6	\$6,749,000	\$6,368,000	6.0
Chicago & North Western Ry.	2,011,000	1,819,000	10.6	4,069,000	3,746,000	7.2
Chicago, Burlington & Quincy R. R.	2,486,000	2,265,000	9.8	5,216,000	4,639,000	12.4
Chicago, Rock Island & Pacific Ry.	1,935,000	1,733,000	11.7	3,644,000	3,230,000	12.8
Great Northern Ry.	1,539,000	1,681,000	(D) 8.4	3,068,000	3,199,000	(D) 4.1
Northern Pacific Ry.	1,709,000	1,720,000	(D) 1.2	3,237,000	3,318,000	(D) 2.4
St. Louis-San Francisco Ry.	1,205,000	1,063,000	13.4	2,345,000	2,060,000	13.8
Southern Pacific Co. (Pac. System)	2,610,000	2,393,000	9.1	5,150,000	4,718,000	9.2
Total	\$16,944,000	\$15,858,000	6.8	\$33,478,000	\$31,328,000	6.9
Grand total all roads reporting	\$43,402,000	\$39,780,000	9.1	\$85,069,000	\$79,190,000	7.4

*Report not received.

with the ———— Cavalry Division in the line on March 30, the army commander's congratulatory message applied to them equally with units of the ———— Cavalry Division. It has been brought to my notice that the men under

have now been received. The report for the second week in April and the first and second weeks combined, showing a considerable increase in earnings, is given in the above table.

Latest Developments in Locomotive Standardization

Roads Permitted to Ask for Special Designs for Conditions Not Met by the Standard Types

THE STANDARDIZATION of locomotives has been the subject of conferences held at the headquarters of the Railroad Administration in Washington during the last week. The conference held last Friday was attended by C. R. Gray, director of the division of transportation, by the regional directors, by Henry Walters, who has been in general charge of the matter of locomotive standardization, and by S. M. Vauclain.

The Railroad Administration until this week never officially indicated whether in case an order is placed for the proposed standard locomotives individual lines will be allowed to get locomotives which their management may consider needed to meet special conditions. The Railroad Administration has thrown light on its attitude regarding this point by sending, as a result of the conferences, the following memorandum to the managements of the various lines:

"It is appreciated that there are special conditions upon some railroads, in which there is an unusual or unique situation to be met.

"In these circumstances it is understood that any such railroad is privileged to make representation to the director general as to its individual necessity for a departure from the standard type."

It is obvious that the effect which the principle enunciated in the foregoing will have upon the locomotive situation will depend on how broadly the principle stated is interpreted and applied. Strictly interpreted, it would mean that only a few railroads having very special conditions or unique situations would be furnished with any locomotives departing from the standard type. On the other hand, broadly interpreted, it might result in all railways having special conditions being allowed to get locomotives adapted to those special conditions. Now, as there is hardly a railway management which has not believed in the past that it had had "special conditions" on at least part of its lines, the broad interpretation of the principle would result in the ordering of many locomotives besides the standard locomotives.

While the Railroad Administration has by this memorandum conceded that it is desirable to have locomotives which best meet the physical requirements of the roads, it would appear that the problems of maintaining the standard locomotives have not been given the consideration they deserve. The committee of builders appointed by S. M. Vauclain on instructions from the director general made certain statements and recommendations in its first report which never heretofore have been made public. This report was handed to Mr. Vauclain on February 19. The statements and recommendations referred to were as follows:

"Inasmuch as there are now, approximately, 70,000 locomotives in service on the railways of this country, it would seem desirable to call your attention to the care and study which should be given to the working up of any plan of future standardization, in order to obtain the greatest possible economy in maintenance and to preserve, as far as advisable, the existing railway standards. Under the conditions existing in the past, it has always been considered advisable when designing a new locomotive for any particular road to have consultations with the motive power officials so that the design could be best worked out to suit the particular shop methods and facilities for repairs on that road. If we are to be called upon to work up standard classes of locomotives suitable for all the railways of the country, we believe the

same care should be taken and numerous consultations with the motive power officials would be necessary in order to secure the best results. After these consultations there still remains the actual working out of each detail on the basis of providing the greatest interchangeability with present standards.

"While it may be said, and truly so, that these standard designs could be rushed out quickly and the building of locomotives from them accomplished within a few months, if this is done the factors just mentioned cannot be taken into consideration, and within the limits of time given, and effort would have to be directed toward standardizing the details among these new types proposed without any reference to the standards now in use. This, in our opinion, would not be advisable, and we feel that the proper execution of such a series of standard designs cannot be carried out in time to permit the building of any of these locomotives for 1918 delivery. As the builders now have a considerable amount of untaken capacity for this year, we would respectfully suggest that if it is your desire that this year's full capacity be utilized, the railways be permitted to order for quick delivery, or until these standard designs can be worked out, such locomotives as they require exact duplicates of those now in service on their lines. This can be done without in any way retarding the progress in the direction of the standardization which you suggest."

It would seem that this part of the report has been ignored and there is reason for doubting whether it ever reached the director general, although it was addressed to him. It will be seen from the foregoing that the committee of locomotive builders recommended that no effort be made to build any standard locomotives for delivery in 1918.

Present indications are that about 1,000 of the standard locomotives will be bought at first and that they will be intended primarily to serve as a flying squadron which can be used on the lines which have not enough locomotives to handle all the traffic which must be moved over them.

It is estimated that there are now about 600 engines in service on foreign lines. As the standard locomotives are delivered it is probable that they will replace these foreign engines and that the foreign engines will be returned to the home lines. While the foreign engines have been taken from numerous railways, they are being used on a comparatively small number of lines. Therefore, if the standard locomotives are used mainly to replace them the result will be that in the early stages, at least, they will be used on only a comparatively small number of roads. As a matter of fact, the Railroad Administration does not know where it will send the standard locomotives at first, but it is considered by some officers of the administration that it will be logical to send home as rapidly as possible the engines that are now off the lines of the owning roads and to replace them with the standard locomotives.

The interchange of power is a questionable practice at any time. Under existing conditions, however, it has been found necessary. If standardization is considered at all, it should apply only to such locomotives. *And only that number which is necessary for a liquid reserve should be built.* Roads requiring new power should be furnished locomotives which best meet their needs and which they are prepared to maintain. The lack of sufficient shop and enginehouse facilities is the main reason for the pres-

ent lack of motive power. To further burden the maintenance forces which are already overtaxed, by calling upon them to handle power which is strange to them and for which they have not facilities to repair, is to still further increase the heavy load they are now called upon to bear.

The question of standardization is by no means settled. It is a well-known fact that neither the soundness of the principle of standardization nor the desirability of its application on our railways in time of war was thoroughly discussed and fully considered before the standardization program was entered upon. On the contrary, the program of standardization was entered upon somewhat hastily and practically all the consideration and discussion of its desirability have occurred since it was practically decided to standardize. It is difficult to find many experts, either among the locomotive builders, on one side, or among the railway men on the other, who unreservedly express belief in the principle of standardization of locomotives, while it is easy to find many experts, both builders and railway men, who do not believe in it.

In these circumstances future developments will be followed with much interest. Probably whether additional locomotives of the same types or of other standard types will be ordered will depend to a considerable extent on the results secured with these locomotives. The Railroad Administration intends to appoint a special committee to study the results of the operation of the standard locomotives. One thing seems certain and this is that the principle of standardization of locomotives has not been finally established even for the period of government control and the future developments and discussion have yet to determine whether it will finally become firmly established.

The Railroads' Liberty Loan Campaign

“I HOPE THAT EVERY RAILROAD EMPLOYEE in the United States will lend all the money he can, consistently with his individual circumstances, to his government in buying Liberty Bonds,” says Director General McAdoo in Circular No. 24 of the Railroad Wage Commission. “They pay four and one-fourth per cent interest per annum and are the safest investment in the world—as safe as the money of the United States and safer than deposits in banks.

In lending your money to the government you not only save the money for yourselves, but you help every gallant American soldier and sailor who is fighting in this war now to save your lives and liberties and to make the world safe for democracy.”

With an organization that reaches every employee in railway service, from the presidents down, the railway men of this country are enthusiastically working to take a large share of the total issue of the Third Liberty Loan, and are doing their utmost to live up to their brothers who are making a record for themselves in the railway engineer regiments in France.

The Eastern Committee, of which President Underwood of the Erie is chairman, reports that the Liberty Loan campaign is making fine progress on the railways of the eastern regional district. Details as to the number of subscribers and the amounts taken, however, have only been received from a few roads. Up to Saturday night, April 20, subscriptions were reported from 93,509 employees for a total of \$5,971,100.

One of the features of the campaign on the Erie is a Liberty Loan train. This train is now on its way from Hammond, Ind., to Jersey City and will stop at the division points and shops on the route. With the train is the Erie's general office band. General Manager R. S. Parsons

is accompanying the train and he and local speakers will address the Erie employees at the important centers along the route.

Western Railwaymen Take \$30,000,000

In the western regional district, more complete returns have been received, so that on Monday, W. S. Bierd, the president of the Chicago & Alton and chairman of the Western Regional District Committee, was able to report that subscriptions of \$30,000,000, or 1 per cent of the total loan, had been taken by employees in that district.

In the bulletin issued Monday to executive officers of Western railroads, stating this fact, Chairman W. G. Bierd added:

“While the results so far secured are highly gratifying, now that all lines have completed their campaign organizations, it is expected that subscriptions toward the next thirty millions, or an additional 1 per cent of the total loan, should be reported much more rapidly than the first thirty millions.

“All carriers should put forth renewed efforts with this end in view.”

Monday's summary showed that 437,645, or 58.08 per cent of the employees of Western roads, had subscribed \$33,387,525 for Third Liberty Loan bonds. The average subscription per capita was \$76.29.

Ten Western railroads had reported up to Monday subscriptions exceeding \$1,000,000. They were:

Road	Per cent of employees	Subscriptions	Average
Chicago, Rock Island & Pacific	96.22	\$2,689,150	69.21
Chicago, Milwaukee & St. Paul	74.30	2,461,150	69.84
Northern Pacific	83.58	2,398,450	90.00
Chicago & North Western	60.19	2,337,300	71.90
Atchison, Topeka & Santa Fe	49.43	2,327,350	73.60
Great Northern	58.83	1,987,050	99.35
Missouri Pacific	71.25	1,961,450	70.97
Chicago, Burlington & Quincy	50.44	1,714,450	73.51
Union Pacific	55.21	1,172,800	73.88
Southern Pacific	33.21	1,109,850	71.90

Seventy-two railroads reported that over 70 per cent of their employees had subscribed to the Third Liberty Loan.

Southern Regional Committee

E. T. Lamb, president of the Atlanta, Birmingham & Atlantic, is chairman of the Liberty Loan Committee which has been appointed for the southern regional district by Regional Director C. H. Markham. The other members of the committee are H. W. Miller, vice-president of the Southern; C. A. Wickersham, general manager of the Georgia Railroad; and W. L. Stanley, assistant to president of the Seaboard Air Line.

Committees of Employees

The Liberty Loan campaign on the railroads has been so well organized that every railway man has been reached by the members of a committee in his department or branch of service. Apparently the work of some of these committees has been as insistent as it has been enthusiastic. The Altoona Tribune, for example, had the following interesting story in a recent issue:

“Twenty-six men in one Altoona machine shop department yesterday placed a strenuous objection with officials when three of their mates failed to acquire war bonds of the present issue. An ultimatum was issued and if the trio continues to ignore the solicitors after 7 a. m. today they must quit or the twenty-six loyalists will.

“Several clerks in one of the offices at the same shops yesterday made it known they weren't going to wear the red-white-and-blue button designating the subscribers to the third loan. A petition was hastily drawn up and all other workers in the office signed it, stating they would resign if the status of the affair wasn't changed favorably.”

efficiency has a direct bearing on safety, economy is of but secondary importance. Figs. 3 and 4 show the two designs of holders employed, and the central rib mentioned may be seen. All dimensions on the figures are given in millimeters.

Treated Canvas Roofing for Steel Passenger Cars

CONSIDERABLE DIFFICULTY has been experienced in the maintenance of the roofs on steel passenger equipment where steel has been used throughout in the construction. Owing to the action of cinders along the top of the cars there is great difficulty in keeping the steel properly covered with a protective coat of paint. As soon as the paint covering becomes broken or cracked, deterioration of the steel plates begins and proceeds rapidly especially where the joints in the roof plates project above the smooth surface of the roof, due to the formation of sulphuric acid from the action of water on the cinders. It is also a fact that no matter how stiff the construction of a car may be, there is always more or less weaving of the roof, which is evidenced by the condition of the joints in the sheets after they have been in service for some time.

A special type of canvas roofing, the material of which is impregnated with a treatment making it both waterproof and proof against mildew has been furnished for several years by the Tuco Products Corporation, 30 Church street, New York, and much of this material is now in use on



Type of Passenger Roof Construction Using Wood Sheathing and Treated Canvas Covering

wood passenger equipment. In the application of this material the use of white lead is unnecessary, thereby effecting a saving of labor and material. Otherwise, the same practice is followed as with any other canvas roofing, the special advantage being that should the protecting film of paint become cracked, thereby permitting moisture to come directly in contact with the material, it does not deteriorate from mildew as is the case with untreated canvas. Within the past few years a number of railways have adopted a semi-wood roof construction in order to secure the advantages of this type of roof covering, which has demonstrated its advantages through many years of service on wooden equipment.

A type of wood roof construction for steel equipment is shown in the illustration. The tongued and grooved wood sheathing is applied directly to furring strips bolted to the

steel carlines and projecting slightly above their upper surfaces. Intermediate wood carlines are placed between the steel carlines to provide additional nailing strips for the sheathing. The Tuco Standard car roofing is then applied to the sheathing in the usual manner. This construction provides its own insulation, a considerable saving in itself, and also eliminates the troubles with the joints of the metal roof, due to the weaving action and the rapid deterioration of the projecting surfaces caused by the impinging action of the cinders and corrosion. There are now a large number of steel passenger cars on which this or a similar type of roof construction and Tuco Standard roofing has been used.

The treated canvas roofing when properly applied and well sanded is fireproof and serves all the purposes of the steel roof. In addition its life is much greater than that of the steel. Cars with roofs covered with this material are now in service with the roofs in good condition after ten years' service. The material is furnished in three weights, designated as "CC," "AA" and "FF," which correspond to No. 4, No. 6 and No. 8 duck, respectively.

Air Brake Association Will Hold Convention

THE AIR BRAKE ASSOCIATION will hold its 25th annual convention in Cleveland, Ohio, May 7 to 10, with headquarters at the Hotel Winton.

Director Prouty, of the division of public service and accounting of the Railroad Administration, in a letter dated April 23 to President C. H. Weaver, has advised that Director General McAdoo desires to encourage members to attend the convention as it seems to be understood that the Air Brake Association members are the men who are actually on the firing line in keeping the air brake apparatus in a state of perfect efficiency. Transportation is granted to those members in actual work of repairing, maintaining and conditioning air brakes. Leave of absence without loss of pay has also been granted to those members attending.

The work of the convention this year will be directed especially toward greater safety of train movement, less expense of maintenance, and more efficient inspection with a particular effort to put air brakes in a condition to help the roads through the coming severe winter campaign. The important papers to be presented are as follows:

The subject "What Is the Safe Life of an Air Brake Hose?" is presented by a painstaking committee which has made upwards of 50,000 examinations of air brake hose at different terminal and repair points to ascertain, if possible, when a hose actually becomes dangerous if left in service. Porosity of the rubber and rupture of the rubber and fibre frequently cause break-in-tuos of long trains, collisions of the parts running together, frequently throwing wreckage on the opposing track and menacing the safety and lives of other trains due to collisions. The committee's report embodies suggestions as to how accidents may be prevented if due care is taken to remove worn out hose.

"Recommended Practice of the Air Brake Association" is a code of rules covering the installation, maintenance and repair of air brake parts on locomotives and cars. Each year's experience brings information which, if employed, not only reduces the cause of air brake maintenance, but makes it better and produces greater safety.

"Conditioning Air Brakes on Freight Trains to Prevent Troubles Enroute," is the subject of a committee report and embodies detailed instruction to all workers concerned in conditioning air brakes on locomotives and freight cars in yards and shops.

"Maintenance of the 8½-in. Cross Compound Compressor" is a committee report of investigations made in very severe service where compressed air production is absolutely essential to the safe handling of trains down heavy grades. A considerable portion of the paper is given over to recommendations as to length of piping with a view of reducing the likelihood of water getting into the air brake system in winter time, freezing up and causing train accidents.

"Preventing Shocks on Long Passenger Trains" is a report prepared after two years' investigation by a large committee composed of the best air brake men on the roads throughout the country. Every phase of shocks coming from brake applications has been investigated, weighed and recommended for.

"Repair and Maintenance of Feed Valves" is an individual author's paper covering his experience of several years' specialist work to maintain feed valves to an accuracy of movement which insures no stuck brakes, wheels skidding, etc.

Improved method of M. C. B. freight brake stencilling, no cleaning, etc., is a recommendation from the North West Air Brake Club, suggesting a betterment of this practice which will enable the work to be done more cheaply, more effectively and with better maintenance results than the old practice.

Eliminating Trap Car Service

WITH INCREASED COMPLICATIONS in large railway terminals there has been a tendency to eliminate the use of standard equipment for the shorter hauls. Trap car service has been found to be uneconomical and slow in certain cases, leading to the use of motor truck service or some other substitute. In other instances traffic congestion has led to specific restrictions on switching and trap car service to permit a greater use of the existing facilities for long haul service. One arrangement undertaken recently has been the use of tractors and freight house trucks to haul

just wide enough for two trucks to pass without difficulty. The trucks were loaded in warehouse A, where the tractor hooked onto a train, varying from two to six trailers, and proceeded through the building, across the tramway up a two per cent grade on a sharp double turn and into the main warehouse where the trailers were dropped at elevators or doorways for final unloading. The tractor was then hooked onto a train of empty trailers, or, as was the case much of the time, a train loaded with material for warehouse A, and the return run was made.

It was figured at the time the various methods were being considered, that it would cost approximately \$4 per car to move this material by railroad and as there were 200 carloads to be moved, the total cost, exclusive of the loading and unloading, would have been about \$800. Instead, five tractor trains were used, each handled by two men who



Tractor with a Six-Car Train

were paid an average of \$3 per day each or a total of \$30 per day. As it required four days to complete the job, the total labor charge was \$120. It cost approximately \$2.50 per day each to operate the tractors, or \$12.50 a day, or \$50 for the four days' operation. At 6 per cent interest on the investment in the tractors, amounting to \$5.64, and with \$2 for depreciation at 20 per cent per year, the total cost of handling the 200 carloads of package material amounted to \$177.64. In all about 2,000 tons were handled at a cost of about 8 4 5 cents per ton. This charge, of course, is for cartage only. The cost of loading and unloading either trucks or cars has not been figured. The equipment used by the government on this job was five Type Z Mercury tractors made by the Mercury Manufacturing Company, Chicago, which were equipped with 50 A-6 Edison batteries each.



Rounding a Curve on a Two Per Cent Grade

freight from one warehouse to another in Chicago over a distance of 1,678 ft. and thereby eliminate the use of freight cars and the switching service which this transfer would otherwise have involved.

The goods were transferred from government warehouse at Ashland avenue and Thirty-ninth street, for a distance of 678 ft. through this building, across a 1,000 ft. wooden tramway and distributed to their proper storage place in the main warehouse at Thirty-ninth and Robey streets. The tramway was built of 2-in. by 6-in. pine planks and is

AMERICAN RAILROAD MEN IN MANCHURIA—A despatch of the Harbinsky Vestnik from Vladivostok says that a detachment of 20 American railroad men has arrived here for work on the Manchurian Usuri Railway, in the northeast corner of Manchuria. Many American engineers have been arriving in Siberia to serve on the Siberian railway. By way of experiment, some of them operated trains at Tomsk with a remarkable result. Russian engineers thought that, at best, their American comrades would be able to run 24 trains only during the 24 hours. It was therefore with great surprise and admiration that they found the Americans actually running 70 a day without a hitch. Thanks to their skill, the freight, which had accumulated at Tomsk and neighboring stations, was disposed of in the course of one week.—*The Far Eastern Review* (December, 1917).

General News Department

Snow early this week blocked trains on the Creston, Iowa, division of the Chicago, Burlington & Quincy and on the Rock Island, near Beatrice, Neb.

The **Railway Development Association** announces that its annual meeting, scheduled to take place in May, has been abandoned on account of the war.

Sir Sam Fay, formerly general manager of the Great Central has been appointed director general of movements and railways, in the British Government, succeeding **Sir Guy Granet**. The director general has a seat on the war council.

C. V. Gallagher, assistant general freight agent of the Minneapolis, St. Paul & Sault Ste. Marie, with office at Chicago, has been appointed western traffic manager of the Grain Corporation of the United States Food Administration, with headquarters at Chicago.

Senator E. D. Smith, of South Carolina, chairman of the Senate Committee on Interstate Commerce, has been elected chairman of the special Joint Congressional Committee on Interstate Commerce, which has been conducting a general investigation of the problems of railroad regulation, succeeding the late **Senator Newlands** of Nevada.

At a meeting of the directors of the **Illinois Manufacturers' Association** in Chicago on April 23, resolutions were passed lodging a formal protest with the director general of railroads and the regional directors for the abolition of line traffic officers. The resolutions claim that the closing of the offices will inconvenience shippers and is no real step towards economy.

Bids of the car builders have been under consideration this week and orders were expected to be placed on Thursday. The locomotive specialty manufacturers were asked on Wednesday to submit bids by April 29, which they were requested to itemize showing the amount of any royalties on patents. The mechanical committee is to meet on Tuesday to consider final designs for locomotives and of the question of specialties.

Dining cars, hotels and restaurants, of the Southern Pacific, now serve no wheat or wheat products of any kind. This action follows the plea of the U. S. Food Administration for still further conservation of wheat. The Southern Pacific chefs are attending special cooking schools to learn the utmost use that can be made of other cereals. This road serves approximately 6,000,000 meals annually and this discontinuance of the use of wheat will effect a large reduction in the amount consumed.

A fine of \$24,000 has been imposed on the Toronto Railway Company of Toronto, Ontario, for failure to provide new street cars as ordered. This is by the action of the Ontario Railway and Municipal Board. A fine of \$1,000 a day for twenty-four days. The board has adopted this order as a penalty for not placing one hundred new cars on the lines as ordered by the board more than a year ago. This action by the board was made possible by legislation passed at the last session of the Ontario Legislature. The act fixed the maximum fine at \$1,000 a day, and the board imposed it from the time the bill received the assent of the Lieutenant-Governor on March 26 until April 19.

R. H. Kendall, examiner of the Interstate Commerce Commission, is holding a hearing at Chicago this week on the protest of the New Orleans, Texas & Mexico on the tentative valuation prepared by the division of valuation of the Interstate Commerce Commission. Those who have so far testified include: W. D. Pence, member of the engineering board, division of valuation; I. G. Hedrick, consulting engineer, of

Kansas City; C. H. Chamberlin, formerly chief engineer of the Texas & Pacific, and I. A. Cottingham, special engineer and chairman of the valuation committee of the Southern Pacific, Texas and Louisiana lines. The hearing will later adjourn to some point on the protesting road to discuss the land matters that are in dispute.

An **Associate Statistician**, at from \$3,000 to \$4,500 a year is advertised for by the United States Civil Service Commission to fill a vacancy in the Interstate Commerce Commission. The duties of the appointee will be to take charge of statistical investigations and to assist the statistician in planning the statistical work of the Bureau of Statistics. Competitors will not be required to report for examination at any place, but will be rated upon the sworn statements in their applications and upon corroborative evidence adduced by the Commission. They must have graduated from a college or university of recognized standing and have had at least three years' responsible experience in directing economic and statistical investigations; and must show that they have made a general study of railway transportation problems and have had actual experience in railroad accounting, or show by other evidence that they are proficient in handling railroad statistics. Applicants must have reached their twenty-fifth but not their fiftieth birthday, and must file their applications with the Civil Service Commission, Washington, by May 14.

The Liberty Loan

Returns from western railroads received up till noon of April 24 show total subscriptions to the Third Liberty Loan of \$37,353,000, or an increase of \$1,759,000 in the last 24 hours; 465,000 out of 751,000 employees of the western roads have so far subscribed to the loan. The Rock Island system leads with subscriptions for 98.55 per cent of its employees.

Railway Signal Association

The Journal of this association will be issued about June 20, notwithstanding the omission of the summer meeting of the association. This issue of the Journal will contain the minutes of the meeting which was held in Chicago last month, together with such reports of regional committees as may be available. It is the intention of the secretary also to print all reports of standing and special committees which may be received prior to the date of going to press.

Rock Island's Gifts to Its Soldiers

Officers and employees of the Rock Island System have shipped tobacco costing \$324 and flashlight equipment costing \$330 to the former Rock Island men who now compose Company B, Thirteenth Engineers (Railways) in France. Because the train rules under which the men work do not permit the use of ordinary lanterns, it was thought that flashlights would be of service to them. Consequently, equipment sufficient to last the company over a year was forwarded, consisting of 184 flashlights, 1122 extra batteries and 200 Mazda lamps.

Meat Train Schedules on Western Roads

In a circular dated April 17 the regional director of western railroads announced revised schedules for trains carrying packing house products from Missouri river points and South St. Paul and also new rules to apply in handling those trains. Under this order cars must reach the first icing station within 24 hours from the loading platform. The arrangement of schedules to permit re-icing within each 24-hour period will also apply to individual cars moving from distributing centers for distribution

from the car at one station or by local service to several stations. Investigation of damage claims indicates a lack of attention to the re-icing of cars set out for bad order, and it is ordered that local arrangements be made, if necessary, to re-ice such cars, to prevent loss. Empty refrigerators must be returned to loading points regularly and without unnecessary delays. To economize in transportation and to insure regularity in movement, refrigerator cars should be returned to packing centers in such a manner as will balance the loaded haul.

Loss of Foodstuffs in Transportation

In a recent bulletin E. D. Hawley, superintendent of freight claims of the Pere Marquette, throws light on the extent of losses of foodstuffs in transportation. In a period of eight months that road paid over \$40,000 for loss and damage to food and foodstuffs, as outlined below:

Butter	\$1,721	Meats	\$2,189
Cheese	429	Poultry	572
Eggs	2,283	Grains	5,174
Flour	1,212	Flour	5,538
Potatoes	4,649	Groceries	5,552
Vegetables	544	Beans	4,700
Live stock	1,334	Sugar	4,259

Mr Hawley estimates that this loss represented enough provisions to feed 40,000 people for one day or, say, 100 persons for more than a year. Some of this loss, is due to accidental causes, but the greater part is due to carelessness on the part of either shippers and carriers; all avoidable if we could have "safety first" at 100 per cent efficiency.

Women in Railroad Service

The Pennsylvania Railroad now has in its service 6,513 women, an increase of more than 5,000 since May 1, 1917. The number of females in each of several occupations is given as follows:

Clerks and stenographers	3,551	Mechanics' helpers	5
Telephone operators	778	Painters	4
Track laborers	293	Hammer operators	6
Messengers and assistant messengers	192	Turntable operators	2
Typists	121	Power operators (electrical)	7
Machine hands	29	Cool inspectors	1
Draftswomen	20	Total	5,009

The number of women now employed on prominent English roads is given in a recent statement as follows:

London & Northwestern	8,392	Northeastern	8,520
Great Western	6,174	Great Central	3,200
Midland	9,000	Glasgow & Southwestern	1,202

The Midland has increased its forces by 2,700 since last July. Over 1,000 of the women on the Northeastern are employed in the shops, making shells.

To Expedite Movement of Government Lumber Orders

In order to insure the filling of government orders for spruce and fir lumber the regional director of western railroads has notified railroads in Idaho, Oregon and Washington that all shipments made on government orders must be accepted and moved promptly to destination; and mills working on government orders must be furnished cars sufficient to move as much of their side cut as may be necessary for continued efficient operation of their plants. No car loaded by a mill on a commercial order shall be re-consigned, nor shall such a car be loaded until assurance has been given that it will be promptly unloaded at destination. Side cuts, consisting of commercial lumber from any one mill, shall not exceed two cars for one car of government orders; and must be further limited to such shipments as may be necessary for continued efficient operation of the plant.

Responsibility for determining what cars shall be furnished under the above-mentioned conditions and the places where and the times when they will be needed has been entrusted to a committee representing the government, composed of Col. Disque, Col. Bloedel and H. B. Vanduser. This committee will discharge its responsibility through requests made by it upon J. C. Roth, or some other authorized representative of the Car Service Section of the Railroad Administration. The committee and the Car Service Section will at all times work in close co-operation, to the end that the Railroad Administration may be promptly advised of the need of cars.

Safety Council Meeting

The executive committee of the Steam Railroad Section of the National Safety Council met in Washington, D. C., on April 2. J. T. Broderick, supervisor of special bureaus of the Baltimore & Ohio and chairman of the accident causes committee, exhibited a report showing in detail the ten most prolific causes of injuries in the transportation, maintenance of way and mechanical departments. R. S. Jarnigan, assistant to the general safety agent of the New York Central lines and chairman of the grade crossing and trespassing committee, reported that all city ordinances and rules of public service commissions and laws passed during the past year affecting safety in transportation have been abstracted for presentation to the annual congress of the Council next fall.

H. W. Belpap, manager of the Safety Section, Division of Transportation of the United States Railroad Administration, attended the meeting and outlined the relation of the Safety Section to individual railroads. He told of the appointment of regional representatives to supervise safety work as heretofore noticed in the *Railway Age*.

C. H. Blakemore, chairman of the safety commission of the Norfolk & Western and chairman of the membership committee, reported the receipt of the following additional memberships, the Georgia & Florida, the Augusta Southern, the Louisiana & Northwest, the Pacific Great Western, the Pittsburgh, Allegheny & McKees Rocks and the Lake Champaign & Moriah. It was announced that questionnaires sent out by the Council in the future will be handled by the officers of each section. They will be mailed out one at a time, separate from the bulletins, and in no case oftener than every two weeks. The meeting of the executive committee was held under the direction of H. J. Bell, chairman (safety inspector of the Chicago & North Western) and C. M. Anderson, secretary (superintendent of safety of the Nashville, Chattanooga & St. Louis).

Recent Circulars Issued by M. C. B. Association

Circulars No. 28 to 33 inclusive, were issued on March 20 by the executive committee of the Master Car Builders' Association.

Circular No. 28 calls attention to the absolute necessity of having all cars equipped with safety appliances by September 1, 1919 and points out that in order to accomplish this it will be necessary and advisable to equip empty foreign cars when passing over the regular freight car repair tracks. The equipment can thus be applied without undue detention to the car. Under the provisions of Rule 33, the repairing line may be reimbursed for the expense of equipping cars with these appliances.

Circular No. 29 is an answer to the question which has been raised as to how the braking power at the brake shoe should be figured in the specifications regarding the adjustment of hand brake power on tank cars.

Attention is called in Circular No. 30 to the necessity from the standpoint of safety that all axles purchased should conform fully to the standards of the association. Axles are being made and offered to railroads which do not conform to the M. C. B. standards. They are made full at the center and hub, but between these two points are under standard size. The circular contains an illustration of the axle in question, that of 100,000 lb. capacity, showing in broken lines the outline of the rough forge axles which are being offered.

In circular No. 31 the executive committee announces the discontinuance of the requirements of circular No. 20, asking for reports as to the number of cars held for material ordered from the owners.

In circular No. 32 is announced an extension of the date after which the requirements for the adjustment of hand brake power on tank cars, set forth in circular No. 22, become effective. The extensions are: (1) On new equipment built after July 1, 1918, (2) on existing equipment by January 1, 1921.

In circular No. 33 the executive committee asks for a statement from the various railroads showing the location on each road of all triple valve test racks which fully conform to the standard requirements of the association for testing triple valves.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1918

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Total, Operating revenues, Maintenance of way and structures, Equipment, Traffic, Trans-Operating expenses, Total, Operating ratio, Net from operation, Railway tax accruals, Operating income (or loss), Increase comp. with last year.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1918

Name of road.	Average mileage operated per cent.	Operating revenue.		Operating expenses.		General.	Total.	Operating ratio.	Net railway operating income.	Railway operating income accruals.	Operating income (or loss).	Increase or decrease last year.
		Freight.	Passenger.	Total.	Trans- portation.								Traffic.
Union R. R. of Idaho.....	8	\$98,379	\$55,419	\$155,892	\$73,555	\$111,659	\$2,887	14.03	\$134,014	\$8,312	(\$125,702)	\$5,184
Union R. R. of Iowa.....	318	579,992	40,973	665,128	30,783	303,138	6,105	32.53	332,999	5,180	226,034	229,815
Vermilion.....	2,119	1,847,410	584,257	2,435,367	307,018	561,904	142,350	41.13	1,254,958	35,209	1,219,749	1,035,880
Washington State.....	10	1,147,100	1,147,100	2,294,200	66,239	1,365,344	84,173	36.91	1,928,861	10,469	1,918,392	1,678,848
West. Maryland.....	707	782,928	65,634	848,562	154,023	272,394	32,545	36.54	966,544	43,665	902,879	360,904
West Jersey & Seashore.....	359	1,252,669	267,617	1,520,286	159,191	102,469	47,721	105.19	477,231	43,260	433,971	350,904
Wheeling & Lake Erie.....	512	591,212	31,939	623,151	114,525	370,207	5,442	61.408	158,100	48,260	206,375	177,758
MONTH OF FEBRUARY, 1918												
Alabama Great Southern.....	312	365,374	160,363	525,737	51,600	204,290	12,668	73.55	148,768	20,665	128,003	49,383
Arizona.....	39	272,608	44,452	317,060	12,945	20,893	3,058	18.98	184,794	10,700	174,094	14,147
Arizona Eastern.....	377	272,608	44,452	317,060	38,416	78,430	15,760	55.44	152,284	17,770	134,514	75,371
Atlantic, Birmingham & Atlantic.....	639	258,653	51,616	336,312	68,999	10,455	12,014	93.40	221,995	15,709	206,286	45,198
Atlantic City.....	170	51,801	13,074	64,875	26,182	19,512	935	121.06	27,579	11,160	38,739	16,925
Atlantic Coast Line.....	4,796	2,740,631	1,310,884	4,357,022	423,553	658,298	56,314	1,632,209	94,228	2,895,992	1,101,770	1,101,770
Atlantic City & Ocean City.....	7	21,671	7,013	28,684	1,352	4,109	1,833	55.707	22,851	2,464	20,387	4,150
Baltimore & Annapolis.....	631	227,559	50,888	292,554	37,770	31,156	10,720	102.61	133,400	12,301	121,099	108,798
Baltimore & Chesapeake & Atlantic.....	31	21,671	7,013	28,684	1,352	4,109	1,833	55.707	22,851	2,464	20,387	4,150
Baltimore & Annapolis.....	631	227,559	50,888	292,554	37,770	31,156	10,720	102.61	133,400	12,301	121,099	108,798
Bessemer & Lake Erie.....	308	509,802	27,735	537,537	61,119	256,466	9,690	273,182	59,049	104,600	48,440	79,547
Birmingham & Gulfport.....	36	199,614	4,450	204,064	34,781	4,782	1,833	44.28	126,619	9,965	116,654	56,537
Birmingham & Nashville.....	2,478	3,342,320	640,615	4,282,935	429,549	984,428	46,382	1,699,163	97,346	3,396,743	1,451,967	1,451,967
Birmingham & Northern.....	374	271,702	18,439	290,141	42,918	20,909	28,763	88.73	145,919	14,591	131,328	104,968
Buffalo & Susquehanna R. R. Corp.....	252	1,917,347	5,403	1,922,750	29,223	42,918	7,432	61.365	37,446	30,384	7,062	14,263
Central of Ga.....	1,918	1,085,496	397,131	1,644,265	208,172	253,691	43,380	1,077,369	85,552	866,895	64,764	266,090
Central of Vermont.....	411	182,048	55,103	237,151	46,831	20,671	11,834	132.45	86,927	17,400	104,333	76,864
Charleston & Western Carolina.....	342	185,091	43,275	228,366	24,602	7,559	4,759	89.648	190,269	9,000	181,269	118,494
Chesapeake & Ohio Lines.....	2,478	3,342,320	640,615	4,282,935	429,549	984,428	46,382	1,699,163	97,346	3,396,743	1,451,967	1,451,967
Chicago & Alton.....	1,566	1,244,166	245,444	1,618,333	169,965	256,263	46,210	1,575,577	97,339	42,256	30,999	270,183
Chicago & Eastern Ill.....	1,131	1,244,166	245,444	1,618,333	169,965	256,263	46,210	1,575,577	97,339	42,256	30,999	270,183
Chicago & Erie.....	269	494,546	30,252	603,169	85,315	114,699	14,886	396,159	18,161	47,465	76,315	103,831
Chicago & Northwestern.....	8,094	6,430,114	1,708,894	8,069,551	980,641	1,641,045	109,000	3,998,265	191,807	6,971,266	426,183	1,021,795
Chicago, Ind. & Quincy.....	9,373	3,045,880	1,784,122	4,830,002	846,842	1,895,347	113,398	3,961,023	234,537	1,712,366	1,258,660	1,322,547
Chicago Great Western.....	1,636	896,135	305,403	1,301,538	144,626	209,062	41,355	616,997	38,763	1,152,258	435,266	6,257
Chicago, Ind. & Lake.....	1,636	439,091	195,398	634,489	57,671	71,654	17,465	361,080	28,675	1,152,258	435,266	6,257
Chicago, Joplin & Gulf.....	174	237,609	79,793	334,761	45,971	31,080	9,792	231,635	11,436	31,900	15,666	24,449
Chicago, Rock Island & Pacific.....	7,824	2,373,373	1,717,991	4,091,364	821,096	1,548,325	130,816	3,089,522	214,604	5,836,120	90,300	378,840
Chicago, St. Paul, Minn. & Omaha.....	1,749	1,091,211	406,516	1,618,276	120,885	170,885	30,768	945,938	46,149	1,488,200	90,000	169,577
Chicago, Terre Haute & Southwestern.....	374	271,702	18,439	290,141	34,215	99,843	3,812	137,276	8,641	287,225	96,400	76,280
Cincinnati, New Orleans & Pacific.....	337	527,346	218,455	745,801	61,662	82,696	21,327	398,905	91,404	57,594	338,362	147,237
Cin. & New Orleans.....	337	527,346	218,455	745,801	61,662	82,696	21,327	398,905	91,404	57,594	338,362	147,237
Cleveland, Cin. & St. Louis.....	2,366	2,666,046	759,647	4,091,364	209,947	381,621	2,652	3,389	150,368	88,838	18,400	17,334
Coal & Coke.....	1,107	681,191	118,684	849,875	410,947	196,514	85,536	3,433,933	84,274	644,844	172,447	245,760
Colorado & Southern.....	1,103	705,802	133,597	839,400	170,270	182,000	14,886	422,964	3,455	5,000	11,056	15,352
Colorado, Denver & Northern.....	1,103	705,802	133,597	839,400	170,270	182,000	14,886	422,964	3,455	5,000	11,056	15,352
Delaware, Lack & Western.....	878	1,679,626	168,331	1,847,957	351,509	507,525	70,230	1,203,999	82,943	213,999	67,640	31,674
Delaware, Lack & Western.....	878	1,679,626	168,331	1,847,957	351,509	507,525	70,230	1,203,999	82,943	213,999	67,640	31,674
Denver & Rio Grand.....	2,557	1,068,149	209,919	1,278,068	203,885	300,019	64,915	1,069,567	93,571	3,360,500	601,477	551,146
Denver & Salt Lake.....	255	52,717	13,108	71,660	36,245	50,670	935	52,847	3,596	1,582,571	77,776	111,867
Denver & Salt Lake.....	255	52,717	13,108	71,660	36,245	50,670	935	52,847	3,596	1,582,571	77,776	111,867
Detroit & Mackinac Island.....	381	69,168	21,669	90,837	14,622	23,832	2,130	52,590	9,889	1,621	60,971	8,881
Detroit & Mackinac Island.....	381	69,168	21,669	90,837	14,622	23,832	2,130	52,590	9,889	1,621	60,971	8,881
Detroit, Toledo & Iron Range.....	431	883,807	7,985	105,919	25,438	33,686	3,330	100,403	5,885	116,848	8,960	169,863
Duluth & Iron Range.....	284	733,690	18,671	102,858	64,364	62,871	1,288	100,350	16,403	235,320	238,500	43,542
Duluth, Mass. & Northern.....	410	92,564	29,831	124,931	104,511	111,874	2,936	31,270	39,184	273,677	248,253	91,993
Duluth, Mass. & Northern.....	410	92,564	29,831	124,931	104,511	111,874	2,936	31,270	39,184	273,677	248,253	91,993
Duluth, South Shore & Al.....	901	177,354	58,277	235,631	65,621	48,615	8,422	159,280	7,996	290,223	11,531	38,610
Duluth, South Shore & Al.....	901	177,354	58,277	235,631	65,621	48,615	8,422	159,280	7,996	290,223	11,531	38,610
Empire State.....	875	601,605	65,610	667,215	24,759	34,276	2,769	50,824	5,841	1,018,770	66,000	54,118
Empire State.....	875	601,605	65,610	667,215	24,759	34,276	2,769	50,824	5,841	1,018,770	66,000	54,118
Florida.....	1,989	3,490,517	656,175	4,146,692	1,500,065	2,635,186	143,884	5,397,448	113,872	68,316	236,892	895,230
Florida, Johnson & Glenview R. R. Co.....	88	300,353	4,005	344,660	6,947	35,391	570	64.10	27,797	4,500	23,297	820
Florida, Johnson & Glenview R. R. Co.....	88	300,353	4,005	344,660	6,947	35,391	570	64.10	27,797	4,500	23,297	820
Ft. Smith & Western R. R. Co.....	453	717,100	133,198	850,298	18,570	27,844	3,732	628,666	91,809	8,194	3,194	6,012
Ft. Smith & Western R. R. Co.....	453	717,100	133,198	850,298	18,570	27,844	3,732	628,666	91,809	8,194	3,194	6,012
Galveston, Wharf & San Ant.....	1,113	116,962	39,264	156,226	11,097	16,983	1,450	106,660	6,616	13,800	92,860	10,740
Galveston, Wharf & San Ant.....	1,113	116,962	39,264	156,226	11,097	16,983	1,450	106,660	6,616	13,800	92,860	10,740
Ga., Southern & Florida.....	462	1,146,943	80,251	1,227,194	36,407	68,811	109,105	8,612	1,146,943	36,293	1,110,650	284,400
Ga., Southern & Florida.....	462	1,146,943	80,251	1,227,194	36,407	68,811	109,105	8,612	1,146,943	36,293	1,110,650	284,400
Great Northern & Ship Island.....	3,7	170,778	41,308	212,086	33,241	29,685	3,920	60,816	6,623	137,726	17,100	44,001
Great Northern & Ship Island.....	3,7	170,778	41,308	212,086	33,241	29,685	3,920	60,816	6,623	137,726	17,100	44,001
Gulf, Mobile & Northern.....	460	148,185	61,188	209,373	22,450	32,387	4,192	106,676	7,310	51,841	55,835	5,174
Gulf, Mobile & Northern.....	460	148,185	61,188	209,373	22,450	32,387	4,192	106,676				

More Acknowledgments of Tobacco Shipments

F. A. Ioor, chairman of the Railway Regiments' Tobacco Fund, Chicago, has received acknowledgments of the receipt of shipments of tobacco from three railway regiments in France. Ernest Graves, lieutenant colonel of the Fifteenth Regiment, U. S. Engineers, writes under date of March 16, that two shipments of tobacco have been received in good condition and distributed to the men. The first shipment contained 240 lb. of Bull Durham and 5 lb. of Tuxedo smoking tobacco and the second shipment contained 540 lb. of Bull Durham and 15 lb. of Lucky Strike. He stated that "There is no doubt but that the men greatly appreciated both shipments."

H. Burgess, colonel of the Sixteenth Engineers Railway Regiment, has written under date of March 12 that the shipment made on December 16 finally reached them although it arrived and was put into the warehouse just a few hours before the latter burned. "The result was that our tobacco was burnt in a fashion different from that intended. One case however, was rescued and distributed, and all the men very much appreciate the gift."

H. H. Maxfield, lieutenant colonel, commanding the Nineteenth Engineers, Railway Regiment, wrote on March 16 to acknowledge receipt of a shipment of tobacco and stated "The men appreciate this tobacco a great deal more than might be expected, since American troops are entirely dependent upon supplies sent from the States."

Railroad's Initiative Saves Great Food Crop

In response to appeals for maximum food production a year ago the acreage of pinto beans was increased over 500 per cent. Pinto beans, which are particularly adapted to dry regions, were grown extensively on lands which had never produced before, particularly in Colorado, New Mexico and southern Wyoming, and thus constituted a real addition to the food production of the country. When the farmers came to sell their crop, however, it was found that there was no market. This was due to the fact that pinto beans were not known in consuming centers and, while equal to white beans in food value, would not sell because of their spotted appearance.

The Burlington road, which had been particularly active in the spring of 1917 in encouraging the planting of these beans on dry lands and had distributed over 200,000 lb. of bean seed to several thousand farmers, felt a responsibility for finding some means of disposing of the crop, and an extensive publicity campaign was initiated, under the direction of J. B. Lamson, agriculturist. This included the distribution of 25,000 advertising circulars giving facts about the bean, 20,000 copies of recipes for cooking it and 3,000 lb. of samples of the beans. Every retailer in Chicago, every daily newspaper and all wholesalers, jobbers and brokers east of the Mississippi and north of the Ohio river and in the states of Iowa, Missouri, Minnesota and Nebraska were circularized in an effort to create a market. This plan, while effective, was not sufficiently successful to solve the problem, and Mr. Lamson made a special trip to Washington, where he presented the facts to Mr. Hoover personally, and impressed upon him the necessity of utilizing this crop and preventing losses to farmers which would discourage the maximum cultivation of dry lands in 1918. This conference resulted in Mr. Hoover's decision to buy the entire crop remaining in the hands of the growers, for the government, at eight cents a pound to the grower. Members of the agricultural department of the Burlington lines were requisitioned by the government and commissioned to make the purchase and to introduce the pinto bean into the larger cities of the country, thereby continuing the work which they had already initiated. Over 20,000 contracts were made with growers and 150 contracts with elevators in western states. As a result over 55,000,000 lb. of beans have been contracted for and approximately 700 carloads are now being shipped to eastern points as rapidly as possible. Over 300,000 cases of canned pinto beans have been sold to the British army and 150 carloads of the dry beans have been sold to the French government for shipment abroad. The remainder of the beans are being concentrated in warehouses in the larger cities of the country to be disposed of as the market demands or to be shipped to the armies abroad. The Food Administration has arranged to sell pinto bean seed to growers at nine cents a pound, whereas they paid from 15 to 20 cents last year; as a result there is now a prospect of an increase in production over the large yield of last year of about 20 per cent.

Traffic News

Anthracite coal shipments in March amounted to 7,276,777 tons or 280,000 tons each working day. This compares with 6,989,075 tons in March, 1917, and is an increase of 1,464,695 tons over February. The total exceeds by 165,827 tons the October (1917) shipments which, until now, had represented the high-water mark in monthly shipments.

Railroads under the jurisdiction of the regional director of western railroads have been asked to prepare statements showing the names, duties, annual salaries and expenses of men employed in development work, both industrial and agricultural. The request specifies that the list should include those whose titles are colonization agent, immigration agent, industrial agent, agriculturist, etc.

Thirty-three freight and passenger offices in Boston are to be closed at once, according to the Boston Transcript. Those of the Baltimore & Ohio, the Chicago & North Western, the Chicago, Rock Island & Pacific, the New York, Chicago & St. Louis, the Pennsylvania and the Southern have already been closed. The three roads centering in Boston—the Boston & Maine, the Boston & Albany and the New York, New Haven & Hartford—will establish a joint passenger and freight office in a central locality.

The Chicago, Rock Island & Pacific announces that in accordance with the orders of the Railroad Administration it has discontinued outside commercial offices at Atlanta, Boston, Buffalo, Cincinnati, Cleveland, Detroit, Indianapolis, Los Angeles, Louisville, Milwaukee, New Orleans, New York, Oakland, Philadelphia, Pittsburgh, Portland (Oregon), Sacramento, Salt Lake City, San Francisco, Seattle and Spokane. Shippers are advised that matters heretofore handled by these offices should be taken up with the lines on whose rails they may be located.

The statistical report of lake commerce passing through the canals at Sault Ste. Marie, Mich., and Ontario, during the season of 1917 shows that 89,813,898 tons of freight was carried in 1917 as compared with 91,888,219 tons in the season of 1916, or a decrease of about 2 per cent. There was an increase of 13 per cent in the movement of soft coal and 16 per cent in the movement of hard coal, while flour, wheat, grain, copper, iron ore and pig iron traffic decreased quite materially. The report was prepared under the direction of Col. F. W. Altstaetter, Corps of Engineers, United States Army.

Eight hundred canal boats of the old style will be available for use in the New York state barge canal this year, nearly half of this number being suitable for use in carrying grain. This statement has been made on the authority of General W. W. Wotherspoon, New York State Superintendent of Public Works. Inasmuch as the proposed construction of larger boats by the federal government will not probably provide actual means of transportation for several months yet, General Wotherspoon believes it important to encourage the owners of these old boats to make use of them without delay. He has lately made an investigation and finds in cities along the canal zone, more than 50,000 tons of freight now awaiting movement, having been delayed because of railroad embargoes.

Wheatless Dining Cars

The principal railroads are to refrain from the use of wheat foods until after the next harvest, a pledge to this effect having been given to the Food Administration on behalf of the dining car services of the country by B. S. Harvey, chairman of the administrative committee of the Association of Dining Car Superintendents. Mr. Harvey advises that 59 out of 63 dining car services in the country have ratified this pledge, and are not using wheat in any form; and the other four are expected to take similar action. Reports received at Washington from the railroads show that during the month of February the dining car services of the country saved 424,198 pounds of meats and 251,138 pounds of wheat flour.

Buffalo to Baltimore, Eight Days

Major G. F. Bailey, commanding the army motor truck service, announces that a motor truck train, carrying war materials to the Atlantic seaboard will leave Buffalo regularly every morning, and that the trip to Baltimore, Md., is scheduled to be made in eight days, as follows:

First stop, two miles west of Canandaigua, 84.15 miles; second stop, six miles east of Vernon, 109 miles; third stop, four miles west of Albany, 100.6; fourth stop, four miles south of Poughkeepsie, 82 miles; fifth stop, three miles west of Newark, 80 miles; sixth stop, three miles west of Philadelphia, 87 miles; seventh stop, Baltimore (Cohlgate Creek), Md., 79.5 miles.

The motors are to avoid large cities, and run around the outskirts of towns; and the men will sleep on the trucks and cook their own meals. Acting on complaints from certain cities, some of the drivers have been censured for running at excessive speed.

Modification of Coal Zone System

Under an order modifying the zone system of distribution, bituminous coal originating on the Pennsylvania, Monongahela, and Huntington & Broad Top Mountain railroads, and their short line connections, in the states of Pennsylvania, West Virginia and Maryland, when routed via the Pennsylvania Railroad, is embargoed from Baltimore and Washington markets. To meet this situation, the United States Fuel Administration will arrange for the essential supply to the points designated from mines on the Baltimore & Ohio, the Western Maryland, and their connections, which lines afford a much more direct route to these points. As a consequence the Pennsylvania lines can deliver increased quantities to points in Eastern Pennsylvania, New Jersey and New England. The order forbids the shipment of bituminous coal over the railroads named for delivery in Baltimore, and also all stations on the Baltimore division of the Pennsylvania from Loudon Park, Md., to Catonsville, Md., inclusive and Arbutus, Md., to Washington, D. C., and Rosslyn, Va.; including Popes Creek branch. Consumers located on the Pennsylvania and Baltimore & Sparrow's Point will continue to receive their coal at their regular points of delivery, the coal moving over the Baltimore & Ohio and Western Maryland being delivered to the Pennsylvania at junctions near destinations.

Coal Production

Production of bituminous coal increased 1,000,000 net tons, or over 17 per cent, during the week ended April 13, compared with the preceding week, according to the weekly report of the Geological Survey. The total production, including lignite and coal made into coke, is estimated at 10,947,000 net tons, an average production per working day of 1,824,000 net tons, compared with an average of 1,777,000 tons for the past year and 1,680,000 in April, 1917. Anthracite shipments rose from 32,223 cars to 37,760 cars, an increase of over 17 per cent. The percentage of full time output produced during the week ending April 6 was 61.9 per cent. The percentage of full time output lost on account of car shortage was reduced from 23.2 in the preceding week to 12.5 per cent, while the percentage lost on account of labor shortage increased from 2.6 to 14.2 per cent. The decrease of 14 per cent during the week of April 6 is attributed to the miners' holiday on April 1 and a partial one on April 6 and, the report says, "the exceptional loss of production in the week of April 6 is, therefore, to be attributed to labor shortage rather than car shortage in all fields reported, with the particular exception of the Ohio and New River districts."

In the monthly bulletin for March the production of bituminous coal, including that coked, in the first three months in 1918 is estimated at 135,514,000 net tons, an estimated increase over the same period in 1917 of 744,000 tons, or $\frac{1}{2}$ per cent, but a slight decrease compared with the same period in 1916. January, mainly because of severe weather, was an abnormally low month. Production in February was greater than in February, 1917, but less than in February, 1916. March was a record month exceeding both March, 1917, and March 1916, and was exceeded in total tons in those years only by October and November, 1917.

Commission and Court News

Interstate Commerce Commission

F. C. Donald, agent for the lines in Central Passenger Association Territory, and F. L. Bevington, J. E. Hanegan and E. F. MacLeod, agents for the western lines, have filed fifteenth section applications with the Interstate Commerce Commission proposing an increase in the charge for the one-way movement of special passenger cars to a minimum of 30 first class fares in place of 25, and a minimum of \$50 for each movement in place of \$25.

E. B. Boyd and Eugene Morris, agents for the western trunk lines and the Central Freight Association lines, respectively, have filed fifteenth section applications with the Interstate Commerce Commission proposing to establish the C. F. A. scale of class and commodity rates governed by the official classification and exceptions thereto between points in Illinois, including nearby related points in Wisconsin, Indiana, Kentucky, Missouri and Iowa, in lieu of the present rates governed by the Illinois and western classifications and the Illinois mileage scale.

Fifteenth Section Application No. 5356 filed by M. P. Washburn, as agent, for authority to make readjustment of the rates on lumber and articles grouped therewith from points of origin in the states of Florida, Georgia, Alabama, Mississippi, Louisiana, on and east of the Mississippi River, Tennessee, Kentucky, Southwest Virginia, and a few points in North Carolina to eastern port cities Virginia cities and interior basing points, has, by direction of the commission, been placed on the formal docket, and will be set down for hearing as soon as the engagements of the commission will permit.

In a hearing held at New York, April 22, conducted by George T. Bell, chief examining attorney, the Commission took testimony in a complaint of the Pneumatic Scale Corporation, Ltd., of Norfolk Downs, Mass., asking the Commission to prescribe lower freight rates on packages of merchandise in theft-proof and damage-proof metal containers. Complainant asks that such an order be directed not only to the railroads but also to the express companies of the country. C. F. Doble, sales manager of the Pneumatic Scale Corporation, declared that the use of metallic collapsible boxes would benefit newspapers and other printing interests by eliminating the waste involved in the use of wood fibre containers.

Water and Rail Rates Advanced

At the request of the United States Railroad Administration, Division No. 2 of the Interstate Commerce Commission has issued a 15th section order authorizing all carriers subject to the commission's jurisdiction without formal hearing to file schedules increasing the joint rail-and-water, water-and-rail; rail-water-and-rail rates, and all-water rates for the transportation of freight on a level not higher than the existing all-rail rates between the same points, the water rates to include marine insurance. The purpose is to enable freight to be diverted readily from rail to water lines so that they may be utilized in the most efficient way and to avoid congestion. It is provided, however, that the rail-and-water rates to and from Duluth and points grouped therewith shall not be higher than the rates to and from Chicago, and that the rail-water-and-rail rates to and from Minneapolis and points grouped therewith shall bear the relationship to the rail-and-water rates to and from Duluth and points grouped therewith as prescribed by the commission in the second Duluth case, 46 I. C. 585. The rates may be established upon not less than five days' notice. In another order the carriers are authorized to establish such rates as they may be necessary to take advantage of this authority without observing the long and short haul provision of the fourth section.

Court News

Contract for Special Service

A station agent after telegraphing about the matter told a shipper that a certain train arriving during the night would take his cattle, on which statement the shipper relied. The Arkansas Supreme Court holds that this did not constitute a contract for special service and a discrimination in violation of the Elkins Act—*Rock Island v. Stallings* (Ark.), 201 S. W., 294. Decided February 18, 1918.

Ejection of Passenger—Exemplary Damages

The Texas Court of Civil Appeals holds that the mere retention in employment by a railroad company of a conductor, after knowledge that he has wrongfully ejected a passenger, does not allow the passenger to secure judgment for exemplary damages against the company; such retention alone not being an adoption or ratification of the malice or violent conduct of the conductor.—*Texas & New Orleans v. O'Connor* (Tex.), 201 S. W., 437. Decided February 21, 1918.

Unauthorized Delivery—Ratification

The Iowa Supreme Court holds that a carrier is not liable for conversion by delivering freight before obtaining the bill of lading, if it afterwards rightfully obtains the bill. It also holds that the delivery of a shipment by the carrier to the buyer, if unauthorized, is ratified by the shipper thereafter, with knowledge of the facts, demanding payment of the price from the buyer, and the shipper is estopped to sue the carrier for conversion. The carrier cannot be held liable for conversion of the goods, consisting of giving them to some one who was not entitled to them, where the plaintiff declares that the buyer owes him the purchase price. The action was one against both the buyer and the carrier.—*Midland Linseed Co. v. American Liquid Fireproofing Co.* (Iowa), 166 N. W., 573. Decided March 6, 1918.

Notice of Claim for Damages

A bill of lading for a shipment of meat provided that claims for loss, damage or delay must be made in writing to the carrier at the point of delivery within four months. The shipper's branch manager and the railroad's freight agent both inspected the meat on arrival and found it damaged. The manager wrote the freight agent the following letter: "This is to confirm our verbal notice of the poor condition of C. R. L. car 3725." The Kansas City Court of Appeals holds, in an action for damages to the meat, that, as there was nothing in the letter mentioning any claim or intended claim of damages, it did not comply with the requirements of the bill of lading. The fact that the plaintiff was investigating the cause of loss did not necessarily mean that it had made up its mind that either of the carriers was liable.—*Cudahy Packing Co. v. Atchison, T. & S. F. (Mo.)*, 201 S. W., 623. Decided February 18, 1918.

Extracting Oil from Right of Way

In 1907 a landowner executed a general warranty deed, in the usual form, conveying to the Wichita Falls & N. W. a strip of land 100 feet wide in Wichita county, Texas, for the consideration of \$1 paid and the further consideration of the enhanced value to the remainder of the owner's land by reason of the construction of the line through it. The company built its road and fenced the right of way. In 1917 it and its lessee, the M. K. & T., leased the right of way to the W. Oil Company, empowering it to prospect for oil, gas and other minerals. In the meantime the landowner sold the remainder of his land "less the right of way." The purchaser leased the land to the P. Oil & Gas Company, which drilled many wells adjacent to the right of way. The W. Oil Company was proceeding to drill wells on the right of way property, when the P. Company sought to enjoin it. The Texas Court of Civil Appeals holds that the conveyance to the Wichita Falls & N. W. vested that company with title to the strip of land and not merely a right of way across it; and as it owned the fee of the land it could not be restrained from extracting oil

therefrom, notwithstanding the Texas statute providing that no corporation shall employ or use its property directly or indirectly for any other purpose than to accomplish the legitimate objects of its creation, or those permitted by law to be applicable.—*Crowell v. Howard* (Tex.), 200 S. W., 911. Decided January 23, 1918. Rehearing denied, February 13, 1918.

United States Supreme Court

Limitation of Liability in Bills of Lading

The Supreme Court of the United States has affirmed the judgment of the Supreme Court of Vermont (90 Vermont, 176), giving a shipper damages for loss occasioned by delay in delivering cattle as a result of the railroad's negligence. The plaintiff had shipped the cattle upon paying the reduced rate under the Uniform Live Stock Agreement. The court said, in part, by Mr. Justice Day: "In the bill of lading now under consideration there is an express agreement limiting liability from unusual delay and detention, caused by the carrier's negligence, to the amount actually expended by the shipper in the purchase of food and water for his stock while so detained. This stipulation contravenes the principle that the carrier may not exonerate itself from losses negligently caused by it, and is not within the principle of limiting liability to an agreed valuation which has been made the basis of a reduced freight rate."—*B. & M. v. Piper*. Decided April 15, 1918.

Rest, Water and Feeding Act

The Supreme Court of the United States has reversed a judgment of the Federal District Court for the Northern District of Illinois, affirmed by the Circuit Court of Appeals (234 Fed. 268), imposing a penalty for alleged violation of the Rest, Water and Feeding Act. The animals were loaded at Ringsted, Iowa, 438 miles from destination—Union Stock Yards, Chicago—at 6 P. M. October 4, and left Clinton, Iowa, 138 miles from Chicago, at 6 P. M. October 5. The ordinary schedule time from Clinton to Chicago is nine hours, but without increase of actual moving speed the run had been made in about six. While passing through Proviso, sixteen miles from destination, a drawbar came out and derailed the car. A delay of two hours and fifty-two minutes followed—not undue, the railroad contended, but the government maintained unreasonably long. Later, at Brighton Park an air hose burst, causing further delay of twenty-eight minutes. The car reached the stock yards at 9:05 A. M. October 6—thirty nine hours after being loaded. The court, by Mr. Justice McReynolds, said: "The statute must be construed with a view to carrying its humanitarian purpose into effect and the exception in favor of the carrier given proper latitude and enforced in the light of practical railroad conditions. Nothing indicates the running schedule was unduly slow; and the jury were improperly given to understand that, conceding matters were properly handled when accidents occurred at Proviso and Brighton Park, they might nevertheless decide the railroad could have got the car to destination within 36 hours if due diligence had been exercised in laying out such schedule. * * * We find nothing in the act indicating a purpose to interfere directly with the carrier's discretion in establishing schedules for trains; the design was to fix a limit beyond which animals must not be confined, whatever the schedule, except under the extraordinary circumstances stated. In general, cattle can be unloaded only at specially prepared places or final destination. If in the exercise of ordinary care, prudence and foresight, the carrier reasonably expects that, following the determined schedule, the car will reach destination or some unloading place within the prescribed time it properly may be put in transit. Thereafter the duty is on the carrier to exercise the diligence and foresight which prudent men, experienced in such matters, would adopt to prevent accidents and delays and to overcome the effect of any which may happen—with an honest purpose always to secure unloading within the lawful period. If, notwithstanding all this, unloading is actually prevented by storm or accident, the reasonable delay must be excused."—*C. & N. W. v. United States*. Decided April 15, 1918.

Equipment and Supplies

Supply Trade News

Government Orders for Locomotives and Freight Cars Soon to Be Placed

After three weeks of conferences regarding the priority to be given the various activities of the government as to their requirements for steel, an agreement was reached at a conference on April 19 between representatives of the War Industries Board, the Shipping Board and the Railroad Administration, by which the Shipping Board, the Army and the Navy will have priority over the railroads. The Railroad Administration was assured the steel required for the construction of the 2,000 locomotives proposed to be ordered, and for the 100,000 cars, but the car program was required to be changed so as to reduce the quantity of material and especially of steel plates that would be needed.

As a result the all-steel box cars, for which standard specifications were recently adopted, will not be built at this time and less steel than was originally planned for will be used in other types of cars. For example, the 55-ton hopper car will probably be built with wooden sides.

The Railroad Administration was represented at the conference by John Skelton Williams, director of finance and purchases, who, with H. B. Spencer, chairman of the Central Advisory Purchasing Committee, had held conferences previously with J. L. Replogle, the steel expert on the War Industries Board. The Shipping Board had objected to the amount of steel asked for by the railroads and it is the negotiations on this subject, together with the negotiations with the car builders on the question of prices which have caused the long delay, in consequence of which the placing of the orders for cars has not yet been accomplished.

It was expected that the Railroad Administration would let contracts during the week for 100,000 freight cars on a basis of cost plus 5 or 6 per cent. The builders had asked for cost plus about 10 per cent but it is understood that the officers of the administration are confident that their terms will finally be accepted.

It is planned to place orders for approximately 100,000 additional cars in about 6 months.

The proposed standard designs and specifications for 12 standard types of locomotives were approved in general by the Regional Directors at a meeting on April 19 and orders are to be placed shortly for probably 1,000, which are expected to be delivered before January 1.

Preliminary consideration has also been given to the rail situation. It is stated that about 40,000 tons of rail are being delivered weekly on old orders.

Freight Cars

THE NEWBURGH & SOUTH SHORE is asking for prices on 100 gondola car bodies.

SWIFT & Co., Chicago, has ordered 100 tank cars from the Pennsylvania Tank Car Company.

THE ILLINOIS ZINC COMPANY has ordered 10 hopper cars from the American Car & Foundry Company.

Iron and Steel

The Western Pacific wishes to sell 1,000 tons of 35-lb. rail and 2,000 tons of 40-lb. rail.

THE LOS ANGELES & SALT LAKE CITY has offered the following rail for sale for use in necessary industrial, logging and mining tracks and other necessary work: Forty-seven track miles of 75-lb. rail; eight track miles of 60-lb. rail; three track miles of 56-lb. rail and 13 track miles of 52-lb. rail.

THE LONDON & NORTH EASTERN EMPLOYS 8,520 WOMEN as compared with 1,575 employed before the war.

The Hall Switch & Signal Company announces that effective May 1 its general offices will be located at Garwood, N. J.

The Maloney Oil & Manufacturing Company has removed its New York office from 50 Church street to 17 Battery place.

Frederick W. Parks, for 10 years advertising manager of the American Well Works Company, Chicago, died in that city on March 25.

George W. Bender, whose appointment as eastern manager of Mudge & Co., Chicago, with office at 30 Church street, New York, was announced in these columns on April 19, was born



G. W. Bender

at Pittsburgh on August 20, 1884, and at the age of 17 entered the engineering department of the Pressed Steel Car Company of that city. In 1906 he accepted a position with the American Locomotive Company, where he had charge of the extra work order department. In 1910 he became associated with Mudge & Co. as chief draftsman, and subsequently was given charge of the mechanical department. Later on he was made assistant to the vice-president, a position he held until his appointment as eastern manager in charge of the business of Mudge & Co. in the New England and Atlantic Coast states.

Charles J. Donahue, formerly assistant vice-president in charge of sales of the American Locomotive Company, died at his home in New York, April 20, after a long illness. Mr.



C. J. Donahue

Donahue was the son of a locomotive engineer. He was born at Cleveland, March 8, 1871. His first position in railway service was in the motive power department of the Lake Shore & Michigan Southern at Cleveland. Here he showed marked ability and was rapidly promoted. He served successively as chief clerk to the superintendent of motive power of the Lake Shore under G. W. Stevens, W. H. Marshall and H. F. Ball, and as chief clerk to W. H. Mordue, general manager. From there he was called to

Chicago as chief clerk to C. E. Slaff, vice-president of the Lake Shore. In September 1, 1908, he was appointed secretary to W. H. Marshall, president of the American Locomotive Company, and two years later was appointed assistant vice-president in charge of sales, which position he held up to July, 1917. He retired from the American Locomotive Company to form a company to handle railroad supplies, but ill health prevented the accomplishment of this purpose.

The **Grip Nut Company** will move its offices from the McCormick building, Chicago, to the Railway Exchange building, on May 1.

N. M. Garland, of New York, district manager for the Ohio Brass Company, has been elected a member of the board of directors of that company.

N. D. Chapin has been appointed director of the interstate commerce and railway traffic department of the LaSalle Extension University, Chicago.

Clyde P. Benning, whose appointment as western manager of Mudge & Co., with office in the Crocker Building, San Francisco, in charge of the business of that company in the Pacific Coast states was announced in these columns on April 19, was born in Atchison, Kan., on September 20, 1888, and was educated in the public schools of that city. In 1903 he entered the service of the Missouri Pacific and held positions as messenger in the chief despatcher's office, telegraph operator and freight office and yard clerk. In 1904 he was employed as timekeeper in the master mechanic's office of this road, remaining in that position until April, 1905, when he entered the Missouri Pacific shops as machinist apprentice, later being promoted to machinist. He left the road in 1910 to accept a position with the Tool and Railway Specialty Company at Atchison, remaining with that concern until December 15, 1914, when he entered the service of Mudge & Co. as shop inspector. He was soon after appointed chief inspector and subsequently held the position of service engineer. In 1916 he was made assistant to the vice-president, which position he held until his appointment as western manager, as noted above.



C. P. Benning

H. A. Jackson, whose election as president of the Chicago Pneumatic Tool Company, Chicago, was announced in the *Railway Age* of April 19, was born in Bethlehem, Conn., on July 7, 1881. He is a graduate of the Lawrence Scientific School of Harvard University, class of 1903, but devoted an additional year to a special course in metallurgical work in the graduate school there. Mr. Jackson entered the employ of the Bethlehem Steel Company in July, 1904, where he served an apprenticeship in the various departments of the works, thus gaining practical experience and an intimate acquaintance with the steel business by personal contact with the production end. He later entered the sales department of the Bethlehem organization. A number of years ago Mr. Jackson was sent to Boston to open the Bethlehem Steel Company's office there and to organize its sales and executive forces in that territory. He continued in the position of sales agent at Boston until his election as president of the Chicago Pneumatic Tool Company at a special meeting of the board of directors held in New York on April



H. A. Jackson

19. He is not an entire stranger in Chicago, where he now has his headquarters, as he was sales agent in that city for the Bethlehem company for several months early in his career. As president of the Chicago Pneumatic Tool Company he succeeds **W. O. Duntley**, resigned.

P. L. Maher, business manager of the Eastern Car Company, Limited, of New Glasgow, N. S., has been appointed assistant to the president of the Damascus Brake Beam Company, Cleveland, Ohio, effective April 15. Mr. Maher will specialize on shop operation and efficiency.

Paul W. Wendt of the P. W. Wendt Company, railway supplies, Chicago, has been appointed assistant production manager in charge of steel, of the Emergency Fleet Corporation, United States Shipping Board, in the Chicago district comprising, Michigan, Indiana, Illinois, Wisconsin, Minnesota and Iowa.

G. E. Warren, assistant division engineer of the Universal Portland Cement Company, Chicago, has been promoted to division engineer, with the same headquarters. **J. W. Lowell**, assistant division engineer at Chicago, has been promoted to division engineer at Pittsburgh, succeeding **K. H. Talbot**, who has received a commission as first lieutenant in the construction division of the Quartermaster's Department of the United States Army. **G. S. Eaton** succeeds Mr. Lowell as assistant division engineer at Chicago.

The **Ohio Electric & Controller Co.**, 5900 Maurice Avenue, Cleveland, has been incorporated with a capital stock of \$200,000 for the purpose of manufacturing lifting magnets and electrical controlling devices. Lifting magnets will be built at once and controlling devices later. The officers of the new company include **F. W. Jessop**, president; **W. B. Greene**, vice president; and **A. D. Walter**, secretary and treasurer. Mr. Jessop was formerly works manager of the Electric Controller & Manufacturing Company, Cleveland. He has had an extensive experience in the manufacture of lifting magnets and electrical apparatus for the control of motors.

The **Schroeder Headlight Company**, Evansville, Ind., manufacturer of locomotive oil and electric headlight and turbo generators, has been purchased by **W. A. Carson**, vice-president and general manager of the Evansville (Ind.) Railways, the Owensboro (Ky.) City Railroad and the Henderson (Ky.) Traction Company, and a number of associates, some of them interested with him in the Evansville Railways. A new company known as the **Schroeder Headlight & Generator Company** has been organized with Mr. Carson as active vice-president and general manager. Mr. Carson has been connected with the Evansville Railways since July, 1908. He was assistant to the general superintendent of the Indianapolis & Cincinnati Traction Company from 1903, to 1906, and assistant general manager of the Indianapolis, Columbus & Southern Traction Company from 1906 to 1908. Since his connection with the Evansville Railways the company has constructed a number of interurban connections and through a syndicate of the officers of that company, of which Mr. Carson was a member, has purchased the city lines of Henderson and Owensboro, Ky. In 1912 a lease was secured on the line of the Illinois Central Railroad between Evansville and Henderson and this property was electrified by the Evansville Railways. A gasoline car ferry was installed to transfer the interurban cars across the river. In 1913 the Crescent Navigation Company was incorporated with Mr. Carson as president to operate on the Ohio river in connection with the railway properties. Mr. Carson retains his connection as vice-president and general manager of the Evansville Railways in an advisory capacity and will continue as president of the Crescent Navigation Company.

Trade Publications

PIPE TOOLS.—Catalogue 38, entitled "Pipe Tools" and issued by the Greenfield Tap & Die Corporation, Greenfield, Mass., shows the complete line of pipe tools made by this corporation. The quick release and quick return features of the Greenfield receding pipe threader are emphasized, and the catalogue contains an extensive list of stocks and dies, burring reamers, pipe cutters and wrenches. The back of the catalogue contains considerable useful information and several tables.

ever, gives the President power to compel the putting back into the road for betterment of all kinds a portion of the whole of the net revenues available for dividends. Stockholders asked what the dividend would amount to and Mr. Buckland thought it might be 1 per cent. The matter of dividend rested with the President and would be determined by the amount of net surplus made available. While on the face of things the amount available might appear to be as high as 3½ per cent, there was no certainty that the dividend would be that.

Walter B. Lashar of Bridgeport was elected a director to succeed Eli Whitney of New Haven, resigned.

NORFOLK & WESTERN.—See editorial comments elsewhere in this issue.

PENNSYLVANIA RAILROAD.—An agreement was approved by the Pennsylvania Public Service Commission by which the Pennsylvania Railroad will acquire the stock ownership of the Cornwall & Lebanon and the Susquehanna, Bloomsburg & Berwick railroads. For years the Pennsylvania has held a controlling interest in these companies.

UNION PACIFIC.—R. S. Lovett has been succeeded as a director by Henry W. Clark, counsel of the company, and Marvin Hughitt has been succeeded by his son Marvin Hughitt, Jr. The following executive committee has been appointed: C. B. Seger, chairman, W. A. Harriman, Otto H. Kahn, William Rockefeller, Mortimer L. Schiff, and Frank A. Vanderlip.

WESTERN PACIFIC.—Alvin W. Krech, of New York, has been re-elected a director and has also been chosen chairman of the board of directors.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company is building a transfer freight house at Argentine, Kan., 32 ft. wide by 1,000 ft. long, 300 ft. of which will be two stories in height. The building will be a frame structure resting on a concrete foundation. J. E. Nelson & Co., Chicago, have the contract for the work, which will cost about \$70,000.

CHICAGO, BURLINGTON & QUINCY.—This company has awarded contracts for the construction of a freight house and a storehouse at Casper, Wyo., to G. A. Johnson & Sons, Chicago. The freight house will be 50 ft. by 110 ft., 90 ft. of which will be two stories. It will be a steel frame structure resting on concrete foundations with brick walls and a composition roof. The storehouse will be of brick construction, 48 ft. by 70 ft., resting on a concrete foundation and covered with a composition roof.

SOUTHERN PACIFIC.—The Public Service Commission of Oregon recently granted the application of the Oregon State Highway Commission for the elimination of the crossing at grade of the West Side highway with the Newberg branch of the West Side division of the Southern Pacific in Washington county, Oregon. The commission has ordered that an undergrade crossing be installed at this point approximately 200 ft. west of the present grade crossing, with a minimum lateral clearance of 24 ft. and a minimum vertical clearance of 15 ft. The cost of the overhead structure, the necessary grading and filling and the additional cost of drainage incident to the construction of the crossing, will be borne in equal proportion by the Southern Pacific and the Oregon State Highways Commission, and the cost of maintaining the overhead structure and necessary abutments will be borne by the railroad, while the expense of maintaining the roadway and surface thereof will be borne by the highways commission.

SOUTHERN RAILWAY.—This road in connection with the building of the government nitrate plants at Muscle Shoals has authorized the following work at Sheffield, Ala., and vicinity. Additional tracks and extension of existing tracks in the Northern Alabama yards; additions and alterations to the Union passenger station and the construction of a baggage room in connection therewith; construction of a two story extension to an office building in connection with the freight station which is to be enlarged, all at Sheffield; and rebuilding four piers of the bridge over the Tennessee river at Florence.

Railway Officers

Executive, Financial, Legal and Accounting

Henry F. Green has been appointed general real estate and tax agent of the Chicago & Alton, with headquarters at Chicago, Ill., succeeding T. A. Rittenhouse, who has been granted an indefinite leave of absence.

J. L. Beven, terminal superintendent of the Illinois Central at New Orleans, La., has been appointed assistant to the executive vice-president of that road and of the Yazoo & Mississippi Valley, with headquarters at Chicago, effective April 19.

L. R. Deevers, whose appointment as auditor of the Wheeling & Lake Erie, with headquarters at Cleveland, Ohio, was mentioned in these columns on April 5, was born at Pittsburgh, Pa., on January 14, 1884. Following his graduation from Westminster College, Pa., in 1906 he entered the service of the Wheeling & Lake Erie as a clerk in the office of the auditor of disbursements. On September 1, 1909, he was appointed shop accountant of the car shops at Toledo, Ohio. He remained there until March 1, 1914, when he went to Cleveland, Ohio, as chief clerk to the auditor. He was promoted to assistant auditor on June 1, 1915, and on September 1, 1917, was appointed acting auditor during the absence of the auditor on account of illness. On April 1, 1918, he was promoted to auditor to succeed C. H. Holmes, resigned.

S. T. Bledsoe, whose appointment as general counsel of the Atchison, Topeka & Santa Fe was announced in the *Railway Age* of April 12, was born in Clinton county, Ky., on May 12, 1868. He was educated in the Southern Normal School and Business College at Bowling Green, Ky., and at the University of Texas. He entered railway service as a local attorney for the Gulf, Colorado & Santa Fe at Ardmore, I. T., in 1895, and was appointed attorney for Indian Territory for the same company in 1907. From 1908 to July, 1912, Mr. Bledsoe was a member of the firm of Cottingham & Bledsoe, solicitors in Oklahoma for the Santa Fe lines. On the latter date he became general attorney for the Santa Fe at Oklahoma City, Okla., retaining his connection with the firm of Cottingham & Bledsoe. On January 1, 1915, he was appointed assistant general solicitor of the road, with headquarters at Chicago, having special charge of valuation and tax matters, supervision of proceedings before state commissions and of litigation resulting from their orders and from legislative acts. On April 2, 1918, he was appointed general counsel to succeed Walker D. Hines, who resigned to accept service with the government.



S. T. Bledsoe

J. C. Davis, attorney for the Chicago & North Western at Des Moines, Iowa, has been appointed general solicitor in charge of the legal department of the company under government control. The entire law department of the road has been reorganized in conformance with the order of the Railroad Administration to divorce corporate matters from operating matters. The officers here given will confine their activities to work concerned with the operation of the road. **W. G. Wheeler** and **A. A. McLoughlin**, attorney for the North Western in Nebraska, have been appointed assistant general solicitors. **E. R. Hart**, general attorney, retains that title

under the new organization, and R. H. Witticombe, commerce attorney, has also been appointed general attorney. The offices of assistant general counsel and commerce counsel have been discontinued. These changes were effective on April 22

Operating

J. E. Fairhead has been appointed general superintendent of the Pittsburgh & West Virginia and the West Side Belt, with office at Pittsburgh, Pa., vice E. M. Alvord, resigned.

A. M. Burt, whose appointment as acting general manager of the Northern Pacific lines east of Paradise, Mont., was mentioned in these columns on April 12, was born at Syracuse, N. Y.,



A. M. Burt

on May 1, 1866. He entered railway service as a roadman on the Colorado Midland in 1885. In 1889 he went with the Northern Pacific as an instrument man, later being appointed assistant engineer. From 1892 to 1897 he was assistant engineer on the Adirondack & St. Lawrence, the Wisconsin Central and the Chicago & North Western. On January 1, 1897, he reentered the service of the Northern Pacific as supervisor of bridges and buildings, and in March, 1901, was appointed assistant superintendent. From October, 1902, to January 1, 1914, he was superintendent of various divisions in Dakota, Montana and Washington. From the latter date until April 1, 1918, he was chief engineer maintenance of way, with headquarters at St. Paul, Minn. As acting general manager he succeeds J. M. Rapelje, promoted, and will continue to have headquarters at St. Paul.

L. M. Davis, whose appointment as superintendent of the Northern division of the Great Northern, with headquarters at Crookston, Minn., was announced in these columns February 22, was born in 1881. He entered the service of the Chicago & North Western as a telegraph operator on June 3, 1899. He was later promoted to relief agent and worked at various points on the line until July 1, 1905, on which date he was promoted to train despatcher in Chicago. On May 1, 1907, he was appointed night chief despatcher and on June 15, 1909, was appointed chief despatcher of the Wisconsin division, with the same headquarters. On May 1, 1913, he was promoted to trainmaster of the same division, which position he held until January 1, 1916, when he resigned to enter the service of the Great Northern as chief despatcher at Minot, N. D. On September 10, 1916, he was transferred to Grand Forks, N. D.; on November 1, 1916, he was promoted to trainmaster of the Dakota division, with the same headquarters, and on July 1, 1917, he went to St. Paul, Minn., to take a course in the accounting department of the Great Northern. The course expired December 31, 1917, and he was returned to Grand Forks as trainmaster, which position he held until February



L. M. Davis

20, 1918, on which date his appointment as noted above became effective

J. F. Alsip, trainmaster of the Northern Pacific at Tacoma, Wash., has been appointed acting assistant to the general superintendent of the western district, with the same headquarters, effective April 10

E. D. Hungerford, assistant superintendent of the Chicago, Rock Island & Pacific at Minneapolis, Minn., has been appointed acting superintendent of the Cedar Rapids division, with headquarters at Cedar Rapids, Iowa, succeeding G. A. Merrill, who has been granted leave of absence on account of illness. F. M. Patt has been appointed acting assistant superintendent at Minneapolis, to succeed Mr. Hungerford.

G. A. Morson, general manager of the Cuban Central, has been appointed general manager of the United Railways of Havana, the Western Railway of Havana, the Havana Central, and the Cuban Central, with headquarters at Havana, Cuba, and T. E. Keyworth, superintendent of locomotives on the Cuban Central, with office at Sagua-la-Grande, has been appointed assistant general manager of the Cuban Central, with headquarters at the same place

Victor Parvin whose appointment as superintendent of the Virginian Railway, with headquarters at Princeton, W. Va., has already been announced in these columns, was born on July 6, 1883, at Laurel, Del., and was educated in the graded schools. He began railway work on November 1, 1899, with the Baltimore, Chesapeake & Atlantic, and served as operator and agent until June, 1901, and then went to the New York, New Haven & Hartford in the same capacity. In March, 1902, he returned to the service of the Baltimore, Chesapeake & Atlantic, as despatcher and from July, 1904, to February, 1907, served consecutively as operator, clerk, car distributor and despatcher on the Washington, Danville and Durham divisions of the Southern Railway. He then returned to the service of the New Haven as chief despatcher on the Western division. From October, 1912, to July, 1914, he was chief despatcher on the Minneapolis & St. Louis, and then was appointed trainmaster on the same road. From February to June, 1917, he was car distributor in the office of the general superintendent of transportation of the Southern Railway Lines West, and then was appointed yardmaster of the Baltimore & Ohio, with office at Newark, Ohio. In December, 1917, he entered the service of the Virginian Railway as trainmaster, which position he held at the time of his recent appointment as superintendent of the same road as above noted.

Traffic

Tinsley Smith, commercial agent of the Central of Georgia, with office at Denver, Colo., has been appointed division freight and passenger agent, with office at Chattanooga, Tenn., vice W. E. Stewart, assigned to special service.

Dan C. Pettibone, manager of mail traffic and general baggage agent of the Northern Pacific, has been transferred to the president's staff, with headquarters at St. Paul, Minn., retaining the title and office of manager of mail traffic, effective April 11. In addition, he will perform such other duties as may be assigned to him

C. P. Barrett, general western passenger agent of the Delaware, Lackawanna & Western, with office at Chicago, has been appointed division passenger agent, with office at Buffalo, N. Y.; E. J. Quackenbush, division passenger agent at Buffalo, has been appointed division passenger agent, with office at Syracuse. The general western passenger agency and the traveling passenger agency at Chicago will be abolished on May 1.

John A. O'Brien, general agent in the passenger department of the Chicago, St. Paul, Minneapolis & Omaha at Minneapolis, Minn., has been assigned to other duties and his office has been abolished. The traffic offices of the Omaha at Helena, Mont., and Tacoma, Wash., were closed on April 15. Freight and passenger matters previously under the jurisdiction of the Tacoma (Wash.) office will hereafter be handled by Frank W. Parker, general agent at Seattle, Wash. Matters previously under the jurisdiction of the Helena (Mont.) office will be handled directly from the traffic department headquarters at St. Paul, Minn.

Engineering and Rolling Stock

O. J. Egleston has been appointed chief engineer of the Utah Railway, with office at Salt Lake City, Utah, vice **H. G. McMechen**, resigned to accept service with another company.

Frank A. DeWolf, master mechanic at the Sagua-la-Grande, (Cuba) shops of the Cuban Central, has been appointed assistant superintendent of locomotives, with office at the same place.

O. R. Hale, assistant superintendent of locomotives of the Cuban Central, with office at Sagua-la-Grande, Cuba, has been appointed superintendent of locomotives, with headquarters at the same place.

Herbert S. Wilgus, engineer maintenance of way of the Pittsburg, Shawmut & Northern, with office at Angelica, N. Y., has been appointed chief engineer and his former position has been abolished.

John L. Smith, master mechanic of the Pittsburg, Shawmut & Northern, with office at St. Marys, Pa., has been appointed superintendent of motive power and equipment, and his former position has been abolished.

E. H. Mattingly, general car foreman of the Baltimore & Ohio, at South Chicago, Ill., has been appointed general car foreman in the Chicago district of the Baltimore & Ohio and the Baltimore & Ohio Chicago Terminal.

H. K. Fox, chief draftsman in the motive power department of the Western Maryland at Hagerstown, Md., has been appointed engineer of tests of the Chicago, Milwaukee & St. Paul, with headquarters at Milwaukee, Wis., succeeding **W. T. Bennisson**, resigned.

J. A. Conley, master mechanic of the Atchison, Topeka & Santa Fe at Raton, N. M., has been transferred to the Valley division, with headquarters at Fresno, Cal., succeeding **John Pullar**, transferred to the Los Angeles division, with headquarters at San Bernardino, Cal., effective April 11.

Robert H. Boykin, division engineer of the Erie, with office at Susquehanna, Pa., has been appointed assistant superintendent of maintenance, with office at New York, vice **H. Knight**, promoted; **Charles M. Lewis**, assistant division engineer at Susquehanna, has been appointed division engineer of the Delaware division and the Wyoming division and branches, vice Mr. Boykin, and **H. D. Row**, supervisor at Jamestown, N. Y., has been appointed assistant division engineer, with office at Susquehanna, succeeding Mr. Lewis.

F. H. Masters, division engineer of the Elgin, Joliet & Eastern, with headquarters at Gary, Ind., has been promoted to assistant chief engineer, with office at Joliet, Ill., succeeding **G. H. Jennings**, resigned to become general manager of the Powers-Thomson Construction Company, Joliet. **Arthur G. Dorland**, assistant engineer at Joliet, has been transferred to Gary and placed in charge of the engineering work previously handled by Mr. Masters. **J. W. Webster**, valuation engineer at Joliet, has assumed the duties of Mr. Dorland, in addition to his present work. All of these changes were effective April 15.

Railway Officers in Government Service

Shelby S. Roberts, consulting civil engineer, Chicago, has joined the staff of the regional director of southern railroads at Atlanta, Ga.

Ralph Peters, Jr., assistant superintendent of the Long Island, with office at Jamaica, N. Y., has received a commission as second lieutenant in the Railway Transportation Corps of the National Army.

W. R. Wood, mechanical engineer of the Great Northern, St. Paul, Minn., has been appointed mechanical engineer on the staff of **Ralph Budd**, assistant in charge of capital expenditures to the regional director of western railroads, Chicago.

B. M. Bukey, assistant general passenger agent of the Atchison, Topeka & Santa Fe at Chicago, has been appointed assistant to **H. P. Anewalt** who is in charge of naval traffic for the U. S. Railroad Administration, with headquarters at Washington, D. C.

First Lieutenant **G. C. Kennedy** of Company F, Thirteenth Engineers (Railways) in France, has been promoted to captain. Mr. Kennedy was formerly chief despatcher of the Gulf, Colorado & Santa Fe at Beaumont, Tex. Second Lieutenant **S. S. McConnell** of the same company, formerly clerk in the superintendent's office of the Atchison, Topeka & Santa Fe at Emporia, Kan., has been promoted to first lieutenant, and **E. P. Dudley**, also a Santa Fe man, has been commissioned second lieutenant.

W. E. MacEwen, traffic manager of the Peerless Transit Line, Cleveland, Ohio, has been appointed director of traffic for the Western Petroleum Refiners' Association, with headquarters at Kansas City, Mo., and will work in conjunction with **O. M. Conley**, representative of the oil director of the U. S. Fuel Administration, and **B. L. Swearingin**, representative of the regional director of western railways, in connection with the problem of expediting the movement of tank cars to meet the demands of the government and its allies.

Obituary

Henry Russell Lloyd, fuel agent of the Chicago, Milwaukee & St. Paul until his retirement in 1910, died at his home in Chicago on April 12.

H. S. Hills, master mechanic of the Louisville & Nashville, with office at Ravenna, Ky., died recently at his home in Irvine, Ky., at the age of 52.

Joseph W. Taylor, secretary of the American Railway Master Mechanics' Association, Master Car Builders' Association, and Western Railway Club, died suddenly on Wednesday morning of this week.

EQUIPMENT OF AN INFANTRYMAN.—A table showing that more than eighteen pounds of metal enter into the composition of articles required for the equipment of each infantryman has been prepared by the Ordnance Bureau of the War Department. The metal equipment carried by each infantry soldier weighs 294.65 ounces, consisting of 153 ounces iron and steel, 12.35 ounces tin, 62.7 ounces brass, 24.2 ounces aluminum, 36.4 ounces of metal in bullets, consisting of lead, tin and cupro-nickel, and 6 ounces of other metal. An additional weight of 114.7 ounces is added by equipment of cotton, wool, leather and wood.—From *The Engineering and Mining Journal*.

BRITISH LOCOMOTIVE WORKS IN SPAIN.—Filson Young, writing from Madrid to the London Daily Mail, on March 5, says a powerful combination of British and Spanish industrial interests, involving an initial capital of \$5,000,000, has been completed between Messrs. Babcock & Wilcox and some of the most important industrial forces in the country, including the Altos Hornos Company, of Bilbao, the only steel producers in Spain. He adds: "The principal object of the combination is the manufacture of high-class locomotives, marine and land boilers, and solid drawn tubes on a new principle which will supersede the Mannesmann process. Works which will be by far the largest in Spain will be erected near Bilbao and give employment to 2,000 men. Messrs. Babcock & Wilcox will undertake the equipment of the factory with British machinery and will direct the technical management until the year 1940. No complete boilers have hitherto been constructed in Spain, and locomotives have almost exclusively been imported from Germany, the value imported in 1913 being \$2,500,000. Although a few have since been imported from the United States at a cost of \$50,000 each, the transport of the country has been practically paralyzed for the last year and a half. This enterprise will make Spain independent of outside supplies for many years to come, and will greatly facilitate the provision of light railways, which is one of the most urgent of the country's needs. The King of Spain, who received the managing director of the British company on his recent visit here, has taken a great interest in the combine, which is generally regarded with enthusiasm as the forerunner of many similar commercial alliances between the two countries."

WAKE UP!—Thus far, we are certain, the Germans haven't invented any long range gun that will carry across the Atlantic. But it would require such a gun to awaken some Americans to the realization that we are in this war.—*Utica Herald-Dispatch*.

EDITORIAL

Railway Age

EDITORIAL

There must be no longer delay in making the necessary improvements in shops and engine terminals for the oncoming winter. At the present time, because of lack of facilities, railway shops are working about 15 per cent overtime in order to get the motive power back into good condition after the severe winter.

Repair Facilities Must Be Improved

One reason for the poor condition of the power was the lack of proper engine terminal facilities. If the railroads are to pass through next winter without a serious power shortage, conditions must be improved. Even with the new locomotives to be received this year, the power will be taxed to the utmost next winter. Everything that can be done to keep the power in condition, to turn it promptly at the terminals, and to keep it on the road doing work for the greatest possible percentage of time. This cannot be done unless immediate attention is given the facilities for handling and repairing the power.

A letter by T. J. Foley, vice-president of the Illinois Central system, published in this issue, focuses attention upon a

Make the Idle Laborer Work

phase of the labor situation in this country which is very much out of harmony with the spirit of the times. In spite of an acute shortage of labor on the farms, in the factories and on the railways, Mr. Foley's observations during a recent trip over the southern lines of the Illinois Central system led him to believe that at least 10 per cent of the labor supply of the South is idle at this time. This is a condition which adds force to the demand for the conscription of labor. Americans of whatever color or position in life who fail to put their shoulders to the wheel to back up the men who are fighting their battles are disloyal to their country in its time of need. To work for one's country is a small sacrifice compared with shouldering a gun, and all those who insist upon idling should be held up to public scorn. If an aroused sentiment against idlers fails to drive these men to work they should be conscripted.

Of vital interest to the public in general and the railways in particular, will be the convention of the International Rail-

Fuel Problems to Be Discussed in Convention

way Fuel Association which will be held in Chicago, May 25. This convention is to be conducted under the auspices of both the Railroad and Fuel administrations. The general arrangements are under the direction of C. R. Gray, director of the Division of Transportation of the Railroad administration, and P. B. Noyes, director of the Conservation division of the Fuel administration. Fuel problems will be discussed which are of vital interest to both the transportation and mechanical departments of the railways. The trying times experienced last year due to coal shortage have shown what an important part the railroads bear to the entire fuel problem. Prominent speakers from both the United States and Canada are to discuss this question. Never before has there been such a group of authorities on fuel gathered together for the pur-

pose of discussing the fuel problem in a broad way. It behooves every railroad to have their transportation and mechanical officers in attendance that the messages may be sown on fruitful ground.

There is an impression prevailing that the standard locomotives to be purchased by the government will be used only as a liquid reserve and to meet the requirements of interchange power. Such a plan has received commendation. To compel the railroads desiring locomotives for their particular use to purchase

Standard Locomotives for Interchange Service

standard locomotives would be asking them to purchase locomotives which perhaps would not best meet their conditions and which they are not prepared to maintain. Take the Pennsylvania for instance. That road has perhaps more carefully studied its motive power requirements and spent more money to develop locomotives which best meet its conditions than any road in the United States. It is obvious that any standard locomotive, which of necessity is of a compromise design, will not be as efficient as the locomotives it now operates. The same applies to other roads. On the other hand there are roads which are now operating locomotives which may not be as well designed as the standard locomotives. In such cases these roads would undoubtedly be glad to purchase the standard locomotives, *provided the details of the design are changed to accord with their own existing standards.* A railroad cannot be blamed for not wanting to buy the completely standardized locomotives. If they buy them the maintenance difficulties due to the fact that they will be different from any other locomotives they operate, will be with them until the locomotives pass out of existence or until a substantial sum is spent to change them over to meet their own standards. This leads to the question as to what the government is to do with the standard locomotives it purchases, after the railroads pass back into the hands of the private owners. It is obvious that standard locomotives would be of no further use to the government. They undoubtedly would be sold to the highest bidder. Being of a detail design different from that used on any railroad in the country, it is apparent that they are very likely to be sold at a loss. Is it wise for the government to order two sets of these locomotives? Is it not better to permit the roads to order locomotives best suited to their coal needs?

Parts of railroad systems which follow the same route operated very satisfactorily under manual block signaling, and are now

Relation Between Signals and Track Capacity

fully congested by the heavy movement of their traffic. It is essential to every congested condition to speak as possible. Where congested conditions exist on single-line mainline trunks, it is possible to install sidings and main tracks to meet or allow other trains to clear the block before they run their present. This introduces a large amount of dead time and such delays are equivalent to reducing much additional equipment out of service. Even better off than speed is the movement of trains; trains moving from rolling stock are motive power

will be released and ready for other duties just that much sooner. One problem before the Railroad Administration and the operating officers of the railroads today is the elimination of as much of this dead time on sidings and main lines as possible. The problems confronting the administration are large and varied in number, and details must necessarily wait their turn, but it would appear to be advisable for problems such as those noted above to receive the early attention not only of railroad officers but the Railroad Administration as well. When it is considered that, on one stretch of single track 15.7 miles long where more than one hour was formerly required to get four important south-bound trains through, the installation of automatic signals has enabled this to be accomplished in less than half the time, it would appear that such installations can be expected to eliminate some of the present congestion. Since signals can be installed at a much less cost per mile and with a considerably smaller number of laborers than other classes of work from which the same returns may be obtained, and as such installations will cut down to a very great extent the amount of dead time in the movement of the present traffic it would appear that this subject should receive careful and early consideration.

Price Versus Speed

THE PURCHASING DEPARTMENT of the Railroad Administration has this week placed the orders for about 100,000 freight cars and 1,025 locomotives. These are the first cars and locomotives that have been ordered for the railways of the United States this year, although one-third of the year is now passed. The St. Paul planned to build 5,000 cars in its own shops but has given up this plan. Furthermore, the statement that these cars and locomotives have been ordered is subject to an important qualification. The specialties which are to be put on them have not been ordered yet; and until the car and locomotive builders get these specialties they cannot actually begin to turn out the equipment. The delays which already have occurred in placing the orders will considerably reduce the number of locomotives and cars that can be built before the rush of business comes this fall. Any further delays in ordering the specialties will further reduce the amount of equipment that can be delivered before fall. Many supply companies are now practically or wholly out of orders and will have to close down their plants and let labor go if they do not get orders soon. It would appear, however, that there are to be further delays, since the supply people have been asked to furnish a large amount of information regarding their costs which they must first work up, and which the Purchasing Division must later compile if the data is to serve any useful purpose.

In entering upon its program of locomotive and car standardization, and in adopting the policy it has in negotiating with the equipment and supply companies, the Railroad Administration has been prompted by worthy motives. Its purpose has been to increase the efficiency of the railroads and to get equipment and supplies for them at the lowest prices practicable. The policy adopted by it regarding standardization of cars is eminently wise and fair. Its scheme of locomotive standardization is, in our opinion, very unwise. The Purchasing department has succeeded in placing the orders for cars on a basis of 5 per cent profit as compared with the 10 per cent originally asked by the builders. This is a victory for the Purchasing department which will save the railroads several million dollars, although it has created intense dissatisfaction on the part of most of the car builders. It is probable that the Purchasing department will succeed in getting the locomotives on a similar basis, which will save the

railways several million dollars more. But it would seem that in the handling of these important matters of standardization and purchases a matter far more important has been given insufficient consideration. This is the imperative need for avoiding anything which will cause delay in providing new cars and locomotives as fast as they can be built.

The railways, under the direction of the Railroad Administration, are now being operated, from a purely transportation standpoint, with a high degree of efficiency, and apparently are moving more essential traffic than ever before. But the crucial test for the railways is going to come in the year 1918, as it did in the year 1917, not in the spring or summer, but in the fall and winter, and how the railways will be able to stand the test next fall and winter will depend mainly, first, on the condition of their old locomotives, cars, track and other facilities, and, second, on how many new locomotives and cars they have and on what additional facilities they are provided with. Now, from present indications the railways will not get enough new cars and locomotives before next fall merely to replace those that will have to be scrapped this year; and they certainly will not unless the Purchasing Division very soon places all the orders for the car and locomotive specialties as well as for the building of the equipment itself.

We respectfully submit that in present circumstances *speed* is more important than a *small difference in prices*; and that the amount the country may be caused to lose next fall and winter in railway earnings, commercial profits and output from mines and factories by an avoidable deficiency of locomotives and cars may greatly exceed all that the railways may be saved by further protracting the negotiations with the railway equipment and supply companies.

Patents and Royalties

on Railway Supplies

THE EXTENT TO WHICH PATENTS and royalties upon patents will be recognized by the purchasing department of the Railroad Administration in buying equipment and supplies is still a subject of discussion. The purchasing department has asked the supply companies in presenting the data showing their costs of manufacture, to list separately the amounts paid by them in royalties. The question involved really has three phases, one of law, one of economics and one of morals.

The legal phase of the matter is concisely covered in an article by Paul Synnestvedt, the eminent patent lawyer, which we publish in another column. Mr. Synnestvedt summarizes two recent decisions in which the United States Supreme Court has passed upon the question as to whether certain patents must be surrendered for the use of the government without compensation. One of these related to the use of some of the patents on the Marconi wireless telegraph apparatus, the other to the use of some Curtis marine turbine patents.

While the government has the same right to commandeer patents as any other property, these decisions show that it cannot do so without providing for just compensation for the patentee. In other words, it cannot authorize one concern to make an article on which another concern owns the patents in such a way as to protect the former against a successful proceeding for damages by the latter. If the Railroad Administration should desire to get more devices of a particular kind than the owner of the patents could make, it could require the owner to let competing concerns make the additional number, but the competing concerns which made the device would have to pay the owner for the use of the patents.

As an economic matter, it is questionable if there would be many instances in which the Railroad Administration would

gain anything by buying more articles of a particular kind than the manufacturer owning the patents could make. If, for example, it should desire to buy only one kind of friction draft gear for 100,000 cars instead of buying from several concerns their different kinds of draft gear probably the concern owning the patents on the particular draft gear selected would be unable to supply enough of them to equip the cars as fast as the builders could turn them out. If, however, other concerns were asked to manufacture this particular draft gear it would be necessary for them to make changes in their organizations and plants which would take a long time and involve a large expenditure. Disregarding the element of time, since a manufacturer who has been making one kind of draft gear would have to incur the expense of preparing his plant and organization to make another kind, it is doubtful if he could make that other kind as cheaply as the concern whose business it has been to make it and which has built up its plant and its organization for that purpose.

Furthermore, the concern which owns the patents on a device and whose prospective business is based on making that device and making it as well as possible, has an incentive, to make it well and to cause it to give good service, which no other concern possibly can have. It always has been customary for the manufacturer of railway supplies to co-operate with the railway management which buys a device in using it properly and getting the best possible service from it. Almost every manufacturer of a patented device in this field has experts who are constantly engaged in teaching railway employees how to use it and in working with railway officers for the purpose of correcting any shortcomings and making any improvements in it that may prove to be necessary or desirable. While the owner of the patents on the device has an obvious incentive to render such service, any competing concern which was authorized to make it would just as obviously not have any such incentive. From an economic point of view probably it will be best for the Railroad Administration, in dividing its orders among the manufacturers, to buy from them, as far as practicable, the particular kind of devices they have been used to making.

As to the moral phase, the Railroad Administration has the right to make any suggestion regarding patents and royalties that may occur to it. It would not be fair, however, for it to use the position of monopoly which government control gives it practically to coerce railway supply companies into making extreme concessions which concerns in other lines of business are not required to make either to the government or to other customers. The government of the United States has given patent rights to inventors of railway devices just as it has given them to other inventors. It has permitted and encouraged companies to buy these patents and build up their businesses on them, just as it has permitted and encouraged other kinds of concerns to buy patents and establish businesses on them. In these circumstances, the railway supply companies are entitled to be treated by the government with the same consideration as other concerns which are making and selling patented articles to the government and other customers.

Undoubtedly, all departments of the government have the right to demand that the concerns from which they buy goods shall not, especially in these war times, charge the government excessive prices and profiteer at its expense; but plainly there is no reason in law, economics or morals, why the Railroad Administration, which is one branch of the government, should make demands of the railway supply companies which other branches of the government do not make upon other manufacturing concerns. The Railroad Administration does not contend that labor employed on the railways should be discriminated against merely because it is working for the railways under government control. It would, however, be as logical to make this contention as to take the position that concerns which are making equipment and supplies for the

railways while under government control should be treated differently from other concerns with which the government is doing business.

Negotiations Regarding Railway Compensation

MANY PEOPLE, even including leading financiers in Wall street, apparently thought that when the railroad control law was passed what compensation should be paid to the railway companies during the period of government control and what they would be allowed to do with the money were practically settled. When, however, the representatives of the Railroad Administration, on the one side, and the representatives of the railroad companies on the other side, presented to each other the terms they had respectively drawn up for incorporation in the contracts, it became apparent that the question of compensation was far from settled. As the negotiations have progressed, the representatives of the two sides have drawn closer together, but regarding some very important matters they are still far apart.

The most important questions which have arisen relate, first, to whether the companies shall be given the maximum compensation provided for by the law; second, as to the use which the companies may be permitted or required to make of the surplus part of their guaranteed compensation, and of their income from outside properties; and, third, as to the policy of the Railroad Administration regarding maintenance.

The law authorizes the President, and he has authorized the director general, to pay to each company an annual return not exceeding the average net operating income earned in the three years ending June 30, 1917. When the control bill was pending representatives of the railways opposed this provision on the ground that it would not give the companies enough compensation, while some members of Congress opposed it on the ground that it would give them, or at least some of them, too much. Those who advocated the proposed basis, including the *Railway Age*, did so upon the ground that while it was not ideal, it represented the experience of the railways under regulation during the last three complete years for which data were available, and that, therefore, it probably was a fair and reasonable a basis to be used in a war measure as could be adopted. It is still contended in some quarters that to give the companies, and especially the more prosperous, the maximum provided by the law, would be to give them too much. Many lawyers believe that a company which carried the question into court could get judgment at a rate equivalent to that which it was earning when its railway was taken over and most roads earned a larger return in the calendar year 1917 than the maximum compensation allowed by law. Therefore, the government might lose rather than gain by taking a stand which would force the companies into the courts.

If the companies should be given in the contracts the maximum return permitted by the law, some companies would have surpluses after paying their interest and dividends, while others would have surpluses after paying their interest. It has been the custom of most railways having surplus income to invest most of it in additions and betterments. Persons belonging to the radical school of thought contend that surplus invested in the properties really belongs to the public and, that, therefore, the companies should not be allowed to derive any return from it. The spokesmen for the companies, on the other hand, always have contended that surplus earnings belong to the companies and that, therefore, property created by the investment of these earnings belongs to them. They have said that some investment of surplus earnings must be made to offset concealed obsolescence, to provide unproductive in-

provements, etc., and have in effect conceded that no return should or even could be paid upon such investment; but at the same time they have maintained that the companies are entitled to earn and pay a return upon surplus invested in productive improvements.

This old question, which has been a bone of contention in almost every important hearing regarding rate regulation or valuation has now arisen to vex those who are negotiating regarding the compensation contracts. The two extreme contentions advanced are that the companies should be required to invest all their surplus compensation and receive no return on it, and that they should not be required to invest any of it and should receive a nominal rate of interest, say, 6 per cent on all of it that they voluntarily invest. One basis suggested was that they should invest 15 per cent of their total net income—including in this both their guaranteed compensation and their income from outside properties—without asking any return on this and that on all additional investment made by them they should be paid a return. The 15 per cent basis has not, however, been pressed, chiefly, no doubt, because, while some companies could invest 15 per cent and have substantial surpluses left, many others could not invest anywhere near this much and have any surpluses at all left.

It is difficult to see why income from outside properties should be considered in this connection. The government has not taken over these properties and assumed the risk and responsibility of operating them; the income from them was not considered in framing the compensation law; and no guarantee of the income from them has been made, or even suggested.

It would seem that the sensible thing to do would be to adopt some compromise basis and expressly provide by a saving clause that the basis adopted should not be regarded as establishing any precedent affecting management or regulation after the termination of government control. Probably the most reasonable compromise basis which could be adopted would be one on which the companies would be paid a return on all investment made from surplus compensation, but which fixed a low percentage of return, perhaps 4 per cent.

The law requires the government to return the physical properties to the companies at the termination of government control in substantially the same condition that they were in when taken over. If the government does not adequately maintain a railway it will be obliged, on the termination of control, to pay the company owning it a sum sufficient to offset the deferred maintenance. Suppose, on the other hand, that the Railroad Administration decides that there was deferred maintenance on a railway when it was taken over and that it must be making larger expenditures for maintenance, improve the property's condition during the period of control. It is being contended, in effect, by some representatives of the Railroad Administration that money expended in taking up deferred maintenance should be deducted currently from the guaranteed compensation of the company owning the property.

This does not seem to be logical. Since a company whose property is allowed to deteriorate under control is not to be recouped for its deterioration until the termination of government control, it would appear that a company whose property is improved by increased expenditures should not be required to settle with the government for this until the termination of government control. Each company should be paid during the period of control its current compensation regardless of current expenditures for maintenance. Nobody can tell until the termination of government control what condition any road will be in when it is returned to its owner. What shape each will be in will depend not merely on what shape the Railroad Administration may desire to keep or put it in, but also on the material and labor situation meantime.

If those conducting the negotiations regarding these contracts should attempt to settle all the difficult problems regard-

ing the rights of the railways, on the one side, and the public on the other, which have been raised in time of peace, and which again will be raised in time of peace, they will hardly be able to agree on a basis which will prevent wholesale litigation. In order to prevent litigation from occurring instead of contracts from being made, it will probably be necessary for them to avoid trying to establish precedents for peace time, and to adopt a series of compromises which will carry out the intent of the railroad control law, which was that government control should be used solely as a war measure, and that the problems of peace should be left to be solved when peace returns.

Shall the Roads Return to Bessemer Rails?

RAILWAY ENGINEERS are much concerned over the reports which have been emanating from Washington during the last few days to the effect that it is going to be necessary for the railroads to go back to Bessemer rails this year because of the demand for the entire output of open hearth steel for munitions and ships. As pointed out in these columns two weeks ago the railways are now far behind in their rail renewal work for this season and although approximately 2,000,000 tons or two thirds of a normal year's output of rails is still undelivered on old orders the mills are now turning them out at the rate of only about 30,000 tons per week, or less than 30 per cent of capacity, and no new orders have been placed so far this year by the government which has notified the roads that it will purchase the rails required for them.

While the principal work now confronting this country is the winning of the war and all other activities should be made subsidiary to this, it is equally true that existing practices should not be disturbed unless such disturbance will contribute to the success of our military efforts. From this standpoint it is, therefore, important to consider the necessity for the transition from open hearth back to Bessemer rails.

Bessemer rails were rolled almost exclusively until ten years ago and large quantities of them are still in the track where they are giving good service. However, about 1908, high grade Bessemer ores suitable for rail making began to run out and the mills went into the manufacture of open hearth rails and they have readily commanded a premium of \$2 per ton over the price of Bessemer rails because of their better quality. Following this transition some of the mills dismantled their Bessemer furnaces or converted them to other uses so that the Bessemer rail capacity today is only a fraction of that of a few years ago. Thus in 1916 (the latest year for which statistics are available) of the 2,709,692 tons of rails rolled, only 440,092, or 16 per cent, were of Bessemer steel. The depletion of the high grade Bessemer ores has continued so that a return to this class of steel can only be made at the sacrifice of service and of safety in the track.

The reduction in the Bessemer capacity of the country which has taken place also acts as a controlling factor, limiting any radical change in rail manufacture. At the present time only four of the large mills of this country which produced rails used by steam roads are equipped to roll Bessemer rails. One of these mills is located on the Atlantic seaboard where it has no accessible supply of Bessemer ores, while another mill can roll Bessemer steel only at the sacrifice of an equivalent tonnage of open hearth. This leaves only two mills in a position to roll Bessemer rails to any advantage, both of these being located in western Pennsylvania. Furthermore, the Bessemer furnaces of these mills are understood to be working practically to ca-

capacity, one of these mills being reported as operating both its Bessemer and open hearth plants to 78 per cent of capacity a week ago.

At a series of conferences between the representatives of the War Industries Board, the Shipping Board and the Railroad Administration, it was decided a few days ago that the Shipping Board, the Army and the Navy will take precedence over the railroads in demands for steel. Open hearth steel is naturally to be preferred for many forms of construction. This has undoubtedly led those departments which have precedence to ask for a large part if not all of their requirements in open hearth steel, taking almost the full output. One of the leading papers in the steel trade field stated last week that the government had so monopolized the steel output that "domestic consumers of steel and steel products will have no more chance to get steel for other than war material construction, than a fat missionary has at a cannibal feast."

It is entirely possible that an analysis of the uses for which the Shipping Board, the Army and the Navy desire steel will show that a considerable portion of the demand can be met just as satisfactorily with Bessemer steel. The use of Bessemer steel in ways such as this where it can be done without the sacrifice of safety or other important considerations will release a certain output of open hearth steel for rails and other uses where it has a marked advantage over Bessemer.

The roads supplanted Bessemer rails with open hearth steel several years ago at an increase in cost of \$2 per ton because of the greater service and security from breakage. To return to Bessemer rails at this time would be a step backward which would be expensive and involve some increased hazards. No railway man will question the advisability of taking this step with all of its disadvantages if the demand for open hearth rail steel for military purposes is really such as to make it necessary, but it is important to ascertain whether the demands of the government can not be met satisfactorily while at the same time giving the railways the open hearth rails which they need.

In solving the rail problem, attention may well also be directed to the location of the mills with reference to the point of use of the finished product. As pointed out above the only two mills which could roll Bessemer rails to advantage are located in the vicinity of Pittsburgh, although large open hearth rail mills are situated as far west as Gary, Ind., and Pueblo, Colo. At the present time when munition work is requiring such a large percentage of the steel output of the country it is well to recall the fact that these munitions move in general to the Atlantic seaboard for trans-shipment, while rails are distributed throughout the entire country. It would, therefore, appear advisable from the transportation standpoint, when the facilities of the roads are taxed to their utmost, to so place all orders for steel products (which run into tonnage rapidly) that the minimum haul will be necessary, other conditions being equal. To illustrate the conditions at present, only a few weeks ago a Colorado mill was rolling munition materials for shipment east to St. Louis at a time when a mill at Gary, Ind., was rolling rails for a road in the southeast and an eastern mill was providing the rails for a line west of Chicago. For the period of the war it would appear advisable for the government, which has assumed control of the output of the steel mills, so to distribute the priority orders that the transportation resources of the railways will be conserved as far as possible. To protect the manufacturers this will make necessary the placing of prices for all steel products upon a comparable basis.

The railways need rails. They need them badly. They should not be required to depart from their existing standards of open hearth to Bessemer steel unless necessary. The rails should be produced as far as possible in those mills nearest to the point of final use.

Letters to the Editor

Duty of the Public to Punish Trespassers on Railroads

ALBANY, N. Y.

TO THE EDITOR:

Your recent editorials on the trespassing evils have served as a much needed "clarion appeal"; only the clarion ought to be louder. There has got to be a good deal of vigorous agitation before we shall see any signs of movement in this mountain of delay, disgrace and death. The state railroad commissioners, to whom you appealed last January (page 148) are indeed neglecting their duty, unless they hammer night and day at this subject until they get the lawmakers aroused; but much more is needed. Your reference to what the New York Central has done is very much to the point. I recall the vigorous address on this subject by Mr. Dow, the general safety agent of that road, reported in your paper about a year ago.* Mr. Dow and his assistants went right to the root of the difficulty—one of the most important roots—by patiently interviewing, instructing and arousing the local magistrates along the New York Central lines in the State of New York. This is slow work, and not very inspiring; but if it is practicable and profitable for the New York Central, why not for other roads?

What is the use of going to Washington? This is a matter in which state autonomy is a well-settled principle; a principle on which all conservative men are agreed. In such a purely local matter we suspend the principle and substitute federal for state authority only because we find legislatures and state officers inefficient. But the extension of federal activities has long since made our Washington government top-heavy. (It is not a mere question of war-time emergencies.) We have a duty to avoid enlarging that unwieldy Washington machine. This is as important as to avoid building one big central railroad station for New York or Chicago which would clog its own working by its very bigness. Centralization cannot go on forever.

To put a stop to trespassing the federal government would have to appoint policemen in almost every town. Comparison may be made with the enforcement, by the Treasury Department, of the laws forbidding the illicit manufacture of whiskey. The revenue officers succeed in this only by the aid of a rigid tax law—which taxes the law-abiding as well as lawbreakers—and of a fairly strong public opinion.

Public sentiment ought to be educated in the matter of the trespassing evil; but public opinion needs such a *great quantity* of education that no man can guide the educational scheme for 48 states. It would be pretty safe to call it an impossible task. The logical way would be to concentrate on one state, say Massachusetts, or New York, and then educate by their example. The public indifference is largely based on that fundamental element in human nature which holds it right and proper that people who are ignorant, lazy, or foolish should actually suffer the punishment that their ignorance, laziness and foolishness impose on them. This is brutal, but it is really what is the matter with us. To ignore this point is to misdirect our energy.

The problem, broadly speaking, is of the same class as that of the prosperous community succoring the poor, the wise helping the unwise to escape the consequences of their ignorance or wickedness. And this enterprise *always loses*. No city poor-fund is big enough to cure more than half the

*Address before the Albany Chamber of Commerce, Albany, N. Y., December 14, 1916. See Railway Age, Vol. 24, 1916, page 956.

poverty and distress that the almoners would like to tackle. But while, for the reasons suggested, I believe federal activity in this line would be wrong, it is quite possible that if the authority of the cities and towns—say all the way from Albany to Buffalo—could be transferred to the state government, perhaps something might be accomplished. Everybody knows how local municipal officers have failed. Their shiftlessness is everywhere apparent. We must call in some authority sufficiently distant to be free from the influences of local sympathy; but the state capital is sufficiently distant; the federal capital is too distant.

Referring again to Mr. Dow, let us heed the lessons of his valuable experience, and go forward to accomplish the results that he accomplishes. He says that "a strict railroad anti-trespass law in every state in the Union, rigidly enforced, and augmented by a systematic campaign of education, conducted, not by the railroads alone but by some authorized public officer, to teach all persons that the law was framed for their own protection, and to save human life, and not for the mere purpose of guarding the railroad tracks against unlawful intrusion, would in time solve the problem."

This means that railroads not only have got to influence every public officer, to the best of their ability; they must strive to secure the necessary action by governors, or other state authorities, to have appointed an officer of the state who can and will inaugurate and carry on a systematic campaign of education.

W. H. BRIGGS.

Standards

LOUISVILLE, Ky.

TO THE EDITOR:

Anyone who knows anything about the manufacturing business is aware that in volume and duplication there is profit. Turning out ton after ton of the same manufactured article day in and day out, invariably means success and big dividends. Manufacturers are tickled to death when repeat or duplicate orders come in, likewise at the receipt of a requisition covering ten, twenty or a hundred thousand pieces of the identical same pattern.

Think what this means in the locomotive and car business alone, not to mention ships, etc. Small drawing force, no new engineering, an insignificant coterie of experts, no new patterns, no new designing—simply a case of order your machine numbers, one, two, three, just like a club breakfast, taking your choice by the card with little or no thought as to the details.

As an apprentice draftsman, I made many tracings of stationary tubular boilers, all of them labeled "Standard." For years they were turned out in this manner, until it seemed old Father Time would overtake me still standardizing. At that time there seemed to be a hazy understanding among us that once these standard boilers were completed the engineering force would automatically shrink. Time ran on and the standards multiplied, until we had eight or ten 60 in. boilers, ten or twelve 72 in. and scores of the smaller sizes. Slowly the deceitfulness of the title dawned upon us and we began to understand the thin significance of the word "Standard." Our force continued to increase.

When I hear standards discussed, no matter what the angle or by whom, it has the same deceitful veneering—camouflage, if you please—of the original variety. Don't misunderstand me. I am a firm believer in modern system, standard practice, etc., etc., and advocate it as far as it is practicable, but when it comes to a wholesale standardization of locomotives, cars, cranes, ships, machine tools and other ponderous pieces of mechanism, it is not to be done in this age, nor any other, except at a loss.

In order to standardize a locomotive intelligently, the conditions under which it is to operate must be considered, or

else it will most certainly have to be rebuilt to accommodate those conditions. Requiring men to accomplish daily abnormal tasks in a definite specified schedule time without the fullest consideration of the conditions surrounding them, is unreasonable, to say the least. If these things we call conditions are ever standardized then there may be some hope—otherwise, there is none. The next Herculean job is to standardize the nerve racking ubiquitous human element and compel the operators in this section to perform exactly like those in another part of the country altogether. It is quite as easy and no more unreasonable to expect a standard prescription to do for this patient what it did for the other.

Brushing aside all obstacles for the sake of argument, the outstanding, foremost, dominating objection is that mechanical genius will receive its death blow. If all bright ideas and clever designs are first to pass censorship and suffer the knife, they will lose their flavor and become stale, flat and unprofitable before they see the real light. Put a ban, if you will, on inventive genius and you knock the props from many an enterprising firm and individual and instead of progression we will have retrogression, narrowness and dry rot. Let us see to it that this excellent, well meaning thing is not perverted and run into the ground. Let us take a firm stand and say, "Thus far and no further, Mr. Standard."

MILLARD F. COX.

Who Wastes the Coal?

GREENVILLE, TEXAS.

TO THE EDITOR:

The article written by "Master Mechanic" which appeared in the *Railway Age* for February 8, in which the writer attributes a waste of coal to the delayed movement of trains caused by dispatchers, makes me think of how the different departments of a railway try to shift responsibility from one to another, when called upon for an explanation. Let some minor accident occur, such as the derailment of a few cars, not serious enough for a government investigation, and you will find the following results:

"Accident not caused by fast running."—Train and Enginemen. "Not caused by bad order cars."—Car Department. "Track in first class condition."—Track Department. "Cars properly loaded."—Station Help.

And so on down, if taken any farther, until there is not a reason on earth for the derailment. So it is with the waste of coal—lay it on some one else, if you can get by with it.

I suppose the reason for this practice is, first, fear of a reprimand, and second, each department trying to show that it is absolutely perfect; which is absurd. All make mistakes, from the management down, and this includes master mechanics and train dispatchers. But in behalf of the train dispatchers, I wish to say that after superintendents' and trainmasters' investigation of the standard delay report, which all good roads use, showing delays from five minutes up, they find the excessive delays caused by dispatchers are few, and in nearly every case can be satisfactorily explained. When a good explanation is not given, the dispatcher usually gets his—our officers are too well onto their jobs to overlook poor work on the part of the dispatcher.

Present conditions are not what they were a few years ago; we now have larger engines handling more cars than most of our side tracks will hold; this causes saw-bys. A dispatcher, to avoid a saw-by, often lays a train out at a certain point to avoid a worse delay at the point where the trains should meet if conditions were favorable.

The government has taken many men from all departments on every railway, and this has caused a shortage of help at many stations. Boys and girls new in the business are being used. This is responsible for some delays; a des-

patcher is often unable to raise the office he wants for orders; then, again, for "Safety First," he will refuse to work with an operator he has reason to fear. Many offices have been closed as far as telegraphing goes on account of the inability to secure men. This same condition exists in the engine department. A student fireman is sent out; because he is unable to perform a fireman's duties, he delays the train he is on as well as opposing trains. A despatcher cannot be responsible for these conditions.

Why do some engineers dislike to send a message advising condition of their engine when leaking a little or unable to handle tonnage, but instead will drag all the way over the division, delaying themselves and all opposing trains? This is true on many roads. Are they held responsible for a condition they cannot help? These cases are referred to just to show that there are other delays besides those caused by the despatcher.

P. CAIN.

Blunders in Handling Labor and the Solution

CHICAGO, Ill.

TO THE EDITOR:

One of the liveliest, if not the very liveliest, topic confronting the railroads and, in fact, our entire nation today is the labor problem, and, if handled with the greatest efficiency, much tact and diplomacy must be displayed immediately. The writer is a railroad superintendent whose reason for writing under the nom de plume of "Observer," is that he does not care to have the employees in different parts of the United States whom he shall mention, know that he is using their cases for illustration.

Back in the early nineties, I was a telegrapher on a Western road which had won a strike against its telegraphers the year prior to my entering its service. At the time I was employed I had no labor affiliations and paid no attention thereto, but in a few months my work took me to a joint office with another road where the telegraphers were well organized and had a very strong division in the town where I was located. I soon became a member of that division and enjoyed the association very much. Later I was transferred to another superintendent's division and the Telegraphers Journal followed me. It was here that I learned for the first time that there was any ill feeling on the part of the officers toward the telegraphers' brotherhood.

I was summoned to the superintendent's office—a fellow telegrapher had informed the superintendent that I was a dangerous character because I was an "order" man. His first question was, "I understand you belong to the Order." My answer was "Your understanding is correct." He then asked, in a bull-dozing tone of voice, if I thought a man could work for the interest of that company and belong to the Order. My answer was that I had been giving the very best service I knew how for the past two years and knew of no reason why I should not continue—that I considered an O. R. T. man could be just as loyal as an O. R. C. man or any other Order man. The superintendent himself was holding a withdrawal card from the O. R. C. After some more bulldozing and humiliation, I was allowed to return to my position with the admonition that if I ever tried to influence any of the telegraphers of that division to affiliate with the order, I would be dismissed by wire.

This was furthest from my mind, but a few years later, after I had left the telegraph service and was handling terminal stations and yards, the road was organized and I became the first chairman of the schedule committee, all because I still felt that I had been unjustly censured when I was attending to my business with no thought of disloyalty toward the company.

After our schedule was granted and I returned to my station (at division headquarters) the superintendent—one in whom I had the utmost confidence and I also enjoyed his confidence—wrote me a curt pencil note to the effect that as system chairman for the telegraphers I had been furnished a card pass, but it was not to be used for the purpose of running around and further perfecting our organization. The facts were that the only time in two months that I had used the pass was in going to a badly handled station where the superintendent had trouble in keeping help, and working almost continually for two nights and a day to straighten out some bad tangles.

These instances are mentioned merely to show how the personal feelings of officers have been allowed to build up and encourage antagonism among the working class.

Some Correct Methods

It may be that some of the raps I received caused me to be more charitable when I got to the position of "Boss." If so, I should be and am thankful therefor. Early in my career, it was my good fortune to be associated at times, with a real humane "higher up" official. One of the strongest points in philosophy he gave me was this expression: "In dealing with the other fellow, no matter what his position, always remember that he is just as smart as you are and maybe he has you beat." His contention was that if he gave him that consideration, he would not make many mistakes in handling men. In dealing with labor problems, I have since used this as my basic principle.

The first terminal station I took charge of had but one switch crew and this crew had more or less trouble through careless work. A careful analysis revealed the cause—the foreman was addicted to excessive drinking. A subscription was taken among the various men at the terminal and he was given the cure. When he returned we had a battle to keep him away from temptation. We finally won by getting him in debt for a home and interested in a garden, also the raising of blooded chickens, in other words, we got him interested in something for himself.

Later I took charge, as yardmaster, of a congested terminal in the South where we were trying to handle 2,500 cars in a 500-car capacity yard. The switchman problem was a serious one. The second week on the job a typical boomer blew in and had a clearance right from Pocatello. We will call him "Red Wilson." On account of his experience he was immediately put to work in charge of an engine. His first night on duty, he came into the yard office, about 1 a. m., and demanded his time, saying he had sideswiped a cut of cars. I asked him if he did it purposely, and he said "Of course, not." I then told him he couldn't quit until morning and to come to my office when he went off duty at 7 a. m. and talk it over.

What an interview that was. I began by asking him to tell me of his experience, which covered service on 26 different roads. Always discharged and the offences not always dischargeable ones. We formed a partnership; he was to stick to me, at least until our congestion was broken up, and I was to stay by him. He had left a wife and five children in Denver. I got passes for them and what a reunion that was. I happened to be looking out of the window of the ticket office when they arrived—a careworn little woman and babe in arms and four others, the eldest a girl of nine years. The first thing he said when he took his wife in arms was "I have found a real boss and we are going to stay here and quit roaming around." Her answer, with tears in her eyes, was "I am so glad."

Pretty soon I began to get bill he owed at different places and it became necessary for me to appoint myself receiver for him—and it was some job. I took 40 per cent of his wages and apportioned it among his creditors and he and his wife seemed happy to think a way was being provided

to get rid of the nightmare of debt. We paid him out in 14 months, then made him buy a home with lots of garden and chicken yard space. He is here today but has three pieces of rental property beside his home.

Last Summer I was called back to that town to attend the funeral of an old friend. At the cemetery a neat looking little lady stepped up and spoke to me, saying she was Mary "Wilson" and was teaching school in a State college located at that place. It was 15 years since she had stepped off the train at that town, poorly fed and clothed. Now she was a highly refined young lady and one of our Nation's educators. When she walked away there was a feeling of pride in my breast, I could not help but think that I had contributed to that young lady's career by taking an interest in her father when he was a boomer switchman and I am satisfied the girl felt the same way about it and only spoke to me to let me know that my name was a topic in their household.

Ten years ago a yard that has since been placed in my jurisdiction, had a pretty hard name for its antagonistic attitude toward the company. The switchmen were unionized to the guards and spent a great deal of time in labor activities generally. We placed a yardmaster in charge who carried out my theory of getting all the men to own homes. You never saw such an improvement from the standpoint of wrecks and derailments. And now you never hear of one of those men taking part in union activities. They are too busy attending to their own affairs when off duty and do a better job attending to company affairs when on duty. This is the only yard I know of that operated last year—the first year of the 8-hour law—for nearly seven cents per car cheaper than the past nine year average.

It seems to me that the open forum, now being prominently mentioned in many of our leading publications, should find a large field among our railroad employers and employees as the plan provides for the employer and employee getting closer together. Surely we need that more than anything just now to insure a better understanding among ourselves.

When you can get the laboring classes to making payments on homes and saying, "This is my home," you have taken a long step toward solving the labor situation and stamping out anarchy. Therefore let us, as railroad officers, commence being our "brother's keeper" and inject just a little humane intelligence and toleration for the man in the lower rank, who, after all, may be our superior in ability were our positions reversed.

OBSERVER.

Consolidation vs. Mikado Locomotives

ST. MARY'S, PA.

TO THE EDITOR:

In the discussion of standard locomotives it may be well to draw attention to the subject of relative efficiency of the different types of ordinary freight locomotives that are in common use with regard to their weight pound for pound. The present necessity of speeding up the delivery of supplies, munitions, etc., compels us to exert every effort to make every pound of material perform its most efficient duty in the shortest time, at the least first cost and at the same time at the least cost of maintenance.

This is particularly true of locomotives required at this time. For some years past American railroads have practically adopted the Mikado type (2-8-2) as the standard type of freight locomotive; this is an efficient machine from the transportation standpoint as compared with the hauling power of smaller locomotives that it has succeeded, but it is a decidedly inefficient machine when compared with the Consolidation (2-8-0) or the Decapod (2-10-0) types pound for pound of locomotive. The writer would like to draw attention to the article appearing on page 961 of the May 7, 1915,

issue of the *Railway Age Gazette* under the title "Factor of Adhesion in Steam Locomotives" and to the contribution to "The Locomotive of Recent Developments" found on pages 109, 110, and 111 of the proceedings of the Central Railway Club of May, 1915.

Considering the Mikado (2-8-2), the Consolidation (2-8-0) and Decapod (2-10-0) types of the same weight in working order, exclusive of the tenders, the Mikado is only about 83 or 84 per cent efficient in hauling power. Comparing the three types with following approximate dimensions we have:

Type	Mikado	Consolidation	Decapod	Loss in productive weight and tractive power in the Mikado
Diameter of drivers.....	63 in.	63 in.	63 in.	
Weight on engine truck.....	25,000 lb.	22,000 lb.	22,000 lb.	
Weight on drivers.....	230,000 lb.	263,000 lb.	263,000 lb.	43,000 lb.
Weight on trailer truck.....	40,000 lb.	None	None	
Total weight in working order	285,000 lb.	285,000 lb.	285,000 lb.	
Cylinders	26 in. by 30 in.	28 in. by 32 in.	28 in. by 32 in.	
Approximate tractive power.....	52,000 lb.	62,000 lb.	62,000 lb.	10,000 lb.
Factor of adhesion.....	4.23	4.23	4.23	
Boiler pressure.....	185 lb.	185 lb.	185 lb.	
Valve gear, type.....	Outside	Outside	Outside	
Superheater (same type).....	Yes	Yes	Yes	

Some objections have been raised to the driving axle load of the Consolidation which would be 65,750 lb., but the following prominent railroads have used axle loads as great or greater:

Erie Railroad.....	(2-10-2) weight on drivers 335,500 lb., axle load 67,100 lb.
D. L. & W.....	(4-6-2) weight on drivers 197,300 lb., axle load 65,700 lb.
D. & R. G.....	(2-10-2) weight on drivers 337,500 lb., axle load 67,500 lb.
Pennsylvania.....	(2-10-0) weight on drivers 334,500 lb., axle load 66,900 lb.

It is to be noted that the axle load on the Decapod would be 3,400 lb. less than that of the Mikado. The Consolidation and Decapod types are approximately 20 per cent more efficient pound for pound than the Mikado; each type having the same weight (285,000 lb.). In other words, considering the three types (2-8-2), (2-8-0), (2-10-0) pound for pound and the maximum tractive power to be 52,000 lb. and the same weight on the drivers we have:

Type	Mikado	Consolidation	Decapod	Loss of the Mikado over the Consolidation and Decapod
(2-8-2)	(2-8-0)	(2-10-0)		
Weight on engine truck.....	25,000 lb.	22,000 lb.	22,000 lb.	
Weight on drivers.....	229,000 lb.	230,000 lb.	230,000 lb.	
Weight on trailer truck.....	40,000 lb.	None	None	
Total weight in working order	285,000 lb.	242,000 lb.	242,000 lb.	43,000 lb.

The weight of either the Consolidation or the Decapod (242,000 lb.) divided by the excess weight of the Mikado (43,000 lb.) = 6.63 or for every 6.63 Mikado locomotives built we lose the use of one Consolidation or Decapod locomotive of 52,000 lb. tractive power. Carrying this to a conclusion in the purchase of 2,000 Mikado locomotives we could have built 2,354 Consolidation locomotives at a gain of 354 locomotives having 18,408,000 lb. tractive power.

Again, basing the cost of the three types at fifteen (15) cents per pound:

The Mikado would cost 285,000 × .15 =	\$42,750
Either the Consolidation or Decapod would cost 242,000 × .15 =	\$36,300
A loss in the Mikado of.....	\$6,450
—for the same amount of tractive power, viz., 52,000 lb.	

The driving boxes, shoes and wedges, engine truck, rod brasses, crossheads, grates and many other parts can be made interchangeable with the existing heavy Mikado locomotive and at the same time eliminate the trailer truck with its attending upkeep.

Many examples of existing locomotives will show that a 63 in. driving wheel can be put under the firebox. The article in the *Railway Age Gazette* referred to above indicates that we can get sufficient wheel base to build a boiler large enough to generate sufficient steam for Consolidation or Decapod locomotives having a tractive power of 62,000 lb.

E. F. GIVIN,

Pittsburg, Shawmut & Northern Railroad.

Doings of the United States Railroad Administration

Regulation of Export Freight; Consolidation of Ticket Offices, and Other Retrenchments

WASHINGTON, D. C.

THE CAR SERVICE SECTION in Bulletin No. 12, addressed to all railroads, asks for detailed information concerning standard gage revenue freight cars of all types and initials on their lines as of May 1, 1918, and roads are asked to take care to see that all freight cars not actually retired from revenue freight service are included. The information is desired as to the number of home cars on foreign lines, the number of home cars on line, the number of foreign cars on line, private line cars on line, and total cars on line.

Expense Accounts of Railroad Officers

The United States Railroad Administration desires that expense accounts of railroad officers be itemized with more particularity hereafter than has sometimes been the case in the past. Director Prouty of the division of public service and accounts has addressed a circular on the subject to the regional directors, who are asked to bring it to the attention of the presidents and to have copies placed in the hands of all officers who render expense accounts. It is ordered that all expense accounts must be so itemized that the nature of the expenditure can be readily understood. For example, the account must indicate how much is paid for room, and separately for meals, and transportation should be shown in reasonable detail to show the division between expenditures for railroad travel, cab hire, etc.

Regulation of Export Shipments

The Car Service Section has issued Circular No. C. S. 2-A, prescribing regulations for export shipments, as follows:

I. In accordance with the provisions of the proclamation of the President of the United States, dated February 14, 1918, effective February 20, 1918, all articles of commerce shall require an export license from the War Trade Board for exportation via any port or border point to whatsoever destination, except to points in the noncontiguous possessions of the United States.

(For Canadian shipments, the articles enumerated in list appended hereto require individual license.)

II. You will immediately instruct all concerned that the furnishing of equipment for shipments consigned, reconsigned, to be reconsigned or intended for export shall be contingent upon—

- (a) The issuance of said license.
- (b) The presentation of license number.
- (c) The marking of bill of lading "For Export."
- (d) The waybill bearing license number. (License or partial shipment authority may or may not accompany waybill, but must be in hands of Collector of Customs at port of exit on or before arrival of freight at that port.)

III. Shipper's Export Declaration, of which there shall be four copies, must be delivered to the Collector of Customs at points of exit from the United States on or before arrival of shipment at such port. For shipments to noncontiguous possessions Shippers' Export Declaration in duplicate only is required.

IV. All shipments are further subject to such regulations and permits as may be required by the various railroad committees controlling export shipments.

V. The Car Service Section of the Division of Transportation of the United States Railroad Administration is

authorized to permit the shipment of commodities intended for export prior to the issuance of an export license, if said Car Service Section shall be satisfied that there is storage room available, or that it is the custom of the trade to move such commodities to seaboard for storage or grading.

VI. With the exception of Paragraph III, the foregoing, for the present, will not in any way apply to any commodities for the exportation of which a special license has been or shall be hereafter issued by the War Trade Board, dispensing with the requirement of an individual license. Such special licenses are at present in force covering the following commodities:

- (a) Any shipments made on Government bills of lading or consigned to the Navy Department, or War Department, or by or to any of the bureaus or other subdivisions thereof, the billing of such shipments to be marked "Export License RAC-18."
- (b) Raw cotton shipped to Great Britain, France, Italy, or Japan, and their colonies, possessions, and protectorates. (Not Sea Island or Egyptian cotton, which requires an individual license.)
- (c) All shipments of coal or coke.
- (d) Shipments to Canada and (or) Newfoundland of all commodities *not* on the Export Conservation List of the War Trade Board, as appended hereto, unless otherwise specified therein.
- (e) Shipments to all countries, other than Canada and Newfoundland, of all commodities *not* on the Export Conservation List of the War Trade Board, provided that value of no one commodity in the shipment exceeds \$100.

VII. That a shipment from one consignor to one consignee, which shall exceed one carload, and which is intended for export, will only be permitted with the provision that the car or cars are loaded to full visible or carrying capacity.

Ticket Offices Consolidated

Director General McAdoo has announced that arrangements have been made for the consolidation of city ticket offices in the following cities in the eastern region:

New York City,	Reading, Pa.
Boston, Mass.	Williamport, Pa.
Philadelphia, Pa.	Newark, N. J.
Baltimore, Md.	Cincinnati, O.
Wilmington, Del.	Columbus, O.
Pittsburgh, Pa.	Detroit, Mich.
Atlantic City, N. J.	Dayton, Ohio
Buffalo, N. Y.	Cleveland, Ohio
Syracuse, N. Y.	Indianapolis, Ind.
Rochester, N. Y.	Toledo, Ohio

There will be five offices in Greater New York—four on Manhattan Island located as follows: 66 Broadway, Stewart building on Chambers Street, facing City Hall Park; somewhere in the lower 50's in the hotel district in that section; No. 114 W. Fort street and street, and one office in Brooklyn on Fulton street, the present offices of the Pennsylvania and New York Central. The rental of the offices vacated in these cities is approximately \$1,070,000 per year. The rental of the consolidated offices will be \$213,200 per year.

Arrangements are also being made to consolidate the offices in Chicago, St. Louis and Louisville. These are border line

points and require joint action on the part of the Eastern and Western districts. Similar consolidations will be made in the Western and Southern districts, and will be announced later.

Committee on Mail Transportation

The Railroad Administration has appointed a committee on mail transportation, reporting to the division of traffic, with Guy Adams, mail traffic manager of the Union Pacific system and chairman of the committee on railway business mail of the American Railway Association, as chairman. The committee is to study the entire subject of mail transportation and one of its purposes is to effect a greater degree of co-operation between the railroad mail service and the post office department. At the request of the Postmaster General, Rudolph Brauer, superintendent of the railway mail service at Omaha, has been appointed a member of the committee, and the other members are G. P. Conard, secretary of the Association of Transportation and Car Accounting Officers, who was also a member of the committee on railway business mail; H. L. Fairfield, manager of mail traffic of the Central of Georgia, representing the southern region; J. C. McCahan, Jr., manager mail traffic of the Baltimore & Ohio, representing the eastern region; and H. T. Mason, manager of mail traffic of the Frisco lines. The committee has its headquarters in the Southern Railway Building at Washington. The announcement says: "It is expected the committee will accomplish important economies and efficiencies in the handling of mails on the railroads.

Guy Adams was formerly in the railway mail service in the post office department and for 20 years has been connected with railway mail service on roads in almost every part of the country. In this work he has been associated in one way or another with the installation of many of the important fast mail trains. He was born on December 5, 1868, at Abingdon, Ia., and was educated in the common schools. He entered railway service in 1882 as a messenger in the trainmaster's office of the Chicago, Rock Island & Pacific, and from 1884 to 1892 he was railway postal clerk. From 1892 to 1896 he was manager of the Rocky Mountain Official Railway Guide at Denver and from 1896 to 1898 general passenger agent of the Union Pacific, Denver & Gulf, and Denver, Leadville & Gunnison railroads. He was later traveling passenger agent of the Lehigh Valley, general agent of the Chesapeake Beach, and traveling passenger agent and division passenger agent of the Delaware, Lackawanna & Western. From 1904 to 1912 he was manager of mail traffic of the Chicago, Rock Island & Pacific at Chicago; from January 1, 1912, until December 1, 1913, manager of mail traffic of the Frisco lines, and since December 1, 1913, has been mail traffic manager of the Union Pacific.

A short time ago Mr. Adams gave 40 acres of a ranch in Colorado and organized the Railroad Men's Mountain Home Association to build a recuperation camp for convalescent soldiers and sailors who were formerly in railroad service.



Guy Adams

Car Shortage Reports Discontinued

The monthly reports of car surpluses and shortages which have been compiled and published monthly by the American Railway Association since 1907, with the exception of a brief period when they were discontinued from motives of economy at a time of a large surplus, have now been discontinued at the instance of the Railroad Administration. While it has generally been considered that the report was a valuable barometer of the state of car supply, at least as reflecting comparative tendencies, it has also been regarded as an imperfect reflection of the exact conditions and the semi-monthly bulletins now compiled by the Car Service Section of the Railroad Administration showing the percentage of freight cars on lines to ownership, by individual roads and by groups, together with more special reports which are received, are considered to afford a better index of conditions. The shortage and surplus reports were regarded as defective for the reason that in times of shortage a shipper would frequently place orders with several roads at the same time in the hope of obtaining cars somewhere and the order would, therefore, be duplicated in the total shortage report. Also a surplus and a shortage would be shown at the same time on one road when at the time of compiling the report the surplus cars were in transit to fill orders.

Since the government took over the railroads the A. R. A. figures have not been published but they were compiled for January 1, February 1 and March 1, and showed net shortages on those dates respectively as follows: 89,995, 98,044 and 138,102. At present, according to reports received by the Car Service Section, the car supply situation is much easier than it has been for some time and except in a few localities shows a general recovery from the condition of last winter.

Freight Traffic Committee

A committee to control freight traffic passing through Potomac Yard, Va., Hagerstown, Md., and Hampton Roads, Va., has been appointed by the division of transportation of the Railroad Administration. The committee is to secure all necessary reports covering traffic through these gateways or held for any of them on account of congestion; will give particular attention to the handling of freight for the government, recommending any measures that will facilitate its movement, and will decide upon all embargoes affecting traffic passing through these gateways, placing them through the regional directors and keeping the Car Service section constantly advised. The members of the committee are: George R. Loyall, assistant vice-president of the Southern Railway, chairman, O. H. Hobbs, H. Billings, and E. T. Wilcox.

Advances to Railroads

The \$500,000,000 revolving fund appropriated for the Railroad Administration by the railroad control law has already begun to serve its purpose. The first large withdrawal from the fund was \$43,000,000 advanced to the New York, New Haven & Hartford to protect its maturing obligations, and since that time advances of various amounts have been made to roads which find themselves in need of small amounts to meet approaching maturities or for other purposes, because the amount of compensation which they are to receive from the government is still undetermined, pending negotiations on the form of contract. The advances in most cases are made as installments for account of compensation and are secured by collateral.

Car Service Section

The Car Service section has issued Bulletin 9-A superseding instructions in Bulletin 9 which conflict with the following: "Until further advised you will handle the

following private line refrigerator cars as hereby directed.

"Pacific Fruit Express cars will be delivered to the Union Pacific System, Southern Pacific (Pacific System), or as directed by the officers of the Pacific Fruit Express Company.

"American Refrigerator Transit and Dairy Shippers' Dispatch cars will be delivered to the Wabasha, Missouri Pacific, or as otherwise directed by the officers of the American Refrigerator Transit Company.

"Union Refrigerator Transit cars in series 1000 to 1999 inclusive to the Illinois Central, and series 40,000 to the Illinois Central or Mobile & Ohio, as most convenient. All other Union Refrigerator Transit cars to roads operating in Wisconsin.

"Fruit Growers' Express cars should be returned to the Atlantic Coast Line and Seaboard Air Line for fruit and vegetable loading.

"Santa Fe Refrigerator Dispatch cars should be deliv-

ered to the Atchison, Topeka & Santa Fe, and Frisco Refrigerator Line cars to the Frisco, or in accordance with directions of the officers of these companies."

Bulletin No. 13 has also been issued saying: "Because of the increased demand in connection with the war program for raw materials which are required in the manufacture of artificial ice, there is likely to be some curtailment in the supply of these commodities making it more essential that all practicable demands for transportation of natural ice shall be met. Will each railroad take such action as is necessary to give this question full protection."

Protection of Railroad Property

Daniel B. Leonard, of Parkersburg, W. Va. has been appointed attorney for the Section on Protection of Railroad Property, and has been assigned to Toledo, Ohio, where a large number of cases of pilfering from freight cars has been discovered.

Minnesota Track Scale Specifications and Tolerances

Rules Adopted by the State Railroad and Warehouse Commission Contain Some New Provisions

THE MINNESOTA RAILROAD and Warehouse Commission has adopted specifications and tolerances for railroad track scales which become effective December 1, 1918, and which represent a large amount of constructive work on the part of the department of weights and measures in co-operation with the railroad scale manufacturers and the United States Bureau of Standards. Following the passage of a statute in 1907 placing track scales under the supervision of the state railroad commission, steps were taken to inspect them and a test car was purchased. The testing of scales throughout the state brought to light an unsatisfactory condition of affairs. It was found that few scales in the state were built on the same plan, foundations were commonly inadequate and the weighings were frequently far from accurate. In an effort to improve conditions the first

manufacturers, particularly as to the manner of rating the capacities of scales, the formulation of a complete specification was urged in some quarters and after a study of the subject, in co-operation with the various associations of men interested in scales, a draft of a second specification was prepared in 1916. This was submitted to the railroads and the manufacturers and to various experts, and finally to the Bureau of Standards. After various hearings and revisions, an amended draft was submitted to the Railroad and Warehouse Commission which adopted it on November 6, 1917, to become effective on December 1, 1918. The specifications are based to a certain extent on those prepared by the United States Bureau of Standards, but go into greater detail. Important features of these specifications and items which differ from those contained in the specifications of the Bureau of Standards and features more or less new are abstracted below.

Abstract of Specifications

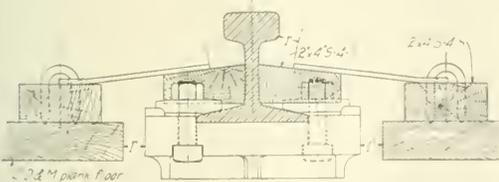
CAPACITY

Capacity Defined: "The capacity of the scale shall be construed to be "equal to the weight of the heaviest loaded car it will weigh, provided that it will support a train of such cars passing over it without stresses being developed in the members thereof, which are in excess of those hereinafter specified." The scale weigh bridges and dead rail beams, when used, shall be deemed to be included in the term "in the members thereof."

Capacity Required: The scale shall have a capacity of at least 200,000 lb. (Following this a set of rules and formulae is given, indicating the methods by which the various parts of the scale may be investigated. The working stresses are the same as those given in the Bureau of Standards specifications.—Ed.)

SCALE LEVERS

Finish. The finished levers shall follow the pattern lines, as far as practicable, and shall not be unduly warped from those lines; they shall be free from blisters and large sand-holes and other imperfections, and shall be brought to a reasonably smooth finish. Levers that are to be equipped with nose irons shall have those portions of the lever ends,



Manner of Applying Steel Weather Strips to Live Rails

step taken was the drafting of the first Minnesota foundation and scale setting requirement, which became effective November 13, 1912. A weights and measures department was created in the meantime, which assumed supervision over all weighing and measuring devices in the state.

Discussions of these preliminary requirements led to questions as to the strength of the weigh bridges, which, after conferences with the engineers of the railroads and the scale manufacturers, resulted in the adoption of the requirement that the strength of weigh bridges and cross I-beams should be determined by the engine loading. This was amended further in 1914 with requirements covering concrete construction.

Owing to a lack of uniformity in the practices of the scale

receiving them machined for the full distance over which they are to move.

SCALE PIVOTS

Material: Scale pivots shall be manufactured from high carbon steel or special alloy pivot steel, which will give, when tempered, a maximum toughness, combined with that degree of hardness, that will insure the least wear under the heaviest loads to be applied.

Design: All pivots shall be designed and manufactured so that the two sides joining to form the knife-edge shall form an angle that will not exceed 90 deg., the sides of which shall be as nearly equal in length as possible.

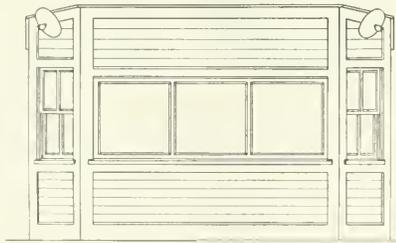
NOSE IRONS

Design: The design of the nose irons shall be such—(a) That the clamp screws or bolts will not make indentations in the lever, and shall be independent of the means provided for adjustment; (b) That these screws or bolts shall force and hold the nose iron against the lever in the same direction as it would be forced by the load; (c) That the movement of the nose iron shall be controlled by means of machine screws of United States standard size and thread, and be made from a non-corrosible material.

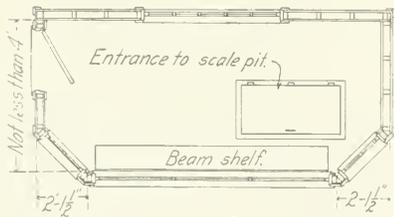
BEARINGS, BEARING BLOCKS AND LINKS

Material of Bearings: (Same as for pivots.)

Mounting: All bearing steels shall be separable and interchangeable, and shall be firmly fastened in their respective



Front Elevation.



Ground Plan.

Standard Scale Beam House

seats means of non-corrosive set screws of United States standard size and thread or other suitable means of fastening which will prevent their movement except for renewal. The use of interchangeable blocks that are self-aligning having bearing seats fastened therein in accordance with the foregoing will be acceptable.

LOOPS AND CONNECTIONS

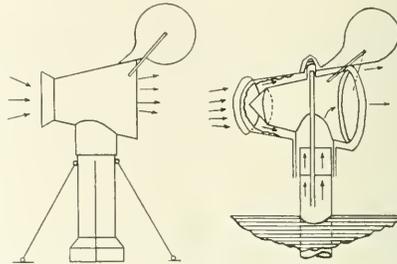
Design: They may be of any type desired, provided the radius of the portion of the bearing making immediate contact with the knife-edge and the radius of the eye of the loop

shall not be less than the length of the longest side of the cross-section of the pivot to be used in the loop.

WEIGHING BEAM ACCESSORIES

Main and Fractional Poises: The poises shall be designed so as to present the least number of recesses or projections in or on which dust or dirt may accumulate. Rollers or other means should be provided to secure as free a movement along the beam as possible. On type-registering beams the fractional poise shall be equipped with means to insure a positive stop at any 20-lb. notch, and a shoulder stop shall be provided to prevent the movement of the fractional bar beyond its proper travel in either direction. A substantial double hand grip shall be provided to facilitate the printing of the weight ticket with the least possible disturbance of the beam.

Marking: Each beam shall be given a serial number, which shall be stamped on the beam. The pivots and all



Elevation and Section of an Automatic Ventilator for Scale Deck

poise parts shall have stamped on them identification marks to show to which beam each belongs, and the pivots shall also be marked to indicate the proper position in the beam.

Beam Fulcrum Stand: The beam shall be set, or supported on the beam fulcrum stand provided with compensating bearings, and shall not be suspended or hung from hooks or supports.

Finish: The base of the stand shall be machined to the plane perpendicular to the axis of the upright portion of the stand and shall be suitable for the capacity of the scale in which the stand is to be used.

Trig Stand Loop and Beam Clamp: The trig loop and beam clamp shall be made of a non-magnetic material. The play of the beam in the trig loop shall be two per cent of the distance from the trig loop to the knife-edge of the fulcrum pivot.

Type of Weighing Beam: Scales that are to be used for spot weighing of cars or carload freight shall be equipped with a type registering beam of a capacity that will enable the entire load to be weighed in one draft without the use of additional weights of any kind. Scales that are to be used for motion weighing of cars or carload freight, either by hand, or by the use of an automatic recording device or machine, shall be equipped with a beam suitable for that purpose, and the beam and machine (if used) shall both be approved by the department before the scale may be placed in service.

ANTI-FRICTION POINTS AND PLATES

Material: Hardened steel anti-friction points and contacts shall be provided to limit the lengthwise displacement of the pivot knife-edges on their bearings.

Design: Plates carrying the anti-friction points shall be securely attached to the levers. Hardened, smooth surfaces to oppose the anti-friction points shall be formed on the bearings. The construction and application of these points

and contacts shall be such that the contact that may be made between them shall be on the line of the pivot knife edges, and will produce a minimum of friction. The clearances between the anti-friction plates and the anti-friction points shall not exceed $\frac{1}{8}$ in.

TOLERANCES

The tolerance to be allowed on the test of all new railroad track scales shall not exceed 0.025 per cent of the test load applied. The same tolerances shall not be exceeded on the test of all railroad track scales over which grain or oil are to be weighed.

Commercial Scales. The tolerance to be allowed on the test of all railroad track scales used for the weighing of cars or carload freight (except grain and oil) shall not exceed 0.1 per cent on the test load applied.

FOUNDATION

Depth: (a) All foundations must extend to at least nine feet below the surface of the ground, and shall include a concrete mat at least two feet in thickness, formed to and upon which shall be set the side, end, neck, and approach walls, except where solid rock formation is found at a depth of less than nine feet. (b) The pit floor shall, in all cases, be cemented over with a smooth coat of cement mortar with a pitch provided to a common point of drainage to prevent the formation of pockets in which water might stand.

SCALE BEAM HOUSE

Dimensions: A suitable and substantial scale beam house shall be provided. The minimum width of the house shall be four feet, inside measurement, and the minimum length shall be sufficient to allow for the installation of a full-sized beam shelf and regulation beam of the proper capacity for the scale. It shall be provided with front and corner windows, the construction to be such that no part of the beam shelf shall make a contact with the ends or front of the scale house. The windows shall be of a sufficient size and shall be placed with the lower edges about on a level with the top of the beam shelf, so as to give the weigher a full view of the scale and car when he is handling the beam.

WEIGH BRIDGES

Platform Ties: The live rail platform ties (weigh bridge ties) may be made up of sound body timber of the hard variety, or of steel I-beams, or of cast steel, stand and tie combined cast in one piece. If the scales are to be used for motion weighing, no wooden ties may be used.

Live Rails: Scale rails shall be continuous without splices or joints. These rails shall be securely bolted to the cast iron pedestals, or fastened to them by means of malleable iron clips. If fastened by clips, each rail shall be equipped with not less than six rail anti-creeper, three spaced each way from the center.

Clearance Along Live Rail: The clearance along the live rail pedestals shall be two inches, which opening shall be protected from the weather and from dirt.

Steel Weather Strips: Steel weather protecting strips cut into lengths of not more than five feet, made from $\frac{1}{4}$ -in. steel, 7 in. in width, shall be provided to protect the scale from the weather and dirt.

Motion Weighing: (a) On scales equipped with automatic recording machines for the motion weighing of cars or carload freight, "transfer rails" or "easer rail joints" of a type to be approved by the department shall be provided to introduce the load to the scale without undue impact.

(b) For motion weighing in train order, where cars or carload freight is to be weighed coupled and under engine control, electric signal targets shall be placed at least two train lengths from the end of the scale to indicate to the engineer the proper speed for the train. These targets shall

be provided with three different signal lights and boards to indicate: "Correct speed," "Speed too fast" and "Speed too slow." The control for these signals shall be arranged so that they may be operated by the weigher, while he is doing the weighing, without leaving the beam.

DEAD RAILS AND CAR PULLER

Dead Rails, When Required: (a) When the scale track is connected at both ends. (b) When a car puller is not used to handle cars over the scale and the scale is not located at the end of a stub track. (c) Dead rails to be constructed to same elevation as approach and live rails.

Dead Rails, When Not Required: (a) When the scale is located at the closed end of a stub track. (b) When a car puller is used to handle cars over the scale.

LIGHT, DRAINAGE, VENTILATION AND CLEANING

Light: Sufficient light for a proper lighting of the scale weighing beam, scale house, scale deck and scale pit shall be provided.

Drainage: Scale pits must be kept free from water. Where possible to construct it, a drain shall be installed, connected through a water-sealed trap to a sewer, cess-pool, or to an outlet to natural drainage. In all other cases the drain shall be connected to an outside water-tight cistern, which shall be kept pumped out.

Ventilation: (a) All scale pits should be ventilated to meet the needs of each particular case, the object being to have the least possible amount of moist air in the pit, to prevent rusting of scale parts and structural steel. (b) (Suggestion by Bureau of Standards:) "One opening, or set of openings, shall be made in the deck of the scale, which are to connect with flues which terminate near the bottom of the pit, and that another opening, or set of openings, be made in the neck in the ordinary way." (c) We suggest a ventilating pipe be extended upward from the opening in the neck to the top of which pipe there be connected a ventilating hood, or jack, similar to the one shown in the drawing.

PROTECTION FROM CORROSION

Painting: All metal parts of the scale and all structural steel shall be painted with not less than two coats of paint before delivery for erection, or before being assembled and erected. All surfaces coming into contact, where such surfaces are to be riveted together, shall be painted before being riveted.

Material: The material for the paint specified above shall conform to one of seven formulas and specifications; [given in the report.—F.I.]

We are indebted for the above information to W. E. Thompson, supervisor of scales for the State of Minnesota, who has been largely responsible for the preparation of the specifications attached hereto.

BRITISH FLIERS WICK FOUR GERMAN TRAINS—The statement on aerial operations issued by the British War Office at London on April 20 says: "There was no improvement in the weather on Friday but a certain amount of flying was done between storms of rain and snow and reconnoissances were carried out at low heights. Four and a half tons of bombs were dropped on the important railway station and ammunition dumps and targets in the Lattle area. Only a few indecisive combats occurred in the air. None of our machines is missing. After dark our night flying squadrons were very active. Sixteen tons of bombs were dropped on Armentieres, Warncourt, Estaires, Bapaume and the Chaumes railway junction. Direct hits were observed on four trains, one of which, judging from the explosion that was caused, was undoubtedly full of ammunition. All our machines returned safely."

The Southern Pacific's Snow Shed Problem

THE MAINTENANCE of uninterrupted operation through the Sierra Nevada mountains with a maximum annual snowfall of 65 ft. has led the Southern Pacific to spend over three million dollars in the construction of 29 miles of snow sheds in a total distance of less than 30 miles. A brief history of the development of these sheds and of the problems involved in their maintenance was contained in a paper prepared by George W. Rear, general bridge inspector of the Southern Pacific at San Francisco, Cal., and published in the Proceedings of the American Railway Bridge & Building Association for 1917, just issued, from which the following information is abstracted.

The following figures show the annual snowfall at various points along the line of the Southern Pacific where it crosses the Sierra Nevada mountain.

Station	Elevation	No. years record	Average seasonal snowfall
Blue Canyon	4,695 ft.	14	17 ft. 3 in.
Cisco	5,939 ft.	33	30 ft. 10 in.
Emigrant Gap	5,230 ft.	29	23 ft. 7 in.
Summit	7,017 ft.	44	35 ft. 0 in.
Truckee	5,819 ft.	35	16 ft. 0 in.

Truckee is at the eastern base of the range and gets less snowfall than stations at the same elevation on the western slope. This is due to the fact that the clouds move easterly from the Pacific coast and drop their moisture before getting over the range. The moisture is deposited in the form of rain to an elevation of about 3,500 ft., snow seldom extending below that height in this latitude. The maximum snowfall at Summit occurred in 1879-80 in which year 65¼ ft. fell, but this record was nearly reached again in 1890 when 64 2/3 ft. fell.

This snow falls in a period of about three months and very little goes off during the winter, but it keeps settling down until the average depth on the level is about 15 ft., although 26 ft., has been measured on the level many times. This makes the snow very heavy, with streaks of ice in it, and it is hard to handle with plows. Rotary plows are used in the territory at each end of the sheds where the snow-fall is less. On certain slopes and in certain canyons the snow piles up to great heights, well onto 100 ft. deep.

The snowsheds in this territory are built of wood and are of two general types: (1) Those designed to keep snow off the track only, (2) Those designed to convey snow and snow-slides over the track. There are 30 miles of these sheds in all, covering a territory of about 40 miles, there being some breaks near the lower ends where the snow-fall is less and where sheds are used in cuts only.

The first sheds were built in 1868, the frames being constructed of round timber cut alongside the track and the sheathing being cut in neighboring sawmills. They were of the pitch roof type and had the fault of crowding out of line when unevenly loaded with snow and were extremely hard to restore to line. The vertical clearance was only 17 ft. in 1868, but this provided nearly as much clearance above the cars as our present 22 ft. does above modern cars.

The sheds were no sooner built than complaints were made that they shut off the view and many efforts were made to overcome this objection. Windows were put in at the most interesting points and shutters that could be opened in the summer were tried, but for one cause or another all had to be abandoned, until the scheme of placing vertical slats something like a picket fence opposite the car windows was adopted. They are now put in wherever possible, except of course, where there is nothing to see in any case. This arrangement provides the maximum view and yet keeps out the snow.

When it became necessary to renew some of the sheds, the present flat roof type was developed and this has been in

successful use for many years. One of its principal advantages is the ease with which it can be lined up if crowded over by the weight of snow slides.

There are approximately 100 million feet of lumber in these sheds and outside of damage from fire, their life is about 27 years. The fire risk is somewhat great, largely as a result of fires started from the outside. The large timber has been cut in this neighborhood but there is considerable brush, which takes fire, usually from fires left by careless campers. While the risk is, thus, somewhat great, the fire loss is small, owing to the precautions taken to prevent its spreading.

In the longer stretches of the sheds, telescoping sections 100 ft. long are built as often as feasible. These sections are mounted on wheels and are rolled back into enlarged sections of the adjacent shed during the summer, making a break of 100 ft. These telescopes divide the sheds into short sections, so that no great length is liable to burn at one time. It should be understood that a fire in these sheds burns the track ties and bends the rail in knots, destroying not only the shed but the track also.

To detect fires, a system of patrols is maintained, each patrolman reporting at an alarm box every hour. These alarm boxes are a little less than a mile apart and each report is registered automatically on a tape which is under constant observation at Summit station and is duplicated in the roadmasters' office at Truckee. When an alarm is rung in, the nearest fire train is notified and the main line is cleared of traffic. (The line is single track but, with sidings every two miles, little time is lost in getting trains into clear.) There are four fire trains in service during the summer, each consisting of a locomotive, a pump, and two water cars, having capacities of about 20,000 gal. These trains are constantly under steam and ready to start on an instant's notice. The locomotives are equipped with high pitched whistles, which are blown almost continuously while the trains are running, enabling workmen to get out of the way. It is reported that no fire has yet gotten by the fire train after it arrived at the scene of the fire.

In addition to these precautions a lookout station is maintained on Red Mountain at an elevation of 7,860 ft. from which point almost all of the 27 miles of the sheds can be seen, there being only two small sections hidden by spurs of the mountain range. At this lookout station two men are on constant watch, reporting by telephone every half hour. They have an engineer's transit mounted in their cabin, to which is attached an aluminum pointer which travels over a chart attached to a stand in front of the transit. There is also a line etched on the bay window of the cabin, which shows the lines of the sheds as seen through the transit. By training the transit on the fire the indicator will point out exactly what part of the shed is on fire or nearest to the fire, if it is not actually in the sheds.

These sheds are built to sustain 25 feet of snow, weighing 25 lb. per cubic foot, and, as the territory through which they pass has very little wind, and the snow is soft and sticky, great loads of snow rest on the sheds, especially in cuts. Some trouble was experienced in early years owing to the snow combing and extending a considerable distance out from the edge of the roof. This was overcome by nailing vertical boards about 8 ft. apart extending about 8 ft. above the eaves. In this range of mountains there are some snow slides, which usually carry with them large boulders. Where they are likely to occur special types of sheds with sloping roofs are provided.

SCOTTISH FISH TRAFFIC.—For the fish traffic carried by the Great North of Scotland from the middle of last June to the middle of September, 406 special trains with a total of 8,830 trucks were required.—*The Engineer, London.*



Grand Station, Rome, Italy

Italian Railways Under Government Management

The Value of Unified Direction Exemplified as a War Measure During Three Years of Struggle

By Our Special European Correspondent

HAS GOVERNMENT MANAGEMENT been justified in Italy, and particularly by the handling of the transportation situation during the war?

This question may be answered in the affirmative from the point of view that Italy's railroads really have done a great war service, have held together, and are still running after three years of mauling, of wear and tear. The question of whether they might have done better under private management on less money becomes absolutely academic in the light of the stake involved—the fate of the Italian nation. The result before us is that so far they have kept going, have never failed the nation—and no more can be asked.

Before writing this article I went one sunny winter's day to the chief of the operating department to ask him a few questions. This chief I found a very cool, pleasant-faced man standing over a desk piled up with telegraphic slips.

"If I had coal, these protests wouldn't be here!" he exclaimed, waving his hands lightly over his desk in comic-tragic despair. "They want me to move troops and freights all over Italy, and you can't run steam locomotives without coal, can you? It's been this way ever since the war began. You're an American. Can't you persuade your government to send us coal?"

The history of railroading does not give another example like that of Italy during this war. For nearly four years her railroads have been operated on an ever decreasing coal supply. The case of Russia cannot in any sense be compared to this, because so many other elements entered in railroading conditions there. In Italy every technical and financial phase of operation has been weekly, if not daily, subject to the sole consideration of her coal supply. Trains

have frequently been run empty for long distances because there was no coal to run them loaded, and yet the cars, of military necessity, had to be at a given point at a given time. Engines have been laid up, idle, because there was no coal to run them. Trains have run at a ten-mile an hour speed because it took more coal to run them rapidly.

Before the war Italy, herself having no coal, imported some 10,000,000 tons, mostly from England. About one-third of this coal was used by the railroads and two-thirds went into industry and commerce and into the heating of private houses. By degrees that supply has been cut down, partly because the less coal used the more money kept in the country, and partly because enemy submarines have made coal importation by sea hazardous. At present (March) Italy is getting about 10,000 tons of coal per day, by hook or crook, or about one-third of her importation before the war, and this coal is of such poor quality as to be injurious to locomotives. All of her short line railways have been stopped or their schedules reduced, main line trains are running but with military freight having the right of way and passenger trains are crowded until the aisles are jammed and even standing room at a premium.

The coal situation is the only condition that has prevented Italy's railroads from giving in war times the same service as before the war. When it is remembered that the war has revolutionized many aspects of railroading, particularly as to carrying unexampled quantities of freight, of troops, and of performing these functions under peculiar conditions, the weight of this statement will be understood.

The whole question of government ownership, so far as general Italian opinion is concerned, is that Italy's railroad's

were better run before 1905, under the private companies, but that for this war it has been better to have them under government control. Italy is a free country, with much liberty of expression of opinion, and it is frequently regretted that before the war the private companies with their faster passenger trains and quicker freight deliveries, had not retained their management.

For war, however, the only solution is government control, and in European countries of near frontiers, with a possible enemy ever just over the border, government management of so powerful a war arm as the railroads must be maintained in peace times. In peace times there is too much political interference with the operation and management of all phases of the roads. Congressmen and senators have too many henchmen to please, have too many voters to satisfy among the employees, and when this is not the case they interfere in technical matters with impractical ideas when they do not speculate in railroad contracts and supplies.

From a war point of view there is also the danger of foreign powers using their moneys and influence to obtain control in peace times of this all-important military arm. On all the railroads of Europe Germany had her fingers, both financially and through her secret agents in the operating departments. As regards Italy's railroads, for instance, in the spring of

and foot, with all the inevitable expenses accompanying government employ, it is claimed that government ownership of railroads has been and is the best plan for Italy.

Railroad Conditions Peculiar to Italy

In order to understand what has happened and is happening in Italy from a railroad point of view, I think it is necessary to tell a few salient elementary facts about the country itself, about the people, about national finances, about the war's conduct, and other national conditions with which the management of a railroad and its prosperity and efficiency must necessarily be linked.

Right off, it must be understood that Italy is not a rich country according even to European standards, and is a very poor country according to our conceptions of wealth. We Americans frequently forget how rich we are, rich in timber, water, soil, mines, climate, natural advantages over and natural protections from other peoples the like of which cannot be found elsewhere on the globe. In our pride we sometimes forget that it is the land we live in which is responsible for our prosperity rather than the people who have developed all this. It takes living abroad in war time, when nations in Europe are staking their freedom, their very existence, on a few paltry hundreds of tons of coal, or of iron ore, or of grain to realize how fully we are blessed with all these things. If we had had to go into this war lacking so much, as did Italy, we as a people might have tried to squirm out of it as a bad business, or having gone in, we might not have accomplished as much and with as light hearts as have the Italians.

From the point of view of Europe, Italy's national wealth is rated at somewhere around fifth in the list. The old pre-war figures used to be 20 billion dollars, with France 50 billions, Germany 80, England, Scotland and Ireland at 85, Russia 40, Spain 5½, and Switzerland 4 billions. The old estimated wealth of the United States was 200 billions, or ten times that of Italy. In the light of war financing, it is difficult to state just how poor any nation is. In measures of dollars Italy has already spent 5 billions on the war, about one-fourth or one-third of her previously estimated national wealth and there are those who claim she is about as rich as usual, with every prospect of doing well industrially if the war ever stops.

It has always been the kind of people who have inhabited Italy that have given her the importance she has always enjoyed. In ancient times, as at this very hour, Roman soldiers were fed on food from abroad. Then it happened to be the fertile Nile countries, now it is America. These people of to-day, however, are far different from the Romans. For one thing the Romans were severely just when not atrociously cruel, whereas the Italians are kind-hearted to a fault, careless of money, indifferent of social values, and yet liberty loving, proud as Romans, as jealous of freedom. This is why Italy can hardly ever become a Russia, why she is now bearing up under the immense strain occasioned by the military losses of last fall.

Geographically Italy is well located as an exchange transportation center, and as she was once rich four or five centuries ago, she will again be rich for the same reason. However, her area of land is a little less than the size of the States of Kentucky, Tennessee and Ohio, or a little more than that of Wyoming. With a population of 35 millions, her soil for agricultural purposes is on the average not so rich at its best as that of Kentucky, and her many mountains contain nowhere any of the coal, oil, iron and zinc treasures of Kentucky. Geologically, Italy came late upon earth, as indicated by her volcanoes. Her iron ore production is a meagre million tons a year, her lead and zinc but a quarter of a million, and she has neither oil or coal, those essential handmaidens of industry and transportation. During the



The State Railroads of Italy

1916 a great quantity of German-owned securities was turned back to the Italians, the Germans having need of money, and feeling no longer the need of such ownership. The securities were transferred through neutral Switzerland, and, it is stated, were for the most part picked up by the Italian government which, it is also said, will in the future exercise a closer control over the sale of her railroad securities. In passing, it may be pointed out that these securities have dropped but 25 points under their sales value of 1914, which indicates what the Italians think of their railroad securities as guaranteed by the government.

With all the hardening of the arteries that belongs to governmental conduct of affairs, with all the horrible and irrevocable inefficiency of the government bureaucrat, with all the dodging of responsibility which ends by tying systems hand

war some 15 million tons of lignite have been dug up, but it is so rich in sulphur and so poor in combustion that it is a purely war substitute.

Politically the Italy of today is hardly 50 years old. If one could forget the background afforded by her ancient history, the material refinements of the Middle Ages, the marvels of her architecture, the wonders of her art of past centuries, the Italy that existed four years ago might have been compared, materially, with any one of our old Southern States, where life ran along easily, was pleasant, with railroads tolerated and industry regarded as a vulgar Northern product.

Government ownership of railways in Italy has always been a political, as well as an industrial necessity. Politically, Italy has been rent by internal dissension for the past 1,500 years, with every city and every hilltop reared against its neighbor, and without any visible outward symbol to point out the necessity of union. Without going into the story of how Napoleon dreamed of uniting Italy, of how many patriots dreamed this dream until it came true after Garibaldi, during our Civil War, and particularly during the Franco-Prussian War, it may be stated that this union has been



On the Genoa-Spezia Line

slowly effected during the past 50 years in the face of interlocking financial struggles.

Through patient national economy, through sacrifices which are still remembered with bitterness, through the gradual inflow of tourist money, through moneys sent to the Holy See, through moneys sent home by emigrants living in North and South America, in France, in England, Italy's money finally before the present war had reached a par exchange value of that of countries with a gold standard.

Italy Just Beginning to Prosper When War Came

Just before the war Italy had caught her breath, nationally. She had ceased to look behind, was about to put into execution an ambitious transportation scheme which would have remedied some of her natural handicaps, increased internal traffic, improved her canals and ports, and prepared the way for reaching out after world freight for making Italy a transshipping center for Southern Europe, the Mediterranean, and more distant points east and west, as in the olden days when Venice, Genoa, Naples and Pisa thus grew wealthy. German money and models were helping in the scheme, and their teaching was worth having.

United Italy began business in 1870 with 1,292 miles of railway, 1,125 of which were mostly in the north country. But 77 miles of railway line were in the south of the peninsula and in Sicily. These railways have helped a lot in holding Italy together, in keeping bound the various provinces and cities which were constantly prey to the suggestion, often

coming from Austria, the old mistress of the Venetian provinces, that a change be made. The political effect of holding provinces together by good roads and rapid means of communication was one of the secrets known and applied by the Romans. The old truth was remembered by the new rulers of united Italy, who at once began improving the various railroad lines, spending money that was sorely needed in other directions. Mark Twain did not understand the truth and said so when he was in the year 1867, visiting Italy of those days. "There are a good many things about this Italy which I do not understand, and more especially I cannot understand how a bankrupt government can have such marvels of turnpikes. Why, these latter are as hard as adamant, as straight as a line, as smooth as a floor, and as white as snow. And yet no tolls are charged.

"As for the railways—we have none like them. The cars slide as smoothly along as if they were on runners. The depots are vast palaces of cut marble, with stately colonnades of the same royal stone traversing them from end to end, and with ample walls and ceilings richly decorated with frescoes. The lofty gateways are graced with statues, and the broad floors are all laid in polished flags of marble.

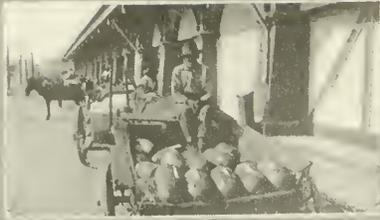
"These things win me more than Italy's hundred galleries of priceless art treasures, because I can understand the one and am not competent to appreciate the other. In the turnpikes, the railways, the depots, and the new boulevards of uniform houses in Florence and other cities here, I see the genius of Louis Napoleon, or rather I see the works of that statesman imitated. But Louis Napoleon has taken care in France there shall be a foundation for these improvements—money. He has always the wherewithal to back up his projects; they strengthen France and never weaken her. Her material prosperity is genuine. But here the case is different. This country is bankrupt. There is no real foundation for these great works. The prosperity they would seem to indicate is a pretence. There is no money in the treasury, and so they enfeeble her instead of strengthening. Italy has achieved the dearest wish of her heart and become an independent state, and in so doing she has drawn an elephant in the political lottery. She has nothing to feed it on. But it is an ill wind that blows nobody good. A year ago, when Italy saw utter ruin staring her in the face and her greenbacks hardly worth the paper they were printed on, her parliament ventured upon a coup d'état that would have appalled the stoutest statesmen under less desperate circumstances. They, in a manner, confiscated the domains of the Church"

Being an outsider, Mark Twain hadn't the time to study in his brief visit the political aspects of the effort to make Italy not a union of states, but a single, closely knit nation. The taking of the property of the Church, which was completed in 1870 by the taking of the city of Rome and the Papal states about Rome, was a measure of doubtful financial wisdom, but it helped to clear the way for a greater Italian nation, as in the same sense that the present war will, when successful, shove Italy forward into the Alps and along the shore of the Adriatic to the port of Trieste and thus complete her geographical entity. As a financial proposition, it looks very expensive, but in the long run, or however long it will be worth while. Indeed, it is part of a scheme conceived by the patriots of 50 years ago and bravely carried out.

With the taking of Rome, Italy established her capital at Rome, took over the Papal railways connecting Genoa with Rome and Naples, and ever since has increased her railroad system, sometimes under private management, sometimes under some form of government control, with the state to pay for the most part being never surrendered, but usually leased to private concerns for a relatively short term of years.

(To be continued.)

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The Preparation and Handling of Package Freight

Illustrations from the Diary of a Freight Inspector—Views in Some
North Carolina Freight Houses

By A. C. Kenly

THE public, which is the happy term we all use in referring to everybody else in a lump, has a hazy idea of railroads. Through its eye, not its mind, it receives the impression of great affluence and unlimited wealth. It sees the magnificent terminals, the luxurious passenger trains, the endless trains of freight cars, the ceaseless activity, and the army of employees necessary for all this, all of which the public demands and all of which the railroads gladly give, and want to give, when they can earn enough to afford it; and which they give eagerly and fast enough, without waiting to be asked, when their receipts justify it. They are

to be delivered at the same time; or a case may be lost. If the case number and date of shipment are shown on each package, it is an easy matter for consignee to keep perfect record of all cases received and in case of non-delivery of a case, to determine its contents.

Photograph No. 1 shows how a shipper of watermelons solved his difficulty by pasting on each melon a slip of paper bearing consignee's name and address. Another method is to scrape off part of the outer rind and mark with a pencil on the exposed surface. Still another is by scratching through the outer rind with a nail or other pointed implement.

Note the well prepared articles in photo No. 2. All glass parts and highly polished surfaces should be fully protected. Household goods, the poor relation of furniture, is another prolific source of claims. When you consider the large proportion of the articles shipped are accepted by carriers prepared for shipment as shown in photo No. 3, it does not require a Solomon to detect the cause. An article of commerce which causes carriers much wailing and gnashing of teeth, as well as pecuniary loss, is the cast iron stove. Some shippers still contend it is not necessary to crate stoves, but the crated stove is increasing all the time. Shipments in sacks also produce many claims. A poor quality of material is often used; sometimes, with heavy contents, the sack has broken by merely lifting it. Another source of trouble is leakage due to mouths not being properly sewed.

Photo 4 is a common scene; rolls of wall paper poorly protected. Photo 5 is a package affected by meat shippers; the boards marked *C* which form the top and bottom are nailed to the inside of the cross piece *A*. If you load heavy articles on boards marked *C* the pressure forces them down, leaving an opening like the one shown. It is surprising how often this happens, and it is a difficult break to repair. In this case, the cooper simply nailed the piece *B* across the opening

ILLUSTRATIONS ON OPPOSITE PAGE

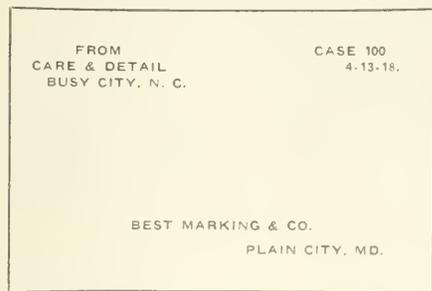
1. Watermelons Clearly Marked
2. Glass Properly Packed
3. Household Goods (A Common Sight)
4. Wall Paper; from a Careless Shipper
5. Poorly Made Box for Meats
6. Fibre Board Boxes—A Kind Often Seen
7. Fibre Board Packages Well Protected
8. Fibre Board, Overloaded
9. Empty Cans Well Protected
10. One Mark Serves for Five Buckets
11. Bad Kegs and a Good One
12. Wooden Butter Dishes

in trade to make a living out of it, just as everybody else is, and just as anxious to please their patrons. The public often looks with envy and unfortunately sometimes with hatred, at the president, vice-president and other officers who whirl by in private cars. The dear public should look at the real facts. Private cars are not castles of ease and indulgence but, rather, business cells of perplexing problems, troubles and worries, and many, many sleepless nights.

One of the great problems now being considered by railroad men is the conservation of freight. Millions of dollars are annually paid by carriers in settlement of claims for freight which is lost or damaged. A few years ago, carriers, shippers and consignees seemed possessed with the idea that freight was fated to be lost or damaged; and that that was all there was to it. Now all three work together to prevent it. The improvement is slow, but sure, and the object of this article is to help the cause along. The carriage of freight is a partnership between the shipper and the carrier. The shipper must "tote fair" by properly preparing his goods for shipment. What a multitude of carelessly marked packages pass through a large freight house in a single day!

The proper marking of a box is a simple thing, yet what varied neglect we see. The example in the next column illustrates proper marking methods. It is always best to show no other letters, figures or words on the top, or on the sides that contain the shipping directions.

A good business man shows his name and address on his business envelopes; he will find it a great advantage to show this information on every package he ships; then in case of trouble, the carrier is able to promptly write him direct. The case number and date of shipment should be put on by all shippers who ship frequently to regular customers, as occasionally a shipment of a later date may arrive before a previous one; or shipments may become mixed in transit and



The way to remedy the trouble is to drive nails through the sides of the case into the boards *C* when first packed.

Photos 6 and 7 are examples of fibre-board packages. This is a very good package when properly made, properly glued and sealed and properly used—and a very poor package when these conditions are not complied with. Photo 8 comes under the "net complied with" category, the principal trouble being that the weight of the contents is too heavy for the package. Photo 7 shows a most excellent method of shipping two or more fibre-board packages to one consignee. Photo 9 is an excellent method for shipping empty cans. Photo 10

shows an approved method of shipping numerous small packages to one consignee; it not only prevents the danger of a small package being overlooked or lost, but it reduces the cost of marking. By wiring the five half-buckets of candy together, it was only necessary to mark the name of consignee and destination once instead of five times.

A striking difference in kegs is shown in photo 11. If you were ordering a keg of nails and you knew *A* used the two kegs on the left and *B* used the one on the right, from which merchant would you buy? Photo 12 shows one way of preparing butter dishes for shipment; and the natural results.

The loading of freight in station order is an art by itself, especially when there comes along an unwieldy article like a harbor-light buoy, a gas engine, or a piece of long piping which must be loaded on the floor of car. It is gratifying to note the increasing study and time carriers are now giving to the loading of freight and its protection to insure its reaching destination in good condition.

The foregoing notes are not the suggestions and ideas of one man, but of many, widely separated, all working with a common purpose; and that purpose is the reduction of loss and damage to freight. If I have shown even in a slight degree the need of earnest co-operation of the manufacturers of containers, the shippers, the consignees and the carriers, I have not written in vain.

The Business Press and the Railway Question

By Samuel O. Dunn

THERE HAS BEEN SOME DISCUSSION recently as to whether the existing facilities of our railways are adequate. I do not understand how any intelligent person can have any doubt regarding that matter. In every month for 21 months a net freight car shortage has been reported. The shortages have varied from 34,000 to 150,000 cars. This great car shortage has prevailed month after month in spite of the most efficient and effective operation of railway facilities ever known. We will gain nothing, but may lose much, by closing our eyes to the truth. We are confronted today with the fact that the capacity of our railways is not equal, or anywhere near equal, to all demands. The long-continued car shortage expresses only roughly, but in a general way it does express, the general transportation situation.

What can we and should we do about this situation? It cannot be cured during the war. Cannot it at least be remedied or ameliorated? There are only two ways in which it can be improved. One is by increasing the facilities. The other is by using them more efficiently. The railways are now being operated under the control of the government. Government control was adopted primarily to render it possible to increase the facilities and to operate them more efficiently.

There will be some increases in facilities made this year, but they will not be large in proportion to the existing demand for transportation service. In every effort the railways may make to enlarge their facilities they will encounter great difficulties created by the shortage of labor and of materials caused by the war. In consequence, while the Railroad Administration undoubtedly will this year spend substantial sums in enlarging facilities the conditions of war will render it necessary to expend them primarily with a view, not to making it possible for the railways to handle more business of a general character, but with a view to making it possible for them to handle more traffic whose movement is essential to carrying on the war.

Arm-chair authorities on railway affairs have been telling us for years that an enormous increase in the efficiency of railroad operation could be secured by consolidating the railways and operating them as a single unified system. Unified control of operation, whether secured by the voluntary action of the railways themselves, or by the exercise of governmental authority, was necessary in order to secure the transportation of the greatest possible amount of traffic essential to carrying on the war.

But it would be easy to exaggerate the increase in the amount of traffic in general which government control will make it possible to handle. Government control makes it possible to direct all traffic by the shortest available routes. But when business is so heavy as at present, the shortest routes soon become crowded, and it continues to be necessary to send business by all available routes, short and long. Government control makes it possible to operate all the terminals in large centers of industry as single units. But before the most advantageous co-ordination in the operation of terminals can be secured, they must be co-ordinated physically; and to bring this about will require time, labor and money.

Furthermore, it must be remembered that, primarily, the problem of the Railroad Administration and of the railways is not that of moving the greatest possible amount of traffic of all kinds, but that of moving the greatest possible amount of the kinds essential to carrying on the war. Now, in some cases, in order to move the greatest possible amount of essential traffic, it is necessary to so dispose matters as actually to reduce the total traffic accepted.

The Railroad Administration includes some of the ablest railway men in America, and they and the managers of the individual lines are devoting all their ability and all their strength to the solution of the problems presented. But it is a condition, not a theory, which confronts them. For almost twelve years the railroads of this country were subjected to a policy of regulation so unfair, so unintelligent and so destructive that, as was long ago foreseen and repeatedly predicted, their development rapidly slowed down, and finally came almost to a stop. Then suddenly, in 1916, there was thrown upon a railway system which had become unequal even to the normal requirements of the country the largest increase of traffic ever known; and within a few months the country entered the greatest of all wars, with the result that additional demands, heavy and abnormal beyond all precedent, were made. The present transportation problem of the United States is the joint product of those twelve years of prejudiced, punitive and repressive regulation and of conditions created by the great war; and if those charged with the operation of the country's railways are not able to make them meet all demands, this is due less to shortcomings on their part than to the fact that they are confronted with problems which no amount of energy and genius could, within a few months, or even a few years, solve satisfactorily.

The movement of cars while in the hands of the railways should and probably will be expedited by sending traffic by the shortest routes as far as may be practicable and by more unified and scientific operation of terminals. But cars are not in the hands of the railways all the time. They are in the hands of shippers and consignees a large part of the time, and upon shippers and consignees mainly depends how heavily they shall be loaded, how long they shall be held for loading and unloading and how long and how many times they shall be detained for reconsignment. The Railroad Administration can increase demurrage rates; it can reduce the time allowed for reconsignment; it can advance minimum carload weights; but unless it can secure the cordial and constant co-operation of shippers and consignees it cannot by any or all means and measures secure the greatest practicable efficiency in the use of cars. The co-operation of shippers and consignees during the last year has contributed

greatly to the increase of car efficiency; but they must co-operate even more cordially and energetically if the railways are to be enabled to render the largest practicable amount of service to the country as a whole.

In a meeting of this kind the question naturally arises as to what part, if any, the business press can play in helping to solve the transportation problems with which the country is confronted. Some of the business papers reach more especially persons who are directly engaged in the operation of the railways. This is true of the group of publications with which I am connected. Most business papers reach chiefly persons and concerns that come in touch with the railways mainly as users of railway service.

The duty of railway papers under present conditions is clear. The papers with which I am connected saw that the time had come when it was necessary for the government in one way or another, to come to the assistance of the companies to save them from financial disaster and to relieve them from the trammels imposed by the anti-trust and anti-pooling laws in order to enable them to operate with the utmost efficiency. They did not believe it was necessary or desirable for government officials to take the control of railway operation out of the hands of railway officers. When, however, government control was adopted, we recognized the fact that it was the duty of every patriotic citizen to do all possible to make it a success; and our papers have acted, and will continue to act, on that principle. The editors of our papers do not consider that loyalty to the government or the Railroad Administration requires that we shall refrain from criticising things done or proposed to be done by the Railroad Administration which we do not consider right or wise, any more than in the past we considered that we ought to refrain from criticising things done or proposed to be done by the railway companies which we regarded as wrong or unwise. Consequently, when the Railroad Administration entered upon a program involving the standardization of locomotives and the relinquishment by railway supply companies of patents essential to the existence of their businesses we did not hesitate to voice our opposition. On the whole, however, our policy thus far has been, and we hope and believe it will be possible for it to continue to be, one of support and commendation rather than one of antagonism and criticism.

Mr. M. Adoo, the director general of railroads, is a man of ability. He labored effectively to secure legislation which would fix a fair basis for compensating the railways for the use of their properties; he has put able and experienced railway men in the most important places in his organization; he has given very little opportunity for politics or politicians to influence operation; and he is keeping uppermost the object of so operating the railways as to make them an efficient instrumentality for helping win the war. Our papers have tried to give him full credit for these things; we have tried to give full weight to the difficulty of his position and the magnitude of his problem; and we sincerely desire above all other things to help in this crisis to so influence the course of events as to make government control of railways a success.

The business papers outside the railway field approach the transportation problem from a different direction. Their constituencies are composed mainly not of those who operate the railways or purvey to them, but of those who use their service. The present transportation situation certainly is not a happy one from the standpoint of the shipper or traveler. It is, of course, entirely proper and highly desirable that the entire business press should investigate the causes of the present transportation situation, should criticise the managements of the individual railways and the Railroad Administration for all shortcomings with which investigation may show that they are properly chargeable, and should offer sug-

gestions for the improvement of conditions which special knowledge of conditions in the various branches of industry render the editors of business paper competent to offer. But the business press should especially endeavor to make sure that all its criticisms of the individual railways and of the Railroad Administration are based on facts rightly understood and that its suggestions for improving conditions are the result of knowledge and good judgment.

Constructive, helpful discussion of the present transportation situation must be predicated on a frank recognition of the fact that railroad facilities are inadequate and that it will be impossible for a long time to make them adequate. It necessarily follows that the most constructive thing the railway managements, on the one hand, and the users of railway service, on the other, can do to improve the situation is to make the best possible use of existing facilities. The business press reaches the shippers of the country, and there is no more useful service it can perform than constantly to keep before its readers the reasons why it is their duty to the country and themselves to co-operate in every way they can with the railway companies in securing the heaviest possible loading and the most expeditious possible handling of freight cars.

Government control is making great changes in the organization and operation of our railways. The longer the war lasts, the greater these changes will be. The determination of the kind of system with which the old system of management and regulation shall be replaced after the war will have a most important effect upon the economic, social and political future of the United States.

Many believe government ownership will be adopted. Government ownership of railways means government monopoly of railways. The railways are the largest purchasers of coal. They are the largest purchasers of iron and steel. They are the largest purchasers of lumber. We cannot establish a permanent government monopoly of railroads without producing profound effects upon the business of all the concerns, and upon the employes of all the concerns, of which the railways are the largest customers. Every person in the country uses the service of the railways. This means that under government ownership every person would have to do business permanently with a huge government monopoly.

The establishment of a permanent railroad monopoly, if the monopoly were in private hands, would mean the concentration of an enormous power in the hands of those who managed the monopoly. If, however, the monopoly were in private hands it would be subject to government regulation, and this would limit its opportunity to abuse its power. If a government railroad monopoly were established the management would be under as much a concentration—temptation in this case, primarily of a political nature—to abuse its power as the management of a private monopoly.

What means would those who sold goods to the railways who used their service, or who worked for them, have of protecting their rights and interests? They would have but one means, and that would be to appeal from one branch of the government to another, from the Railroad Administration to Congress. Even if the officers of the government monopoly did not abuse their power, the very fact that they were exercising the power of a great monopoly would arouse suspicions and apprehensions that they were abusing or intended to abuse it. People would then inevitably appeal to their representatives in Congress for protection. I am not saying anything about the navy. These very suspicions and apprehensions regarding government monopoly already have been developed under government control, although it has existed less than four months, and many classes of persons already have begun to beat their heads to the offices of their senators and representatives in Washington to tell their pro-

tection or their help in dealing with the Railroad Administration.

The adoption of government ownership of railways would establish a precedent for the adoption of government ownership of other public utilities. The railways consume from one-fourth to one-third of all the coal produced, and what would be more natural than for the argument to be made, and effectively made, that the government should produce the coal for its own railroads? You would then have the beginning of what probably would end in government ownership and operation of all the coal mines. If the government should not be satisfied with the prices made to it by manufacturers of cars, locomotives and other railway materials, what would be more natural than for it to be argued that the government should engage in the manufacture of these things for itself? This would be the beginning of what probably would end in a programme under which the government would engage on a large scale in the manufacturing business. In brief, the logical and inevitable result of the adoption of government ownership of railways would be the acquisition by the government of so many other industries that we would soon be embarked on a wholesale policy of state socialism. There is, as a matter of fact, no difference between government ownership and management of the railways and socialism itself, except one of degree. You cannot advance a single argument for government ownership and management of railroads which the socialist does not use in favor of the adoption of socialism. The socialist is logical in that he applies the same reasoning to all property. The advocate of government ownership is illogical in that he applies his reasoning only to some kinds of properties—these always being kinds of property which he does not own himself!

Since there is no natural or logical halting place between government ownership of railways and socialism, it is time for all of us to make up our minds whether we are going to advocate government ownership of railways as a long advance toward socialism or oppose it for the purpose of preventing a long advance toward socialism. It especially behooves the editors of business papers thoroughly to study and frankly to recognize existing tendencies and to discuss them upon their merits and with a view to the effects which if unchecked they will produce upon the entire industrial and political future of the United States. In my opinion, within a very few years there will be a great struggle in this country over government ownership of railways, and the outcome of that struggle will largely determine the economic, political and social future of this country. Those who favor government ownership will really be favoring socialism with all that it would involve. Those who oppose government ownership will really be opposing socialism with all that it would involve.

The business press can make itself one of the most potent and effective agencies for presenting to the public not only the arguments against government ownership, but also the arguments for a new, fairer and more constructive policy of government regulation.

AMERICAN ENGINEER IN CHINA IS RELEASED.—George A. Kyle, of Portland, Ore., the American engineer who since March 5 has been held captive by Chinese bandits in the province of Honan, China, has been released, according to advices to the State Department from the American Legation in Peking, forwarded to the Siems-Carey Railway & Canal Company of New York. Two other Americans and a Chinese engineer previously had been freed. The message to Mr. Kyle's employers here gave no details of how the captive's release was brought about. He was the chief engineer of the Siems-Carey Company and was engaged in making a survey for 2,600 miles of railroad when captured with E. J. Pursell, another engineer, and a Chinese assistant.

Idle Labor in War Time

IN A LETTER RECENTLY sent to all agents of the Illinois Central system, T. J. Foley, vice-president in charge of operation, calls attention to the surprisingly large amount of idle labor which he observed during a recent trip over the southern lines of the road at a time when there is an acute shortage of labor for railway purposes. He suggests that idleness on the part of Americans at this time is equivalent to disloyalty and believes that an aroused public sentiment in each community against idling will have a most salutary effect. Mr. Foley's letter reads in part as follows: "On my trip I observed great numbers of both white and colored men on our trains, traveling from place to place. I wondered why they were traveling around at this season of the year, when their services are so badly needed on the farms and in the manufacturing industries, as well as on the railways. Passing through the towns, I saw enough idle labor standing around the depots, gazing at the trains to supply the needs of this company, as well as the needs of a good many farms and industries. At one town of approximately 1,200 inhabitants I counted 55 colored men standing at the depot. At another town of about 5,000 inhabitants I counted 165 colored males, including boys, young men and middle aged men. At another place of 500 inhabitants I counted 23 at the depot, standing around with their hands in their pockets, apparently doing nothing whatever. The thought occurred to me that about 10 per cent of the labor supply of the South is idle at this critical time.

"The one job which we have on hand at present is winning the great war, and it follows that every person who is able to work, but who is not at work, is a liability instead of an asset to his country, and should be held up to scorn. My interest in this matter is just like the interest of every other loyal citizen anxious to do his full duty by his country. I firmly believe that a strong public sentiment against idlers in each community would make it so uncomfortable for the idlers that they would be driven to work. Some of them would drift into agriculture, others into manufacturing industries and the railroads would get their share. This is a free country, but it will not remain free unless every person exerts himself at this time to the very limit of his capacity. If idling is to be permitted, it ought not to be permitted now, and this should apply to the rich as well as to the poor. You should direct the attention of local authorities and leading citizens to the idlers around the depots and do what you can in every proper way to arouse public sentiment against idlers. If there ever was a time to attack idlers, it is now. If there ever was a time when every person, regardless of age, color or station in life, should be at work, it is now. Rest and leisure should be deferred until after the war has been won, until after individual freedom has been enthroned and made secure for all time. At present, a part of the business of every community should be to see that everybody is at work.

"These are my individual views. If you can make any use of them, I hope that you will do so. We need labor on the railroad and need it badly. The problem will be solved when the idlers are driven to work. Just as a matter of information, I would like to request you to acknowledge receipt of this circular and give me the benefit of your views; also to advise me approximately the number of idlers in the towns and communities served by your respective stations."

THE PERIODICAL "LA TECHNIQUE MODERNE" suspended its publication after its issue of August 1, 1914, because its managers, editors and the majority of the contributors had been mobilized. After three and a half years of suspension the *Technique Moderne* has resumed its publication. The *Railway Age* is advised that the *Technique Moderne* would be pleased to receive and publish articles bearing on scientific and technical developments in this country.

Speeding Up the Operation of Terminals

A Series of Practical Suggestions of Ways to Take Up the Slack and Increase the Output of Transportation

By M. E. Burk,

Transportation Department, Norfolk & Western, Roanoke, Va.

A GREAT EFFORT has been made since our entrance into the world war to formulate general policies for railroad operation. Meetings have been held where the necessity of absolute co-operation has been emphasized, but few definite plans have been given to the local officers to guide them in ways of increasing their efficiency. In fact, the general officers have been so crowded of late with outside duties that they have not been able to spare even the time for their usual supervision and criticism. It is found that terminal delays to trains are increasing. The same is true of the time between terminals. The former is usually accounted for by terminal congestion and the latter is credited to motive power not being kept up to as high a standard as formerly and to inferior fuel. There is no question as to the partial truth of these explanations, but they, by no means, fully cover the situation.

Assuming that the proper car was given the shipper, that he loaded it to capacity plus 10 per cent and did not take his good time in so doing and that the agent did not fail to provide the proper billing, no special provision has been made to assure a continuous movement of the car (barring accidents). It would be practical for each road to use a set of symbols in the form of conspicuous cards with letters large enough to draw the attention of every yard checker, car tracer and yard conductor, this card naming the last terminal on the system to which the car is to be taken on a through freight schedule.

Another splendid opportunity for increasing efficiency is offered in standardizing yard organizations. It is surprising to note cases where a yard on one division will be much further advanced in its methods of operation than on another (this is often true in neighboring yards on the same division). One yard will use an elaborate, up-to-date tag system, while the other will still hold on to the old method of chalking cars; one yard will use semaphores for switching purposes, while the other still wastes one or two brakemen per crew in forwarding signals for long trains. The clerical organization in yards is also far from being standardized, thus preventing the general officers from being able to measure the degree of their efficiency. Whenever you see a yard congested most of the time, you can almost always feel assured that it has no organization to speak of. If the ever-increasing demand for transportation is to be met successfully, the railroads will have to keep complete records of every movement in the yards for it is here that the additional efficiency is to be sought. Much help can be gained from a daily record showing the time an engine is put on and taken off the "spark" track, the time it is put on the train, and the time the train pulls out of the terminal, requiring the terminal trainmaster or general yardmaster in charge of the yard to explain any delays. The receiving and de-patching of trains in any yard of considerable size ought to be entrusted to a responsible employee. It is surprising how often such an important duty is left to an inexperienced clerk while the man really in charge of it is occupied elsewhere.

Close co-operation between the chief dispatcher's office and the yard office is absolutely indispensable to the efficient handling of trains in and out of yards. The yard office must be kept constantly informed of the number of trains, the time

they left the initial terminal, the probable time of arrival and their consist. If anything unforeseen happens and the trains are delayed on the road, such information must be given to the yard at once so that other arrangements may be made.

The bunching of trains in and out of terminals is a very wasteful practice. In most cases it is the result of short-sightedness on the dispatcher's and yardmaster's part. It can almost always be avoided by running uniformly loaded trains, properly spaced. While there is no rule prohibiting the running of trains of the same class around one another, it is not being practiced because the crews object to it. Trains uniformly loaded and properly spaced will eliminate bunching in a terminal. As it is, the yards are now taxed to their utmost. When three or four trains are waiting to be let in, with a passenger train often due at the same time, the question no longer becomes that of the proper disposition of those trains. The only problem is to get them out of the way. This usually culminates in a congested yard. The necessity of keeping the classification yard open cannot be over estimated and this can only be accomplished by a proper combination of judgment exercised in the dispatcher's office and by the yardmaster, the former spacing the trains and keeping them uniformly loaded and the latter having a competent man to handle the incoming and outgoing trains, if he cannot attend to it himself. Yardmasters do too much clerical work which can better be done by a regular clerk at decreased expense.

The increase as well as the change in the character and requirements of the present business have led some chief dispatchers to wrong conclusions. They seem to think that reducing the tonnage rating of engines will expedite the business and fail to realize that the reverse is true, that the actual moving of freight between terminals is only about 15 per cent of the problem and that by decreasing tonnage ratings the number of trains is automatically increased, which, under present conditions, means the use of inexperienced road crews—all of which contributes much to the delays at water and fuel stations, and for that matter, all over the line. Any trick dispatcher will exercise better judgment when handling fewer trains.

At this point it is apropos to mention that the train sheets are analyzed less than any other record, yet they contain the most valuable information relative to efficiency in train operation. A study of train sheets will show plainly whether the dispatcher is careful enough in fixing the meeting points for trains, whether the conductors are losing time at stations in calling for their orders and whether the station operators are alive to their responsibility. An analysis of train sheets will also show whether or not the trains are spaced properly and whether or not the crews are held unnecessarily long at the terminals.

Not only is the practice of reducing tonnage ratings wasteful from a road standpoint, but it also is a hardship on the terminals. Terminal congestion is directly proportional to the number of incoming and outgoing trains. It would be more profitable, therefore, to change the policy of reducing tonnage to that of increasing supervision. Each division should have enough trainmasters and engine foremen to be able to follow up the operation of trains closely. The custom

formed on many roads of using the trainmasters and engine foremen to "chaperon" private cars should be abolished. A trainmaster, as a rule, does not belong on passenger trains. There are too many freight crews to look after. As matters now stand, any unusual delay is taken up through correspondence by some office man, and the answers matched up and filed away for future reference.

In line with a search for greater efficiency, much work can be done to advantage in bringing about greater harmony between the mechanical and yard organizations. The number of orders for power cancelled by the yard office every 24 hours is a criticism of the care exercised in handling this important part of the work. The difference between the time estimated to get engines ready and the actual time they are made ready for service is so great as to call for more attention. Both of the above can and should be lessened through careful and continuous analysis of the practices.

A daily record of cancelled orders will lead the man ordering power to keep more closely in touch with the general situation so that he can order power when needed and be ready to use it as soon as it is furnished. A similar record of the "hits and misses" credited to each roundhouse foreman who estimates wrongly the time an engine will be made ready for service will cause him to learn the situation before reporting it. His information will then offer a practical basis for the yard to work on. As it is, the yard now orders a whole day's supply of engines at one time. The roundhouse foreman tries to fill these orders as soon as received so as to be able to report to his chief, "No unfilled orders on hand."

The bunching of power by the roundhouse people is due primarily to two definite reasons; (1) Trains not uniformly loaded and properly spaced arrive in bunches. When such is the case, the roundhouse turns them out in the same way. The solution of this lies with the chief dispatcher and the terminal trainmasters. (2) Since the eight-hour law went into effect, necessitating three shifts during 24 hours, three distinct periods can be noted during each 24 hours when the roundhouse does not turn out much power. To study the situation more closely it will be necessary for each master mechanic to plot an hourly record of the daily output of engines for a week or so. He will soon become convinced that during the changing of shifts there is always a period of unproductiveness. This can be overcome, as far as maintaining a uniform output of engines, by getting the shifts to overlap each other. The difference in overtime will be more than offset by the extra use the company will make of its power.

Conclusions

To assure additional efficiency great enough to offset the ever-increasing demand for transportation, it will be necessary:

(1) To standardize all similar organizations of the system. Its effect will be twofold: (a) a man from one office can be sent to a similar office elsewhere when occasion arises and be qualified to fill the requirements; and (b) the management will be in a better position to check up the efficiency of each organization, the unit of requirement being the same.

(2) To emphasize the fact to all concerned that the "Average" is an imaginary quantity, and that it, therefore, does not represent actual operation. It is intended only as an auxiliary method of calculation. The average would be a fair enough figure to work on if the railroad dealt with only one person—the good practice would then offset the bad. As it is, the loss caused to one from bad practice is not balanced by the gain resulting to another from good practice. The individual practice, therefore, must coincide very closely with the imaginary average.

(3) To rearrange, where necessary, all reports pertaining to operation so as to show individual responsibility. Tabulate such information in the proper way so as to enable the

management to credit one and discredit the other, making this policy known to all concerned. The initiative of the average railroad employee is at a very low ebb due to the fact that each feels that he is lost in the crowd. A fair and prompt recognition of individual ability is the only solution to this condition. Too much shifting of responsibility is a direct outcome of it. A railroad management will have to recognize the individual if it wants individuality.

(4) To determine the merits of each practice on the system by its relation to other practices. Too much wrong economy is found almost everywhere, owing to the fact that each official attempts to make a showing for his division, disregarding the fact that his apparent gain may be more than offset by a loss to the company elsewhere.

(5) To remember that the conditions which the railroads are now facing are different from any previous experiences and that it is not strange to find many of the old practices not efficient enough to meet the present situation. Some of the older officers are very sentimental when it comes to changing practices. It is up to the management to take the necessary steps for immediate readjustment wherever this has not already been done.

(6) To shift the center of interest from the road to the yards and terminals, realizing that they comprise from 70 to 80 per cent of the problem.

(7) To reduce as much as possible the number of freight trains. See that there are no avoidable delays to trains on the road but do not try to reduce tonnage ratings to shorten time between terminals. Advocate and enforce uniformly loaded and properly spaced trains.

(8) To see that the mechanical department takes charge of each engine as soon as it is relieved by the crew; that all repairs are made to the engine before it is put on the "spark" track (too much delay to trains in terminals is caused by the mechanical department having to work on an engine after it has been put on a train, thus resulting in overtime to the engine and train crews, as well as in tying up the yard); and that the engine is taken off the "spark" track and put on the train without delays.

In discussing the mechanical situation one asks himself, "Is the time not ripe for the government to realize that machinists must not be taken away from the railroads? With the supply of new power cut off, with not enough force to maintain the present power, with the increased business necessitating the using of power to its limit—what will be the final result?" The railroads can not attempt to hold their machinists by increasing the pay, for their expenses are already not in accord with their revenues. The government will have to regulate the supply of labor whether the railroads call for it or not. Enough emphasis has been laid on the importance of the railroads in the present crisis, but they will not be able to continue to do their share unless their motive power is in working condition. The present arrangement of pooling power will only relieve the situation temporarily. It takes machinists to keep an engine in good repairs.

(9) To solve the question of fuel, not by getting coal, but by saving it. Very few roads are keeping a scientific check on the fuel used. There seems to be little realization of the fact that the improper use of fuel is not only expensive in wasting coal but also in wasting time on the road. The damage done to an engine whenever a fire has to be cleaned on the road is known to every mechanical man.

(10) To get close to the railroad employees, and to make them feel that their co-operation is necessary, noted and appreciated. Energize the organization and success will follow.

AEROPLANES ATTACK FRENCH TRAINS.—The suggestion has been made that trains in France be supplied with machine guns as a defense against aeroplanes which swoop down on them, especially when the train has come to a standstill.

The Passenger Car Distributor and His War Job



The Man Who Provides the Passenger Cars Has Had a More Important Task Since Troop Movements Began.

By John W. Roberts
Chief Passenger Car Distributor, Boston & Maine.

THIS NARRATIVE is meant to bring out some facts concerning an old type of provider known only to a few of his own craft and undoubtedly never thought of by millions of the traveling public—the *passenger car distributor*.

In peace times he has made possible the carrying out of the pleasurable desires of the vacationist; the business men go to their offices daily on his developed shrewdness; the babies of the land share his interpretation of Christian charity; Helen's letters owe their safe delivery to him; Race-track Phil, our well known theatrical stars, and, lately, to a greater degree than ever, Wall street, have felt his assistance to such an extent that they are all his debtors.

After war was declared by the United States, this individual—the passenger car distributor—became puzzled as to how he was to handle his soldier dependents and still take care of his regular business. Although not schooled in military tactics, the command—"We move—provide"—is like an order from the captain and his dealings with the United States government have developed in him such a respect for its compliance that it might well be said that his loyalty takes on the unquestionable aspect of the soldier and causes his patriotic concern to place him in the cast of the regular army man—that is, sacrificing his all for America's interpretation of democracy.

Every one remembers the call in the Mexican border crisis—nobody any better than the soldier in this story. He was on the job at 5 A. M. that memorable day, getting all available equipment together to move the largest number of men the longest distance on record. Later his heart throbbed when he heard that the big commander complimented his chiefs on the success of the undertaking, and only in his own humble way did he consider the part he played. Unlike the recognized soldier, he was not made a sergeant, lieutenant or captain for his work, but was allowed to stay on the job as a private and utilize the benefit of this experience as a guide on the next big movement—the one in which we are now engaged.

It is estimated that for the movement of one field army of 80,000 men, 6,229 cars made up into 366 trains are required. Consider, if you will what this meant in cars for the national draft army of 687,000 men and 350,000 regulars recently moved to the various camps and canton-

ments, involving a haul anywhere from 25 to 1,500 continuous miles.

When it has been decided that our boys are to move somewhere, an order is given stating how many men, officers, horses and how much impedimenta are involved. The order is passed along through the various officers and as soon as possible placed in the hands of the passenger car distributor. He figures the actual requirements, basing them on the rules and regulations of the government with respect to over-night journeys or day runs, keeping in mind at the same time the restrictions placed by the roads over which the troops move, the electric third rail and tunnel clearances, the lighting, and the different requirements effective in various states.

Orders received may involve an assignment of from 10 to 250 extra cars at a time. The order is absolute and, with the severe shortage of all types of cars now being experienced by all roads, the difficulties of furnishing the wherewith to transport the boys on schedule are various, especially when the public, which has been kept entirely in ignorance of the move, must also receive the service to which it has always been accustomed. The public does get protected. The boys leave for "somewhere" on schedule. Little do they know, however, what arrangements have to be made to insure their safe departure. The passenger car distributor robs his regulars gets in touch with his foreign allies (the roads via which the trains are to move), and in his own way obtains an appreciable amount of assistance at a very expensive empty haulage rate. He has the shop situation thoroughly canvassed and gets everything with wheels that is suitable to run and can be spared without closing down the big plant for want of equipment. Extra cars are brought from all points of the road, sometimes involving long hauls, and in a word every available car is put to the originating point.

The cars are shifted into regular train units, turned over to another department for cleaning, oiling and general inspection, and await the arrival of the boys who are to use them to parts only known by their commanders and the various railroad officers who arrange for their transportation to destination.

In one of the first regiments to go to France was a young lieutenant who by profession was a very well known pas-

senger car distributor on the line over which his regiment was to move. Ordinarily his business would require that he know all about such a movement, and you can bet he always did. Just before they left I had occasion to go to this camp with some of the equipment required for the movement, and in saying good-bye to my friend was surprised to find that he had an inference that he was going to a training field in one of our states instead of to a well known port of embarkation. This to me was rather pitiful. Here was an officer, only out of his regular line of endeavor a short while, and not in possession of that knowledge, which now would be of interest to himself, and which he always had had for the interest of others.

It is no uncommon sight for the commuter to glance up from his morning paper and see from the car window a number of foreign ownership cars that have an unfamiliar look. Sometimes the cars get a great distance from home. In his wonderment Mr. Commuter asks himself if the owning road has lost this equipment. The answer is, yes, but only temporarily. In a short while after the troops have left the originating point, the passenger car distributor, still in the game, has his orders for the return of the cars, taxing the Western Union and the energy of the mail man, requesting the various lines involved in the movement (sometimes eight or ten), to effect the prompt return via service route. This means that each line in some instances has received the order in advance of the arrival of the cars, and when the request is received it is then only a matter of getting the power lined up to start and keeping the cars moving on their homeward journey for another big assignment. This return movement is not accomplished on the mere presentation of a request, and must be followed much closer and with greater difficulty than the service movement.

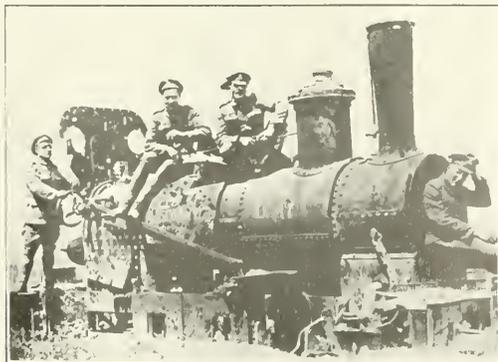
When it has been decreed by Him that the North Pole has some samples of whistling winds, treacherous but beautiful icicles, new brands of granulated snow described by the poets, which are not required at all periods of the year in that region, they are sent us. The passenger car distributor then experiences an aggravated amount of trouble—freezing up of steam pipes, causing bursting and requiring shopping of cars affected, thereby reducing his maximum supply of equipment materially. He is not daunted, however, by that word trouble, as certainly every one in the railroad business has his troubles, and so he overlooks them, and he won't admit that he has any more than the other fellow, although in his heart he thinks he has.

The omission of this feeling could be carried on successfully from day to day if it were not for the mass which he has been trying faithfully to serve—the public—who as individuals are better classed as conservatives, but when considered in the public category are prone to reflect their critical traits across the horizon of public service corporations, principally because of misinformation or more often through lack of information which may not be available in some cases on account of strict government orders.

The writer is one of the public himself. He knows full well how the feelings of the public are sometimes aroused through the action of some of the corporations to which our people have to look for assistance. In short, he sometimes cannot but agree that the complaint rendered is just, and that corrective action is necessary if the good will of the public is to be retained. But in the role of the conservative he often sees the unjust and irresponsible citizen, in these times especially when sacrifices are asked to be made, displaying a conceited attitude.

In a large railroad terminal, or in many of these terminals these days, congestion is a familiar sight at certain periods of the day. The congestion is caused possibly by slow backing of trains into the station. Perhaps, however, some of the trains are cut, a car having been taken from their normal make-up because four or five thousand soldiers are being transported over the system that day, and the management finds it necessary to inconvenience its regular patrons a small amount in order to carry out the obligation placed upon it by the government. We are transporting our brothers, our protectors, who are on their way to fight for us—for the public—but this same public does not want to put up with even this small sacrifice, and when discommoded to this small extent actually heaps voluminous abuse upon the railway which is trying to carry out orders from Washington, and at the same time take care of thousands of commuters with the least possible inconvenience.

The passenger car distributor does not mind this abuse—he is accustomed to hearing it—but at the same time he classifies the citizens who make it with those of the unthinking and unpatriotic class. The intensity of their unfairness is somewhat modified, however, to his mind, because they do not know that the drain of the normal resources is being made for their own benefit—a fact which emphasizes to him how well the government desires to keep the secrecy of such important matter are being adhered to.



Central News Photo Service



The Railroad Helps the Tommies Enjoy Themselves Off Duty. On the Left, a Light Railway Locomotive Captured from the Germans. On the Right, Getting Water Supply from a Railroad Tank

Increases in Rates in New England Allowed

Financial Condition Reviewed. Higher Rates and Fares Authorized. Mileage Abuse Criticized

THE INTERSTATE COMMERCE COMMISSION on April 27 rendered its decision in the New England rate case, allowing certain increases in class freight rates and establishing local and joint one-way passenger fares based on a rate of 2½ cents per mile on New England lines or portions thereof where the one way fares are now on a lower basis. The order also provides for the sale of mileage tickets at the same rate per mile as one-way tickets or, in the carrier's discretion, on a basis of one-tenth of a cent or one-eighth of a cent per mile below the regular one-way fares. It also provides for the withdrawal from sale of open and unlimited trip tickets, for the sale and use of 25-trip family tickets limited to three months from date of sale on a basis of 2½ cents per mile in instances where the continuance or establishment of such tickets is proposed in the pending applications, establishes party fares on a basis of 2½ cents per mile, and provides for increased zone fares on the Providence, Warren & Bristol branch of the New York, New Haven & Hartford. Proposed increased class freight rates by the Bangor & Aroostook and the Canadian Pacific are held not to have been justified. The report, by Commissioner Anderson, includes an interesting analysis of the financial condition on the New England railroads.

The proceeding grows out of the filing by all of the New England roads of applications under the amended fifteenth section asking permission to file numerous and substantial increases in passenger fares and class freight rates. Members of each of the public service commissions of the six New England states and of the Second District of the state of New York sat with the representatives of the federal commission in order that the whole rate situation might, if practicable, be dealt with promptly and in order that all the officials charged with public responsibility in transportation regulation might have the benefit of a joint hearing. Most lines of industry in New England were also represented at the hearings. The report points out at the outset the distinctive nature of the New England transportation problem, growing out of the facts that the New England lines serve directly almost none of the territory outside of New England, and that the traffic of the New England roads is poorly balanced because of the excess of raw materials moving into New England over the amount of manufactured products moving westward. Probably there is nowhere in the country, the report says, a substantially equivalent population living upon a comparable area so dependent upon transportation as the New England community. Yet this community "has allowed its chief railroads to be wrecked by mismanagement equalled in but few instances reflected in our reports. It would be difficult to exaggerate the handicap with which New England is now suffering from this mismanagement."

Condition of New England Roads

Like other carriers in eastern territory, the report says, the New England roads have recently found their operating expenses increasing more rapidly than their operating revenues. The applications were filed primarily to obtain as speedily as practicable additional revenue to offset present and prospective cost increases. Most of the interests represented at the hearing not only admitted the carriers' need of additional revenue and that it should be provided at the earliest possible date, but expressed their willingness to pay during war times any additional rates which the commission might find reasonable and proper, with the qualification,

however, that the rates proposed by the carriers were not thought to be scientifically constructed and were not considered as constituting a proper or satisfactory basis for a permanent rate structure. Some objection was also offered to any increases in rates unless accompanied by an improvement in the service. Shippers recognized, however, the report says, the dependence of the community upon efficient transportation service and that that service must be paid for. Therefore, the issues presented have been approached as a problem of general importance and private individuals and concerns have largely subordinated their interests to those of the general public.

In the report in the Fifteen Per Cent Case, the commission observed that "Among eastern carriers those located in New England appear to present the most serious condition." That the cost of operation on New England roads has increased sharply during the last year is not open to question. For seven typical New England carriers increases in wages in 1917 actually granted prior to the hearing in the latter part of November and the first part of December amounted to about \$8,950,000 annually, and other demands were pending. The increased annual cost of fuel for the seven roads was estimated at \$12,450,000, based on the September prices. In spite of a decided increase in traffic during the last few years the financial condition of the New England roads as a whole has been less favorable as far as net income is concerned, except for the year 1916, than it was during the period prior to 1913. The net income for the seven roads decreased during 1917 by \$11,429,000, while the gross operating revenues increased by substantially the same amount. High interest and renewal charges on short term notes were among the potent causes of unsatisfactory net results. The monthly report of eight New England railroads show for the calendar year 1917 a gross railway operating revenue of \$200,593,559, an increase of \$12,555,779 over 1916, but the operating expenses were \$150,369,991, an increase of \$23,860,891. The railway operating income shows a decrease of \$12,028,817.

New Haven

The report then takes up the revenue needs of the individual railroads. Regarding the New Haven it is stated that it is impossible to deal with or even superficially consider its income needs and rights without becoming involved in the labyrinthine maze of its financial past. "In a word," the report says, "both the present corporate structure and the financial history of this so-called railroad shows that it now is and for some time has been everything that a railroad should not be. With one of the finest opportunities in the world for successful railroading, with a property which for years prior to 1903 had been managed conservatively and steadily if not very progressively, its present status is such that neither its present management nor the regulating commissions under whose jurisdiction it falls can do anything more than make the roughest kind of guess as to their proper course of procedure. Its condition is the result of a decade of attempting to run a great railroad property regardless of either ethics or mathematics." It is stated that any present finding on rates must be understood to be subject to thorough revision if and when the controlling facts become ascertainable.

After discussing conflicting evidence on the subject, the report says that the percentage earned on investment in prop-

erty used or usable for "possibly legitimate railroad purposes" by the New Haven as nearly as can now be computed was 5.48 and 6.04 for the fiscal years 1915 and 1916, respectively, 5.98 for the calendar year 1916 and 5.23 for the calendar year 1917 (estimated in part). It follows that the New Haven as a railroad has been making fair earnings, the report says, but its investment in additional railway facilities for the last twelve years has not shown a proportionate increase in traffic units. The gist of the New Haven's troubles is said to be in its so-called "other investments," the amount of which, the commission finds it impossible to state, but making allowance for variations and uncertainties, it is stated that the New Haven as an investment enterprise has now about \$200,000,000 invested in outside properties yielding a return of less than 2 per cent, a large part of which therefore must be charged off as loss.

Regarding the attitude which the commission should take toward this situation, the report says in part:

"We do not overlook that under our present form of corporate management the great majority of the stockholders in the New Haven enterprise were even more the victims of the mismanaging directors than were the patrons of the road. It is common knowledge that the directors of these great corporations are in fact selected by banking or other interests in too many instances actuated by motives essentially adverse to the interest of the stockholders toward whom they bear a fiduciary relation. But as long as our public policy is represented by the law as it now is, this commission must, so far as rate making is concerned, hold stockholders responsible for the mismanagement of directors who, in contemplation of law, are selected by them. Until this commission, or some other governmental body with adequate power, permanently controls the issue of carrier securities and, within reasonable limitations, the application of the proceeds thereof, stockholders and other investors in carrier securities are certain from time to time to be subjected to such perils of mismanagement and resultant losses as have accrued to the stockholders of the New Haven, the Rock Island, the Pere Marquette, the Cincinnati, Hamilton & Dayton, and others. We say this with reference to future conditions, not overlooking the adequate, but temporary, safeguards now obtaining under federal control.

"After a railroad corporation like the New Haven and some of our other well-located and prosperous railroads has had a long career of business success and reasonably safe management, its stock becomes widely distributed among investors who pay little or no attention to guarding their investments. But this situation, fraught with grave danger to the investing public, is one with which the Congress must deal. As the law now is, this commission is powerless to afford any real remedy for past misdoings or in the future to protect other similar bodies of stockholders from deprivations and losses of an analogous kind. We can do no more than investigate and condemn after the evil has been accomplished, and make a "report" of losses and sufferings which we were powerless under the law to prevent. Private capital invested in carrier companies can not be generally safe under such lack of security regulation as has existed prior to federal control.

"This commission has frequently in its annual reports to Congress urged the necessity of remedial legislation along the lines indicated above. But the absolute necessity of such legislation, if the nation is on return of peace to continue to rely upon private capital for the extension and development of its transportation system, takes on new pith and point when considered in connection with a concrete situation such as that presented by the New Haven, the Rock Island, and other fraudulent or wasteful exploitations above referred to. The regulating commission is presented with a problem impossible of sound and satisfactory solution. On the one hand we have the claimed necessity of

approving such rates as will under private control establish credit and invite new capital for the public service. On the other hand we have a history of waste and wrecking, demonstrating that lower rates might have been adequate had the carrier corporation managed its business with some fair regard to law and sound principles. After the evil has been done, the money wasted, the stockholders victimized, then there follows, as in the present case, the stern necessity of some measure to provide needed transportation facilities. The regulating commission is then urged to 'adopt a constructive policy,' 'not to dwell upon past errors,' etc. Interpreting these euphemistic phrases, the real demand is that the regulating commission shall, through the medium of excessive rates, take money from the rate payers to make up the losses which the carrier corporation's directors have caused by their lawless or unfaithful administration.

"The fate of the New Haven stockholders is a hard one. But we have no alternative except to hold them chiefly responsible for losses which, in contemplation of law, they brought upon themselves through their chosen directors. There is no exact mathematical basis for determining a just and reasonable return. We limit our present conclusion to finding that under all the circumstances of the New Haven case a reasonable return upon the carrier property investment shown upon its books may be justified."

It follows, the report says, that the New Haven railroad is entitled to such rates as will keep its return on its carrier property at least up to the standard of the past three years, but after taking into consideration the rapidly increasing costs and the railroad's estimates of the increased revenues to be expected from the rate increases asked, doubt is expressed as to whether the revenues from the proposed rates will exceed or even equal the increased expenses.

Boston & Maine

Regarding the Boston & Maine, it is stated that none of the parties to the record questions and the facts demonstrate the need of additional revenue, but its right to such increases requires more careful consideration. The road had deficits in 1913 and 1914, and it is estimated that final returns will likely show a deficit for the year 1917 of more than \$400,000. The financial organization of the system, the report says, has for many years been intrinsically unsound. Even before it came under New Haven control its management was never conservative of the rights of its investors nor progressive in furnishing facilities and service to its patrons. The report also refers to reckless and destructive financing under New Haven control, but declares that the stockholders have already been heavily penalized for the mismanagement and that therefore it cannot be said that the system is not now entitled to rates adequate to pay a reasonable return upon its investment in carrier property. There is nothing in the record to indicate the possibility of such economies in management and operating expenses as to provide such return. The only relief seems to be a substantial increase in rates.

A speedy consolidation of the lessee company with its chief leased lines, it is declared, would greatly simplify and strengthen the financial structure and make possible substantial economies, particularly in connection with the Boston terminals. Such reorganization is plainly demanded in the interest of both the public and the security holders.

Maine Central

As to the Maine Central, the report shows that the increased expenses in 1917 were expected to amount to \$2,720,633, whereas the proposed increases in revenue from the proposed increases in rates were estimated at \$1,670,000. Therefore, the additional revenue expected is more than a million dollars less than the estimated additional costs, and

there is no present indication that the carrier may reasonably expect a decided increase in tonnage during the year 1918.

Boston & Albany

As to the Boston & Albany, it is estimated that the increased freight rates proposed will add \$200,000 annually to the revenues and that the additional revenue from increased passenger fares will amount to approximately \$600,000. The increase, the report says, seems plainly demanded in the public interest.

In discussing the reasonableness of the proposed passenger fares and the changes in mileage book and trip tickets, the commission says in part:

Reasonableness of Proposed Passenger Fares

"Since the report in *The New England Investigation* was published the New England roads, following the recommendations of a joint conference of representatives of the several state railroad commissions of New England, and a member of the Interstate Commerce Commission, have revised their passenger fares upward and at the present time the basis for one-way fares in southern New England is 2½ cents a mile (except in the Boston suburban zone, where it is 2 cents a mile) and for mileage tickets 2¼ cents a mile. It is proposed by the roads operating in southern New England to increase the basis uniformly to 2¾ cents a mile for one-way fares and to 2½ cents a mile for mileage books. It is also proposed to increase the rate for party fares from a maximum of 2¼ cents to a maximum of 2½ cents a mile. It appears that in trunk line territory and central freight association territory generally the present basis for interstate one-way fares is 2½ cents a mile and for mileage tickets 2¼ cents a mile. In *Western Passenger Fares*, 37 I. C. C., 1, after an exhaustive investigation involving interstate passenger fares in a number of midwestern states, we found as reasonable in the state of Illinois; Wisconsin; Michigan, upper peninsula; Minnesota; Iowa; Nebraska; Missouri, north of the Missouri River; and in Kansas on and north of the main line of the Union Pacific Railroad from Kansas City to the Colorado state line, a basis of 2.4 cents per mile for one-way fares and a basis of 2.25 cents per mile for 1,000-mile tickets; and in the state of Missouri, south of the Missouri river, and in the state of Kansas, south of the main line of the Union Pacific Railroad, a basis of 2.6 cents per mile for one-way fares and 2.5 cents per mile for 1,000-mile tickets. At page 33 of the report in *Western Passenger Fares*, appears the following table:

GENERAL STATISTICS	Territory			
	New England	Trunk line	Central Western	
1. Average population per square mile.	105.7	136.7	89.8	24.9
2. Average population per mile of road	\$27.0	75.0	444.0	244.0
3. Average passenger-train revenue per mile of road.	\$8.0	\$7.676	\$4.110	\$2.961
4. Average number of passengers carried 1 mile per mile of road.	431,387	357,779	169,743	124,069
5. Average distance in miles each passenger was carried.	11.45	25.45	39.65	44.39
6. Average receipts per passenger per mile	\$0.01777	\$0.01755	\$0.01917	\$0.01911
7. Average receipts per passenger-train mile	\$1,110.0	\$1,464.20	\$1,320.0	\$1,333.03

"The conclusion to be drawn from these data is that normally the passenger fares in New England should not be on a higher basis than in the other parts of the country referred to in the foregoing table, but that the proposed fares may be approved as an emergency or war measure.

"There is probably no part of the country where the sale of mileage books on a substantially lower basis per mile than regular one-way fares has resulted in such flagrant abuses, such unjust discriminations, and such impairment of railroad revenues as in New England.

"It is customary in the greater part of New England to sell 500-mile books, good to bearer, and good until used, at

a rate of 2¼ cents a mile. In southern New England the regular one-way fare is over 11 per cent higher than the mileage fare, and in northern New England the regular fare, in many instances, on a 3-cent basis, is 33 1/3 per cent higher than the mileage fare. The result is that ticket "scalpers" thrive in all parts of New England; and they and others make a business of dealing in mileage books which are displayed like ordinary merchandise in the store windows, at reduced prices. Certain individuals engaged in this traffic have constantly on hand as many as 200 mileage books, and it is estimated that their profits amount in single instances to as much as \$3,600 annually.

"The fundamental evil in the sale of mileage books, at least in New England, is that they accord preferential fares to those who use them. In northern New England, for example, a man with sufficient capital to buy a mileage book, may ride 100 miles for \$2.25. A less fortunate individual riding between the same points in the same train and on the same car, must pay \$3 for the same service. Witness after witness testifying for the carriers, when asked upon what theory such discrimination could be justified, replied that it could not be justified on any principle. It is clear that the mileage book evil in New England must be eliminated, either by canceling the mileage fares entirely or by increasing them more nearly to the basis of regular one-way tickets. If travelers want mileage tickets as a convenience and not as a discrimination, there is no great objection to permitting their sale.

"Most of the objectionable features of mileage books are found also in certain forms of trip tickets. These are sold in New England usually in strips of from 5 to 50 tickets, good to bearer and until used. The rate ranges from 1 cent to 2 cents per mile, resulting in many instances in passenger fares less than one-half the regular one-way fare. The extent of the discrimination in favor of purchasers of these tickets is even greater, therefore, than in the case of mileage books. This form of ticket is used quite generally in southern New England, but more particularly to and from the city of Boston within a 15-mile zone. Such tickets are used not only for travel wholly within the zone but also for the purpose of breaking down the through fares between the city of Boston and points beyond the suburban zone. It is proposed to increase by 25 per cent the charge for trip tickets within the Boston suburban zone. The New Haven proposes to withdraw from sale trip tickets on other parts of its line and similar proposals are made by the Boston & Albany.

The general passenger agent of the Boston & Maine testified that the 12-trip tickets, which are said to be sold in no other part of the country, result in greater abuse than any other form of ticket. The misuse of these tickets not only results in according preferential fares to certain persons but it seriously impairs the carriers' revenues. There is little, if any, evidence of record in justification of the continuance of these tickets, and considerable evidence in support of their withdrawal. While these trip tickets in the Boston zone are recognized by an act of the Massachusetts legislature, the Massachusetts Public Service Commission now seems to have full rate-making power.

In principle there is no easy justification for the continuance of trip tickets within the Boston zone only. Such tickets are not sold between New England points and New York City. The usual 60-trip monthly commutation tickets and 25-ride family tickets, to be later discussed, would seem to meet most of the legitimate demands of the Boston commuters for special fares. At any rate, some method should be devised to prevent such misuse as we have just described.

The general withdrawal of open and unlimited trip tickets with respect to interstate transportation and their continuance for intrastate travel within the Boston zone on the low basis proposed is of questionable propriety. The proposal

to eliminate such tickets with respect to interstate travel is approved.

Freight Rates

Regarding the reasonableness of the proposed increased class rates, the report says that one cannot study the structure of class freight rates in New England without being impressed with the fact that the rates as a whole are relatively low and that there is no reason as far as it is advised why the rates in Southern New England should be lower than in Central Freight Association territory, but that as a matter of fact they are substantially lower. The railroads had proposed two mileage scales of class rates, one to apply to the division of New England roads known as class A and the other to class B roads. The commission makes some modification in the division of roads between classes A and B and finds that a logical and proper rate structure will result if the rates now in effect in Central Freight Association territory, zone B, are applied to class A lines in Southern New England. The rates for class B lines, it finds, should not be more than 10 per cent higher than those for class A lines, and the rates for any haul embracing both a class A line and a class B line should be made on the class B basis. The report also says that the prevailing impression that less-than-carload traffic is not generally remunerative is supported by the evidence in this and other cases. Investigation of the profitableness of less-than-carload traffic made under the direction of a committee of eastern railroads including the New Haven, tends also to the conclusion that this traffic is not remunerative. These considerations suggest the propriety of establishing in New England a rate structure that will have the effect of imposing on the merchandise traffic a greater portion of the transportation burden than it has hitherto borne, and the commission finds that this result would be effected by establishing for class A lines in New England the zone B rates in effect in Central Freight Association territory.

After discussing the proposals of the Bangor & Aroostook Railroad, the commission finds that the evidence submitted by this carrier in support of the proposed increased class rates does not establish their reasonableness. It is suggested that the Bangor & Aroostook undertake a thorough revision of its tariffs, particularly its commodity tariffs, with a view to making such moderate increases as may be needed to offset its increasing costs, but primarily for the purpose of reconstructing its rates on a logical and equitable basis, so that their propriety can then be determined upon an adequate record.

Relative Results of Freight and Passenger Operation

A careful study was made by one of the commission's expert accountants of the relative cost of freight and passenger operation on the Boston & Maine, the Boston & Albany, and the New Haven for the first nine months of 1917 as compared with the years ended June 30 and December 31, 1916. The Boston & Maine figures for 1917 cover only the first six months of the calendar year. An examination indicates that on the Boston & Albany and on the New Haven the passenger service is more profitable than the freight service, and that on the Boston & Maine the two classes of service appear to produce about the same relative result. An allocation of revenues and expenses as between the passenger and freight service shows that with respect to the Boston & Albany and the New Haven the operating ratio for the passenger service increased much less rapidly in 1917 than the operating ratio for the freight service. Among other interesting statistics shown it will be noted that the wages of freight enginemen and trainmen absorbed in 1917 a slightly greater proportion of the freight service revenue than in 1916, while the wages of passenger enginemen and trainmen absorbed in 1917 a somewhat smaller proportion of the passenger service revenue than in 1916 and

that out of every dollar of passenger service revenue in 1917 the Boston & Maine and the Boston & Albany spent 14.56 cents and 14.06 cents, respectively, for fuel for passenger locomotives, as compared with 8.62 cents and 8.96 cents for the calendar year 1916. The relatively satisfactory showing of the passenger service as compared with the freight service is due principally to the fact that in 1917 the daily average mileage of passenger trains and locomotives decreased, while contemporaneously there was an increase in the number of passengers per car-mile and per train-mile and also an increase in the passenger service revenue.

Other Possible Sources of Revenue

It was stated by the officials of certain of the New England lines that a proposal was in process of development to establish a charge for checking baggage and also to assess an extra charge in addition to the regular or normal ticket fare against passengers occupying sleeping and parlor cars because of the alleged additional cost of passenger transportation in Pullman cars over that in ordinary day coaches. In addition to this, the opinion was expressed by several traffic and other officials that (a) the minimum charges for less-than-carload shipments of freight should be increased from 25 cents to 50 cents (b) that many of the exceptions to the official classification involving rates, rules, minimum weights, etc., should be canceled; (c) that special less-than-carload commodity rates should as far as possible be eliminated and (d) that certain carload commodity rates, notably those applicable to lumber and pulp wood, should be increased. The report says that if unduly low or unremunerative rates have in the past been established to meet conditions that obtained at the time of their inception, and if conditions have now changed so that there is no justification for maintaining such rates, they ought to be increased to a basis where they will be remunerative.

Another Use for a Ford

THE MICHIGAN CENTRAL has developed a new use for a Ford automobile, using it in the manner shown in the photograph to haul men back to the hump at its West Detroit classification yard. The car is fitted with flanged



A Ford Car in Hump Yard Service

wheels and draws a trailer which will carry from 15 to 20 men at a time, or practically the entire crew of riders on the hump.

LOCOMOTIVE PRICES IN ENGLAND.—The Taff Vale Railway of England has recently given orders for some new locomotives which, the chairman of the railway company says, will cost £7,000 (\$35,000) each instead of the pre-war price of £2,300 (\$11,500) each.

The Actuary Theory of Depreciation of Physical Property Values*

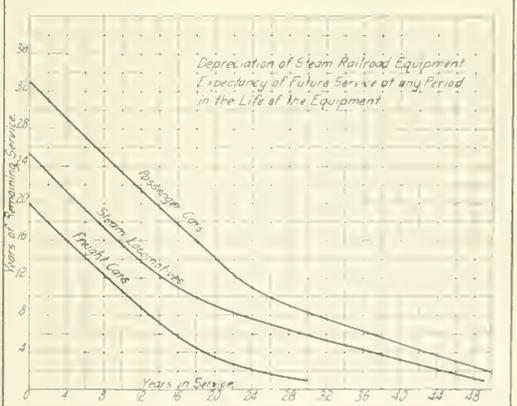
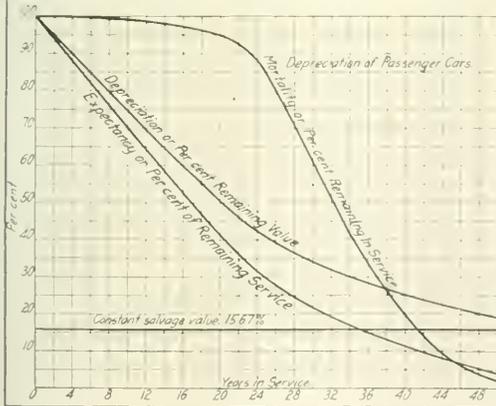
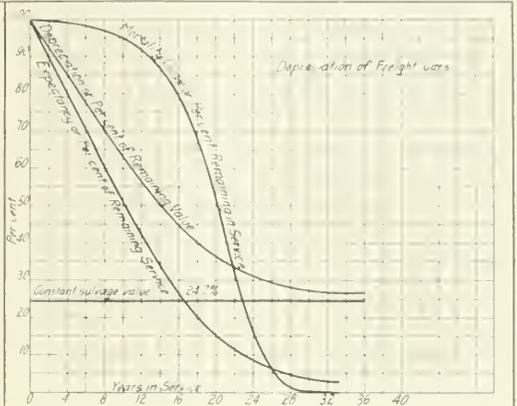
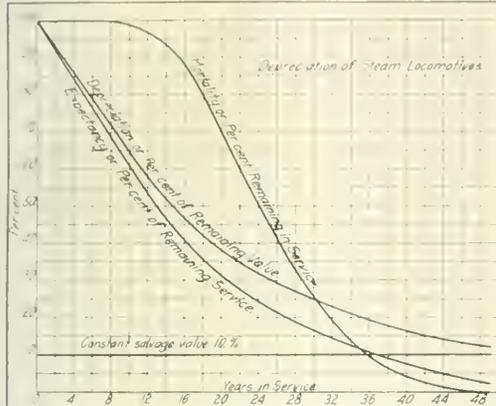
By E. J. Kates

ONE OF THE MOST DIFFICULT questions confronting valuation engineers, accountants and economists of the present day is that regarding depreciation of the values of physical property. With the Government appraisal of railroad properties well under way, various conflicting theories now being advocated should be crystallized into some one rational and workable basis.

Before a determination of the proper method of arriving at the amount of existing depreciation can be reached, it is necessary to decide what elements or factors shall be given

The second plan reverses the proposition and gives but little consideration to the expectancy of future service but rather attempts to measure the deferred maintenance or cost of repairs necessary to put the article into a 100 per cent operating efficiency. Here the locomotive after coming from the shop with a general overhauling would be rated close to 100 per cent, while the one just ready for general repair would be given a much lower rating.

Just what attitude the courts will eventually take in regard to this matter, is not as yet clear, though there are considerable grounds for the belief that the final interpretation of the meaning of the terms "realized depreciation" as a deduction to be made from the value new of physical property will be the first of the two definitions given above or in other words, a measure of the used service compared with the remaining



consideration. Depreciation has been described as representing a wastage of serviceable life. Present value has been described by some as representing the proportion of service remaining in the property and by others as representing the present physical condition of the property, considering the state of repairs and its adaptability to meet current requirements. The first gives but little consideration to the actual condition of the article so far as its need of repairs is concerned since an article, such as a locomotive, may reasonably be expected to have as great an expectancy of future serviceable life just before it goes into a shop as it will have just after it comes out of the shop with the needed repairs made.

service in the article. If this method be adopted, then some rational basis for the determination of the relation of future expected service to total expected service must be found.

Various methods have been advocated such as the "Straight line theory," the "Sinking fund theory" and the "Average age of dollar invested theory" but to all of these there are serious objections. In the first place they depend upon a fixing of an average life for each class of property which is used as a measure with which each individual or group of individual articles are compared. Averages are not applicable to individual cases without a considerable element of error being considered. Neither are averages applicable to individual cases where the realized life has exceeded the expected aver-

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age. To overcome this feature it is quite commonly the practice to use a minimum service value, past which depreciation is not figured, but this in itself violates the basic principle of averages.

To overcome the objections to the various methods heretofore used, the writer has devised what has come to be known as the "Actuary theory." This name is due to the fact that the same principles are used here as are used by the actuary in computing the risks of an insurance company. The fact that these principles have stood the test of time in the modern business world, is surely one point in their favor, when applied to the question of depreciation of physical property values.

In the development of the mortality and expectancy tables and curves for railroad equipment, the writer has been fortunate in having access through the various commissions and by reason of his connection with a number of the larger rate cases during the past nine years, to the records of practically all the railroads west of Chicago. The data are a composite from these various roads and covers an extended period of time. For illustration three tables and four charts are shown herewith, giving the general average data for each of the three general classes of railroad equipment.

TABLE 1

THE RATES DEPRECIATION STUDIES FOR LOCOMOTIVES

Years in service	Per cent remaining in service	Expectancy in years of service	Expectancy in per cent of remaining service	Expectancy in per cent of remaining value
0	150	25.4	100	100
1	100	24.4	96.1	96.5
2	100	23.4	92.1	92.9
3	100	22.4	88.2	89.4
4	100	21.4	84.3	85.6
5	100	20.4	80.3	82.3
6	100	19.4	76.4	78.8
7	100	18.4	72.5	75.3
8	100	17.4	68.5	71.6
9	99.5	16.5	64.7	68.5
10	99	15.6	60.9	64.8
11	98	14.7	57.2	61.5
12	97	13.8	53.5	58.2
13	95.5	13.0	50.0	55.0
14	94	12.2	46.6	51.9
15	91	11.6	43.6	49.2
16	88	11.0	40.8	46.7
17	84	10.4	38.0	44.2
18	80	9.9	35.5	42.0
19	75	9.5	33.3	40.0
20	70	9.1	31.3	38.2
21	64.5	8.8	29.5	36.6
22	60.0	8.4	27.6	34.8
23	54.8	8.1	26.1	33.8
24	50.5	7.7	24.3	31.0
25	46.0	7.4	22.9	30.6
26	41.2	7.1	21.4	29.3
27	37.0	6.8	20.1	28.1
28	33	6.5	18.8	26.9
29	29.2	6.2	17.6	25.8
30	25.7	5.9	16.4	24.8
31	22.5	5.6	15.3	23.8
32	19.2	5.4	14.3	23.0
33	16.5	5.1	13.4	22.0
34	13.9	4.9	12.6	21.3
35	11.8	4.6	11.6	20.4
36	9.6	4.4	10.9	19.8
37	8.0	4.1	10.0	19.0
38	6.5	3.8	9.1	18.2
39	5	3.6	8.5	17.7
40	4	3.3	7.6	16.8
41	3.0	3.0	6.8	16.1
42	2.2	2.8	6.2	15.6
43	1.6	2.5	5.5	15.0
44	1.0	2.3	5.0	14.5
45	.7	2.0	4.3	13.9
46	.4	1.7	3.6	13.2
47	.1	1.5	3.1	12.8
48	.08	1.3	2.6	12.3
49	.02	1.0	2.0	11.8

It is not contended that these ratios will exactly fit conditions on each and every road, nor is it contended that they will exactly fit conditions on any road under the present war time methods of operations. Indeed the writer prefers whenever possible to make an individual study of the conditions on each road involved, with a derivation of tables and curves more especially adapted to any peculiar conditions thereon. However, it may be said that in general the data shown herewith are applicable without any considerable change to nearly any western road operating under the conditions exist-

ing prior to the present war. Again, the data for freight cars come more nearly meeting actual conditions when divided into the various groups or classes of equipment such as coal, flat, box, stock and refrigerator cars.

In all three charts the curve designated "Mortality curve" is derived from the actual history of thousands of items of equipment and represents the per cent remaining in service at the end of each year or inversely the per cent taken out of service during any year after the date of building. This curve is exactly analogous to the actuaries' mortality curve.

TABLE 3

THE RATES DEPRECIATION STUDIES FOR PASSENGER CARS

Years in service	Per cent remaining in service	Expectancy in years of service	Expectancy in per cent of remaining service	Expectancy in per cent of remaining value
0	100	33.16	100	100
1	100	32.16	97	97.5
2	100	31.16	94	94
3	100	30.16	91	91.4
4	100	29.16	88	89.9
5	100	28.16	85	87.4
6	100	27.16	82	84.9
7	99.7	26.2	79	82.3
8	99.5	25.3	76.8	79.8
9	99.2	24.4	73	77.3
10	99.0	23.4	70	74.7
11	98.7	22.5	67.2	72.4
12	98.2	21.5	64.2	69.8
13	98.2	20.6	61.3	67.4
14	98.0	19.6	58.3	64.9
15	97.5	18.7	55.5	62.5
16	97.0	17.8	52.7	60.1
17	96.5	16.9	49.9	57.8
18	96.0	16.0	47.1	55.4
19	95.5	15.1	44.3	53.1
20	95.0	14.3	41.7	50.9
21	94.7	13.4	38.8	48.4
22	92.5	12.5	36.2	46.2
23	90.2	11.7	33.7	44.1
24	88.0	11.0	31.4	42.2
25	84.0	10.5	29.6	40.7
26	80.0	10.0	27.8	39.1
27	75.5	9.5	26.0	37.6
28	71.0	9.1	24.6	36.4
29	65.7	8.7	23.1	35.2
30	60.5	8.4	21.9	34.2
31	55.7	8.0	20.5	33.0
32	51.0	7.6	19.2	31.9
33	46.2	7.3	18.1	31.0
34	41.5	7.0	17.0	30.0
35	37.7	6.6	15.9	29.1
36	34.0	6.3	14.9	28.3
37	30.2	6.0	14.0	27.5
38	26.5	5.7	13.0	26.7
39	22.8	5.4	12.0	25.8
40	20.0	5.0	11.1	25.1
41	17.0	4.7	10.3	24.4
42	14.0	4.5	9.7	23.9
43	11.5	4.3	9.1	23.4
44	9.0	4.2	8.7	23.0
45	7.7	3.7	7.6	22.1
46	6.5	3.3	6.7	21.4
47	5.0	2.9	5.8	20.6
48	3.5	2.7	5.3	20.2
49	2.7	2.3	4.5	19.5
50	1.8	2.0	3.9	19.0
51	1.0	1.7	3.2	18.3
52	0.5	1.4	2.6	17.9
53	0.2	1.0	1.9	17.3
54	0.0	0.0	...	...

From it we can see, for instance, that of every group of freight cars placed in service, an average of 51.4 per cent have been found to be in service at the end of 20 years and 11.1 per cent at the end of 25 years. If history shows a certain rate of vacations in the past, it is well within the laws of probabilities to assume the same rate of vacations for the future unless some radical changes in operation are introduced.

From this curve or the data upon which it is built, we can derive an expectancy table showing the probable number of years of future service. To illustrate, from the curve and data for freight cars we find that at the end of 20 years there will remain an average of 51.4 per cent of the original number of cars and that these will have an average additional life of 3.8 years. We now have the two factors needed to establish the ratio of expectancy of future service to total service. If the car has been in service 20 years and has 3.8 years expectancy, the total will be 23.8 years and the per cent of remaining service will be the ratio of 3.8 to 23.8 or 15.3 per cent. This represents the expectancy of service. To

find the per cent of remaining value we of necessity apply this per cent to the depreciating portion of the total value and add to the resultant, the non-depreciating portions. With freight cars having an average salvage value of 24.7 per cent, the depreciating or wearing portion of the value is 75.3 per cent. With 15.3 per cent expectancy in remaining service at the end of 20 years, the expectancy in remaining value becomes (15.3 x 75.3) plus 24.7 or 36.2 per cent.

The expectancy in per cent of remaining value then becomes the measure of present value. It will be noticed that the present value curve never quite reaches the non-depreciating value line because so long as the article is in service there is some expectancy of future service.

In the data from which these curves have been drawn, the writer has included vacations from all causes. Cars and locomotives are all finally wrecked, destroyed by fire, con-

verted into work equipment, dismantled or sold. Whatever the method by which its final abandonment is accomplished, the fact remains that so soon as the article is placed in service it becomes subject to a liability of destruction, obsolescence, inadequacy or decrepitude, and the measure of this liability is the measure of the effect that each of the various causes making vacations have had on similar equipment in similar service in the past.

As stated above, the exception comes where there is a radical change in operating conditions. For instance, up to the present time the roads have universally dismantled freight cars when they reached a condition such that a practical rebuilding became necessary. Within the past year, however, this plan has just as universally been abandoned and the carriers are now rebuilding almost anything that has a number. This will, if carried on, give an extension to the average serviceable life of equipment. A fair approximation of what this extension will be can be determined if the mortality curves data for individual classes of cars, such as box cars, be divided so as to show the effect of the various causes making necessary the vacations. With such a division we find that a certain per cent of cars have been dismantled and also we find the ages or periods in which such dismantling has occurred. With this data in hand we can then compute the number of rebuildings possible, assuming that during the added life, these rebuilt cars will be subject to

the same liability of accidental destruction and conversion into work equipment as are new cars.

A very interesting comparison of efficiency of design of any series of cars can be made by means of mortality curves such as are here presented. That is, if a curve be developed to show the average performance of a certain class of cars on a given road then a new series coming into service may, after it has been in service a few years, have its mortality curve developed, and from this a comparison made which will show readily whether or not the series is holding up to the average expectancy. Or the mortality curves for a given road may be compared with the average for all roads or for any one selected as a criterion and very interesting and instructive conclusions may be drawn.

TABLE 3

PER CENT DEPRECIATION STUDIES FOR FREIGHT CARS

Years in service	Per cent remaining in service 100	Expectancy in years of service	Expectancy in per cent of remaining service 100	Expectancy in per cent of remaining value 100
1	99.8	19	95	96.2
2	99.6	18	90	92.5
3	99.3	17	85	88.7
4	99.1	16	80.2	84.9
5	98.8	15.2	75.2	81.3
6	98.4	14.2	70.3	77.6
7	97.9	13.3	65.5	74.0
8	97.3	12.4	60.8	70.5
9	96.1	11.5	56.1	66.9
10	95.0	10.6	51.4	63.4
11	94.0	9.7	46.8	59.9
12	92.3	8.9	42.6	56.8
13	89.6	8.1	38.4	53.6
14	86.5	7.4	34.6	50.8
15	83.6	6.6	30.5	47.7
16	79.5	5.9	27.0	45.0
17	74.5	5.2	23.4	42.3
18	68.4	4.6	20.3	40.0
19	61.3	4.0	17.4	37.8
20	51.4	3.8	15.3	36.2
21	41.0	3.3	13.6	34.9
22	32.4	2.9	11.7	33.5
23	21.7	2.6	10.1	32.3
24	16.7	2.3	8.7	31.2
25	11.1	2.1	7.3	30.2
26	6.4	1.8	6.5	29.6
27	3.4	1.5	5.3	28.7
28	1.3	1.3	4.4	28.0
29	0.3	1.2	4.0	27.7
30	0.09	1.0	3.5	27.3
31	0.04	1.0	3.1	27.0
32	....	1.0	3.0	27.0
33	....	1.0	2.9	26.9
34	....	1.0	2.8	26.9
35	....	1.0	2.7	26.8
36	....	1.0	2.6	26.7

United States Supreme Court on Patentees' Rights

By Paul Synnestvedt

IN CONNECTION with the discussion which has recently arisen relative to the question whether or not all rights in that species of property known as Letters Patent should be surrendered to the government during the period of the war without compensation to the patentee or owner, much importance would seem to attach to two recent decisions of the United States Supreme Court reported in the early April advance sheets of the Supreme Court Reporter of the West Publishing Company of St. Paul.

The two cases referred to are a suit relating to some of the patents on the Marconi wireless telegraph apparatus, the litigation on which went to the Supreme Court from the United States Circuit Court of Appeals in New York, and a suit relating to some Curtis marine turbine patents which went to the Supreme Court from the United States Circuit Court of Appeals sitting in Philadelphia.

In the Marconi case the Federal Court in New York had held in substance that under the present statutes touching the rights of a patentee against unauthorized use of his invention by the government, a competitor of the patentee could bid against the patentee, and if awarded the contract, could supply the government with the patented apparatus without other remedy to the aggrieved patentee than an action in the Court of Claims, under the federal Statutes relating to patent cases, for damages against the government arising out of the unauthorized use.

The Supreme Court strongly advanced the opposite view, condemning such violation of a patentee's rights as unlawful and unjust, while at the same time recognizing, of course, that it is within the sovereign power of the government to commandeer anything needful to government use, and that it is not open to any individual to obtain injunctive relief against such sovereign authority. The exercise of such sovereign right to appropriate for government use private property not surrendered by contract or consent was held to be proper only in accordance with the law, that is, according to proper and legitimate means, and with ample provision for safeguarding or protecting the owner of such commandeered property as against damage or loss.

The Supreme Court further refused to endorse the theory that had been advanced in the lower courts, and sustained in New York, that because of certain provisions in some federal statutes recently passed the government should be regarded as holding a general license for the use of all patented inventions such as would enable it to obtain such patented apparatus from competitors of the patentee without the owner of the patent rights having any other relief than a suit for damages in the Court of Claims against the United States.

The net result of the Supreme Court rulings is that the

rights of a patentee against infringement by competitors in unlawful appropriation of patented inventions supplied to the government remain as before and unimpaired, and while the government clearly cannot be stopped from appropriating and using any invention which it may desire or need especially for promoting its activities in the war, such patented mechanism must be secured by or through the owner of the rights who, exactly as is the case with other personal property, has a right to look for and expect reasonable compensation.

Substantially the same questions arose in the litigation relative to the Curtis marine turbine patents, some of which had been incorporated without license in navy boats built for the government by The Cramp & Sons Shipbuilding Company; and this again came up in the United States Circuit Court of Appeals in the Third Circuit in connection with a controversy as to whether certain ships that had been so equipped were to be included with others in calculation of recoveries held to be due under patents which had been sustained by the United States Circuit Court of Appeals in Philadelphia.

The effect of the decision by the Supreme Court in both cases was to grant to the patentee his right of recovery against the infringer who supplied the government with the infringing turbines, and this action by the Supreme Court was apparently in support of the view held by the Philadelphia court.

Railroad Employees Breaking All Records in Liberty Loan

“I AM VERY PROUD, too, of the splendid work the officers and employees of the railroads of the United States are doing for the Third Liberty Loan. Their enthusiasm and loyalty have been conspicuous,” said Director General McAdoo in Chicago last Sunday after his arrival from his trip through the South and Southwest.

Eastern Regional District

The Eastern Regional District Liberty Loan Committee, of which F. D. Underwood, president of the Erie, is chairman, reported on Wednesday that it had heard from 39 roads reporting total subscriptions of \$23,925,050, about \$21,000,000 of this having been taken by 325,000 men.

Several of the eastern roads are trying to break all records for total subscriptions, number of subscribers and percentage of subscribers to total employees.

The Delaware Lackawanna & Western, on May 1, was able to report the following percentages:

	Number	Subscribers	Per cent
Station employees	1,078	1,078	100.0
Conductors	258	258	100.0
Trainmen	852	827	97.0
Switchmen	716	716	100.0
Yardmen, tins and clerks	329	329	100.0
Superintendents' offices	121	121	100.0
Shopmen, roundhousemen and carmen	5,704	5,376	94.3
Locomotive engineers	904	937	94.3
Locomotive firemen	928	831	90.0

Several other departments have reported 100 per cent and the number is still increasing.

The total number of subscribers Wednesday had reached 29,893 and the total subscriptions \$1,738,400. For all departments of the railroad the percentage of subscribers to total employees was 81.2 per cent.

On the Lehigh & Hudson River, the result of intensive work on a small road has been shown in subscriptions taken by 745 employees, 100 per cent of the personnel and a perfect record.

The Baltimore & Ohio reported up to the evening of April 29, subscriptions for \$2,445,100.

The Erie up to Wednesday morning reported that 19,550

subscribers had taken \$1,244,650. The mechanical department employees of the Marion division, including the Hammond, Ind., shops, turned out the splendid record of no less than 1,137 subscribers out of 1,150 employees.

The Pennsylvania Railroad System, lines east and west, on April 27 had taken \$8,444,850 in bonds, there being 141,800 subscribers. On the lines west 71.83 per cent of all employees subscribed up to April 27.

New York Central

The New York Central up to noon April 30 had reported total subscriptions for the entire system by 109,446 employees, 63.8 per cent of the total employees, for \$7,773,550. In the second loan 33,872 employees subscribed for \$2,256,450. The New York Central's figures are as follows:

NEW YORK CENTRAL LINES LIBERTY LOAN COMMITTEE
SUBSCRIPTION TO THIRD LIBERTY LOAN REPORTED UP TO NOON, TUESDAY, APRIL 30, 1918

	Third Loan			Second Loan*	
	Total Employees	Number of Subscriptions	Percent of Total Employees	Number of Individual Subscriptions	Amount
Road					
NYCRR, East	64,248	40,552	63.1	\$3,001,700	\$873,500
NYCRR, West	34,045	24,334	71.4	1,623,000	453,350
B. & A.	8,149	1,831	22.4	120,850	471
M. C. R. R.	15,390	9,794	63.6	665,000	266,750
C. C. C. & St. L.	23,042	17,718	76.8	1,363,750	398,150
Ch. Nor.	881	313	35.2	49,450	72
P. & L. E.	11,496	6,800	59.2	502,250	5,600
T. & O. C.	3,900	1,800	47.0	130,000	1,002
K. & M.	1,600	1,600	100.0	289	70,500
L. E. & W.	3,400	2,757	81.1	196,900	21,510
I. H. Belt.	2,921	1,570	53.7	97,550	529
Rutland	2,300	1,777	77.2	123,200	32,300
Total	171,372	109,446	63.8	\$7,773,550	\$2,256,450

* Figures for Second Loan not available.
Special note—Total number of employees given 171,372—is entire payroll of all classes and departments of labor at this date, including large numbers of transient or “floating” workers, many of whom remain only for a few days, the constant changes making the “turn-over” often above 100 per cent a month.

On the New York Central there are 650 divisional and departmental committees, each with specific responsibility, territory and lists, these embracing as active workers more than 3,500 employees.

A specially-designed “Honor Flag” is awarded to each department showing 75 per cent of its personnel as subscribers to bonds, a star being added for each additional 5 per cent. Already numerous departments have reported “100 per cent subscribed” and claimed the flag with five stars. In the general offices at the Grand Central Terminal, New York, no less than 158 offices, some with a hundred or more employees, have received the 100 per cent flag.

Depew Shops 100 Per Cent

But the banner for the entire New York Central System to date apparently goes to the Depew shops where out of 650 employees 650 subscriptions were reported.

Girl employees with brothers or family members at the front form a unique branch of the New York Central organization selling Liberty bonds. They are the special “storm troops” or “shock squads,” as it were, of the army of 3,500 bond canvassers, being used to win over those “hard cases” when other appeals have failed. When an employee who is well able to invest resists all efforts and is reported by the regular “team” as hopelessly indifferent or laggard, a “squad” of the girls makes the final effort. Every one of the girls has a brother, husband or father in the fighting forces, this being a necessary qualification, and with thoughts of the needs of their loved ones “over there” which the bond money would supply as an inspiration, their pleas seldom fail to convert reluctant investors.

For the final week of the bond-selling on the New York Central, the “Safety First” organization has changed its

slogan to "Liberty First." The regular "safety meetings" held by employees under direction of local committees have been devoted instead to arousing enthusiasm for the third bond issue.

"Safety First" Yields to "Liberty First"

Marcus A. Dow, general safety agent of the system, as this is written is holding a series of Liberty bond mass-meetings for railroad employees, on a fast tour that will cover all the big centers to Buffalo. Commencing at the Harmon shops, the schedule includes big rallies for employees at West Albany, Rensselaer, Utica, Frankfort, Syracuse, Depew, Rochester, Buffalo and Niagara Falls.

Two veterans of the war, invalided for wounds, accompanied Mr. Dow and addressed the railroad employees' gatherings, telling of conditions and their personal experiences in the trenches. These were Private L. C. Bugess, a bomber who saw three years' service with the famous Canadian "Princess Pats" and lost an eye for liberty, and Private H. J. Pickell, who served three years with the 24th Battalion, Canadian Infantry, and was wounded at Vimy Ridge.

The meetings in shops, roundhouses, at stations and in switching yards have been marked by the greatest enthusiasm, the railroad men being particularly interested in hearing about the American railway engineers who threw down their shovels and seized rifles at Cambrai, thereby becoming the first of our expeditionary forces in battle.

Western Regional District

W. G. Bierd, chairman of the Liberty Loan Committee for the western regional district, reported up to Saturday, April 27, total subscriptions of \$40,878,030.

The reports of the leading railroads up to April 25 showed:

Road	Subscriptions	Per cent of employees
Atchison, Topeka & Santa Fe	\$2,802,400	59.97
Chicago, Rock Island & Pacific	2,762,556	98.10
Chicago & North Western	2,536,650	65.72
Chicago, Milwaukee & St. Paul	2,500,100	75.41
Nor. Pacinc	2,398,450	83.58
Great Northern	2,204,350	74.33
Missouri Pacific	2,055,000	78.48

Some idea of the way the Liberty Loan is going in the western district is shown by the complete tabulation of Class I roads up to April 25:

Total employees	714,973
Total subscribers	481,633
Per cent	67.36
Total subscriptions (April 25)	\$36,673,780
Average per subscriber	\$74.07

THE FUTURE OF DISABLED EMPLOYEES was considered at the recent meeting of the London & North-Western of England. Sir Gilbert Claughton, chairman of the company, said that the question of providing suitable employment on their return to civil life of those members of the company's staff who were disabled through war service, had engaged the attention of the directors and officers, special attention being given to those who were, or might be, incapacitated owing to the loss of a limb or an eye. In 57 such cases suitable work had been found for them by the company in positions such as time-keepers, ticket-collectors, watchmen, etc. Of the 1,987 men who had returned to the company, 1,913, or 96 per cent, had taken up their former positions at their proper rates of pay or had been placed in equally good positions at not less than their former remuneration. There were no cases where men had returned disabled and ready and fit to resume work that had not been provided for.—*Railway Gazette, London.*

A High Lift Industrial Truck

IN THE EFFICIENT HANDLING of freight and stock from platform to storeroom, different forms of industrial lift trucks are becoming more and more important factors and their use has spread to railroad repair shops and freight houses. One of these trucks, recently developed by the Lewis-Shepard Company, Boston, Mass., intended especially for railroad work, is shown in the illustration.

With a capacity of 3,500 lb. and large rear wheels to insure easy rolling, it combines the added advantage of a universal joint which permits the load to be raised with the handle in any position. In this way it is possible to use the truck in freight cars and other cramped quarters hitherto inaccessible, and a total lift of 21 1/2 m. allows the wooden platforms to be pulled over inclines and other irregularities in the floor.

The load is elevated by a combination of levers—re-



Model 10 W S B Jacklift Master Truck

quiring from four to six short strokes of the handle and a ratio of 40 to 1 gives a powerful purchase. In lowering, a release check permits the load to descend slowly to the floor and eliminates the possibility of spills.

At one freight depot where this truck is in use, all incoming freight is unloaded directly onto small platforms made for the purpose. Platform and freight are then moved by the aid of a truck to destination without rehandling.

GERMAN RAILWAY TRAVELING.—In an article in the London Daily Mail, E. L. Pyke, a London business man who has recently been released from Ruhleben after 3 1/2 years' internment, writes: "The Germans, even if they had food, are handicapped by the immense deterioration of the railways, of which I have heard nothing in England except an occasional suggestion that there is a shortage of axle-grease in Germany. I came back along the well-known Berlin-Flushing line from Charlottenburg to Gosh. Before the war the Germans were proud not only of their roadbed but also of their rolling-stock. Well, the German railways are now no place for those who like smooth traveling. Although I was on the way to freedom and in the height of good spirits, the state of the railway wheels, but more particularly the state of the track, rendered conversation and sleep impossible. One wag of the party suggested that the wheels were square."

General News Department

Senator Jones, of Washington, has introduced a bill in Congress, S. 4370, to prohibit trespassing upon the cars or trains of common carriers in interstate commerce.

Ink, mucilage and paste are among the things which the Southern Pacific now makes for itself. The 45,000 employees of the Pacific system have also been encouraged to apply thrift to their office work. They are using 10,000 paper tubes to put over pencil stubs. The company uses 4,000 quarts of ink annually and 2,400 quarts of mucilage, and difficulty experienced in securing these articles led to manufacturing experiments at the Sacramento shops.

The shops of the **Lake Erie & Western**, at Lima, Ohio, were destroyed by fire on the night of April 24, together with 15 passenger cars and a number of freight cars. Estimated loss, including damage to 14 locomotives, \$500,000. The fire is supposed to have been incendiary.

The conflagration followed a blaze discovered in the same place two hours earlier and later flames were discovered at three different places in the plant. Federal agents have been investigating the fire and one suspect has been arrested.

The **New York-New Jersey Port Development Commission**, a joint commission established by the states of New York and New Jersey, will soon begin the investigation of general traffic conditions at the port of New York, the legislature of New York having followed that of New Jersey in making an appropriation of \$100,000 for the expenses of the commission. The chairman of the commission is William R. Wilcox of New York City, formerly chairman of the New York State Public Service Commission, First District.

Twelve hundred war gardens were planted by employees of the Pennsylvania Railroad last year, and in a circular which has just been issued, urging employees to do even better this year, it is stated that the estimated value of the crops raised by the employees in these gardens last year was \$250,000. The company leases these lands to employees at one dollar an acre. There are, on the lines east of Pittsburgh and Buffalo, about 2,800 acres of land owned by the company, none of it on the right of way. Garden primers have been secured from Washington and one will be given to every employee who is interested.

New York to Washington and back the same day, by two men in a Breguet biplane, is the latest American aeroplane record. This trip was made on Wednesday, April 24, by two French officers connected with the Aviation Mission to this country, Major Tulasne, and Lieutenant Flachaire. They left the Mineola field, 20 miles east of New York, at 9 a. m.; arrived in Washington at 12:15; started back at 3 and arrived at Mineola at 6 p. m. The distance traversed was approximately 500 miles, making the average rate of speed about 80 miles an hour. On Sunday, April 28, a flight from Washington to Mineola was made in about three hours by a 450 hp. airplane carrying four men.

Concrete barges, four of them, are to be used by the Navy Department for service in New York harbor to transport fuel oil. The order for the construction of the barges has been given to the Ambursen Construction Company, 61 Broadway, New York City. The vessels are designed to carry in the hold about 800 tons of oil and also may be used for carrying the same tonnage of coal or other cargo. This is the first official recognition by the Navy Department of the adaptability of reinforced concrete to ship construction. The vessels will be built at the yards of the Ambursen Company on the Hackensack river, and it is expected the first one will be launched by June 15.

Increases of fares on electric roads, made necessary by the high cost of living now imposed on these lines, seem likely to throw some passenger business to steam railroads, here

and there. On the Boston & Maine, northward from Springfield, Mass., to Holyoke, eight miles, between which cities there are a dozen local trains each way daily, the fare (on these local trains) is 10 cents, reduced several years ago partly because of trolley road competition; but now the electric line has advanced its fare to 20 cents, and for those passengers to whom the railroad is convenient the lower fare in the steam cars will be a decided attraction. The Boston & Maine expects, also, some increase in travel on its through trains, the fare on these trains, 20 cents, being no higher than that on the slow electric cars. From Westfield, ten miles west of Springfield, many workmen ride daily to the latter city, and the Boston & Albany, the parallel steam line, has been asked to put on additional local trains.

Annual Meeting of Pacific Railway Club

At the annual meeting of the Pacific Railway Club on March 14 at San Francisco, Cal., the following officers were elected for the coming year: President, P. P. Hastings, assistant general freight agent of the Atchison, Topeka & Santa Fe; first vice-president, G. W. Rear, general bridge inspector, Southern Pacific; second vice-president, J. H. Leary, assistant superintendent of the Western Pacific; treasurer, C. E. Norton, chief train dispatcher, Southern Pacific. The club, which was organized in March, 1917, now has a membership of 279.

War Finance Corporation

President Wilson on Monday nominated four directors of the War Finance Corporation, who, with Secretary of the Treasury McAdoo, will administer the work of this organization in extending financial assistance to essential war enterprises. The directors nominated are W. P. G. Harding, governor of the Federal Reserve Board; A. B. Forbes of New York; Eugene Meyer, Jr., of New York; and Angus McLean of Wilmington, N. C. Members of the new capital issues committee, which is to investigate and pass upon proposals of industrial concerns to issue securities in excess of \$50,000, were also nominated as follows: Charles S. Hamlin, member of the Federal Reserve Board and former Assistant Secretary of the Treasury, John Skelton Williams, controller of the currency and director of finance and purchases of the Railroad Administration, Frederic A. Delano, member of the Federal Reserve Board, Henry C. Flowers of Kansas City, Frederick H. Goff of Cleveland, James B. Brown of Louisville, Ky., and John S. Drum of San Francisco.

Associations Approved by the Railroad Administration

In last week's issue there was given a partial list of organizations the expenses of which the Railroad Administration has decided may or may not be charged to operating expenses after May 1. Additional organizations have since been approved until further order, including the following:

The International Railway Fuel Association, the Association of Transportation and Car Accounting Officers, the Railway Storekeepers' Association, the American Wood Preservers' Association, the Air Brake Association, the Master Car Builders' Association, the Bridge and Building Association, the Roadmasters' and Maintenance of Way Association, all car interchange bureaus, the Ore and Coal Exchange, the Tidewater Coal Exchange, the American Steamship Association, the New Orleans Steamship Association, the Kansas City and St. Joseph Clearing Houses, and various Texas associations.

Some organizations, including the American Railway Master Mechanics' Association, has not been passed on because they failed to file application. All local freight associations are approved until further notice, but their expenses must not exceed those of last year, except after specific authorization. The va-

rious claim associations, tariff issuing bureaus, classification committees, freight and passenger traffic associations and inspection bureaus have been given letters, saying:

"Consideration is now being given to the possible necessity of re-organization of associations similar to your own, with a view to economical and efficient operation. It is therefore impossible to determine how long the present method of organization and expenses should continue. Only such assessment as is necessary to meet your current expenses to May 30, 1918, should be with the understanding that if no order has been issued prior to that date you may continue to make such assessments until such notice is given."

Other organizations specifically disapproved are the Association of Railway Telegraph Superintendents, the Society of Railway Financial Officers, the American Society for Testing Materials, the Western Association of Short Line Railroads, the American Museum of Safety and the National Safety Council. The Bureau of Railway Economics may continue until July 1.

Expenses for R. Walton Moore, commerce counsel of the southeastern roads, have been approved until June 30.

Railroad Traffic in England

The Railroads of Great Britain find their passenger traffic now as heavy as it has been at any time in their history, although early in 1917, the government increased fares 50 per cent for the express purpose of diminishing the amount of travel. There was a falling off for a time, though not to the extent that had been anticipated; and now, according to a statement made by the president of the Board of Trade recently in Parliament, the volume of traffic has gradually risen so that the effect of the increase in fare is no longer apparent. The president of the Board of Trade was making a general statement on the condition of railway traffic and explaining how train service would have to be further curtailed, mainly because of an increase in the traffic in coal by rail because of the withdrawal of steamers from the coasting service. These steamers had been carrying about 3,000,000 tons of coal yearly. The railroads have not been able to add any new cars or engines since the beginning of the war, while a good many locomotives and several thousand freight cars have had to be sent to France. Today, both passenger and freight traffic is heavier than ever before, and has to be carried on with a diminished number of cars and engines and a reduced personnel.

Government Advances to Railroads

The railroads to which the director general has furnished funds, either in the way of loans or as advances on account of rentals, to April 30, are reported as follows:

New York, New Haven & Hartford.....	\$43,964,000
New York Central (including the Michigan Central, the Cleveland, Cincinnati, Chicago & St. Louis and the Pittsburgh & L. E.).....	28,500,000
Pennsylvania.....	7,000,000
Baltimore & Ohio.....	5,000,000
Chicago, Rock Island & Pacific.....	3,000,000
Wabash.....	1,300,000
Minneapolis & St. Louis.....	750,000
Chicago, Indianapolis & Louisville.....	500,000
Buffalo, Rochester & Pittsburgh.....	400,000
Detroit, Toledo & Ironton.....	200,000
Total.....	\$90,614,000

All of these advances were in the shape of loans, except \$13,000,000 advanced on account of rentals for the first quarter of the current calendar year to the New York Central lines and \$1,300,000 similarly advanced to the Wabash. Of the above aggregate of \$90,614,000 advanced, \$77,514,000 was obtained from the Treasury through the revolving fund provided for in the Railroad Act, and \$13,000,000 was derived from funds turned over to the Railroad Administration from their surplus funds by certain railroad corporations. The payments to the New York Central include \$10,000,000 for the New York Central itself, \$900,000 each for the Michigan Central and the Big Four and \$1,200,000 for the Pittsburgh & Lake Erie.

Overman Bill

Rejecting all amendments designed to limit the President's authority, the Senate on Monday, April 29, passed the Overman bill, which contains a general grant of power to the executive to coordinate and reorganize executive or administrative commissions, bureaus, agencies and offices of the government, by a vote of 63 to 13. An amendment proposed by Senator Cummins to except the Interstate Commerce Commission was voted down by a vote of 43 to 31. Throughout the protracted debate on this bill many senators had opposed it on the ground that it included authority to reorganize agencies of the government such as the Commission, the Federal Trade Commission and the Federal Reserve Board, which the opposing senators felt it was not necessary to affect because of any war condition. Because such determined opposition was manifested by the Administration leaders to any exception from the blanket authority it was frequently intimated that one of the purposes of the bill might be to give the President power to transfer the functions of the Interstate Commerce Commission to some other body. Senator Overman finally gave the Senate an assurance that it was not proposed to interfere with the Federal Reserve Board, the Interstate Commerce Commission and some other bodies, but a special effort to except them was made both during the consideration of amendments and at the time of the final passage of the bill. The proposed standard form of contract between the railroads and the government to govern the amount of compensation for the use of railroad property during federal control seems to contemplate the continued existence of the Inter-state Commerce Commission, which is given the function of passing upon any question that may arise as to its interpretation.

Call for a Single Terminal Manager in Chicago

In a recent letter to Director General McAdoo, John F. Wallace, chairman of the Railway Terminal Commission of the Chicago City Council, recommends the unification of terminal operation in Chicago, under one manager; and the construction of such connecting tracks and other facilities as may be immediately necessary to render joint operation more practicable. His letter reads in part as follows:

"While the commission appreciates that the full development of a co-operative system will involve the construction of certain joint or common facilities which require careful consideration, it, however, believes that the existing facilities can be so arranged and operated as to substantially promote both efficiency and economy; and the purpose of this letter is to suggest to you the immediate appointment of a local manager and staff to operate all of the railway terminal facilities within the Chicago terminal district as a unit. The commission will be pleased to give to such a manager the benefit of its study of the terminal situation and will assist him in any way in its power.

"The commission believes that large efficiencies and economies can immediately be obtained by this procedure and that the actual operation of the Chicago terminal facilities as a whole will promptly develop practical steps for the development of the co-operative principle, and that the practical application of this principle in the manner suggested will demonstrate its desirability both to the railroads and to the public.

"The commission proposes to continue the preparation of its report, but it believes that the adoption by you of the suggestion above made need not await your consideration of any particular plan of terminal operation.

"If, however, suggestions other as to a general plan of operation or as to any particular point or phase of the matter would in your judgment be helpful, the commission will be glad to present such suggestions."

For the purpose of working out a plan for the unification of Chicago terminals, R. H. Ashton, regional director of western roads, was already appointed a committee of railroad officers with George Hammer, general manager of the Indiana Harler Belt, as chairman. Spoken for by the Railway Terminal Commission recently was that Mr. Hammer's committee is doing valuable work but contend that the committee plan of operation has the fault of recognizing individual

railroad systems as a basis. The Railway Terminal Commission, on the other hand, favors the obliteration of all forms of separate authority and interest in terminal matters and the re-organization and operation of the railroad terminal facilities of the Chicago district upon the basis of complete unity.

Western Regional Director's Orders

Misuse of Officers' Names.—In a letter sent out to the railroads on April 27, R. H. Mishton, western regional director, warns them to watch for the unauthorized use of government officers' names by shippers to expedite the movement of freight.

No Advertising for Labor.—In supplement No. 1 to circular No. 63, on Track labor, the regional director of western lines, reiterates the request that roads utilize as far as possible the employment service of the United States Department of Labor in securing track labor. Railroads should advertise for labor only in exceptional cases.

Grouping of Purchases of Stationery.—In circular R. P. C. No. 9 sent out by the Regional Purchasing Committee of the Western Railroads, attention is called to the wide discrepancy in prices paid by different roads for printing forms D, C. E. 1, 2, 3 and 4. Purchasing agents in the same locality should get together on matters of this kind and make all their purchases at one time. The same idea can be carried out to a large extent in connection with accounting and operating blanks.

Branches to New Coal Mines.—The regional director of western railroads has asked the lines under his jurisdiction to secure the approval of the United States Fuel Administration at Washington before completing arrangements for the construction of tracks for the opening of new mines. While the Fuel Administration realizes the necessity of keeping up the production of coal, it does not believe new mines should be opened unless the work can be done without taking labor from mines already developed and capable of producing more coal than at present. It is urged that transportation facilities serving existing coal mines, where inadequate, be enlarged before new undertakings are initiated. Approval for the building of tracks to new mines should be obtained from the United States Fuel Administration through the mining company interested.

Statistics of Receipts and Expenses.—Circular No. 69, issued by the regional director of western railroads, directs the lines in his district to send to C. R. Gray, director of the division of transportation, Washington, two copies of the following reports, and one copy to the regional director, for the months of January, February and March; and for each month thereafter: (1) Detailed income with comparisons with last year, and expenses by primary accounts; (2) Transportation officers' reports used to measure efficiency and cost of operation; (3) Report used to measure efficiency and cost of locomotive performance; (4) Usual explanations provided for president or chief operating officer covering increases and decreases.

Cement Estimates.—The regional purchasing committee of western roads has addressed a communication to purchasing agents pointing out that there may be a shortage of cement and asking that they file with the requirements division estimates of their needs for the year; (a) The number of barrels required. (b) What part of your requirements has been contracted for or purchased? (c) Names and addresses of companies with which you have contracts, or with which you have placed orders, the quantity, price, and f. o. b. point in each instance. (d) Location of mills from which the balance of your supply would naturally come, in order to most economically serve your company, taking into consideration transportation and price.

HANDLING OF COMPLAINTS AND CAR REPORTS

In circular No. 81, recently issued by the regional director of western railroads, lines in western territory are requested to acknowledge promptly inquiries or complaints from patrons. Some lines are said to be lax in this regard. Complaints sent to individual lines by the regional director's office need not be acknowledged to the regional director unless the communication

of transmittal so requests. In handling these complaints roads should communicate directly with the complainant and where the complaint appears to be serious should have representatives adjust the matter by conference. Traffic officers relieved from other duties can be used to good advantage in this work. All communications from the regional director's office requiring answers should be given prompt attention.

Western roads are also instructed to systematize the making of reports to the regional director's office and to the Car Service Section of the Railroad Administration, as well as to their representatives at various points, so that it will be unnecessary to telegraph or telephone for reports that have been overlooked. Where this work is of great volume it may be advisable to establish special representatives in larger terminals and general offices to prepare these reports.

The roads are also requested to advise the regional director from time to time on matters of general interest as the following: (a) crop conditions; (b) general movement of traffic, as compared with last year; (c) impending large movement of any particular traffic and arrangements made to handle it; (d) general car situation; (e) changes in methods of operation effecting economies; (f) labor situation; (g) traffic interruption due to storms or otherwise; (h) serious collisions or derailments; (i) suggestions for changes in handling traffic that will result in economies or in expediting movement.

COMMITTEES TO BUY TIES

The regional purchasing committee of western railroads recently issued circular No 6 containing the names and territories of sub-committees for the purchase, inspection and handling of cross-ties as follows:

Michigan and Wisconsin—

I. E. Seldon, purchasing agent, C. St. P. M. & O., St. Paul, Minn., chairman.

E. T. Stone, purchasing agent, M. St. P. & S. Ste. M., Minneapolis, Minn.

L. S. Carroll, general purchasing agent, C. & N. W., Chicago, Minnesota and West to Cascade Mountains, and South to Northern Boundary of Iowa, South Dakota, Wyoming and the Salmon River in Idaho—

F. G. Prest, purchasing agent, N. P., St. Paul, Minn., chairman.

J. W. Taylor, assistant to president, C. M. & St. P., Chicago.

F. A. Bushnell, purchasing agent, G. N., St. Paul, Minn.

West of Cascade Mountains and South to California Line and South of Salmon River in Idaho—

G. W. Saul, purchasing agent, O. W. R. & N., Portland, Ore., chairman.

F. G. Prest, purchasing agent, N. P., St. Paul, Minn.

F. A. Bushnell, purchasing agent, G. N., St. Paul, Minn.

California, Nevada, Utah, Arizona and New Mexico—

F. W. Taylor, general purchasing agent, S. P., San Francisco, Cal., chairman.

M. J. Collins, general purchasing agent, A. T. & S. Fe, Chicago.

W. T. Jacobs, purchasing agent, W. P., San Francisco, Cal.

Colorado, Wyoming, South Dakota, Nebraska and Iowa—

L. N. Hopkins, purchasing agent, C. B. & O., Chicago, chairman.

F. D. Reed, general purchasing agent, C. R. I. & P., Chicago.

W. F. Lefavre, purchasing agent, D. & R. G., Denver, Col.

Missouri, Kansas, Arkansas, Oklahoma and Illinois—

N. M. Rice, second vice-president, St. L. S. F., St. Louis, Mo., chairman.

C. A. How, general purchasing agent, M. P., St. Louis, Mo.

W. S. Atkinson, purchasing agent, K. C. S., Kansas City, Mo.

Texas and Louisiana—

N. J. Randolph, purchasing agent, Sunset Central Lines, New Orleans, La., chairman.

T. H. Ryan, purchasing agent, V. S. & P., New Orleans, La.

R. T. Irwin, purchasing agent, T. & P., New Orleans, La.

Each committee is to make a comprehensive survey of its respective territory and report to the regional purchasing committee. This circular is accompanied by a questionnaire, regarding tie requirements.

JOINT SWITCHING ARRANGEMENTS

The regional director of western railroads recently issued circular No. 82 on the subject of joint switching, his purpose being to determine what further action is necessary in connection with economies in switching where two or more lines serve the same industry. Where conferences have not been held between interested lines to consider joint operation they are requested to do so at once. In determining as to joint operation at any point, full consideration must be given to: 1. Public convenience. 2. Rights of men involved. 3. Expediting movement of traffic. 4. Economies to be effected. Where a joint arrangement proposed will seriously affect public convenience, a conference should be arranged with concerns interested; and where rights of men are involved and the plan is likely to cause protest from them, it should not be put in effect until agreement is made with the organizations interested.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1918

Name of road.	Average mileage operated		Operating revenues		Total revenues		Maintenance of way and structures		Equipments		Operating expenses		General.		Total.	Operating ratio.	Net from railway operation.	Railway tax accrual.	Operating income (or loss).	Increase (or decrease) last year.
	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.						
Michigan & West Point	31	571,053	155,673	8,508	164,181	84,113	\$39,467	\$31,101	\$18,440	\$10,000	\$108,400	\$18,440	\$10,000	\$18,440	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
Ohio & Erie	4,908	1,864,320	7,531,635	4,598	12,132,215	6,593,887	3,538,328	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Boston & Maine	2,005	3,344,981	4,110,648	1,277,655	5,428,603	4,110,648	1,277,655	5,428,603	4,110,648	1,277,655	5,428,603	4,110,648	1,277,655	5,428,603	4,110,648	1,277,655	5,428,603	4,110,648	1,277,655	5,428,603
Balt., Roch. & Pitt.	583	94,551	101,903	1,083,741	1,185,244	15,687	154,651	170,338	31,811	1,190,726	170,338	31,811	1,190,726	170,338	31,811	1,190,726	170,338	31,811	1,190,726	170,338
Calif. Pac. Inter. Me.	234	185,328	1,194,319	35,331	1,229,650	15,687	154,651	170,338	31,811	1,190,726	170,338	31,811	1,190,726	170,338	31,811	1,190,726	170,338	31,811	1,190,726	170,338
Carroll, Chesapeake & O.	28	69,079	26,991	346,978	376,069	14,615	109,006	123,621	20,385	210,390	123,621	20,385	210,390	123,621	20,385	210,390	123,621	20,385	210,390	123,621
Carroll, Chesapeake & O. of S.	684	1,679,158	483,487	2,443,522	4,122,710	5,568	4,444,454	66,889	4,511,343	66,889	4,511,343	66,889	4,511,343	66,889	4,511,343	66,889	4,511,343	66,889	4,511,343	66,889
Cent. of N. Eng.	3,011	3,294,937	5,556,444	3,722,258	9,027,191	6,301	6,301,000	607,272	6,908,272	6,301	6,301,000	607,272	6,908,272	6,301	6,301,000	607,272	6,908,272	6,301	6,301,000	607,272
Chgo., Mil. & St. Paul	10,305	5,050,531	1,489,360	7,539,891	9,029,451	135,484	4,202,187	210,727	4,412,914	135,484	4,202,187	210,727	4,412,914	135,484	4,202,187	210,727	4,412,914	135,484	4,202,187	210,727
Chgo., Peoria & St. Louis	37	98,340	19,441	125,008	144,449	5,329	80,256	85,585	171,146	5,329	80,256	85,585	171,146	5,329	80,256	85,585	171,146	5,329	80,256	85,585
Chgo. & N. W.	16	62,693	10,834	16,635	27,528	6,299	84,551	91,250	175,801	6,299	84,551	91,250	175,801	6,299	84,551	91,250	175,801	6,299	84,551	91,250
Cripple Creek & Colo.	3	44,950	10,934	16,997	27,929	1,319	198,273	200,000	313,147	1,319	198,273	200,000	313,147	1,319	198,273	200,000	313,147	1,319	198,273	200,000
Colo., Southern & Fla.	4,765	3,464,008	1,456,181	6,333,078	7,787,289	6,556	114,669	101,138	268,819	6,556	114,669	101,138	268,819	6,556	114,669	101,138	268,819	6,556	114,669	101,138
Ill., Cent.	3,8	344,950	96,937	266,776	363,713	1,319	198,273	200,000	313,147	1,319	198,273	200,000	313,147	1,319	198,273	200,000	313,147	1,319	198,273	200,000
Ill., Cent. & Ind.	1,6	84,666	16,130	21,994	38,130	2,065	23,274	25,339	48,613	2,065	23,274	25,339	48,613	2,065	23,274	25,339	48,613	2,065	23,274	25,339
Kansas City, Mo.	1,154	630,528	92,711	1,001,989	1,634,700	10,949	66,613	77,562	134,174	10,949	66,613	77,562	134,174	10,949	66,613	77,562	134,174	10,949	66,613	77,562
Los Ang. & Salt Lake	1,16	695,871	270,185	966,056	1,236,241	30,571	743,414	773,985	1,517,400	30,571	743,414	773,985	1,517,400	30,571	743,414	773,985	1,517,400	30,571	743,414	773,985
Maine Cent.	1,16	695,871	270,185	966,056	1,236,241	30,571	743,414	773,985	1,517,400	30,571	743,414	773,985	1,517,400	30,571	743,414	773,985	1,517,400	30,571	743,414	773,985
New York, New Haven & Hartford	6,979	9,085,721	4,151,171	16,446,892	20,526,963	38,579	3,411,418	4,202,187	7,613,505	38,579	3,411,418	4,202,187	7,613,505	38,579	3,411,418	4,202,187	7,613,505	38,579	3,411,418	4,202,187
New York, Westchester & Albany	554	311,509	180,855	737,883	1,049,392	6,199	303,096	319,295	612,391	6,199	303,096	319,295	612,391	6,199	303,096	319,295	612,391	6,199	303,096	319,295
Virginia, Portland & Seattle	1,131	1,033,460	162,440	1,195,900	1,358,360	1,619	90,040	101,659	201,699	1,619	90,040	101,659	201,699	1,619	90,040	101,659	201,699	1,619	90,040	101,659
Western Ry. of Ala.	1,131	1,033,460	162,440	1,195,900	1,358,360	1,619	90,040	101,659	201,699	1,619	90,040	101,659	201,699	1,619	90,040	101,659	201,699	1,619	90,040	101,659
Wash. Miss. Valley	1,381	1,036,380	389,381	1,425,761	1,815,141	18,862	581,477	640,339	1,221,816	18,862	581,477	640,339	1,221,816	18,862	581,477	640,339	1,221,816	18,862	581,477	640,339
Ala. & Va.	11	164,716	34,838	199,554	234,392	85,008	271,296	356,304	441,312	85,008	271,296	356,304	441,312	85,008	271,296	356,304	441,312	85,008	271,296	356,304
Atlanta & West Point	106	160,646	18,853	179,499	198,352	3,376	16,590	20,000	36,886	3,376	16,590	20,000	36,886	3,376	16,590	20,000	36,886	3,376	16,590	20,000
Atlantic & St. Lawrence	1,106	1,036,380	389,381	1,425,761	1,815,141	18,862	581,477	640,339	1,221,816	18,862	581,477	640,339	1,221,816	18,862	581,477	640,339	1,221,816	18,862	581,477	640,339
Boston & Maine	2,305	2,444,454	1,188,003	3,632,457	4,820,460	3,176	6,109,277	117,664	4,183,009	3,176	6,109,277	117,664	4,183,009	3,176	6,109,277	117,664	4,183,009	3,176	6,109,277	117,664
Balt., Roch. & Pitt.	584	976,378	95,036	1,071,414	1,166,450	15,015	150,235	165,250	315,485	15,015	150,235	165,250	315,485	15,015	150,235	165,250	315,485	15,015	150,235	165,250
Can. Pac. Inter. Me.	283	194,850	14,589	233,269	247,858	48,475	42,346	172,637	215,023	48,475	42,346	172,637	215,023	48,475	42,346	172,637	215,023	48,475	42,346	172,637
Carroll, Chesapeake & O.	18	35,965	7,843	43,808	51,771	4,236	10,617	15,843	26,460	4,236	10,617	15,843	26,460	4,236	10,617	15,843	26,460	4,236	10,617	15,843
Carroll, Chesapeake & O. of S.	684	1,679,158	483,487	2,443,522	4,122,710	5,568	4,444,454	66,889	4,511,343	5,568	4,444,454	66,889	4,511,343	5,568	4,444,454	66,889	4,511,343	5,568	4,444,454	66,889
Cent. of N. Eng.	3,011	3,294,937	5,556,444	3,722,258	9,027,191	6,301	6,301,000	607,272	6,908,272	6,301	6,301,000	607,272	6,908,272	6,301	6,301,000	607,272	6,908,272	6,301	6,301,000	607,272
Chgo., Mil. & St. Paul	10,305	5,050,531	1,489,360	7,539,891	9,029,451	135,484	4,202,187	210,727	4,412,914	135,484	4,202,187	210,727	4,412,914	135,484	4,202,187	210,727	4,412,914	135,484	4,202,187	210,727
Chgo. & N. W.	16	62,693	10,834	16,635	27,528	6,299	84,551	91,250	175,801	6,299	84,551	91,250	175,801	6,299	84,551	91,250	175,801	6,299	84,551	91,250
Cripple Creek & Colo.	3	44,950	10,934	16,997	27,929	1,319	198,273	200,000	313,147	1,319	198,273	200,000	313,147	1,319	198,273	200,000	313,147	1,319	198,273	200,000
Colo., Southern & Fla.	4,765	3,464,008	1,456,181	6,333,078	7,787,289	6,556	114,669	101,138	268,819	6,556	114,669	101,138	268,819	6,556	114,669	101,138	268,819	6,556	114,669	101,138
Ill., Cent.	3,8	344,950	96,937	266,776	363,713	1,319	198,273	200,000	313,147	1,319	198,273	200,000	313,147	1,319	198,273	200,000	313,147	1,319	198,273	200,000
Ill., Cent. & Ind.	1,6	84,666	16,130	21,994	38,130	2,065	23,274	25,339	48,613	2,065	23,274	25,339	48,613	2,065	23,274	25,339	48,613	2,065	23,274	25,339
Kansas City, Mo.	1,154	630,528	92,711	1,001,989	1,634,700	10,949	66,613	77,562	134,174	10,949	66,613	77,562	134,174	10,949	66,613	77,562	134,174	10,949	66,613	77,562
Los Ang. & Salt Lake	1,16	695,871	270,185	966,056	1,236,241	30,571	743,414	773,985	1,517,400	30,571	743,414	773,985	1,517,400	30,571	743,414	773,985	1,517,400	30,571	743,414	773,985
Maine Cent.	1,16	695,871	270,185	966,056	1,236,241	30,571	743,414	773,985	1,517,400	30,571	743,414	773,985	1,517,400	30,571	743,414	773,985	1,517,400	30,571	743,414	773,985
New York, New Haven & Hartford	6,979	9,085,721	4,151,171	16,446,892	20,526,963	38,579	3,411,418	4,202,187	7,613,505	38,579	3,411,418	4,202,187	7,613,505	38,579	3,411,418	4,202,187	7,613,505	38,579	3,411,418	4,202,187
New York, Westchester & Albany	554	311,509	180,855	737,883	1,049,392	6,199	90,040	101,659	201,699	6,199	90,040	101,659	201,699	6,19						

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY, 1918, CONTINUED

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Total operating revenues, Maintenance of way and structures, Equipment, Operating expenses, Traffic, Trans- portation, General, Total, Operating ratio, Net from operation, Railway accruals, Operating income (or loss), Increase in income compared with last year.

*Was a lessor company.
†Began operation June 1, 1917.

REVENUES AND EXPENSES OF RAILWAYS

TWO MONTHS OF CALENDAR YEAR, 1918

Name of road	Average mileage operated during period		Operating revenues		Maintenance of way and structures		Equipment		Operating expenses		Net from railway operation	Railway taxes	Operating (or decr.) income, comp. with taxes
	Miles	Days	Freight (inc. misc.)	Passenger	Total (inc. misc.)	Way and structures	Equipment	Traffic	Trans.	General			
Ala. & Vicksb.	213	378,305	5,707,405	320,130	6,027,535	95,704	262,990	\$16,483	\$16,483	\$16,483	\$16,483	\$1,000	\$16,483
Ann Arbor	393	310,902	1,106,369	419,035	1,525,404	54,846	93,520	264,436	264,436	264,436	264,436	4,177	268,613
Ann Arbor & Jackson 213	378,305	5,707,405	320,130	6,027,535	95,704	262,990	\$16,483	\$16,483	\$16,483	\$16,483	\$1,000	\$16,483	
Arizona Eastern	377	515,479	94,683	709,586	804,269	128,850	83,530	1,116	1,116	1,116	1,116	26.00	1,142.16
Atlanta, Birmingham & Atlantic	639	565,247	1,088,996	676,585	1,765,581	185,283	145,283	23,007	23,007	23,007	23,007	35.41	23,357.41
Atlantic & West Point	93	138,422	132,436	331,779	464,215	36,275	59,572	7,991	7,991	7,991	7,991	31.00	11,001.00
Atlantic N. St. Lawrence	170	154,409	139,668	315,566	455,234	56,922	86,922	3,607	3,607	3,607	3,607	16.41	5,213.41
Atlantic Coast Line	4,786	5,889,068	8,570,977	1,320,383	9,891,360	839,713	684,415	1,746	1,746	1,746	1,746	320.00	2,066.74
Baltimore, Ohio (Chic. Term.)	79	163,461	784	1,634,611	1,635,411	68,415	108,415	2,029	2,029	2,029	2,029	41.27	2,070.27
Baltimore & Chesapeake	67	28,871	41,758	118,856	160,614	24,212	36,712	2,674	2,674	2,674	2,674	27.04	29,411.04
Baltimore & Annapolis	62	469,003	1,114,363	418,716	1,533,079	100,266	169,266	7,896	7,896	7,896	7,896	27.04	7,923.04
Boston & Maine	308	911,876	55,878	1,024,820	1,080,706	522,984	262,984	19,526	19,526	19,526	19,526	4.66	24,190.66
Brighton & Gasfield	36	485,996	8,976	470,968	479,944	72,762	96,550	2,982	2,982	2,982	2,982	6.18	3,011.18
Birmingham Southern	44	176,995	2,339,459	57,835	2,397,294	57,835	87,835	1,742	1,742	1,742	1,742	7.18	1,749.18
Boston & Maine	308	911,876	55,878	1,024,820	1,080,706	522,984	262,984	19,526	19,526	19,526	19,526	4.66	24,190.66
Buff. Riv. & Tor.	235	4,688,435	2,475,658	1,151,205	3,626,863	1,673,372	89,372	6,843	6,843	6,843	6,843	387.99	7,230.99
Buff. Riv. & Tor. R. Corp.	235	4,688,435	2,475,658	1,151,205	3,626,863	1,673,372	89,372	6,843	6,843	6,843	6,843	387.99	7,230.99
Can. Pac. Term. in Me.	53	376,207	1,134,9	359,671	1,494,571	32,104	102,861	3,214	3,214	3,214	3,214	19.00	3,233.00
Carolina, Lynchburg & O. S. C.	262	585,144	545,400	649,696	67,236	126,604	28,591	40,181	40,181	40,181	40,181	16.00	56.18
Central of Virginia	1,918	2,075,829	996,723	3,072,552	4,069,275	511,280	4,500	11,970	11,970	11,970	11,970	15.00	11,985.00
Cent. of N. J. Term.	301	634,641	485,52	7,465,16	17,561	132,525	3,407	4,576	4,576	4,576	4,576	6.14	5,033.14
Central of Vermont	411	404,697	115,128	583,594	89,963	145,542	16,177	47,315	22,221	751,595	128,79	34.99	162,029.99
Chicago & Eastern Ill.	269	884,929	82,972	1,105,983	489,274	238,437	40,802	797,955	36,616	1,597,685	109,80	171.65	1,769,496.65
Chicago & Northwestern	8,094	8,863,148	3,545,702	18,791,954	4,666,240	3,600,959	2,211,57	7,918,590	14,452,938	104,14	573,784	840.00	15,026,722.00
Chicago, Ind. & Quincy	9,373	12,637,631	3,718,894	19,108,970	1,810,479	3,923,325	266,324	1,239,944	28,074	13,077,714	94,22	116.59	13,194,300.59
Chicago Great Western	1,496	1,621,158	762,600	1,438,757	1,604,357	178,661	233,661	3,407	4,576	4,576	4,576	6.14	5,033.14
Chicago, Ind. & Louis.	651	762,600	238,319	424,685	119,329	348,376	33,440	603,831	42,874	1,190,534	103,55	63.37	1,253,904.37
Chicago, Mil. & St. Paul	10,305	10,195,829	2,820,629	14,815,285	17,999,244	4,223,498	2,450,551	8,737,086	4,330,664	15,327,877	133,38	1,072.70	16,400,659.70
Chic. & N. W. Term.	247	238,122	400,999	282,342	41,664	109,157	11,032	175,333	14,341	338,831	17,071	36.99	355,821.99
Chic. & N. W. Term. & Gulf	474	486,228	163,667	692,664	67,052	109,157	17,276	33,940	30,689	11,797,053	60,37	31.22	11,828,374.22
Chic. & N. W. Term. & Pac.	7,823	8,152,259	3,822,599	17,278,95	6,684,034	6,088,343	2,543,32	11,963,238	91,761	2,985,981	91,09	1,014.10	3,087,395.10
Chic. & N. W. Term. & S.	374	346,454	36,190	515,272	75,700	195,330	18,885	61,899	226,070	179,335	578,962	84.53	663,746.53
Chic. & N. W. Term. & S.	374	346,454	36,190	515,272	75,700	195,330	18,885	61,899	226,070	179,335	578,962	84.53	663,746.53
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Traffic News

The Railroad Administration has sent questionnaires to all the railroads asking for detailed information concerning the number of tariffs and tariff supplements issued each year and the cost of their preparation. It is probable that this investigation will lead to the extensive consolidation of individual tariffs into joint tariffs. This policy, for a time at least, will mean an increase in work for the joint tariff committees.

The Railroad Administration is taking cognizance of numerous protests from shippers regarding the abolition of off-line agencies. The traffic division is investigating the question of organizing local offices to handle information and other service formerly performed by outside agencies. J. F. Holden has been specially assigned to this investigation, and the traffic assistants to the regional directors considered the matter at a meeting this week in Washington.

Western Regional Traffic Committees Appointed

Instructions issued by the director general on March 28 provided for the appointment of committees in each railroad region to handle current traffic matters. Accordingly a passenger traffic committee consisting of five men was created recently to handle all passenger matters in western territory; and this committee is directed to appoint, from time to time, such sub-committees as may be necessary to work out detailed matters. A freight traffic committee of five members has also been appointed for the western region with similar instructions. The freight traffic committee consists of A. C. Johnson, of the Chicago & North Western, chairman; S. H. Johnson, of the Chicago, Rock Island & Pacific; J. B. Baird, Northern Pacific; F. B. Houghton, Atchison, Topeka & Santa Fe; Gentray Waldo, Southern Pacific. The passenger traffic committee consists of P. S. Eustis, Chicago, Burlington & Quincy, chairman; A. Hilton, St. Louis-San Francisco; W. J. Black, Atchison, Topeka & Santa Fe; L. M. Allen, Chicago, Rock Island & Pacific, and Chas. S. Fee, Southern Pacific.

Coal Production

The output of bituminous coal increased 366,000 net tons, or 3.4 per cent, during the week ended April 27, compared with the preceding week, according to the weekly bulletin of the United States Geological Survey. Total production, including lignite and coal made into coke, is estimated at 11,230,000 net tons, and the average production per working day at 1,872,000, compared with 1,811,000 the previous week and 1,680,000 in April, 1917. Losses attributed to car shortage amounted to 18.1 per cent during the week ended April 13, as compared with 12½ per cent the preceding week.

The National Coal Association has issued a statement declaring that coal production has been curtailed by inadequate car supply and that interference with the war program will soon be inevitable unless something is done to prevent other traffic crowding coal off the rails. "The mines are not working at top speed nor at a rate even approaching top speed," the statement says, because of insufficiency in the supply of cars at the coal mines and practically no headway has been made to meet the estimated shortage of 50,000,000 to 75,000,000 tons of coal. The statement adds:

"It is understood that the railroads are hauling far more traffic as a whole than they ever hauled before. It is evident, therefore, that freight of other classes than coal is responsible for all or practically all of this increase. It would seem that the time has come for the War Industries Board, or whoever is running the war, to decide upon a readjustment of traffic over the eastern railways, so that coal may be handled in sufficient tonnage to take care of the industrial and domestic requirements of the eastern states.

"Unless such readjustment is made very soon there will be inevitable interference with the war program and shortage of domestic fuel in the New England, Atlantic, middle Western and other states throughout the year."

Commission and Court News

Interstate Commerce Commission

The Commission has amended its regulations for the transportation of dangerous articles by express to provide that during the period of the war shipments of dangerous articles other than explosives as defined in the regulations, to or from the War or Navy Departments or recognized offices thereof, may be transported when packed, including requirements as to weight and quantity, in a manner approved by the department.

Eugene Morris, agent for the lines in Central Freight Association territory, has filed a fifteenth section application with the commission proposing the establishment of diversion and reconignment rules to provide for a charge of two dollars a car for stopping freight in transit for orders for the purpose of delivery, reconignment, diversion or reforwarding, and also charges ranging from \$2 to \$5 a car for diversion or reconignment before the arrival of the car at the first billed destination. These rules are to apply on green fruit, vegetables, berries, melons and grapes, both within Central Freight Association territory and interterritorially.

The Commission has issued an order to protect shippers whose consignments may be diverted by a railroad by providing that in instances in which, under the director general's order No. 1 shipments have been or are consigned by routes over which the rates are higher than over the routes designated by the shipper, or over routes not provided for in through rate schedules, carriers participating in such transportation are authorized to adjust the charges to the basis of those applicable by the route designated by the shipper or of those applicable by the route by which the freight would ordinarily have been sent. The director general's order No. 1 requires that existing schedules of rates and outstanding orders of the commission are to be observed; that through routes which have not heretofore been established because of short hauling or other causes are to be established and used whenever expedition and efficiency of transportation will thereby be promoted, and that for this purpose the designation of routes by shippers is to be disregarded.

The commission has amended the diversion and reconignment rules prescribed in its fifteenth section order of March 26, as follows: Paragraph B, page 2, and paragraph A, page 6, are changed to read: "Orders for diversion or reconignment will not be accepted under these rules at or to a station or to a point of delivery against which an embargo is in force. Shipments made under authorized permits are not subject to this condition." Eastern trunk line and New England carriers which have lawfully on file with the commission terminal tariffs providing specific rules governing at eastern seaboard terminal points, are authorized to add an exception, to the effect that the rules will not apply to freight at Boston, New York, Philadelphia and Baltimore, for which other tariffs are provided. (Reference to be made to such tariffs.) The rules and charges governing grain, seed (field), seed (grass), hay or straw, carloads, held in cars on track for the privilege of national, state, board of trade or other official inspection at billed destination or points intermediate thereto, set forth on pages 5 and 6 of the order of March 26, 1918, are postponed until further order.

Court News

Suspension of Proposed Tariff

The New Mexico Supreme Court holds that neither by the State Constitution nor by statute is the state corporation commission given the power to suspend a proposed tariff, and the law does not cast upon a railroad the burden of justifying a proposed rate. The commission cannot cast this burden upon the carrier by serving it with an order to show cause why a given rate should not be established. In re Coal Rates in New Mexico (N. Mex.), 171 Pac., 506. Decided February 16, 1918.

Injuries from Cinders from Engines

The Texas Court of Civil Appeals holds that one into whose eye a hot cinder is thrown by an engine 174 feet distant has the burden of proving negligence. No spark arrester that will permit a reasonable use of a locomotive will prevent the emission of cinders of the small size shown to have entered the plaintiff's eye. The rule of burden of proof in case of fires resulting from sparks escaping from engines will not be extended to cases of this kind.—*Missouri, K & T v Langford (Tex.)*, 201 S. W., 1087. Decided March 13, 1918.

Assumption of Risk by Roundhouse Employee

The Texas Court of Civil Appeals holds that a roundhouse helper who had worked for over two years about engines and a turntable which was always lighted the same way, the lever handle of which had always been the same length, and the electrical turner had for months been in the same condition, all of which he knew, assumed the risk of injury from such conditions, and it was error to charge that he could recover if the master was negligent.—*Fr Worth & Denver City v Miller (Tex.)*, 201 S. W., 1049. Decided March 23, 1918.

Demurrage—Ownership of Private Tracks

As the prompt movement of cars is necessary to carry on the business of carriers, as well as to prevent discrimination among shippers, the Federal District Court for the Western District of Pennsylvania holds that a carrier may impose demurrage charges on privately owned tank cars used in its business. A railroad's tariffs provided for demurrage and storage charges on shipments of explosives, c. l. and l. c. l. Under an agreement with a shipper, the railroad laid a side track partly on its property and partly on the shippers, the contract providing that the railroad should have the right to use, without cost, any part of the siding in connection with other business, provided such use did not interfere with the shipper's business. Privately-owned tank cars were held by the shipper on the siding for longer than the free time. It is held that, as the purpose of the law is to prevent discrimination, the railroad was entitled to charge demurrage on such tank cars, though they stood on a track partly owned by the shipper.

Under the tariff, carload shipments of dangerous articles were subject to both demurrage and storage charges. Less charges were prescribed for the storage of less dangerous and relatively safe explosives, c. l. and l. c. l. It is held that, under these rules, the railroad could, where gasoline was stored in tank cars on sidings, collect both demurrage charges and storage.—*Pittsburgh, C C & St. L.*, 247 Fed., 573.

Liability for Fires—Proof of Cause

By Arkansas Acts, 1907, p. 336, §1, a railroad company is liable for the destruction of or injury to any property which may be caused by fire or result from any locomotive, engine, machine, train, car or other thing used on such railroad, or in the operation thereof, or which may result from or be caused by any employee, agent or servant of such company upon or in the operation of the railroad. The Arkansas Supreme Court holds that under this section a railroad company, while absolutely liable, not only for fires set out by its locomotives and machinery, but for fires set out by its employees while engaged in cleaning or repairing the roadbed or right of way, is not absolutely liable for fires which may have spread on the railroad right of way, and which its servants have failed to extinguish, or which may have been lighted thereon by other persons, and which the railroad employees have not restrained or extinguished, and in such case proof of negligence is essential to recovery. In an action for the destruction of the plaintiff's property along the right of way, evidence of a forest fire in the vicinity which might have caused the destruction of the property is admissible. In such an action, where there was evidence that the fire might have resulted from some cause other than the negligence of the railroad company, an instruction that the verdict should be for the railroad company if the probabilities were equal that the fire might have resulted from causes for which the company was not liable was held proper. Judgment for the railroad was affirmed.—*Clark v. St. Louis, I. M & S (Ark.)* Decided February 4, 1918.

Equipment and Supplies

1,025 Locomotives and 95,000

Cars Ordered by Government

The Railroad Administration announced on Tuesday the placing of orders for 1,025 locomotives 557 to the American Locomotive Company and 470 to the Baldwin Locomotive Works. These locomotives will be built to the standard designs recently evolved by the committee of builders and railroad experts, there being six types, each of a heavy and light design. The total cost of the orders is approximately \$60,000,000.

Under the terms of the contracts between the government and the two locomotive builders actual construction must begin at once. Deliveries are promised to begin in July and continue monthly during the remainder of the year, the locomotives being allotted on completion to the railroads where they are most needed. The locomotives will all be lettered with the initials U. S.

The Lima Locomotive Works was not given any of the first orders because it is now working to capacity.

The locomotives will require 300,000 tons of steel, including 100,000 tons of plates. The prices range from approximately \$35,000 for the switching locomotives to \$90,000 for the heavy Mallet locomotives.

The locomotive builders are to be paid 5 per cent of the estimated cost of manufacture if the cost does not exceed the estimates. If the cost is less than the estimates the difference is to be equally divided between the builders and the government. The locomotive appliances to be used and the basis of profit thereon have not yet been decided.

In announcing the order the Railroad Administration made the following statement:

"The awarding of this contract marks the establishment by the government of the standardized type of locomotives, specifications for which have been developed and perfected by committees of experts, who, for many weeks, have devoted time and study to the subject.

"The six standard types of locomotives, two sizes of each class, are expected eventually to supersede the many miscellaneous types and varieties of locomotives in service embracing engines built according to 500 or more varying specifications. This is the first time that any real forward steps have been taken looking to the wide standardization of locomotive engines."

It is understood that the 555 locomotives ordered from the American Locomotive Company will be supplemented by another order in about 60 days for 145 locomotives, also for 1918 delivery, making a total of 700 locomotives. The first 555 are understood to include approximately the following types:

- 40 Mallet 12,882
- 35 Heavy Santa Fe
- 150 Light Santa Fe
- 100 Heavy Mikado
- 290 Light Mikado
- 50 Six wheel switching

This distribution as to types however, has not been given out officially and in fact may not be definitely determined.

BIDS FOR APPLIANCES AND SPECIALTIES

The letter sent by the Central Advisory Purchasing Committee to manufacturers regarding proposals to furnish appliances for the locomotives enclosed information which the committee believed sufficient on which to base an intelligent bid. If any further details were desired they might be obtained by an inspection of the drawings of the locomotives at the office of the committee. It was stated that no bid would be considered unless the device offered was interchangeable in its application with similar devices offered by other manufacturers, that the prices named should cover delivery of the articles at the different locomotive works and that the bids should include a detailed analysis of the prices asked, showing kinds and quantity of material with unit prices, cost of productive labor, overhead expenses, royalties, if any, freight charges, margin of profit and total price. Op-

portunity was offered to include a quantity factor if desired; that is, one price for equipment for 100 locomotives or less and another price for 200 locomotives or more. Manufacturers were also requested to state definitely their productive capacity and at what rate per week or per month they could guarantee delivery. If they were prepared to give any guarantee under bond as to length of service, cost of maintenance, or efficiency, of the device, it was stated that this should form part of the proposal.

95,500 CARS ORDERED

The United States Railroad Administration has placed the following orders for cars:

American Car & Foundry Company.....	30,000
Canadian Car & Foundry Company.....	7,500
Standard Steel Car Company.....	13,500
Pressed Steel Car Company.....	13,500
Pullman Company.....	7,500
Haskell & Barker Car Company.....	7,500
Bettendorf Company.....	3,000
Liberty Car & Foundry Company.....	1,000
St. Louis Car Company.....	1,000
Cambria Steel Company.....	3,000
Ralston Steel Car Company.....	3,000
Pacific Car & Foundry Company.....	3,000
Mt. Vernon Car Manufacturing Company.....	2,000

The builders, like the locomotive builders, are to be paid 5 per cent of the estimated cost of manufacturing these cars if the cost does not exceed the estimates. If the cost is less than the estimates the difference is to be equally divided by the builders and the government. It is understood that this basis was proposed by the American Car & Foundry Company and accepted by the other builders.

The car and locomotive specialties to be used and the basis of profit specialty people will be given have not yet been decided on.

The mechanical committee and Frank McManamy, manager to the locomotive section, met Tuesday and Wednesday to decide on the locomotive specialties and some further details as to specifications. They were to have taken up the car specialties similarly on Thursday.

PRIORITY

The Railroad Administration is working with the War Industries Board with a view to securing priority in all materials, and the builders have been given opportunity to arrange for some materials in advance. The government does not expect to actually purchase any of the materials, but it will co-operate. Any maximum prices on raw material fixed by the government will prevail. The question of financing the builders has not yet arisen.

Locomotives

THE LACKAWANNA STEEL COMPANY has ordered 2 eight-wheel switching locomotives from the American Locomotive Company.

THE CAMBRIA & INDIANA has ordered 2 Mikado locomotives from the Baldwin Locomotive Works.

Freight Cars

THE GENERAL CHEMICAL COMPANY, New York, is inquiring for 10 to 25 wood lined tank cars.

THE MIDWEST IRON COMPANY, Kansas City, Mo., is inquiring for 25 to 50, 40-ton, 8,000-gal. tank cars.

THE CERTAIN-TEED PRODUCTS CORPORATION, St. Louis, is inquiring for 5, 50-ton, 10,000-gal. tank cars.

THE KING CHEMICAL COMPANY, New York, is inquiring for 3 to 5 sulphuric acid, 50-ton, 7,000-gal. tank cars.

THE AMERICAN STEEL COMPANY has ordered 50, 60-ton, steel hopper cars from the Pressed Steel Car Company.

THE CHICAGO, MILWAUKEE & ST. PAUL, which has been contemplating the construction of 2,500 box and 2,500 coal cars, has failed to negotiate the sale of equipment trust certificates to cover their cost, according to a recent statement by President H. E. Byram. It will therefore be necessary for the government to provide the funds, but thus far arrangements have not been completed with the Railroad Administration for this purpose.

Supply Trade News

The Ogle Construction Company, Chicago, announces that after April 20 it will be located at 1504 Steger building, 28 East Jackson boulevard.

The Sprague Electric Works of the General Electric Company announces the removal of its Boston office from 201 Devonshire street to 84 State street.

Albert Tate Smith, lately manager of the R. U. V. Company, 50 Broad street, New York, has returned to the Permutit Company, with which he was formerly connected, to take the position of assistant manager of sales.

McCord & Co., Chicago, have purchased several parcels of property in the vicinity of 112th and Green streets, Chicago. The property is adjacent to the company's present plant and will be used for future extensions.

Fred H. Jones has been appointed resident manager for the General Railway Signal Company in charge of its eastern territory, whose offices are located at 30 Church street, New York. Mr. Jones has been connected with the General Railway Signal Company since the time of its organization in 1904. During this period of 14 years, he has occupied a number of important positions with the company including that of assistant resident manager of the Chicago office and resident manager of the San Francisco office. Mr. Jones assumed his new duties as Resident Manager of the New York office on May 1.

W. S. Henry, acting resident manager of the General Railway Signal Company at New York, has been appointed service engineer of the recently created service department at

Rochester, N. Y., effective May 1. He has been connected with the company since the organization of the Taylor Signal Company in 1900. In September, 1900, he served as superintendent of construction, with headquarters at New York. In 1904, when the Taylor Signal Company was consolidated with the Pneumatic Signal Company, forming the General Railway Signal Company, Mr. Henry was transferred to the engineering department at Buffalo. In April, 1905, he went to the Lehigh Valley as assistant signal engineer, resigning in August of that year to return to the General Railway Signal Company as assistant engineer on the engineering work of the New York Central electric zone signaling. Later he was transferred to New York City as resident engineer on the same installation, and in July, 1907, returned to the engineering department as development engineer, in connection with circuit and apparatus design. After serving a year and a half in this capacity he was promoted to the position of principal assistant engineer, which position he held until his appointment as acting resident manager in charge of the New York office.



W. S. Henry

Frank Hopewell, head of the firm of L. C. Chase & Co., Boston, Mass., died April 25, at the age of 61. Mr. Hopewell was born in Shelburne Falls, Mass., in 1857. His father, a native of London, England, came to the United States at the age of 14 and settled in Springfield, Mass., where his son, Frank, graduated from the Springfield High School in 1875 and the Springfield Collegiate Institute in 1879. In 1881, Frank Hopewell became associated with L. C. Chase & Co., of Boston, selling

agents for Sanford Mills, Troy Blanket Mills, Reading Rubber Manufacturing Company, and Holyoke Plush Company, becoming a partner in 1887. He became treasurer of Sanford Mills in 1896, holding this office until 1915.

Independent Pneumatic Tool Company

A re-organization has been effected of the Independent Pneumatic Tool Company a New Jersey corporation, and the Aurora Automatic Machinery Company, which is incorporated in Delaware. Both companies were owned by the same interests, the Independent Pneumatic Tool Company representing the selling division for the Thor pneumatic and electric tools, and the Aurora Automatic Machinery Company being the manufacturing department. The latter company also manufactures and sells Thor motorcycles and gasoline engines.

The combining of the two Companies under one corporate name is for convenience in handling business.

Under the re-organization plans the Company is known as the Independent Pneumatic Tool Company, incorporated in Delaware for \$3,000,000. Ten directors will serve on the board as follows: John P. Hopkins, former mayor of Chicago, chairman; John D. Hurley, James J. McCarthy, William A. Likeman, Leonard S. Florsheim, Edward G. Gustafson, Robert T. Scott, Ralph S. Cooper, August Gatzert and Fletcher W. Buchanan.

The officers are John D. Hurley, president; Ralph S. Cooper, vice-president; Fletcher W. Buchanan, secretary and Edward G. Gustafson, treasurer.

The general offices of the company are in the Thor building, at 1307 South Michigan Boulevard, Chicago.

Trade Publications

RED CROSS CIRCULAR.—E. S. Jackman & Co., Chicago agents for the Firth-Sterling Steel Co., are sending out an attractive folder prepared by Edwin S. Jackman in the interests of the American Red Cross.

SMALL TOOLS.—The small tools department of the Pratt & Whitney Company, Hartford, Conn., has issued catalogue No. 9 covering the taps, dies, milling cutters, reamers, punches, drills, etc., manufactured by that company. The catalogue has 315 pages, 4½ in. by 7½ in. and in the miscellaneous section in the back there are several valuable tables.

DRIVING BOX LUBRICATION.—The Franklin Railway Supply Company, Inc., New York, has issued bulletin No. 500 describing the Franklin automatic driving box lubricator. Instructions are given for applying the lubricator, also for its proper inspection and care, and in connection with the lubricator, a special method of grooving the brasses is described and recommended.

CABLE-WAY CARRIAGES.—The Blaw-Knox Company, Pittsburgh, Pa. has issued a folder describing its automatic single-rope cable-way carriage, designed for the operation of the Blaw single-line clam-shell buckets on overhead cables. The folder is illustrated with four views showing various steps in the operation of the bucket by means of the carriage.

INDUSTRIAL LIGHTING.—The importance of proper lighting as an aid in securing the maximum production in the shops is well brought out in a booklet published by the Cooper-Hewitt Electric Co., Hoboken, N. J., under the title, "Lighting for Production and Safety." The intensity of illumination, system to be used, character of light source and units, are discussed and the application of the principles set forth is illustrated by several drawings showing typical lighting arrangements as installed in various manufacturing plants.

ELECTRIC WELDING.—A 6-in. by 9-in., 45-page manual entitled "Electric Welding" has been issued by the Wilson Welder & Metals Company, Inc., New York. This manual provides instructions covering the installation, care, operation and maintenance of Wilson electric welding equipment. Also, directions are given regarding the welding of various kinds of metal, the grade of welding wire to be used, the amount of current to employ, etc. Some interesting illustrations are given of the broken cylinders on the converted German steamships which were successfully repaired by the electric welding process.

Financial and Construction

Railway Financial News

ATOKA, TOPEKA & SANTA FE.—At the annual meeting of the stockholders of the Atokan, Topeka & Santa Fe at Topeka, Kan., on April 25, Dewitt Cuyler of Philadelphia and Augustus Juillard of New York were elected directors. D. L. Gallup, controller, New York, was elected a director in succession to Carl R. Gray who resigned recently to become an assistant to the director general of railroads at Washington.

CHICAGO, MILWAUKEE & ST. PAUL.—The directors at the monthly meeting on April 25 again postponed action on the dividends. H. E. Byram, president, said that nothing would be done in connection with the semi-annual payments until after the contract between the Government had been signed, an operation which he hoped would be completed before the annual meeting next month.

MARSHALL & EAST TEXAS.—Through the action of W. G. McAdoo, director general of railroads, the Marshall & East Texas will not be junked. The owners of the property have been seeking for some time to abandon that part of the road running between Marshall and Winsboro, a distance of 74 miles, and to dispose of the rails. Court proceedings prevented the plan from being carried out and it has been effectively stopped by order of Mr. McAdoo, who has taken over the line on behalf of the Federal Government. Provision for a resumption of train service over the division has not yet been made.

NATIONAL RAILWAYS OF MEXICO.—The directors for the ensuing year were elected at the annual meeting at Mexico City, on April 24. Constituting the board of directors in Mexico: Carlos Basave y del Castillo N., Elias S. A. de Lima, Aquiles Elorduy, General Pablo Gonzalez, Fernando Gonzalez Roa, Thomas P. Honey, Mario Mendez, Rafael Nieto, Alberto J. Pani, Francisco Puga, Ignacio S. Rodriguez and General Jacinto B. Trevino. Constituting the New York Local Board: Henry Bruere, Justo Acevedo, Alfredo Caturegli, Adolfo de la Huerta, J. J. Hanauer, J. Hirschman, L. F. Loree, W. T. Rosen and H. H. Wehrhane.

NEW YORK CENTRAL.—Holders of the \$10,000,000 one year 5 per cent notes of the New York Central, maturing on May 1, were paid off with funds obtained by that company from the government. An interesting phase of the New York Central financing growing out of government operation was that the company borrowed \$13,000,000 from the government. That amount, together with cash on hand, enabled the New York Central to pay off the \$10,000,000 notes and meet \$9,000,000 quarterly interest and dividend payments now due. This is the first case known where the government has advanced a railroad money to make good the guarantee that annual income so long as the war lasts shall be as large as the average for the three years ended June 30, 1917.

Railway Construction

CANADIAN GOVERNMENT RAILWAYS.—Bids were received recently for carrying out improvements at Halifax, N. S., to include a temporary station, mail, baggage, express and commissariat building, car repair building, two transit sheds, subway and water and sewer systems. The cost of the work will be about \$700,000.

CHICAGO, BERKSHIRE & QUINCY.—This company is building a second track between Crawford, N. B., and Scotland, N. S. The contract for the work has been awarded to S. F. Rice & Nelsby. The tracklaying will be done by the rail and forces.

This road has orders from the American Tractor Company, steel for 5 turntables to the following: Iowa, 110 ft.; Edgemont, S. D., 100 ft.; Pittsford, N. D., 100 ft.; Seneca, N. D., 100 ft.; Denver, Colo., 100 ft. The last mentioned is for the Colorado & Southern.

Canadian Pacific Railway Company

Annual Meeting of Shareholders, May 1, 1918

ADDRESS BY

THE RT. HON. LORD SHAUGHNESSY, K.C.A.O., Chairman

Compared with the returns for the calendar year 1916 the Thirty-seventh Annual Report of the Directors now before you for consideration and approval shows an increase in gross revenue from transportation of \$12,660,000, but this amount was more than absorbed by the working expenses, which increased \$16,590,000, so that the net income from transportation in 1917 was less by \$3,930,000 than it was in the previous calendar year.

Notwithstanding the larger volume of traffic in 1917, it will be gathered from the statistics incorporated in the Report that there was a substantial decrease in traffic train mileage and loaded car mileage, indicating still further improvement in operating efficiency. In normal times this should be reflected in the working expenses, but its effect was minimized by the higher scale of wages and the enhanced cost of fuel and other materials required for the maintenance and operation of the railway that prevailed during the year and that added \$15,350,000 to the operating expenses.

These conditions were not exceptional in the case of your Company, but applied in a proportionate degree to all the other Canadian carriers.

In view of the abnormal and constantly increasing cost of railway operation, the Board of Railway Commissioners, after due deliberation, authorized an increase of ten to fifteen per cent. in specified zones in the tariff of charges for the carriage of passengers and freight. This concession to the Railway Companies to assist them in meeting, in part, the increased cost of the transportation services that they are providing is very moderate indeed when compared with the increased prices due to similar causes which the public has to pay for all other commodities. It was clear that without higher rates many of the Railway Companies would be compelled to face large deficits, and in so far as it applied to these lines, some of them being wards of the Government, the Board appeared to arouse little objection or criticism. But certain trade bodies and others appealed to the Dominion Government for the disallowance of the Order of the Board of Railway Commissioners on the ground that the additional revenue resulting from the higher rates would be used by the Canadian Pacific Railway Company, have the effect of supplementing that Company's substantial surplus income after the payment of fixed charges and dividends.

To enable the weaker Companies to reap the benefit of the higher rates, and at the same time to meet the objections that had been urged to the participation of the Canadian Pacific in the benefits, the Government decided to permit the advance in rates for the carriage of traffic authorized by the Board of Railway Commissioners to become effective March 15th, 1918, but concurrent with this decision there was an Order of the Governor-General in Council under the War Measures Act, substantially as follows:—

1. The Canadian Pacific Railway Company, hereinafter called "the Company," shall pay to the Government of Canada the following special taxes:

1st.—One half of its net earnings from railway operation in excess of seven per cent. on its Common Stock (after paying fixed charges, appropriation for Pension Fund, and dividends on Preferred Stock).

2nd.—Income tax on the Company's special income (inclusive of all the Company's income, except earnings from railway operations), under the provisions of The Income War Tax Act, 1917, or any amendment thereof hereafter enacted.

Provided that the total amount to be paid each year by the Company shall not be less than—

(1) The Company's net earnings in such year from railway operations, and from special income as defined above, in excess of 10% on its Common Stock (after paying fixed charges, appropriation for Pension Fund and dividends on Preferred Stock), up to \$7,000,000, or

(2) The amount by which its net earnings from railway operations exceed the net earnings from railway operations for the fiscal year ended December 31st, 1917, due to the increase in freight and passenger rates granted by the Order of the Board of Railway Commissioners, dated 26th December, 1917.

3. Payment in full of special taxes under this order shall in respect of earnings from and after January 1st, 1918, relieve the Company of liability under the Business Profits War Tax Act, 1916, and any other Dominion Act of like nature hereafter enacted, and (save as hereinbefore provided) under the Income War Tax Act, 1917.

4. This order shall be deemed to have come into force and effect on the first day of January, 1918, and to continue in force and effect during the present war, and until further ordered.

Briefly stated, this Order-in-Council not only deprives your Company of any improved revenue that might result from the higher tariff, but imposes upon it a measure of discriminatory and arbitrary charges, and therefore your Company might with propriety question its fairness or justification. A state of war, with its enormous demands upon the National Treasury, and other financial burdens brought upon the Country by an unfortunate railway policy, coupled with the prevailing condition of your Company's affairs, were in all probability taken as furnishing reasonable warrant for the Government's action.

Since the outbreak of war your Company has deemed it a duty to render to Canada and the Allies all the practical and financial assistance in its power, and while it is not possible with constantly changing conditions to form at this time even an approximate estimate of the tax, the amount, whatever it may be, will be paid without protest or embarrassment to your finances. It must not be assumed that in the adoption of this measure the Government was actuated by any spirit of hostility to the Company. On the contrary, it may be stated without reservation that at no other time has your Company enjoyed the confidence and support of Parliament, the Government and the people to a greater extent than at present. Nor should the Government be assumed to foreclose a policy that in the future that might jeopardize investments in Canadian Government, Municipal, or Corporation Securities.

What is commonly called "Canada's Railway Problem" has, for some months past, occupied a place in the attention of the Canadian people, not only in the affairs of war, and expedients designed to lighten the burden imposed on the Public Treasury by the railway situation have been considered and discussed by the Public and the Press.

Not unnaturally your Company has, by reason of its outstanding position in the business affairs of the country, been brought into the discussion. It

was evident that some of the writers and speakers who took part had but imperfect information or were guided by traditional misconception when dealing with the affairs of your Company.

Although more than 90% of its securities are owned abroad, your Company is essentially Canadian in its inception, progress and aspirations, and therefore the Directors feel that it is not out of place at this time to give you, for the information of the Canadian public as well as the investors in the property, a brief review of some salient features of the Company's financial policy and progress leading up to its present stable position.

Under the terms of the contract of October 21st, 1880, between the Government of Canada and the Syndicate acting for the Canadian Pacific Railway Company in anticipation of the Charter, the Government undertook to give, by way of subsidy, to assist the Company in carrying its enterprise to successful completion, certain sections of railway between Lake Superior and Winnipeg and between Savona and Port Mooly in British Columbia then in process of construction under Government auspices, \$25,000,000 in cash and 25,000,000 acres of land suitable for settlement. After work had been in progress for two or three years it was found that the cost was substantially in excess of the estimates, and the Company applied to the Government for further temporary aid by way of loans. When, in 1885, the repayment of the loans was being arranged, the Government decided to accept in part payment of 6,700,000 acres of the Land Grant in place of \$10,000,000 in cash; in effect, therefore, the subsidy consisted of \$35,000,000 in money, 18,300,000 acres of land, and the sections of railway in process of construction by the Government to which reference has already been made.

At the outset the Company had expected to raise the requisite funds for the execution of the work by sales in the English market of Capital Stock and of Bonds secured by the Land Grant, thus keeping the railway property free from bonded debt, but it soon became manifest that this was impossible, and the former Parliament was asked to issue by way of guarantee of the issue of \$35,000,000 5% First Mortgage Bonds and \$65,000,000 Ordinary Share Capital. Despite a determined effort on the part of the Directors to give confidence to investors by depositing in cash with the Government the amount of the loan, and to meet a government guarantee of dividends at the rate of 3% per annum on the Common Stock for ten years, unfriendly influences at home and abroad were so prejudicial in the English, American and Continental markets that the original \$65,000,000 only yielded to the Treasury of the Company an average of somewhat less than 1% of its face value. The unwillingness of investors to pay a higher figure for the Stock in those early days need not be considered extraordinary, however, when we learn that as late as 1895, when the railway had been completed and in operation for more than nine years, the Stock was offered in the market at as low as 33% with but few takers.

In 1885 the President of the Company, now Lord Mount Stephen, induced Baring Brothers to find purchasers for the \$35,000,000 First Mortgage Bonds, and by this means the Company was enabled to repay the loans from Government and to meet its obligations.

It was evident that the main line described in the Agreement, serving as it did thousands of miles of territory almost uninhabited, could not be kept going unless it was brought into touch with the more important commercial centres. Eastern Canada and was provided with branch lines and connections that would contribute traffic to its rails, and, therefore, arrangements were made to reach Montreal, Ottawa, Toronto, and at later stages Quebec, Hamilton, the more important manufacturing towns in Ontario and Quebec, and the Winter port at St. John, N. B. Similar arrangements were established at various points along the frontier from the Atlantic to the Pacific with railway systems in the United States. These extensions, feeders and connections were obtained by agreements with a number of Canadian Companies for the acquisition or lease of their properties, the consideration in most cases being a guarantee of interest on their securities by way of rental, and in other cases the Company's credit was utilized for the construction of new lines. In circumstances when the interchange of traffic was a matter of prime importance, the connecting lines in Canada were only built to the International Boundary after the Company had taken the requisite steps to ensure the observance of traffic agreements by the railway lines on the other side of the International Boundary.

Inevitably this policy would lead to a variety of securities in the shape of Bonds assumed by the Company with reference to acquired properties or created and issued to furnish money for construction of new lines, each series secured by a mortgage on the particular property to which it applied.

In order to avoid this undesirable situation the Company decided, with the consent of the Board, to utilize Consolidated Debenture Stock for the purchase or conversion of existing Bonds, and to provide funds for building or acquiring such additional mileage as might appear to be required from time to time for the advantage of the Country and the Company. This Consolidated Debenture Stock is perpetual in character, different from the mortgage bond in that it gives no right of foreclosure in the event of default. The holder, however, has a first claim on the revenues of the Company for their semi-annual dividends after the working expenses and taxes or fines have been paid, and the contract demands of existing bondholders have been satisfied. If by any chance the Company failed to pay within a fixed period the dividend accrued on the Consolidated Debenture Stock the holders of that Stock would become the Shareholders of the Company and would control its affairs until the default was made good, when the property would automatically revert to the holders of the Preferred Stock.

In the early period of its history the Company was beset by many difficulties and disappointments, but on the whole its progress was not unsatisfactory.

In 1890 the Company had 7,000 miles of railway; its gross earnings were \$29,200,000, and after the payment of working expenses there were net earnings of \$12,200,000; the funded debt secured by Mortgage Bonds was \$47,000,000; Debenture Stock had been sold to the amount of \$54,237,000, and the annual interest charges were \$6,000,000. The double track operated system comprised 13,000 miles, with net earnings of \$20,200,000 and an increase of only \$3,500,000 in the annual interest charges.

CAPITAL EXPENDITURE

After 1899 the Company's traffic commenced to show considerable growth and the necessity for more equipment and for traffic facilities and improvements of every possible description became imperative. Year by

Company's resources during the period required to bring to a productive basis these branch lines, which at the outset earned neither interest nor, in most cases, operating expenses.

With the exception of the comparatively small advantage given to the Shareholders when, in 1914, they were offered the 6% Note Certificates secured by outstanding land contracts, all of the net money that came to the Company from the sale of these lands was devoted to the railway property, taking the place of that much capital and reducing the Company's annual interest charges proportionately.

The exemption from taxes of the Canadian Pacific Land Grant for a period of 20 years after their selection has been a source of considerable adverse comment, but the delay in selection was largely due to circumstances already explained, over which the Company had no control, and it is manifest that at the time the Grant was made, and for some years after, no one could have afforded to take the lands as a free gift if they were subject to taxation. When the lands were sold, however, the purchaser became a tax payer, and the records show that the 14,000,000 acres thus far sold have brought to the Public Treasury in taxes an amount exceeding \$20,000,000.

THE TEN PER CENT. CLAUSE

The Dominion Railway Act in force in 1880, when the contract was made for the construction of the Canadian Pacific Railway, authorized a return of Fifteen Per Cent. on the capital invested by any railway company in its enterprise before the tariffs for the carriage of passengers and freight could be scaled down by the Government authority named in the Statute, but in the contract with the Canadian Pacific Railway Company, confirmed by Act of Parliament, this limit was reduced to Ten Per Cent. per annum. This is what is known as the "Ten Per Cent. Clause" in the Company's Charter. Years ago this Clause became ineffective when the Company admitted that the net earnings had reached Ten Per Cent. on the capital invested, and its Tariffs came under the control and supervision of the Board of Railway Commissioners.

The suggestion made in some quarters that the spirit and intent of this Clause was to limit the Company's dividends to Ten Per Cent. is entirely out of harmony with the clear, unquestionable language of the instrument. The Clause had no more relation, direct or indirect, to the Canadian Pacific dividends than it had to the dividends of any other Railway Company, or of any commercial or industrial corporation. The Company has been and is absolutely untrammelled in the declaration of such annual dividends as the Directors may feel justified in declaring out of the revenue, and Seventeen Per Cent. instead of Ten Per Cent. per annum might properly have been distributed from the average earnings of the railway and the income from investments and extraneous assets during the past few years, had the Directors not been convinced that a prudent and conservative policy was in the best interest of the property.

The total capitalization of the Canadian Pacific Railway Company's transportation system, comprising 13,400 miles of railway in Canada operated directly by the Company, with the rolling stock equipment and steamboat craft on inland waters, its splendid terminal stations and facilities, and other accessories, is \$623,000,000, but this amount is far below the actual cost of the property, which, excluding the cost estimated at \$31,000,000 of the sections of railway constructed by Government and handed over to the Company, is carried in the books at \$687,000,000, after having been reduced by \$131,000,000 provided from surplus earnings, land sales and other sources, expended on the property and written off without being capitalized. So that, based upon the cost, the transportation system represents an outlay of \$818,000,000, or about \$61,000 per mile, which is lower than the average cost per mile of the other principal Canadian railways, and about half the cost per mile of the railway system of the Grand Trunk in Canada, based upon its outstanding capital.

In addition to the mileage to which reference is made, the Company owns or controls 948 miles of railway lines in Nova Scotia, Quebec and British Columbia that are operated separately for economic or other reasons, but their affairs have no reference to the figures that have been quoted.

The great benefits resulting from the conservative financial policy pursued by the Canadian Pacific Directorate are strikingly illustrated by the fact that the net earnings per mile required to meet the annual interest charges on the Grand Trunk, Canadian Northern, Grand Trunk Pacific and National Transcontinental railways, would suffice to cover the annual interest charges, dividend on the Preference Stock, and 7% dividend on the Common Stock of the Canadian Pacific.

EXTRANEIOUS INVESTMENTS

The extraneous investments and available resources belonging to the Shareholders of the Canadian Pacific are quite distinct from the transporta-

tion system and play no part in the transportation accounts. They are made up of the Ocean and Coastal Steamship Lines, investments authorized by Parliament in shares of Railway Companies outside of Canada, made, in most cases, many years ago when the shares that now command high prices had only a nominal market value, Government Securities and Loans, money set aside for investment, and other items, amounting in the aggregate to \$137,000,000, and available resources in unsold lands, amounts payable on lands already sold, coal mine and other properties, having an estimated present and prospective value of \$116,629,000, after providing for the retirement of the outstanding Note Certificates.

The total appraisal of these items, namely, \$253,629,000, is substantially below the market value. Large as is the amount, it was not accumulated by speculation or risky exploitation. Apart from the temporary loans and money it represents the accumulated worth of properties and resources many of which had little or no value when they came into the possession of the Company, but were developed and safeguarded until they became profitable.

Doubtless such development in its conception and execution had its selfish side, but no one familiar with the details of Canada's progress in the last quarter of a century will deny that every work of development undertaken by the Company, quite aside from its railway enterprise and its vigorous immigration policy, has given to the Country a return infinitely greater than any received by the Company or its Shareholders.

SUMMARY

Summarized it would appear:—

1. That the Canadian Pacific Railway, as originally designed, forms but a small part of the present great system with its comprehensive operating traffic and business organization, through which in normal times thousands of people are brought every year to and through Canada from all portions of the civilized world, thus helping to people the Country and to bring her vast resources under general notice.
2. That the cost of the transportation system as described in this Memorandum was \$818,000,000 against which there is outstanding capital of all classes amounting to \$623,000,000.
3. That every share of \$100 Ordinary Stock in the hands of the public represents the payment into the Company's Treasury of \$112 in cash, and \$31 from surplus income, or a total of \$143.
4. That it has been the Company's policy to avoid mortgage debt and mandatory interest charges with their attendant dangers.
5. That lands and resources capable of development, belonging to the original Company or that came into its possession through the acquisition of other railways, have been husbanded, developed and utilized so successfully and advantageously that, distinct from their railway transportation system, the Shareholders have extraneous assets valued on a moderate basis at \$253,629,000.
6. That the highest dividend paid to Shareholders from transportation revenue, namely, 7% per annum, is only equivalent to 2 1/4% per annum on the cost of the railway system, and if the dividend of 3% from Special Income be added, making a total of 10% per annum, the distribution is less than 2 1/2% on a conservative valuation of the Company's total assets.
7. That the average rates per passenger mile and per ton mile for the carriage of passengers and freight, respectively, received by the Canadian Pacific were lower than those received for the same services by any combination of railway lines in the United States constituting a through route between the Atlantic and the Pacific Ocean.
8. That the wages paid by the Canadian Pacific in every branch of its service are at least as high as, and the cost of its rails, fuel and general supplies is higher than United States railway companies are required to pay, and in all of these items the increase in both Canada and the United States has been abnormal since the outbreak of the War.
9. That the Company's successful effort to keep its capitalization substantially below the real value of its property and assets deserves the commendation of the Canadian people and should not, in any case, be made a pretext for penalizing the Company when rates for the carriage of traffic, or other matters relating to general railway policy, are before Parliament or Government for consideration and decision.

The Shareholders and Directors of the Company have always been impressed with the idea that the interests of the Company are intimately connected with those of the Dominion, and no effort or expense has been spared to help in promoting the development of the whole Country.

[Adv.]



Central News Photo Service

A Light Railway Carrying Strange Freight

Railway Officers

Executive, Financial, Legal and Accounting

J. M. Johnson, vice-president of the Missouri Pacific, with headquarters at Chicago, has been transferred to San Francisco, Cal., where he will have charge of the road's Pacific coast interests. Mr. Johnson's office in Chicago has been discontinued.

James C. Davis, whose appointment as general solicitor, in charge of the legal department of the Chicago & North Western, was announced in these columns on April 26, was born in Keokuk, Iowa, on September 2, 1857. He attended the public schools there and the Hellmuth Boys' College at London, Ont. His legal training was gained while employed in the law office of C. P. Lomax, Keokuk, Iowa. He was admitted to the bar in 1877 and practiced law at Keokuk between 1877 and 1903. During the period between 1881 and 1883 he was city solicitor of Keokuk. On January 3, 1903, he was appointed general attorney for the Chicago & North Western, for the state of Iowa, with headquarters at Des Moines, which position he held continuously for 16 years, until his appointment as mentioned above. As general solicitor he will have headquarters at Chicago.

John M. Rapelje, whose appointment as acting vice-president, in charge of operations for the Northern Pacific lines east of St. Paul, was announced in these columns on April 12, was



J. M. Rapelje

born at Chippewa, Ont., on January 22, 1857. He began railway work in August, 1879, as a brakeman on the Grand Trunk, and then became a fireman on the Atchison, Topeka & Santa Fe. From May, 1882, to November, 1887, he was conductor on the Canadian Pacific, and from January of the following year to June, 1898, was conductor on the Yellowstone division of the Northern Pacific. He was then appointed trainmaster on the same division, and subsequently was again a conductor until June, 1902, when he was re-appointed trainmaster on that division. From April, 1905, to July, 1908, he was superintendent of the same division at Glendive, Mont., and from the latter date to May, 1910, was superintendent of the Rocky Mountain division, at Missoula, Mont. He was then transferred to the Idaho division, at Spokane, Wash., where he remained until April, 1912, when he was appointed general superintendent of the lines from Mandan, N. D., to Paradise, Mont., with headquarters at Livingston, Mont. In May, 1914, he was promoted to assistant general manager at St. Paul, Minn., remaining in this position until October, 1914 when he was appointed general manager of the lines east of Paradise, Mont. He continued as general manager until his recent promotion to acting vice-president in charge of operation at St. Paul, Minn., as mentioned above.

Operating

S. W. Crabbe, has been appointed superintendent of the Schreiber division of the Canadian Pacific with headquarters at Schreiber, Ont., vice **G. J. Fox**, transferred.

H. E. Whittenberger, general superintendent of the Ontario lines of the Grand Trunk, with office at Toronto, Ont., has been appointed general superintendent of the Western lines, with

headquarters at Chicago. **C. G. Bowker**, general superintendent of the Eastern lines, with office at Montreal, Que., succeeds Mr. Whittenberger, and **W. R. Davidson**, general superintendent of the Western lines, with headquarters at Chicago, succeeds Mr. Bowker.

W. R. Hudson, formerly general superintendent of the Chesapeake & Ohio, has been appointed general superintendent of the Seaboard Air Line, with headquarters at Hamlet, N. C., succeeding **R. S. Marshall**, resigned.

J. L. McKee, superintendent of the Buffalo division of the Delaware, Lackawanna & Western, with office at Buffalo, N. Y., has been appointed assistant general superintendent of the Michigan Central, with headquarters at Detroit, Mich.

Claude R. Young has been appointed trainmaster of the Illinois Central, Cairo district, with headquarters at Fulton, Kentucky, succeeding **Herbert W. Williams**, transferred to the Fulton district, in place of **Edward Bodamer**, transferred, effective April 1.

A. E. Staub, superintendent of car service of the Delaware, Lackawanna & Western, with office at Scranton, Pa., has been appointed superintendent of the Buffalo division, with headquarters at Buffalo, N. Y., **F. J. Lawrence**, acting superintendent of the Stanton division, with office at Stanton, has been appointed superintendent of the same division, and **A. J. Miller**, traveling car agent, with office at Scranton, has been appointed superintendent of car service, succeeding Mr. Staub.

John Carter Stamm, whose appointment as superintendent of the Vicksburg, Shreveport & Pacific, with headquarters at Shreveport, La., has already been announced in these columns, was born in 1872, at Sartoria, Miss., and was educated in the common schools. He began railway work in 1885, with the New Orleans & Northeastern division of the Queen & Crescent as a telegraph operator at the age of 13, and his entire railway service has been with the same system. He served later consecutively as train dispatcher, chief train dispatcher and trainmaster until his recent appointment as superintendent as above noted.

A. J. Sullivan, assistant superintendent of the St. Louis-San Francisco at Sapulpa, Okla., has been appointed inspector of passenger train service with office at Springfield, Mo.; **W. H. Malone**, superintendent of locomotive performance, has been appointed inspector of freight train service, with office at Springfield; **L. N. Bassett**, superintendent of terminals at Springfield, has been appointed superintendent at Sapulpa, Okla., in place of **A. W. MacElveny**, resigned; **F. G. Faulkner**, assistant superintendent at Birmingham, Ala., has been appointed superintendent of terminals at Springfield, Mo., in place of Mr. Bassett; **B. F. McDonough** and **C. S. Hall** have been appointed transportation inspectors, with headquarters at Springfield, Mo.

W. S. Cooper, general superintendent of the Southern district of the Chicago, Milwaukee & St. Paul, has been appointed assistant to the vice-president with office in Chicago. **W. M. Weidenhamer**, inspector of transportation at Chicago, has been promoted to general superintendent of the Southern district, succeeding Mr. Cooper, with headquarters at Chicago. **N. P. Thurber**, superintendent of the Southern Minnesota division with headquarters at LaCrosse, Wis., has been transferred to the Kansas City division with headquarters at Ottumwa, Iowa, succeeding **J. M. Oxley**, assigned to other duties. **M. J. Larson** has been appointed superintendent of the Southern Minnesota division, succeeding Mr. Thurber. All these changes were effective May 1.

Edward Flynn, whose appointment as general superintendent of the Chicago, Burlington & Quincy with headquarters at Lincoln, Neb., was announced in these columns on April 5, was born at Benet, Ill., on May 19, 1873. He began railway work in April, 1900, as a trackman with the Chicago & Eastern Illinois. For the next few years he was employed consecutively in the track department of the Wabash, as a brakeman with the Southern Pacific, the Wabash, and the Burlington, and as a conductor on the last-named line. On November 15, 1906, he was promoted to trainmaster of the Burlington, with headquarters at Omaha, Neb. Two years later Mr. Flynn was promoted to assistant superintendent

at Lincoln, Neb., and on April 15, 1909, he became superintendent, with office at Omaha. On May 20, 1911, he was transferred to McCook, Neb., two years later to La Crosse, Wis., and on June 1, 1917, to Chicago. He remained at Chicago as superintendent, which position he held until his recent promotion to general superintendent of the Nebraska district, as mentioned above.

Traffic

C. T. Slauson, foreign freight agent of the Missouri Pacific at Chicago, has been transferred to St. Louis with the title of manager of foreign freight traffic.

John Bickel, commercial agent of the Duluth, South Shore & Atlantic at Chicago, has been transferred to the general superintendent's office at Marquette, Mich.

George T. Stocks, commercial agent of the Central of Georgia, with office at Rome, Ga., has been assigned to other service; **F. D. Robinson**, commercial agent at Oklahoma City, Okla., has been assigned to service on the line and the agencies at both places have been closed.

R. B. Robertson, assistant general freight agent of the Chicago, Indianapolis & Louisville has been placed in charge of the Chicago district office of inland traffic service of the U. S. War Department, effective May 1. Matters heretofore handled by Mr. Robertson will be taken care of by **A. C. Tunny**, general freight agent.

John A. Jackson, assistant general freight and passenger agent of the Gulf, Mobile & Northern, with office at Mobile, Ala., has been appointed general freight and passenger agent, with office at Mobile, vice **W. L. O'Dwyer** resigned to accept service elsewhere, and the position of assistant general freight and passenger agent has been abolished.

N. B. Wright, assistant freight traffic manager of the Central of Georgia, with office at Savannah, Ga., has been detached from the service of the company to serve as a member of the Freight Traffic Committee for the Southern regional territory; **J. G. Carlisle**, general freight agent, with office at Savannah, has been appointed assistant freight traffic manager and will exercise the authority heretofore delegated to Mr. Wright; **F. L. Corwin**, Florida freight agent at Jacksonville, Florida, has been assigned to service on the line; **J. R. Randolph**, commercial agent at Jacksonville, has taken a position in the office of the regional director, and the Florida freight agency at Jacksonville has been closed; **H. E. Shepard**, commercial agent at Tampa, Florida, and **S. L. Peeples**, commercial agent at Memphis, Tenn., have been assigned to service on the line, and the agencies at both places have been closed.

Engineering and Rolling Stock

D. Hubbard has been appointed division engineer of the Newark division of the Baltimore & Ohio, with headquarters at Newark, Ohio, succeeding **C. R. Diermar**, who has been transferred.

D. Rounseville, engineer maintenance of way of the Chicago & North Western, at Chicago, has been appointed assistant to the chief engineer, and the office of engineer maintenance has been discontinued.

W. H. Penfield, assistant to the vice-president of the Chicago, Milwaukee & St. Paul at Chicago, has been appointed engineer of track maintenance with the same headquarters, effective May 1.

F. W. Fritchey, of the Division of Locomotive Inspection, Interstate Commerce Commission, District 15, has been appointed superintendent of shops of the Wheeling & Lake Erie, with headquarters at Brewster, Ohio.

W. Wright, division master mechanic of the Canadian Pacific, with office at Toronto, Ont., has been transferred as division master mechanic to Brownville Junction, Me., replacing **C. Powers**, who has been made division master mechanic at Toronto.

Railway Officers in Government Service

J. M. Guild, safety agent, of the Union Pacific, on May 1, left the service to report to the School of Military Aeronautics, Berkeley, California, for training as an aviator.

Eugene McAuliffe, president of the Union Colliery Company and formerly general coal agent of the Frisco Lines has been appointed manager of the Fuel Conservation Section, Division of Transportation of the United States Railroad Administration, and will give attention to the conservation of fuel on all roads, with special reference to its preparation and proper use. He will also investigate and make recommendations in connection with its transportation to and handling at fuel stations; **Major Edward C. Schmidt** now with the Fuel Administration has been appointed an assistant to Mr. McAuliffe, who will have headquarters both at Washington and at St. Louis.

Obituary

Balie P. Waggener, general solicitor of the Missouri Pacific for Kansas, Nebraska and Colorado, with office at Atchison, Kan., died at his home in that city on April 28. Mr. Waggener was born in Platte county, Neb., on July 18, 1847. He was admitted to the bar in June, 1867, following which he began the practice of law at Atchison. From 1876 to 1910, he was general attorney of the Missouri Pacific for Kansas and Nebraska, and from 1910 to the date of his death he was general solicitor of the same road for Kansas, Nebraska and Colorado.

Joseph W. Taylor, for 19 years secretary of the American Railway Master Mechanics' Association, the Master Car Builders' Association and the Western Railway Club died



J. W. Taylor

suddenly at his home, 4102 Calumet avenue, Chicago, on the morning of April 24, from organic heart disease. Mr. Taylor was one of the most widely known and best liked men in railway mechanical circles. He died in the harness, so to speak, having been at his desk the day before he died and in apparently good health. Mr. Taylor was born in Saltsburg, Pa., on March 9, 1862. He started railroad work on the Pennsylvania in his native town and later went with the Erie Railroad, rising to the position of

chief clerk to the general manager and secretary to the vice-president. On leaving the Erie, he became secretary to John W. Cloud, who was formerly secretary of the mechanical associations. In 1899 Mr. Cloud went to London to take charge of the British office of the Westinghouse Air Brake Company and in June of that year Mr. Taylor was appointed secretary of the associations. Throughout his long tenure of these offices Mr. Taylor discharged his duties in a thorough, efficient and most trustworthy manner. He is said to have never betrayed the confidence of his position. The reports and proceedings which he edited were always models of correctness. Mr. Taylor's personal characteristics endeared him to a large circle of acquaintances. Straightforward and open in his manner, sympathetic and always ready to lend assistance, he went about it in a quiet way, aiding many without the knowledge even of his intimate friends. Mr. Taylor was a 32nd degree Mason and his funeral was held in Chicago, Saturday, April 27 under the auspices of the Knights Templar. Mr. Taylor is survived by a brother; a son, Joseph W. Taylor, Jr., and his widow, who is in very delicate health and has on that account resided in El Paso, Texas, with her son for a few years past.

IN MILITARY SERVICE

Patrick Ryan, locomotive engineman of the Illinois Central, a member of the American Railway Engineers' Regiment in France, was killed in action on April 18.

EDITORIAL

Railway Age

EDITORIAL

With the placing of orders for the 1,025 standard locomotives for the Railroad Administration there has been launched one of the greatest experiments ever tried in the history of American railroading. With the order came the statement, "This is the first time that any real forward step has been taken looking to the wide standardization of locomotive engines." It is evident that whoever prepared this statement intended to convey the impression that from now on, while the railroads are under the control of the government, none but standard locomotives are to be ordered. This is contrary to the statement issued by the Railroad Administration a short time ago that railways having peculiar conditions would be allowed to order suitable engines. It is evident there is still some misunderstanding on this extremely important subject. Doubtless the policy to be followed and the reasons for it will be clearly defined later on. It would seem at present, however, that the purpose is to restrict the railways just as far as possible to the purchase of the standardized locomotives, regardless of important differences of operative conditions. In other words, those in favor of an extreme policy of standardization seem to have prevailed. This is highly regrettable. Undoubtedly there should be a reduction in the number of classes of locomotives in use on our railways, but the disadvantages of an unnecessary multiplication of classes have been far less than would be the disadvantages of too stringent limitation of the number of classes. The number of different conditions under which locomotives must be operated is very great; and the most economical and efficient operation of the railways as a whole never could have been and never can be obtained without the use of enough classes of locomotives to meet all conditions. Fortunately there is some reason for hoping that a continuance of full and frank discussion of the subject will ultimately cause those in authority to recognize the fact that it is easier and more practical to adapt the locomotive to the operating conditions than to adjust the operating conditions to the locomotive.

Are those who are responsible for placing the orders for the government's standard locomotives more interested in firmly establishing the standard locomotives than they are in obtaining the new locomotives as fast as possible? The manner in which the orders for the 1,025 standard locomotives were placed last week would seem to indicate that they are. The distribution of the orders was first arranged so that both the American Locomotive Company and the Baldwin Locomotive Works would have as large a number of one class to build as possible, with the exception of the 400 light Mikados, which were split equally—200 locomotives to each company. The manner in which the order was finally placed divided the number required of each class between both builders. The table shows an outline of both plans of distribution. The final plan gives the American orders for units of 3, 5, 10, 15, 20, 25, 30, 70, 75, 75 and 217 locomotives, and Baldwin orders for units of 2, 10, 10, 15, 15, 15, 20, 20, 20, 30, 75 and 183 locomotives where the first arrange-

ment permitted the orders to be placed in lots of 70, 35, 50, 100, 150 and 200 for the American and 5, 10, 10, 15, 150 and 200 for Baldwin. Now each builder will be obliged to make patterns, dies, jigs, etc., for each of the twelve standard types, whereas the first arrangement required the American to build six designs and Baldwin seven. The former arrangement would have made it possible to turn out the present order more quickly while the present ar-

Types	First Distribution		Final Distribution	
	American	Baldwin	American	Baldwin
Mikado (light)	100	200	217	183
Mikado (heavy)	100	0	70	30
Santa Fe (light)	100	0	75	75
Santa Fe (heavy)	0	0	0	0
Mallet (2-6-6-2)	0	0	15	15
Mallet (2-8-8-2)	0	0	5	15
Pacific (light)	0	0	10	20
Pacific (heavy)	0	0	10	10
Mountain (light)	0	0	20	15
Mountain (heavy)	0	0	0	2
Switcher 90-600	0	0	0	20
Switcher 90-800	0	183	75	75

angement would make it possible to turn out a future order of the standard engines more quickly; and this probably explains the arrangement adopted. Meantime, fortunately the builders still have yet to build almost two thousand locomotives, orders for which were placed by individual railways last year. Since January first the eastern lines have received 704 new locomotives, including 62 which were built for the western lines, 23 which were built for the southern lines, 122 which were built to be sent to France, and 125 which were built for Russia. The southern lines have received 98, including 13 which were built to be sent to France and 60 built for Russia. The western lines have received 53. This makes a total received this year of 855. Additional engines to be received on orders that were placed before January first includes 1,013 for eastern lines, 834 for western lines and 140 for southern lines, a total of 1,993. This number, together with the 1,025 standard locomotives which have just been ordered, makes a total of 3,018 locomotives now on order for the railways of the United States.

Can Local Lines Take Over Work of Off-Line Agencies?

THE RECENT PROTEST of the Illinois Manufacturers' Association against the discontinuance of off-line traffic offices is representative of the attitude of a large proportion of American shippers and focuses attention upon one of the most radical changes so far made by the Railroad Administration. It is the contention of the shippers that while solicitation is now superfluous because of the absence of competition, the informative services performed by the off-line representative are still necessary. Those duties included the quoting of domestic and foreign rates, the filing of passing reports on the carload shipments of patrons, thereby facilitating the tracing of delayed cars, supervision over package car service and the prompt tracing of delayed mer-

chandise, the adjustment of claims, the handling of foreign freight matters, including bookings and clearances, the re-assignment of carload freight and the diversion of delayed or embargoed freight to connections. While shippers admit that the performance of this work does not require the maintenance of separate off-line offices, they contend that local lines will be unable to discharge this function satisfactorily and that the proper solution of the problem is the establishment of a joint off-line office in each important city. Supporters of the action of the Railroad Administration maintain that local lines will be able to perform this informative work satisfactorily if shippers assume a reasonable and co-operative attitude toward them.

In the past the keen competition between roads has put a premium on service to the shipper with the result that traffic representatives have exerted themselves to get into the good graces of their patrons. This condition, supporters of the Railroad Administration say, led to the rendering of many services which were unnecessary and unreasonable, but which the shipper has come to consider properly due him. Having grown accustomed to being sued for his favor by railway solicitors, it is naturally difficult for the shipper to adjust himself to a new situation in which traffic is not sought after. It is unfortunate that the discontinuance of off-line agencies will prove a hardship on many traffic representatives who have spent years in solicitation work and will have some difficulty in adapting themselves to different positions. Every effort, however, is being made to provide new places for these men in other kinds of railway work. It is also to be regretted that the off-line agencies were abolished before adequate means were provided for furnishing to shippers, not the same service as before, but the service to which they are entitled. However, since the powers that be believe that the offices of local lines can take over the work of off-line agencies, this new plan should be given a fair trial before passing final judgment upon it.

The Problem of the Contractor

WHILE MOST OF THE MORE IMPORTANT construction contracts which have been let by the roads during the last year have been on the basis of cost plus a percentage, or cost plus a fixed sum, a considerable amount of work under contracts awarded on a unit price basis, before our entrance into the war, is still uncompleted. The railroad contractor who is working under such an agreement at the present time, is in a dilemma. Almost every factor entering into the cost of his work has risen; labor rates are much higher than 15 or 18 months ago, and even then it is practically impossible to maintain sufficient forces to enable the work to be pushed to the best advantage and maximum economy; materials and supplies have risen in price, while delays in deliveries result in further disorganization and increased cost. Therefore unless the roads come to the relief of these contractors, they are confronted with the option of completing the work at a large loss, or of abandoning it and forfeiting their bonds.

The conditions giving rise to this situation are beyond the control of the contractor or the road. In many instances materials arranged for in adequate time have been taken by the government and in other cases working conditions have been so disarranged directly or indirectly by government work that forces have become demoralized. In general the engineers of the roads have realized the seriousness of the situation and have taken steps to reimburse the contractor for the actual and necessary increases in costs. This action has not been universal, however, and in instances where it has not been done hardship has resulted.

This situation is not confined to the roads, but is prevalent in all construction work. One notable illustration is the new subway system in New York, where the contractors are working under such adverse conditions that an attempt is now being made to secure relief for them through special legislation authorizing the Public Service Commission, which made the original contracts, to make proper and equitable adjustments.

The object of any contract is to provide for the building of a facility to the satisfaction of the road and at the minimum cost, consistent with the earning of a fair and reasonable profit by the contractor. Any return less than that, particularly if brought about by conditions which were unavoidable and which neither party anticipated when the contract was signed, is certain to result in mutual dissatisfaction. The most unsatisfactory and expensive contractor on a road is one who is losing money and who is therefore looking for every opportunity to reduce the cost, frequently at the expense of the finished work. Under present conditions the roads should, in all fairness to contractors working on pre-war contracts, consider carefully the terms of the contracts to ascertain if justice is being done and if not to take such steps as will insure fair treatment for them.

The Co-Ordination of Terminals

THE DIVERSION OF BALTIMORE & OHIO passenger trains from the terminal of the Central Railroad of New Jersey on the west shore of the Hudson River at Jersey City into the Pennsylvania terminal on Manhattan Island a week ago last Sunday is the most radical step which the Railroad Administration has yet taken to unify the operation of terminals. The unification of terminals has been a much-favored topic among the city planning enthusiasts in a number of cities, notably Chicago, for many years. On the surface the idea has much to commend it. However, the deeper one studies into the practical phases of the subject the more does he realize the difficulties which exist.

When the government assumed control of the roads the popular idea was that the administration would be able to save millions of dollars through the common operation of terminals and that the delay and congestion would disappear as if by magic. It is to the credit of the Railroad Administration that it has not allowed itself to be stampeded by this clamor at a time when errors would add seriously to the congestion and that it has proceeded to study the subject carefully, availing itself of the services of railway men conversant with local conditions in the various cities. While this method is not as spectacular as some enthusiasts desire it is having a more important beneficial influence on operating methods.

Railway men will agree that many improvements in terminal operation can be effected through unified control, for this control of the roads removes many of the barriers to the joint operation of terminals inherent in individual management. At the same time many of the existing practices are the result of legitimate demands for service which still exists and which must be met. If the roads were all to be wiped out and rebuilt new today there is no question but that many of the terminals would be located and built differently. However, to consider the operation of terminals on this basis at this late day is an idle dream, for the roads are now located in certain places and they must be operated as they now exist.

While in some instances it may be practicable to adopt as radical methods as the diversion of the Baltimore & Ohio trains into the Pennsylvania station at New York, in most instances the most immediate results, and those most effective in winning the war, can be secured by improving conditions

at one point or another, which while perhaps relatively minor in themselves, become large in the aggregate.

It is to be expected that the officers on the individual roads are best able to handle terminal operations on their own lines. It is when two or more roads come in contact with each other in joint operations that the government has the greatest opportunity to effect economies by co-ordinating efforts. As an instance, the interchange of cars has commonly been made at the point and under the conditions most convenient to the receiving line, frequently regardless of the expense to the delivering road. Unified control now enables this interchange to be made at the place and in the manner which will result in the greatest common good to both roads. As another example, the western regional director has already taken steps to avoid duplicate switching at industries served by two or more roads. While measures such as these are not necessarily original, for they have been worked out locally by mutual agreement between roads, in many instances they are now being extended to more general use.

It is possible that ultimately roads with modern terminal facilities of sufficient capacity may be asked to share them with other roads less favorably situated during the period of government control in order that the public may best be served with the minimum investment. In some instances this will undoubtedly make necessary the construction of connections between existing roads and the building of other facilities for joint operation. However, the Railroad Administration is proceeding for the present along the most practical lines by undertaking first those improvements which will yield most direct and the quickest results.

Is a Labor Monopoly Advisable?

GOVERNMENT CONTROL is already resulting in a number of marked changes in the established practices of the maintenance of way department, the outcome of which is being watched with much concern. Orders have been issued that the roads shall not purchase rails, but that the Central Purchasing Board will take over this work. As a result no orders for rails have been placed since January 1, mills are rolling at less than 30 per cent capacity on unfilled orders and many roads have little or no rails on hand at the season when their renewal is normally well advanced. Likewise, the authority of the roads to purchase ties has been restricted and most of this work turned over to the government so that a shortage for replacement purposes exists on many lines.

The most recent and probably the most radical departure is the fixing of maximum rates for track labor and the consolidation of railway and private agencies with the government bureaus. In an order issued by the western regional director the maximum rate of 25 cents an hour has been fixed for the central and southwestern territories and 27 1/2 cents an hour in the northwestern territory and in large terminals. The only exception is that lines now paying higher wages in certain localities may continue those rates, but shall not extend them.

No one will deny that abuses have existed in the labor field in times of business activity and competition for men. Roads have bid against one another and labor agents have encouraged gangs to transfer from one line to another on slight pretext, with the result that the cost of the work has been increased while the total output of labor has been reduced rather than enlarged. Nothing seems to demoralize the labor market more rapidly than this practice, and this promiscuous competition for men should be eliminated.

Many of the labor agencies have also been the source of abuses and have exploited the men to their own benefit, while playing one road against another. The consolidation of these agencies under government control should eliminate abuses of this character. The establishment of a fixed rate over a wide area prevents the roads from meeting competition with outside industries at local points, and the manufacturer or contractor will now be able to secure all the men he desires from the railway forces, knowing that the roads are unable to meet his rates. As a result while the rate established may be satisfactory in small, isolated communities, it will not be sufficient to enable the roads to retain adequate forces in the busy industrial and agricultural communities where labor is at a premium. This condition will result in many men being attracted from the railways into other work.

The consolidation of private labor agencies under the supervision of the government, also possesses disadvantages. In spite of the commonly recognized abuses of private labor agencies, they have built up systems and acquaintances by means of which they have been able to secure men for the roads in past years when the government bureaus have been unable to do this. In general the roads have secured little assistance from state or national labor bureaus in the past. With the private labor agencies closed, the advantage of the federal agencies will, of course, be increased, but it is doubtful if bureaus which are engaged in the recruiting of labor for all classes of government activities will not allow the roads to suffer.

Furthermore, with the incentive of private gain removed, the labor agents working under government control will very probably not show the same zeal in securing men for railway service that they have in the past.

There is now an acute shortage of labor and this situation will become more serious as the season advances. There is, therefore, a wide difference of opinion among railroad men regarding the advisability of disarranging existing practices so radically, when the main object is to secure an adequate supply of labor and when the wage rate although important, is secondary to the importance of completing the work. There is a fear that the disadvantages resulting from these radical steps may be more serious than the abuses which they are designed to correct. Time and a thorough test of the plan alone will determine this.

New York Central

THE NEW YORK CENTRAL IS BY A GOOD DIFFERENCE the best today from what it was three years ago. The merger in the latter part of 1914 of the Lake Shore & Michigan Southern and the New York Central & Hudson River was a financial readjustment which gave an opportunity for greatly strengthening the general credit position of the New York Central Lines by making available directly to its parent company the "plowd in" surplus profits of the Lake Shore. No matter how skillful, however, a financial readjustment may be the rock bottom foundation on which to base a profitable prediction as the turning point of the railway projects to sell. Even after the merger with the Lake Shore the New York Central's financial structure was not so impregnable that an extravagant or mistaken policy of operation might not have seriously weakened it. As a matter of fact, the operating results obtained in the last three years have immensely strengthened this structure.

The New York Central came through even the unpropitiously trying year of 1917 with a fine showing. In the three years since the merger with the Lake Shore the New York Central has increased its average train load by over 10 per cent and during this interval has held down train mile ex-

penses to an increase rather less proportionally than the increase in wages and cost of materials.

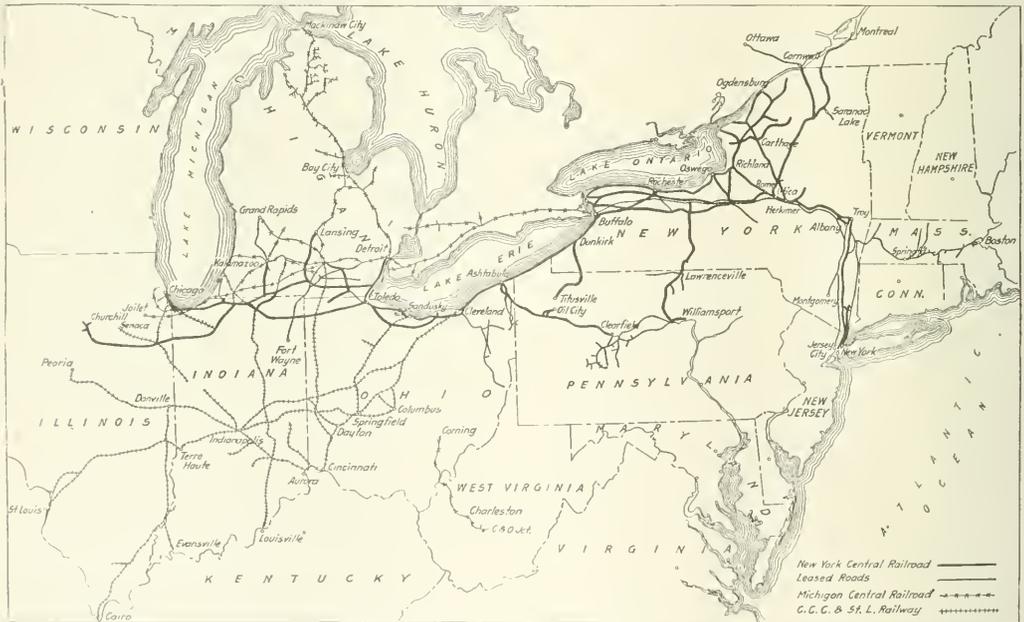
In 1917 the New York Central with its 5,685 miles of line, of which the main line is a four-track road from New York to Chicago, earned \$216,268,000, an increase over 1916 of \$14,682,000. Expenses increased by \$23,859,000, but even so, the operating ratio was 71 per cent in 1917 as against something over 64 per cent in 1916. Taxes increased by \$2,758,000, "other income" decreased by over \$7,000,000 due to a very much smaller profit on separately operated properties and lower dividend declarations of controlled companies, so that net corporate income available for dividends amounted to \$25,599,000 in 1917 as against \$45,659,000 in 1916. But even in 1917 the five per cent dividend took less than half of the amount available, leaving a surplus of over \$13,000,000. In 1916 the surplus was \$30,693,000. The piling up of surpluses in the years 1915, 1916 and 1917 which could be carried to profit and loss are of an importance that it is hard to overestimate. One need only try to figure what the 1917 balance sheet would have looked like had the company not been able to add more than \$46,000,000 to its surplus during these three years. The addition of this \$46,-

LIABILITIES.

	January 1, 1915	December 31, 1917
Capital stock	\$249,590,500	\$249,849,400
Debt	703,413,900	729,185,500
Total capitalization	\$953,004,400	\$979,034,900
Current liabilities	\$32,805,500	\$46,552,700
Deferred and unadjusted liabilities...	33,152,900	\$7,410,600
Surplus	29,405,900	75,803,700
	\$1,048,368,700	\$1,158,801,900

The increases in revenue in 1917 as compared with 1916 were the result of a considerably larger freight movement, a much larger passenger business and a somewhat higher average ton-mile rate and passenger-mile rate. Freight revenue amounted to \$135,979,000, an increase of \$8,113,000. The total tonnage of freight carried was 110,238,000 tons, an increase of 3,830,000 tons, and the average haul of revenue freight was 204 miles in 1917 and 201 miles in 1916. The average revenue per ton of freight was 6.03 mills in 1917 and 5.98 mills in 1916.

Passenger revenue amounted to \$49,987,000, an increase over the previous year of \$4,466,000 and the total number of passengers carried was 57,288,000, an increase over 1916



The New York Central, the Cleveland, Cincinnati, Chicago & St. Louis, and the Michigan Central

000,000 to liabilities is a bookkeeping transaction, but it is actually contained in assets. Try to picture the assets' side without this \$46,000,000. Below is a condensed comparative balance sheet of 1915 and 1917.

	Assets.	
	January 1, 1915	December 31, 1917
Road and equipment	\$620,480,100	\$693,619,200
Improvements on leased property.....	82,942,200	92,132,200
Miscellaneous physical property.....	6,011,900	8,680,600
Securities of affiliated companies.....	224,678,800	194,534,900
Securities of other companies.....	34,312,800	44,429,300
Total property	\$968,426,500	\$1,034,396,200
Current assets	69,161,200	84,827,800
Deferred and unadjusted assets.....	10,781,000	39,577,900
	\$1,048,368,700	\$1,158,801,900

of 1,759,000. Nearly all of this increase, however, in number of passengers carried was in commutation passengers. Nevertheless the average passenger journey was 44 miles in 1917 and 42 miles in 1916. In other words, the average of the interline journeys and local passenger journeys other than commuters' journeys must have increased very considerably so as to offset the larger proportion of commuters' journeys. The average revenue per passenger per mile was 1.96 cents, as against 1.934 cents in 1916.

Notwithstanding an increase of 1,137,000,000 ton-miles handled by the New York Central, the freight train mileage decreased by 1,212,000, totaling in 1917 26,620,000. Reductions in passenger service enabled a saving of 727,000 passenger train-miles, the total in 1917 being 27,735,000.

The average number of passengers per train-mile was 92 in 1917 as against 82 in 1916.

The reduction in freight train mileage is really a remarkable achievement. The average train load of all freight in 1917 was 927 tons, an increase of more than 80 tons over 1916. It is true that there was a decrease in empty car mileage, the average number of empty cars per train being 16.59 in 1917 as against 17.57 in 1916; there was also a decrease in the movement of loaded cars per train, the average in 1917 being 34.94 and in 1916 35.83. There was a notable increase in car loading, the average loading per loaded car was 26.54 tons in 1917, as against 25.63 tons in 1916, an increase of over 12 per cent. There was no great increase in the number of heavy locomotives in service during the year. Five locomotives were added to freight service and 15 retired, and none were added to passenger service. The increased car loading and reduction in empty car mileage materially reduced, of course, the tare weight which had to be hauled for each ton of revenue freight. But making allowance for this, it would still appear that in a year in which pressure of business, labor unrest and in some months very unfavorable weather conditions, had all tended to demoralize railroad operation, the operating management of the New York Central succeeded in showing a marked improvement even over the banner year 1916.

Some of the increases in transportation expenses are fairly startling when we consider how good the showing is measured in business moved and train-miles consumed in moving it. The cost of fuel per train locomotive, excluding yard and switching locomotives, was \$14,482,000, or \$5,816,000 more than in 1916. This increase in train locomotive fuel alone is equal to more than two per cent on the stock of the New York Central. Fuel for yard locomotives cost \$3,938,000, an increase of \$1,671,000. Train enginemen's wages amounted to \$7,363,000, an increase of \$1,064,000, and trainmen's wages amounted to \$8,617,000, an increase of \$1,198,000. There was a heavy increase in loss and damage to freight, the total amount paid on this account in 1917 being \$2,920,000, or \$1,087,000 more than was paid in 1916.

There was spent on maintenance of way and structures \$20,704,000 in 1917, an increase of \$1,739,000 over 1916. Apparently this increase does not by any means represent the difference in cost of the same standard of maintenance in 1917 and 1916. For instance, whereas there was a charge of \$615,000 for rails (a comparatively small charge) made in 1916, there was a credit taken of almost the same amount for rails in 1917, making a total difference in this account as between the two years of \$1,240,000. It may be presumed that inability to get deliveries of rails was a factor in cessation of the rail relaying program. Maintenance of equipment cost \$38,447,000, an increase of \$2,451,000. Much larger expenditures for repairs to locomotives, freight cars and passenger cars was offset in part by large decreases in the amount charged for retirements. In other words, in 1916, with the very large net earnings available, the New York Central found it expedient to retire an extraordinarily large amount of equipment and to charge the difference between accrued depreciation plus scrap value and original cost to retirements. In 1917 charges for retirements were comparatively small.

The following table shows the ratio of each class of operating expenses to total operating revenues:

	1917	1916
Maintenance of way and structures	9.57	9.41
Maintenance of equipment	17.78	17.85
Traffic expenses	1.35	1.44
Transportation expenses	38.67	37.24
Miscellaneous operations	1.37	.29
General expenses	2.28	2.15
Total	75.02	64.26

In 1916 the New York Central had planned to issue and sell at par to stockholders \$25,000,000 stock, but market

conditions were such that the offer was withdrawn. The market price of New York Central dropped below par. The company, however, issued \$20,000,000 4 1/2 per cent refunding and improvement mortgage bonds, which were deposited as collateral for \$15,000,000 two year five per cent notes, due September 15, 1919, which were sold. The company also sold \$8,205,000 4 1/2 per cent equipment certificates, but finding itself unable to sell more of these certificates to the public, itself took \$1,805,000 additional. A total of \$34,271,000 was charged to additional investment in property, but this included the purchase of the Dodgeville & Salisbury Railway Company and the Cornwall Bridge Company, both of which were already controlled and operated by the New York Central. The actual amount spent for enlargements of yards and terminal facilities was \$5,867,000, of roadway and bridge improvements \$2,917,000 and elimination of grade crossings \$1,120,000. In addition there was an increase of \$15,973,000 in the investment in equipment and \$3,737,000 in "improvements on leased railway property."

The following table shows the principal figures for operation in 1917 as compared with 1916:

	1917	1916
Average mileage operated	5,665	5,689
Freight revenue	\$135,599,133	\$117,774,102
Passenger revenue	4,287,343	4,151,129
Total railway operating revenues	140,886,476	121,925,231
Maintenance of way and structures	20,704,000	18,965,000
Maintenance of equipment	38,447,000	35,996,000
Traffic	8,000,834	8,270,338
Transportation	81,677,440	64,209,538
General expenses	4,218,116	4,138,110
Total operating expenses	153,097,400	129,738,169
Taxes	1,239,605	8,401,549
Operating income	5,149,322	63,344,017
Gross income	6,873,026	85,367,446
Net income	5,796,180	45,659,217
Dividends	16,477,003	13,466,611
Appropriated for equipment operations	1,805,000	2,560,000
Sinking fund	1,004,264	
Surplus	1,004,264	30,691,606

Michigan Central and Cleveland, Cincinnati, Chicago & St. Louis

THE MICHIGAN CENTRAL and the Cleveland, Cincinnati, Chicago & St. Louis are the two principal controlled lines of the New York Central. In many ways they are strikingly different one from another. The Michigan Central is nearly all main line. It runs from Buffalo through Ontario along the northern shore of Lake Erie to Detroit, Mich., and to Toledo, Ohio, with a main line east and west across the southern boundry of Michigan and around the lower end of Lake Michigan to Chicago and with a north and south line from Detroit through Bay City to the northern point of the Michigan peninsula at Mackinaw City. The mileage operated totals 1,862 miles. In contrast to this the Cleveland, Cincinnati, Chicago & St. Louis, or Big Four, as it is usually called, operates a network of lines radiating over western Ohio, Indiana and eastern Illinois, with a western through line to St. Louis, Mo. It connects the lake cities of Cleveland, Sandusky and Toledo with Columbus, Springfield, Dayton and Cincinnati, Ohio, and with Indianapolis and Terre Haute, Indiana. In all the company operates 2,587 miles of line.

In 1916 both companies enjoyed quite extraordinary prosperity and the following figures for 1916 show the principal characteristics of the two roads under these conditions: The Michigan Central operating revenue was \$24.93 per mile, the Big Four, \$19.556 per mile. The freight density of the Michigan Central was 2,280,000 ton miles, of the Big Four 2,471,000 ton miles. The average ton mile rate on the Michigan Central was 7.14 mills and on the Big Four 5.56 mills. The average length of haul of freight on the Michigan Central was 167 miles and on the Big Four 178 miles. The passenger density on the Michigan Central

was 289,000 passenger miles, on the Big Four, 211,000 passenger miles. The revenue per passenger per mile on the Michigan Central was 2.190 cents and on the Big Four 2.007 cents. Of the 24,948,000 tons of freight carried by the Michigan Central 4,778,000 tons was furnished by bituminous coal, 2,154,000 tons by stone and sand and 1,230,000 tons by anthracite coal. Of the total 32,903,000 tons of freight carried by the Big Four, 14,509,000 tons was furnished by bituminous coal and 2,025,000 tons by stone and sand, and a negligible amount by anthracite coal. About the same tonnage of grain was handled by the two roads and the Michigan Central handled a somewhat greater tonnage of manufactured products. The average train load of all freight in 1916 on the Michigan Central was 606 tons and on the Big Four 654 tons. In 1916 the Michigan Central had \$6,837,000 available for dividends and the Big Four \$8,332,000.

It is rather interesting to see how these two roads, both controlled by the same interests but with such widely different operating conditions, were affected by the extraordinary traffic and operating changes which took place in 1917.

The Michigan Central's net income available for dividends was about cut in two, amounting to only \$3,438,000, as against \$6,837,000 in the previous year, despite an increase of \$6,461,000 in operating revenues. The Big Four's net available for dividends held up rather better and amounted to \$5,258,000 in 1917 as against \$8,332,000 in 1916. Moreover, the gain in operating revenues was only \$5,973,000 for the Big Four. By a coincidence the Michigan Central with its 1,800 miles of line earned quite nearly the same amount as the Big Four with its nearly 2,400 miles of line. The exact figures are shown in the table at the end of these remarks.

The Michigan Central's gain in freight revenue was about half a million dollars more than the Big Four's gain. Nearly the entire increase of tonnage on the Big Four was bituminous coal; the other products showing an increase were offset by a numerous list of products showing decreased tonnage. On the other hand the Michigan Central's bituminous coal tonnage increased in actual amount considerably less than that of the Big Four, but the proportion of increase to total tonnage carried was greater and there are numerous other classes of commodities showing fairly large increases in tonnage with comparatively few offsetting losses in tonnage. Furthermore, the average ton mile rate on the Michigan Central increased by 0.12 mills, amounting in 1917 to 7.26 mills, while the Big Four's ton mile rate increased by 0.10 mills averaging 5.66 mills in 1917.

The Michigan Central did a much smaller business in handling local passengers, but showed a gain in this class of business of 159,000, against a gain by the Big Four of 155,000. The Michigan Central, handling a larger number of interline passengers than Big Four, showed a gain of only 110,000 in this class of business as against a gain for the Big Four of 237,000.

Total operating expenses of the Michigan Central amounted in 1917 to \$38,289,000, an increase over 1916 of \$7,643,000. The Big Four operating expenses amounted to \$38,059,000 and the increase over 1916 was \$6,837,000. The increase in the out-of-town pocket-cost of handling freight and passenger business (transportation expenses) was a little greater on the Michigan Central than on the Big Four. These expenses in 1917 on the Michigan Central amounted to \$22,211,000, an increase over 1916 of \$5,805,000. Corresponding expenses on the Big Four amounted to \$21,460,000, an increase of \$5,644,000. The greatest difference on the two roads was the increase in cost of fuel. In 1917 the Michigan Central spent \$4,529,000 for fuel for train locomotives; this was an increase of \$1,904,000—nearly 75 per cent. The Big Four in 1917 spent \$3,844,-

000 for fuel for train locomotives, an increase of \$1,558,000—68 per cent. The increased cost of fuel for yard locomotives was even greater proportionately on the Michigan Central as compared with the Big Four. On the other hand the Michigan Central showed a comparatively small increase in wages of train engineers, the amount spent in 1917 being \$1,731,000, or only \$224,000 more than in 1916, while the Big Four spent \$2,025,000 on this account in 1917, an increase of \$369,000.

Total train mileage of revenue trains was 14,249,000 on the Michigan Central in 1917, an increase over the previous year of 108,000 train miles. On the Big Four total revenue train mileage was 17,984,000, an increase of 329,000 train miles.

The average total train load of the Michigan Central was 683 tons, an increase of 77 tons over the average in 1916. The Big Four's train load in 1917 was 745 tons, an increase over 1916 of 67 tons. The Big Four, however, labored under the disadvantage of having a more unbalanced traffic in 1917 than in 1916. The average number of empty cars per train was 12.6 for 1917 as against 11.6 in 1916, while the Michigan Central had the advantage of a better balanced traffic in 1917 than in 1916, the average number of empty cars per train being 10 last year and 12 the year before.

Expenditures for maintenance probably reflected to a less extent than ever heretofore, taking the country as a whole, the policy of retrenchment or the reverse of the management, because in 1917 the exigencies of the situation were such as to in considerable part take the matter of how much work should be done out of the hands of the management. In general the pressure of business was so great that all the maintenance work which could be done with the labor and materials available was authorized. The Michigan Central spent \$5,390,000 on maintenance of way in 1917, an increase of about \$223,000 over the previous year and spent \$8,026,000 for maintenance of equipment, an increase of \$1,351,000. The Big Four spent \$4,378,000 for maintenance of way, a decrease of \$169,000 and spent \$9,808,000 for maintenance of equipment, an increase of \$1,122,000. Like the parent company, the New York Central, the Michigan Central and the Big Four both had a credit in 1917 for rails. In other words, there had been charged prior to 1917 more for rails than was actually represented by rails used and nothing was charged in 1917, but the previous excess charges were taken up that year. Like the parent company, also, less was charged out in 1917 for retirements of equipment both by the Michigan Central and the Big Four, with the exception, however, of a large charge for retirements of freight train cars made by the Michigan Central.

Neither the Michigan Central nor the Big Four issued any bonds during the year and the expenditures for additions and betterments amounted to \$1,719,000 in the case of the Michigan Central and \$2,222,000 in the case of the Big Four; the net addition to equipment amounted to \$6,891,000 for the Michigan Central and \$4,092,000 for the Big Four. At the end of 1917 the Michigan Central had \$3,710,000 cash and \$15,828,000 loans and bills payable. The Big Four had \$2,966,000 cash and \$3,763,000 loans and bills payable.

Just a word ought to be said in particular about the progress which the Big Four has made since the floods in 1913. During these four years it has been necessary to take up in operating expenses very large expenditures for repairs due to flood damage. It has been necessary to operate at times under unusually trying conditions and yet the Big Four has improved its position so materially that it can no longer be called one of the poor relations of the New York Central Lines.

The following table shows the principal figures for oper-

ation for the Michigan Central and the Cleveland, Cincinnati, Chicago & St. Louis in the two years 1917 and 1916:

	Michigan Central, 1917	Big Four, 1917	Michigan Central, 1916	Big Four, 1916
Average mileage operated	1,862	387	1,86	2,387
Freight revenue	\$33,988,347	\$36,077,390	\$9,810,576	\$32,536,534
Passenger revenue	12,859,889	12,966,347	11,146,334	10,026,742
Total operating revenues	52,879,434	57,680,220	49,418,790	46,679,240
Maintenance of way	5,389,671	4,378,438	5,166,001	4,547,817
Maintenance of equipment	8,050,084	9,808,418	6,674,868	8,686,251
Typhs	865,725	1,647,706	819,283	1,028,789
Transportation expenses	29,111,761	1,485,558	16,406,747	15,815,902
General expenses	97,401	1,041,133	878,085	929,532
Total operating expenses	38,289,136	38,059,421	30,046,261	31,211,927
Taxes	1,972,237	2,738,886	1,686,010	1,686,720
Operating income	12,604,655	13,881,881	14,076,169	13,779,866
Gross income	13,474,457	13,411,830	15,011,999	15,061,336
Net income	3,438,216	5,257,807	6,337,377	8,331,702
Dividends	749,456	499,628	749,456	374,944
Surplus*	2,436,157	4,656,976	3,886,932	6,999,964

*In addition to dividends there were various appropriations to sinking funds, additions and betterments, etc., made during the figures given for surpluses were traveled.

Hocking Valley

THERE IS ONE ROAD in the east at least on which increased expenses did not more than consume larger revenues in 1917. It is a short one, the Hocking Valley, but a very important coal carrier. There may be, when all the annual reports come in, other roads showing an increased operating income in 1917 as compared with 1916, but it is pretty safe to say that they will be comparatively few in number. The Hocking Valley earned \$10,696,000 in 1917, an increase over the previous year of more than 30 per cent. The company operates 350 miles from Toledo, Ohio, to the Ohio river at Gallipolis and Pomeroy. The road now has a connection from Columbus, Ohio, over the Norfolk & Western and the Chesapeake & Ohio Northern with the main line of the Chesapeake & Ohio at Portsmouth, Ohio. A majority of the Hocking Valley stock is owned by the Chesapeake & Ohio.

The Hocking Valley is a coal road with comparatively little other freight tonnage except manufactures. In 1917 the total tonnage of all freight carried was 14,867,000 tons and of this over 81 per cent was products of mines, bituminous coal alone furnishing more than 71 per cent of the total tonnage. The increase in tonnage carried as compared with 1916 was 1,807,000 tons and the increase in tonnage of bituminous coal alone was 1,375,000 tons. Besides the increase in tonnage there was a considerably higher average ton-mile rate received. The average in 1917 was 4.56 mills; certainly a figure that does not sound high, but this was an increase of 12 per cent over the average received in 1916.

With an increase of 30 per cent in revenues there was an increase of only 52 per cent in expenses, the total in 1917 being \$7,409,000. Despite an increase of 41 per cent in taxes, operating income amounted to \$2,455,000, an increase of about 22 per cent over the operating income of 1916. A decrease in miscellaneous income was more than offset by decreased rental payments and after paying 5 1/2 per cent dividends, the company had a surplus of \$1,529,000 in 1917.

The interesting feature of the Hocking Valley's annual report is the indications which are given as to how expenses were held down nearly in proportion to the increase in revenue. Maintenance of way expenses showed a very considerable increase, amounting in 1917 to \$946,000, or an increase of 20 per cent over 1916. In some way or other the Hocking Valley apparently was able to obtain track labor sufficient in quantity to carry on quite extensive renewal work, especially of ties. Track laying and surfacing, which is a labor cost, amounted to \$901,000 in 1917, an increase

of \$64,000. Ties, which is a material cost, amounted to \$233,000, an increase of \$ 5,000. The Hocking Valley, like so many other roads, apparently found rails impossible to obtain or obtainable only at prohibitive prices. There was only a nominal sum—less than \$7,000—spent for rails in 1917.

Maintenance of equipment cost \$3,366,000, an increase of \$210,000, or nearly 10 per cent over 1916. The greater part of this increase is due to much heavier expenditures for repairs to locomotives in 1917, \$515,000 being spent for repairs to locomotives, an increase of \$145,000. This was an average in 1917 of \$8,750 for repairs per locomotive.

It is obvious from the above that it was not by large savings in maintenance that the Hocking Valley was able to hold down operating expenses.

While it is true that transportation expenses increased 57 per cent, this increase, coupled with the increases in maintenance expenditures, was not great enough to offset by more than half a million dollars, the increase in revenues.

Transportation expenses in 1917 amounted to \$3,716,000, an increase over the previous year of \$1,352,000. The increased cost of fuel was the most staggering of the increases in transportation expenses. For both train locomotives and yard locomotives, fuel costs increased by more than 100 per cent. These two increases alone accounted for nearly half a million dollars of the \$1,352,000 increase in transportation expenses. Wages of trainmen, yard conductors and brakemen, engineers and other employees make up the greater part of the rest of the total increase. With an increase of over 100 per cent in fuel costs, there was an increase of only eight per cent in freight train mileage and practically no increase in passenger train mileage.

On a road doing so largely a coal business, we would expect to find heavy average train loading, but it must also be remembered that on the Hocking Valley the coal cars have to be hauled south empty. The average number of loaded cars per train northbound in 1917 was 47.7 and of empty cars northbound 2.5, while the average number of loaded cars southbound was 13.2 and of empty cars 40.8 per cent. An average trainload, therefore, of 1,368 tons is a showing that the Hocking Valley may well be proud of. This trainload was 151 tons, or 10.6 per cent greater than the average in 1916. Even more remarkable, however, are the results which the Hocking Valley has obtained in car loading. The average loading per loaded car even in 1916, was 40 tons. This would be good car loading even if all of the traffic of the Hocking Valley were coal, because while its own coal cars average 47 tons capacity, it has to handle a certain number of foreign cars of lower capacity, but it must be remembered that there is also a considerable tonnage of merchandise and manufactures and the Hocking Valley's 5,085 box cars average only 20 tons capacity. In 1917 an average loaded freight car of 44 tons was obtained, an increase of over one car load above the very high figure of 1916. This reflects a tremendous campaign on the part of the transportation and operating officers to obtain orders to load cars to full capacity and an earnest effort on the part of the operators to cooperate with the Hocking Valley.

M. J. Carlin, president and president of the Hocking Valley and a member of the executive committee of the United States president in charge of the building of the Chesapeake, Cincinnati & Ohio. The line was leased and built to show a very low ratio of expenses to revenue in operating revenues by means of very heavy tonnage. The very good showing which the Hocking Valley has made under the enormous pressure of coal business in 1917 would appear to be in good part due to the success of the efforts of the operating management to put in practice on that road certain principles of operating and logistics to those for which

the Carolina, Clinchfield & Ohio was especially designed. The following table shows the principal figures for operation in 1917 as compared with 1916.

	1917	1916
Average mileage operated	350	350
Freight revenue	\$8,974,873	\$6,681,262
Passenger revenue	961,700	917,935
Total operating revenue	10,696,454	8,200,420
Maintenance of way and structures	945,500	787,949
Maintenance of equipment	2,365,944	2,156,129
Traffic expenses	120,675	101,989
Transportation expenses	3,716,354	2,364,020
General expenses	261,469	187,802
Total operating expenses	7,409,133	5,597,889
Taxes	832,748	590,470
Operating income	2,447,845	2,011,438
Gross income	3,141,108	2,585,415
Net income	1,933,912	1,376,127
Dividends	604,973	439,980
Surplus	1,328,939	936,147

Chesapeake & Ohio

IN MARCH, 1916, the directors of the Chesapeake & Ohio decided to appropriate during the three years ending March 30, 1919, \$7,500,000 from income toward additions and betterments, or for other capital expenditures, or for the reduction of liabilities. The company had found itself in a position where it was necessary to refund \$33,000,000 of five per cent secured notes and to provide additional

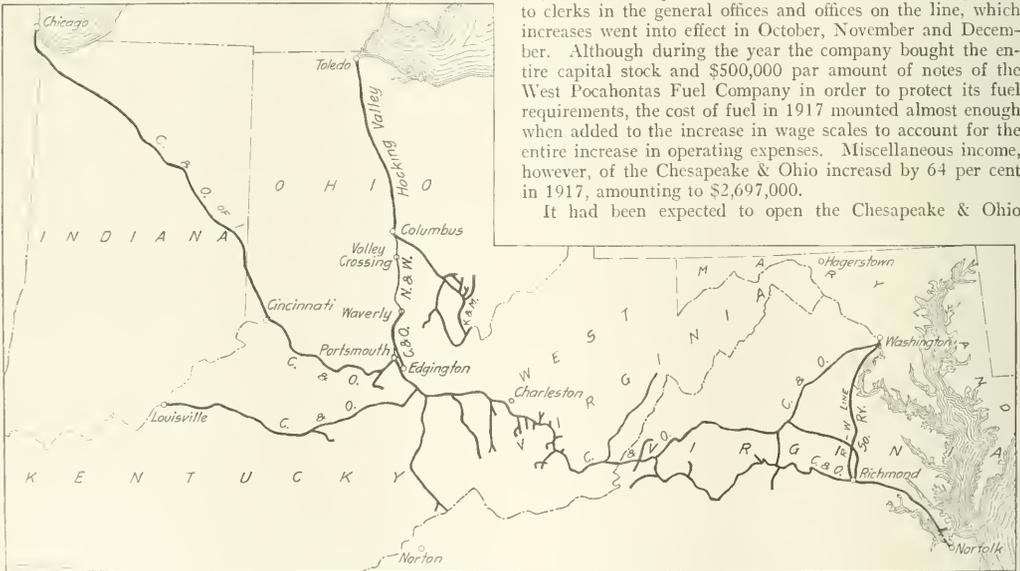
the difference should be represented by an expenditure on the property or a retirement of liabilities made from income.

The company out of a net income from May 1, 1916, to December 31, 1917, has appropriated \$7,500,000 for capital expenditures. In other words, the whole three years' program has already been taken care of. It is rather unusual to find a railroad able and willing to anticipate its obligations in this way under the conditions which prevailed in 1917. The Chesapeake & Ohio, however, although it did not do quite as well in respect to net income in 1917 as in 1916, earned \$7,066,000 available for dividends, or the equivalent of 11.25 per cent on its outstanding stock. The company is now paying dividends at the rate of four per cent, calling for \$2,511,000 in 1917.

In reviewing the annual report for the calendar year 1916 it was said that: "Present prospects are encouraging in respect to the ability of the property to earn net somewhere in the neighborhood of \$7,000,000." Even under the quite extraordinary conditions of 1917 the property justified this estimate.

Total operating revenues in 1917 amounted to \$54,644,000, an increase of \$4,809,000, or 9.65 per cent over the previous year. Operating expenses amounted to \$38,106,000, an increase of \$5,407,000, or 16.54 per cent. Increased wage scales alone accounted for an increase of approximately \$3,051,000 in expenses. This included an increase granted to clerks in the general offices and offices on the line, which increases went into effect in October, November and December. Although during the year the company bought the entire capital stock and \$500,000 par amount of notes of the West Pocahontas Fuel Company in order to protect its fuel requirements, the cost of fuel in 1917 mounted almost enough when added to the increase in wage scales to account for the entire increase in operating expenses. Miscellaneous income, however, of the Chesapeake & Ohio increased by 64 per cent in 1917, amounting to \$2,697,000.

It had been expected to open the Chesapeake & Ohio



Chesapeake & Ohio

capital for additions and betterments. The proportion of funded debt to stock outstanding on the Chesapeake & Ohio was already higher than was consistent with what is generally accepted as sound railroad financing. The Chesapeake & Ohio stock, however, was selling very considerably below par and a bond issue appeared to be the only means of financing the maturing notes. An issue, therefore, of \$40,180,000 five per cent 30-year convertible notes was sold. These notes are convertible up to April 1, 1920, into common stock at 75, between 1920 and 1923 into common stock at 80, between 1923 and 1926 at 90 and after that up to April 1, 1936, at par. The resolution to set aside from income \$7,500,000 was dictated by the thoroughly sound principle that if bonds were converted into stock at less than par,

Northern for operation early in 1917, but actually the road was not opened until the middle of September. The Chesapeake & Ohio Northern consists of 29 miles of road built by a subsidiary of the Chesapeake & Ohio from Limeville, Ky., to Waverly, Ohio, with trackage rights from Waverly over the Norfolk & Western for 62 miles, to a connection with the Hocking Valley and with trackage rights for about a mile over the Hocking Valley to Parsons yard at Columbus, Ohio. For the greater part of the year, therefore, Chesapeake & Ohio earnings were not benefited at all by getting a connection with the Hocking Valley, and even from September to the end of December only a part of the traffic which will under ordinary circumstances be handled over this line, moved that way.

On the other hand the Chesapeake & Ohio did get the benefit of a higher rate per ton per mile, both on coal and all other freight. The revenue from coal per ton per mile in 1917 was 3.23 mills, as compared with 3.02 mills in 1916, an increase of seven per cent. The revenue per ton per mile on freight other than coal was 6.45 mills in 1917, as against 5.70 mills in 1916, an increase of 13 per cent. When one stops to think that it is customary in many cities and towns to charge 50 cents additional for a ton of coal when it is carried into the cellar, an average of certainly not more than 100 ft., the charge the railroad company makes of 3.23 mills for moving the coal one mile or less than 1/150 of the charge which the coal man makes for moving the coal 100 ft., one gets some idea of the extent to which a railroad like the Chesapeake & Ohio adds to the national wealth in each day of its operation.

In 1916 the Chesapeake & Ohio was the only road of 2,000 miles or over with a revenue train load of more than 1,000 tons. Since then the Norfolk & Western has joined this class, and in 1917 the Chesapeake & Ohio increased its train load by 36 tons, making the average 1,043 tons. Including company freight, the average in 1917 for the Chesapeake & Ohio was 1,112 tons.

There was a considerable increase in expenditures for maintenance of way. In 1917 \$6,906,000 was spent on this account, an increase over the amount spent in 1916 of nearly 14 per cent. Rails and ballast were the only two items which showed large important decreases, and the reason for the decrease in ballast is probably a combination of circumstances, including the fact that the ballast situation was in such good condition as to not call for extensive ballast renewal.

Maintenance of equipment cost \$10,522,000, an increase of only 2.08 per cent. During the year 50 Mallet locomotives were added and three locomotives were retired. At the end of the year 8.4 per cent of the locomotives in service were undergoing or awaiting general repairs. This is a rather large percentage. On the other hand only three per cent of the freight cars in service were undergoing or awaiting general repairs. At the end of the year the company had on hand \$2,260,000 cash, with no loans and bills payable except \$95,000, which nominally comes under this head.

The following table shows the principal figures for operation in 1917 as compared with 1916:

	1916	1917
Average miles operated	3,411	3,377
Freight revenue	\$4,706,723	\$3,186,732
Passenger revenue	7,907,451	6,435,025
Total operating revenues	\$12,614,174	\$9,621,757
Maintenance of way and structures	6,841,770	6,067,658
Maintenance of equipment	10,717,774	10,740,498
Traffic expenses	6,241,270	6,755,381
Transportation expenses	10,959,181	14,355,565
General expenses	8,107,712	1,035,932
Total operating expenses	42,928,800	47,808,676
Taxes	2,472,281	7,636,604
Operating income	1,414,123	15,486,677
Depreciation	11,720,000	11,178,820
Net income	7,096,146	7,666,882
Locomotives	311	1,255,632
Supplies	1,655,141	1,411,458

New Books

Comparative Tests of Six Sizes of Illinois Coal on a Mikado Locomotive. By Edward C. Schmidt, et al. Bulletin No. 101, Engineering Experiment Station, University of Illinois, 190 pages, 6 in. by 9 in., bound in paper. Published by the University of Illinois, Urbana, Ill. Price 50 cents.

This bulletin contains a complete report of the tests which were run on the locomotive testing plant of the University of Illinois with a Baltimore & Ohio Mikado type locomotive,

by the Committee on Fuel Tests of the International Railway Fuel Association, the Engineering Experiment Station of the University and the United States Bureau of Mines. An account of the same tests was presented by the Committee on Fuel Tests at the 1917 convention of the International Railway Fuel Association, and an abstract of this report appeared in the *Railway Age Gazette* for July 13, 1917, page 51.

What is Fair? By William G. Raymond, professor of civil engineering and dean of the College of Applied Science, State University of Iowa, Iowa City, Iowa. 172 pages 4 1/2 in. by 6 1/2 in. Bound in cloth. Published by John Wiley & Sons, Inc., New York. Price, \$1.00.

This book discusses the relations between the railways and other public utilities and the public. It is divided into five chapters with the titles, General Relationships, Suitable Control; Rate Control, What is Fair Return? and Valuation. Its attitude is decidedly refreshing in contrast with that of many recent utterances on this subject. In the preface the author states that "the book is the result of an honest effort, extending over some years, to determine for the author's own satisfaction just what is fair in the relationships of the public and the owners of its utilities. Always he asks, "What is fair?"

He draws a parallel throughout the book between the individual in business and the corporation. "The corporation is defined as 'an artificial individual which, within the limits of its privileges, does business just as a natural individual does.'" The author states further that "men go into the business of furnishing public service—service that is generally recognized to be a proper, if desirable, public function—for exactly the same reason that men go into any other business namely: to make money."

In discussing earnings his attitude is shown by the statement that "it is intended to declare that earning large profits is not *per se* a crime or misdemeanor; that except as it must be governed by the terms of its agreement with the public, a public utility corporation should stand on the same footing as any private business catering to or depending on the public for support."

The author lays particular stress upon the character of control which should be exercised over a corporation. He states that "governing the use of property and taking property are two different things which should be clearly distinguished but are sometimes confused." In these days of widespread diversity of ideas regarding the duties of public regulating bodies and their responsibility to the public and to the utilities, it is refreshing to note the attitude of the author which is reflected in the following sentences: "When an engineer is employed to supervise the construction of a great work being performed under contract, it is his duty to help the progress of the work. He is there to see that no dishonest work or improper material goes into the structure if attempts are made to defraud in these ways, but just as much it is his duty to do what he can to forward the work, assisting rather than nagging or hindering the contractor. * * * It is just as much the duty of a public utility regulating body to try to make the attitude of the public toward the corporation to be fair, as it is to insist that the corporation shall be fair in its dealings with the public."

The attitude of the author, as expressed in this book is so thoroughly founded upon the query "what is fair" that one is forced to agree with the correctness of most of his conclusions. The book should be of much interest and value to all interested in the regulation of public utilities and should have an important influence in arriving at the correct solution of the perplexing problems confronting the corporations and the regulatory bodies.

Letters to the Editor

Locomotive Cost as Related to Service

TO THE EDITOR:

WASHINGTON, D. C.

The Purchasing Department of the Railroad Administration, in placing orders for locomotives and freight cars, has exacted a basis of approximately estimated cost plus five per cent profit for both classes of equipment.

A freight car is constructed mainly of unmachined parts by a large percentage of unskilled labor. Refined workmanship, material and appliances are vitally essential to only a limited extent in a freight car as a whole to insure proper safety, operation and maintenance, as it is not subject to pressures, stresses and conditions such as a locomotive.

A steam locomotive is a highly specialized piece of mobile machinery, generating the power necessary for its propulsion and for the development of great hauling capacity. Its running gear, boiler and engines must be of such design, workmanship and material, and equipped with control and other auxiliary mechanism of such refinement as will insure maximum safety, precision of manipulation and ease of handling at all times. Furthermore, it must be so equipped that the labor, fuel, water, lubricants and other supplies required for its operation can be effectively and economically utilized.

Railroads in the United States have gotten just what they were willing to pay for, the same as purchasers of other commodities—no more, no less. Perhaps the locomotives were good enough, but are we not now aiming at a lower standard?

To place the profit on a locomotive at a figure so low that an unavoidable interruption of the plant output from any of many possible causes or increases in labor and overhead charges might jeopardize the making of any profit whatsoever or possibly incurring a loss, would seem to result in but one tendency—that of lowering a standard of excellence none too high.

In the locomotive building industry the builder, unlike the manufacturer of a staple article whose costs are known from day to day, bases his proposals for new locomotives upon an estimate computed from previous performances in connection with the building of locomotives of as nearly the same design as can be obtained. However, owing to variation in designs and material and construction specifications, it is impossible to secure a correct check on the cost figures and it often happens that an estimated profit may be greatly reduced or actually converted into a loss. The filling up of the building plants with locomotives of an entirely new design places the matter of profit in a much more precarious position than were the builders to receive part of their orders in duplicates of previous designs. It is hardly to be expected that the Government can guarantee the labor and material figures that the builders must use in their estimates, and if these should be lower than anticipated, the Government will benefit through existing taxation.

How does the Government expect to secure all that is vitally essential to the best interests of the railroads and of the officers, engineers, firemen, mechanics and others directly concerned in the locomotive supervision, working and upkeep, upon whom it is dependent for the final result, if the first cost of design, material and construction is to be placed on a parity with that for a freight car? What assurance is given to those directly concerned that the standard practice heretofore developed is to be maintained? The Government should certainly set a higher standard throughout than was obtained from private management, not only in first construction but in the "follow up" service.

Other countries having both Government and private ownership of railroads work on the basis of intensive competition and high-grade individual interest, endeavor, design and workmanship. Why, then, should not the United States do the same? Steam railway locomotives have, during the past twenty years, gone through a great development stage. Many failures have occurred in new combinations of designs and materials embodied in cylinders, frames, fireboxes, axles, rods, motion gear, and mechanical appliances which have necessitated a certain amount of renewal and reconstruction. Are we to now throw many of the results of these years of accomplishment into the discard through any incentive to lower the standard of design, workmanship and material in order to meet a relatively low first cost?

The director general's advisors are establishing an untried practice in the purchase of locomotives that is bound to result in chaotic conditions, and which, if continued, will cause serious embarrassment to not only the Government and its employees, but to the general commercial and shipping public and all others who are directly involved and dependent upon transportation for the prosecution of the war and industrial activity. Unfortunately, the railways, their employees, and the people will ultimately be required to assume the burden of and pay for the experiment. LIBERTY BONDHOLDER.

Constructive Rehabilitation Pays

SCARSDALE, N. Y.

TO THE EDITOR:

At this time when the owners of all classes of railway securities in all parts of the world are watching with keen interest the administration of the railways in the United States by the government, the case of the Kansas City Southern may be cited to show what can be accomplished by the vigorous prosecution of a definite rehabilitation program.

This railway is a relatively small property and extends from Kansas City, Mo., which is in the vicinity of the geographical center of the United States, to the Gulf of Mexico, a distance of about 800 miles.

During 1917 it hauled about 35 per cent more freight and 25 per cent more passenger traffic, at lower freight and passenger rates, with 15 per cent less locomotives at an operating ratio of about 8 per cent less, as compared with ten years ago, and at the same time did not put out a single embargo but accepted and expeditiously moved all traffic offering along its own line and from connections.

This was the outcome of the constructive policy of the management that has obtained on that property during the past ten years, and which has resulted in doubling the revenue freight train load by improvements in grade and alignment, operating divisions, and shop and enginehouse facilities; strengthening equipment by the substitution of new types of locomotives and cars more suitable for the operating conditions for those that were obsolete and inadequate, and by the modernizing and reinforcement of existing locomotives that could, by that change, be made to perform more effective and economical service.

While the neighboring and competitive railroads, such as the Wabash; Missouri Pacific; Iron Mountain; Missouri, Kansas & Texas; Frisco; Texas & Pacific; Missouri, Oklahoma & Gulf; International & Great Northern; Cotton Belt, and others have—during the past ten years—either passed their preferred stock dividends or otherwise defaulted in interest or gone into the hands of receivers, the Kansas City Southern has been earning and paying its preferred dividends and building up a substantial surplus besides, in addition to paying the interest on long-term bonds and the interest and principal on equipment notes that it has put out to take care of the rehabilitation work that has made its performance possible.

J. E. MUELFELD.

Commission Recommends Increases of \$300,000,000

Graduated Scale Suggested—43 Per Cent to Those Paid \$46
a Month Down to \$1 for Those Paid \$249 a Month

THE REPORT OF THE RAILWAY WAGE COMMISSION to Director General McAdoo, recommending increases in wages estimated to approximate \$300,000,000 a year over the present payroll was given out Wednesday, although still under advisement by McAdoo for his decision, because of premature newspaper publication.

The commission reached the conclusion and recommends that the fairest method of dealing with the problem of wage increases is to award increases on a percentage scale ranging from 43 per cent for employees receiving \$46 a month and under, down to \$1 for those receiving \$249. These percentages are based on the rates of December, 1915. The percentages awarded by \$10 grades are as follows:

Wages per Month.	Per Cent of Increase.
\$50	45
60	41
70	41
80	40.44
90	36.38
100	31.29
110	27.12
120	23.64
130	20.69
140	18.16
150	15.96
160	14.04
170	12.34
180	10.83
190	9.48
200	8.26
210	7.16
220	6.15
230	5.24
238	4.56

239 to 250 increases are enough to make up \$250.

The increases per month therefore range from \$1 up to \$34, which is the increase for employees now receiving around \$85 a month.

If an employee has received an increase since December 31, 1915, it will be used to make up the recommended increase. The commission has also made some investigation of salaries of officers receiving above \$5,000 yearly, and states that substantial readjustment may be made and efficient operation of roads promoted thereby. The commission recommends that during the period of government conduct of the roads no salaries be paid to officials not essential to operation of roads shall be charged as a part of operating expenses and that careful study be made of the proper relation between salaries of higher officials and their subordinates with a view to readjustment.

The commission recommends also that there should be constituted a tribunal or tribunals to continue the study of railroad labor problems and says that the existing state of war prohibits anything approximating a determination of ideal conditions.

The requests made for wage increases would involve an additional outlay in wages of somewhat over one billion dollars a year.

At the outset it was seen that there were the gravest inequalities in wages paid, but to reclassify employments would call for more time, skill, insight and knowledge than that possessed by the commission. The commission made an

exhaustive investigation of the increased cost of living and found large increases necessary to meet it, saying each dollar now represents in power to purchase a place to live, food to eat and clothing to wear, but 71 cents as against 100 cents on January 1, 1916.

Statistics gathered by the commission showed that 51 per cent of all employees in December, 1917, received \$75 per month or less. Eighty per cent received \$100 per month or less. Among locomotive engineers the preponderant number received less than \$170. Between the grades receiving from \$150 to \$250 per month there are included less than 5 per cent of all employees, 66,000 out of 2,000,000. The greatest number of employees are in the class receiving between \$60 and \$65 per month.

Reductions in hours are not to be regarded as increases in pay, the report says; as to those who have already received increases, the railroads scale should be adhered to, but there should be no reduction. A practical plan for increases in harmony with the scale has been devised for application to piece work and wages for recognized overtime.

A similar practical plan has been devised for application to the mileage rates for trainmen, which will be increased proportionately. The commission believes that this is not a time to reduce hours of work, and while it is strongly disposed to a standard day, its judgment is that existing hours of service should be maintained for the period of war.

Existing rules and conditions of payment for overtime should not be disturbed during the war, but should be made the subject of study. Increases shall be effective as of January 1, and members of organizations and non members must stand upon the same footing.

"Whatever its effect upon the mind may be," the commission says in discussing amount of the increase, "we regard such an expenditure as necessary for the immediate allaying of a feeling that cannot be wisely fostered by national inaction and as not one dollar more than justice at this time requires. It will make hard places smoother for many who are now in sore need. It gives no bounty, it is not a bonus, it is no more than an honorable meeting of an obligation."

INCREASED COST OF EGYPTIAN RAILWAY FUEL—The Egyptian Budget for 1918-1919 shows that the increase in expenditure is due to the high prices of material, food and fuel, the extra cost of fuel for railways amounting to £950,000 (\$4,750,000).—*Railway Gazette, London*

CHINESE EASTERN RAILWAY STOCKHOLDERS have severed the official connection of the road with Petrograd, according to press despatches, and have named a new board of directors. The road was built with Russian capital and the contract provided that half the board should be Russian. The decision reached by the shareholders was based on "present conditions in Russia."

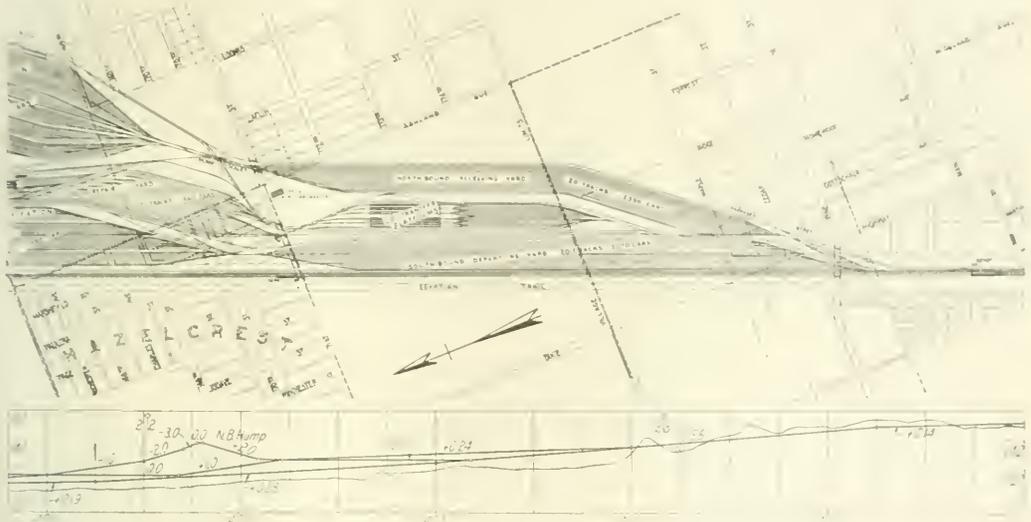
GOODS STOLEN ON PRUSSIAN STATE RAILWAYS.—The Prussian State Railways in 1917 paid 57,000,000 marks (\$14,250,000 at pre-war rates) compensation for property lost or stolen in transit, compared with 4,000,000 marks (\$1,000,000) in 1914. The German Post Office paid 5,000,000 marks (\$750,000) in 1917 for similar losses compared with 100,000 marks (\$250,000) in 1912. The robberies on the Austrian railways are reported to be probably even greater than in Germany.

present right-of-way. By throwing the northbound freight track to the extreme east side of this tract and placing the new yard between this track and the existing southbound freight track, a layout is secured which can be operated without any crossover movements. An examination of the profile shows that there is a rise of about 50 ft. from the north to the south in the three mile length of the site. As a consequence the grades are generally favorable to the northbound or loaded car movement. As laid out there is a 0.96 per cent grade into the southbound receiving yard, and a 1.0 per cent grade between the southbound classification yard and the departure yard, the grade through the latter being 0.55 per cent. The maximum grade opposing the northbound movement, with the exception of the hump grade, is 0.35 per cent. More advantageous grades might have been obtained if it had not been necessary to elevate the tracks to separate the grades from those of the streets of Hazelcrest, Homewood and Harvey, which cross the tracks in the three miles included within the limits of the yard. The grades ascending the humps are 2.0 per cent in both directions, but the descending grades

servng the two outside tracks on the east side of the classification yard.

Special Arrangement to Return Riders

Both classification yards of this terminal will be provided with special facilities for returning the riders to the humps. A similar plan is to be carried out in the New Haven yard. One or more tracks will be provided in the body of each yard for the use of motor cars to accommodate the riders. To avoid the ladder tracks radiating from the hump, these motor car tracks will enter subways in the vicinity of the hump, passing underneath the approach tracks and out to the side of the hump embankment, where the cars can be conveniently brought to a destination along the side of the summit. As a further convenience in the Illinois Central plan, midway of the length of the classification yards, small pedestrian subways are to be provided crosswise of the yard with entrances between tracks at convenient intervals and affording ready access to the motor car tracks. Thus it will be possible for the riders to reach the motor cars without hav-



South Half of the Markham Yard

of the southbound hump are 3.5, 1.5 and 0.75 per cent respectively, as against 3.0, 2.0 and 1.0 per cent on the northbound hump.

The Northbound Yard

The northbound yard consists of a receiving yard of 20 tracks, having a total capacity of 2,589 cars, a classification yard of 62 tracks, with a capacity of 2,921 cars, and a departure yard of 20 tracks with a space for 1,650 cars. The large number of tracks proposed for the classification yard are planned to permit necessary distribution of cars called for by the many different transfers and important industries served in the Chicago terminal district. In most cases one track is provided for each transfer, but the clearing yard and a few other especially large transfers are allotted more than one track each. One special part of this yard comprises a grid of 16 tracks holding 13 cars each on which trains are subdivided into cuts of cars destined for the various industries on the Illinois Central's line in the city, so that the transfer engines can make deliveries with the minimum switching. Another feature of the yard is an icing station

ing to climb over a great many cars standing on the yard tracks.

The Southbound Yard

The southbound yard has a receiving yard of 20 tracks with a capacity of 1,577 cars; a classification yard of 40 tracks, with space for 2,051 cars, and a departure yard of 20 tracks, with a capacity of 2,072 cars. The tracks in the southbound classification yard are relatively longer than those in the northbound yard, some of the tracks in the former accommodating over 70 cars. This greater length is desirable in the southbound yard on account of the classification of the large number of empty coal cars.

Transfer Station

Parallel to the southbound departure yard and with convenient connection with the southbound classification yard, the plan provides for a less-than-carload transfer station, where freight received in trap cars and from the different city stations may be consolidated for movement to destination. This station will consist of five platforms 700 ft long with

tracks on either side, and with a supporting yard immediately to the south of equivalent track capacity, so that a rapid shift of the cars at the platforms may be made at meal times or other periods of the day when the men are not working on the platforms. The south end of the transfer yard is connected directly with the northbound receiving yard, so that any cars in the transfer for destination north may be re-handled over the northbound hump.

A repair yard of 21 tracks, holding 660 cars, with convenient connections with both humps, is provided between the two yards. To the north of the repair yard space is arranged for an engine terminal to serve both road and transfer engines.

The plan contemplates complete engine terminal facilities, including two roundhouses, a large coaling station, etc. For the purpose of turning engines without the necessity for using the turntables, a circle track is proposed, as shown on the map. This is intended primarily for the use of the transfer engines, which will be turned frequently without need of entering the roundhouses.

The project will involve the placing of about 6,000,000 cu. yd. of filling, which will be sand taken from a pit about two miles from the yard. As may be seen from the profile, a large part of the yard will be on fill varying from 2 to 15 ft. in height. The northbound hump requires a fill of 30 ft. and the southbound hump a fill of nearly 40 ft. The work contemplated for the present season includes the placing of about 2,000,000 cu. yd. of filling.

The street subways under the yard constitute a formidable feature of the work. There will be five subways for the city of Harvey, three of which are the full width of the street and two, 8 and 10 ft. wide respectively, for the use of pedestrians only. The one for One Hundred and Fifty-ninth street, 66 ft. by 125 ft. in section, will pass under 40 tracks. Several other subways are proposed for streets in the village of Homewood, but have not been definitely determined upon.

The New Haven Freight Terminal

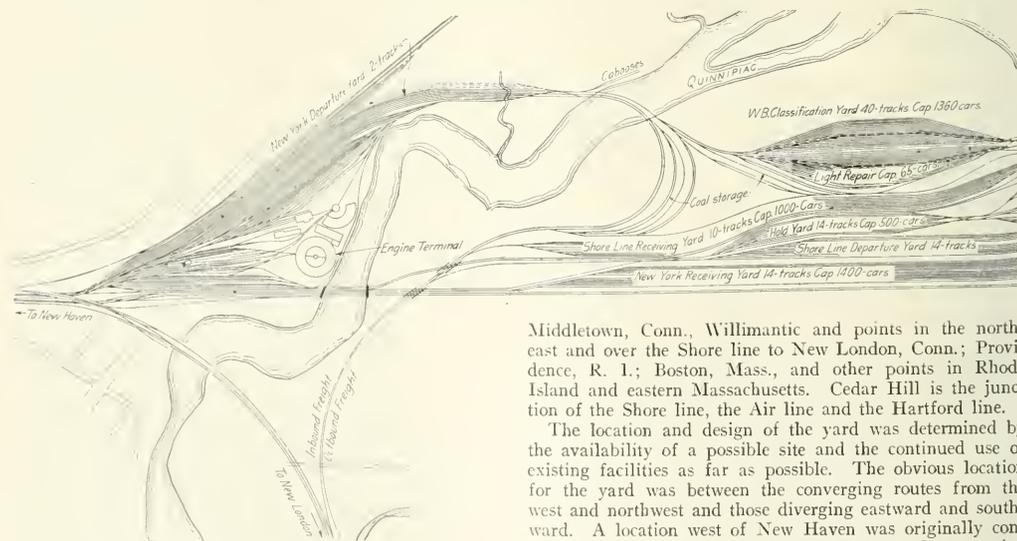
The New York, New Haven & Hartford Railroad is constructing a terminal and classification yard at Cedar Hill, New Haven, Conn., to relieve the congestion in existing yards and terminals caused by the unprecedented industrial development in New England since 1915, during which period business in many places has grown more than 100 per cent. It will furnish the facilities to receive trains from all routes converging at New Haven and the classification of the received cars into trains for their proper destination.

The terminal, including connections, is 6 miles long and $\frac{1}{2}$ mile wide. The present installation is to have a standing capacity of 6,500 cars, and when entirely complete the terminal will have a capacity for 11,000 cars. The project involves 2,836,000 cu. yd. of grading, consisting of sand and gravel, 23,000 cu. yd. of concrete, 2,000 piles for masonry supports, and 3,000 lin. ft. of single-track trestle for river crossings.

The 95 miles of track to be laid require 13,000 tons of rail and 460 switches. The work has been carried on since June, 1917, by railroad forces consisting of from 275 to 500 men, with mechanical equipment including 7 steam shovels, 2 Jordan spreaders, 120 air dump cars of 16 and 20-cu. yd. capacity, and 4 pile drivers. Thus far 525,000 cu. yd. of sand and gravel have been removed.

Handles Traffic of Several Routes

A location near New Haven was chosen for the yard site because of the relative importance of this city to the entire New Haven system. As shown in the map, important lines radiate from New Haven to New York; to the west over the Poughkeepsie bridge route; to the north via the Canal line to Holyoke, Mass., and Northampton; to Waterbury, Conn., and Winsted; via the Hartford line to Hartford, Conn., and Springfield, Mass.; via the Air Line to



Southwest Half of the Cedar Hill Yard

The terminal plan also contemplates interlocking plants, electric lighting, pneumatic tube systems for the despatching of way bills, automatic scales at the hump, and other modern facilities.

Middletown, Conn., Willimantic and points in the northeast and over the Shore line to New London, Conn.; Providence, R. I.; Boston, Mass., and other points in Rhode Island and eastern Massachusetts. Cedar Hill is the junction of the Shore line, the Air line and the Hartford line.

The location and design of the yard was determined by the availability of a possible site and the continued use of existing facilities as far as possible. The obvious location for the yard was between the converging routes from the west and northwest and those diverging eastward and southward. A location west of New Haven was originally considered, but was abandoned because of the rock excavation necessary as disclosed by tests, and other difficulties which made this location prohibitive. The site chosen for the yard is in the eastern portion of the city of New Haven and is partly on tide land and partly on uplands composed largely of sand. This provides excellent material for grading, and the contour of the site is such that the excavation and filling

balance. The course of the Quinnipiac river necessitated the location along the Air Line, with a connection at the northern end of the yard across to the Hartford division.

Arrangement Is Complex

The yard is of the hump type and consists of two main divisions, one for westbound traffic and the other for east

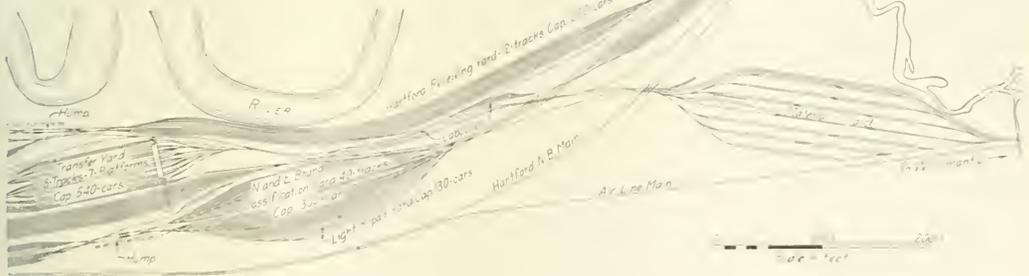
and the north and eastbound classification yard. The north end of the Shore line departure yard, which consists of 16 tracks, with capacity for 1,600 cars, is located in close proximity to the lower end of the eastbound classification yard, and the north end of the Shore line receiving yard adjoins the hump end of the westbound classification yard. With this arrangement the deadhead mileage of road power and yard power is minimized. Instead of making the light going or returning movement, as is customary in the usual hump yard, the light movements of the road engines are reduced, while yard engines will handle cars in both directions. The yard movements of power to and from trains is, within limits, comparatively close to the engine terminals. The Shore line departure yard will have both east and westbound connections at the southerly end, which will permit it to be used by through trains not requiring classification, but which require change of power, cabooses, inspection and possibly icing. Tracks for light repairs will adjoin each classification yard.

Speeder or motor car tracks for car riders will be provided between each pair of leads in each of the classifica-



Relation of the Cedar Hill Yard to the New Haven Lines

and northbound traffic, each division embodying receiving, classification and departure yards. In addition, provision



Northeast Half of the Cedar Hill Yard

has been made for a receiving and a departure yard for the Shore line trains and an l. c. l. transfer station with a supporting yard by which it is served through the agency of a third hump. There will also be a coal storage yard, a material yard and engine terminal facilities.

The westbound division consists of a southbound receiving yard of 12 tracks with a capacity for 1,200 cars, a classification yard of 40 tracks having capacity for 1,360 cars, and a westbound departure yard of 12 tracks with capacity for 960 cars. The arrangement for the north and eastbound divisions is similar to the westbound division and consists of a receiving yard of 12 tracks, with capacity for 1,400 cars, a classification yard of 40 tracks having a capacity for 1,350 cars, and a northbound departure yard of 12 tracks with capacity for 1,200 cars. The Shore line receiving yard consists of 10 tracks with capacity for 1,000 cars. A connection is provided from this yard to both the westbound

tion yards. As in the Illinois Central yard, these tracks will pass under the tracks at the throat of the yard below the hump and extend along the hump, terminating beyond it, opposite the point where the car riders take the cut-off cars they are to handle.

The relative location of the new yard and the tracks of the Shore line make it necessary for the heavy traffic of the Shore line to enter and leave the yard at the same time, making special arrangements and design necessary. It was necessary to provide for the separation of grades at several points as well as a re-routing of the northbound passenger trains to Hartford and Springfield around the east side of the yard, instead of west of it, as previously. At Air Line junction the westbound Shore line passenger trains will be carried overhead. At a point about one mile further east the westbound Shore line main will be carried beneath the eastbound freight connection from the yard. Both of the

Shore line freight connections, inbound and outbound, will pass over the Air line, the northbound passenger main to Hartford and the freight tracks over which traffic is received from the Harlem river and Poughkeepsie bridge routes.

The north-bound passenger main to Hartford will pass under the Air line, the material yard and other connections near the north end of the yard.

Special Facilities

The transfer station for less-than-carload freight, with its supporting yard, is located approximately in the center of the yard. This will be convenient for the receipt of such cars from the various routes and for the delivery of northbound cars to the various points from which the trains will depart.

On the completion of the yard, traffic from and to Plainville and the north on the Canal line to Holyoke and Northampton and other points will be routed into the new yard via New Britain and Berlin. At the same time through traffic via the Poughkeepsie bridge, heretofore handled over the pusher grades at Sandy Hook and Terryville, via Plainville, and for points east and north, will be routed over the low grade line through the Cedar Hill yard.

The New York-Maybrook departure yard is already electrified to the extent necessary for motors to reach and handle outbound trains. The electrification will be extended to include three or four tracks in the Shore Line departure yard.

The improvement includes a second turntable 95 ft. in length and an additional roundhouse of 18 stalls. Later additional facilities will be provided for the inspection and care of electrical power. These involve a small shop, inspection pits and pantagraph inspection platforms.

The Illinois Central yard is being designed and will be constructed under the direction of A. S. Baldwin, chief engineer, and F. L. Thompson, assistant chief engineer. The New Haven yard was designed under the direction of Edward Gagel, chief engineer, who also exercises general supervision over the construction. The prosecution of the work is under the immediate direction of I. D. Waterman, construction engineer.

Railroad Administration

Organizes to Stop Thefts

THE LOSSES OF ONE WESTERN RAILROAD resulting from thefts totaled over twice as much in 1917 as in the previous year. This marked increase was due in part to advances in prices of the materials stolen and to increased traffic, but also in considerable measure to increased lawlessness on the part of employees and the public alike. This growing disrespect for law and order seems to be a manifestation of the unrest and callousness which is generally a concomitant of war. The problem of suppressing this anti-social spirit, which is equally acute on all railroads of the country, has been undertaken by Philip J. Doherty, recently appointed manager of the Property Protection Section of the Division of Law of the Railroad Administration.

Mr. Doherty is unifying the detective forces of all the carriers for the purpose of securing the highest degree of co-operation among them in combating the pilferage evil. He has already appointed T. T. Keliher, chief special agent of the Illinois Central, and R. S. Mitchell, chief special agent of the Missouri Pacific, as his local representatives in the Chicago and St. Louis districts, and will no doubt appoint other men to represent him in the remaining important railway centers. In addition, he will have a corps of secret service agents and attorneys reporting directly to him, who

will assist the staffs of individual lines and check their work.

Section XI of the Railroad Control bill will prove a most effective aid to the Property Protection Section, as it is by far the strongest legislative enactment so far passed to prevent the theft of railroad property. It provides a maximum penalty upon conviction of ten years' imprisonment or a \$5,000 fine, or both, and not only designates theft as a crime, but also tampering with or knowingly impeding the operation, use or possession of railroad property.

Prosecutions for violations of this section of the Railroad Control act will all be in the district courts of the United States under the direction of the attorney-general. The first conviction under the new law was recently secured in Chicago in the court presided over by Judge Kenesaw M. Landis.

This case was disposed of with despatch and forecasts expedited prosecutions of other cases which may come up under the Railroad Control act in the future. On February 2, Dante Cecchetto and Herman A. Heyne were arrested for stealing \$150 worth of copper wire from the Illinois Central in Chicago. On March 29 the men were indicted, and on April 5 were convicted, fined \$1,000 apiece and sentenced to three years in the Federal penitentiary at Leavenworth, Kan.

There are two classes of thieves on the railways, i. e., those who work individually and take property in small lots, and those who carry on their activities in well-organized groups. The latter class is more common in the large railway centers, where the chance of detection is smaller and the disposition of stolen goods easier. Sometimes the entire contents of a car are hauled away in trucks and wagons by these gangs. These organizations often have confederates among the railroad employees, thereby rendering it more difficult to trace them. A recent case of bootlegging discovered on a middle western line indicates the extent to which railroad employees are sometimes involved in these conspiracies. Through the connivance of train crews and yard men regular shipments of liquor were made from a wet state into dry territory, where they were disposed of at great profit to all concerned. As all the railroad employees who handled the cars participated in this traffic, no record of the car movements reached higher railroad officers, and as a result the practice continued for some time before it was detected.

The proportions of the theft problem may be gathered from a recent statement in the press by G. S. Ward, chief special agent of the Wabash, who estimates that \$35,000 worth of freight is stolen from the railroads in the St. Louis switching district every month. The property taken is usually such as will gain a ready sale, such as cigars, shoes, clothing and hardware. Journal brasses are also stolen in large quantities. These are removed from freight cars by the use of hydraulic jacks or other means of raising the body of the car from the truck. As the price of brass is exceptionally high, thieves find it very profitable to sell their stolen goods to junk men. In the past it has been almost impossible to prosecute this class of thieves because of the difficulty in proving the road to which the stolen brasses belonged. In the future, however, under the provisions of the Railroad Control act, it will only be necessary to prove that a brass was stolen from a railroad car and the federal authorities will do the rest.

In Chicago the unification of the secret service work of the railroads has led to the organization of a committee which will give special attention to the apprehension of thieves in the Chicago switching district. T. E. Pratt, chief special agent of the Chicago, Burlington & Quincy, is chairman of this committee, and the other members are H. H. Germain and William Briggs, of the Chicago, Rock Island & Pacific and Pennsylvania Lines, respectively.

Government Car and Locomotive Orders

Distribution of the Orders with a Discussion of the Prices, Specialties and Policies

THE UNITED STATES RAILROAD ADMINISTRATION has announced the placing of orders for 100,000 freight cars, to be built to its standard specifications, including 50,000 box cars, and 50,000 hopper and gondola coal cars, divided between 17 car building companies, and 1,025 locomotives also of its standard types, 555 from the American Locomotive Company and 470 from the Baldwin Locomotive Company.

The total cost of the cars is placed at from \$250,000,000 to \$300,000,000 and of the locomotives at approximately \$60,000,000, although the specialties have not yet been awarded and the final detailed contracts have not yet been executed. It is understood that 145 additional locomotives are to be awarded to the American Locomotive Company, and 30 to the Baldwin Locomotive Works, in about 60 days, and that approximately 1,000 additional locomotives and about 100,000 additional cars are to be ordered in about six months.

The first order for cars, 30,000 to the American Car & Foundry Company, was announced on April 25, and announcement of the allotment of orders for 70,000 additional cars was made on May 2. The locomotive orders were announced on April 30. A partial list, incorrect in some particulars, was published in last week's issue. It is now possible to give the complete list, with the division of both the cars and the locomotives by types and by companies, although there may be some modifications in the number and types of cars apportioned before the detail contracts are executed.

Cars

The total order includes cars of five types as shown in the following list:

35,000	40-ton	double sheathed box
25,000	50-ton	single sheathed box
10,000	50-ton	composite gondola
5,000	70-ton	low side gondola
25,000	55-ton	hopper
100,000		

The distribution of the order by companies and types is as follows:

American Car & Foundry Co.	6,000	40-ton	double sheathed box
	9,000	50-ton	single sheathed box
	6,000	50-ton	composite gondola
	6,000	55-ton	hopper
Pittsburgh Steel Car Co.	6,500	50-ton	composite gondola
	5,000	55-ton	hopper
	2,500	70-ton	low side gondola
Standard Steel Car Co.	2,000	40-ton	double sheathed box
	3,500	50-ton	composite gondola
	1,000	55-ton	hopper
	2,000	70-ton	low side gondola
Pittman Car Co.	6,000	50-ton	single sheathed box
	1,000	55-ton	hopper
Haskell & Barker Car Co.	6,000	50-ton	single sheathed box
	2,000	50-ton	composite gondola
	1,000	55-ton	hopper
Ruston Steel Car Co.	1,000	50-ton	composite gondola
Camden Steel Co.	1,000	50-ton	composite gondola
Mingo Car Corporation	1,000	50-ton	composite gondola
St. Louis Car Co.	1,000	50-ton	single sheathed box
Mt. Vernon Car Co.	4,000	40-ton	double sheathed box
Phenix Car & Foundry Co.	3,000	40-ton	double sheathed box
Liberty Car & Equipment Co.	5,000	40-ton	double sheathed box
Kent Car Mfg. Co.	1,000	40-ton	double sheathed box
Lacoma Car Co.	1,000	40-ton	double sheathed box
Bettendorf Co.	3,000	50-ton	single sheathed box
Leroir Car Works	2,000	40-ton	double sheathed box
Darkey & Smith Car Co. (pending)	3,000	40-ton	double sheathed box
Total	100,000		

Locomotives

The locomotive order was divided, 555 to the American Locomotive Company and 470 to the Baldwin Locomotive Works as follows:

American	Baldwin	Types
217	185	Light Atlantic
75	30	Heavy Atlantic
30	11	Light Mountain
3	2	Heavy Mountain
40	20	Light Pacific
30	10	Heavy Pacific
25	10	Light 210 2
30	10	Heavy 210 2
80	30	Six wheel switching
75	27	Eight wheel switching
5	15	2-6-2 Miller
5	17	2-8-2 Miller

The division of types given in last week's *Railway Age*, whereby the American Locomotive Company's 555 locomotives included only six types, was afterwards changed to the above.

This order for 1,025 locomotives will be increased probably before July 1 to 1,200, the American Locomotive Company being given 145 more locomotives to make 700 locomotives, and the Baldwin Locomotive Works 30 more, to make 500.

Prices

The car orders were all placed upon the basis of the minimum bids as to costs for labor and materials with the understanding that any reduction in costs which may be obtained from these fixed prices will be divided equally between the Railroad Administration and the car builders, but any increase in these costs will be borne exclusively by the builders. The government will have supervision or control as to the prices of the materials required in construction and in cases where the government has fixed prices these will be the maxima, but an effort is to be made to secure steel and other materials at prices below those previously fixed. In this case the builders will have an opportunity to share in the saving.

The compensation of the builders in the case of both cars and locomotives will be approximately 5 per cent on the cost, as estimated on the minimum bid. The contracts with the locomotive builders provide that the government guarantee the cost of material and that if any saving is made on the estimates other than that on the material, that it be divided equally between the government and the builders.

In the case of the locomotives, the announcement stated that deliveries are to begin in July and continue monthly during the remainder of the year, and in the case of the cars that it is hoped that the entire order will be completed in time for the fall and winter business of the railroads.

The general specifications and dimensions of eight types of freight cars as designed by the administration's car committees were published in the *Railway Age* of March 29, and the general drawings were published the following week. In the issue of April 12 the designs for an all-steel box car were published. After negotiations with the War Industries Board it was found necessary to curtail the steel requirements of the car program to a considerable extent because of the needs of the Army, Navy and Shipping Board, and the cars ordered are of five types. While both a 40-ton and a 50-ton steel frame single sheathed box car were designed, the orders are for the 50-ton type. The 50-ton steel gondola,

the 70-ton hopper car and the all-steel box car have not been ordered, and it was necessary to make some changes in the design of the 55-ton hopper car to use wooden sides and ends. Some additional minor changes in the designs have since been made and designs for flat, stock and refrigerator cars are still under consideration.

The tentative specifications and dimensions of the locomotives were published in the issue of April 19. These have been undergoing some final changes and are expected to be completed by the latter part of this week.

The question of specialties has been under consideration for several weeks. The manufacturers of locomotive specialties were called into conference with the Central Advisory Purchasing Committee on April 1, and were requested to submit bids by April 29. The bids on car specialties were to be in by May 4, but in both cases some additional time was allowed.

The Railroad Administration's mechanical committee held meetings last week to determine the specialties to be used, but announcement will not be made until the contracts are awarded. The question of specialties was to be considered at a joint meeting of the mechanical committee and the Central Advisory Purchasing Committee this week. The prices for the cars, according to the announcement from the office of the director general, average between \$2,500 and \$3,000 apiece. These include an arbitrary figure for the specialties and the final price will depend on the actual cost of the specialties and labor and materials. The cost of the locomotives averages a little less than \$60,000, and it is understood ranges from about \$35,000 for the light switching engines to about \$90,000 for the heavy Mallet.

The statement given out regarding the locomotive order says: "The contracts were awarded on terms much more favorable to the railroads than the bids originally submitted by the builders." The terms for both the cars and the engines were the subject of protracted negotiations between John Skelton Williams, director of the division of finance and purchases, and the builders. It is understood that the car builders originally asked for cost plus 10 to 12 per cent, and that the locomotive builders originally asked 15 per cent. But they were required to submit their costs in detail, together with information as to their capitalization, previous profits, etc., and it was made evident that the Railroad Administration intended to drive a closer bargain than many departments of the government have.

The American Car & Foundry Company finally accepted approximately the terms proposed by Mr. Williams, and actually itself made the proposition which was adopted as the basis for the contracts. The other car building companies had to agree to accept the same terms to get orders. There has been much criticism in the railway supply field both of the government for using its monopoly power as the only purchaser of cars in the market to force down prices, and of the car company for accepting such terms. The American Car & Foundry Company has large orders from other departments of the government, on which it is understood to be receiving a much higher rate of profit, but had some untaken space that it could devote to cars. One company having accepted the low terms, it was manifest that others that refused to would not receive orders.

Specialties

A similar policy has been followed as to the specialties. When the manufacturers were asked to submit bids it was suggested that they forego royalties on patents and pool their patents so that several companies could manufacture the same device at the same time. While there has been no definite announcement of policy on the part of the Railroad Administration, it has asked the manufacturers in submitting their costs to itemize their royalties, and while there has been a great deal of opposition manifested to the idea

on the part of the supply manufacturers some for various reasons have offered to waive royalties.

Meetings with various groups of manufacturers are being held this week by committees representing the purchasing department of the administration at which an effort is being made to break down the iron and steel prices previously fixed by agreement by the War Industries Board and the Iron and Steel Institute, which in many instances represented considerable reductions under the prices which had previously prevailed. One difficulty about the plan is that the manufacturers of railway materials and supplies will have to compete for labor in many cases with neighboring industries handling other government contracts on the basis of 10 per cent profit on whatever the cost happens to be.

The attempt which is being made by John Skelton Williams, director of purchases of the Railroad Administration, to break down the government prices on iron and steel may lead to some very interesting developments. The existing iron and steel prices were fixed by President Wilson, effective on January 1, 1918, through his approval of an agreement reached by the government's War Industries Board, on the one side, and a committee representing the American Iron and Steel Institute, on the other hand. The agreement was reached in December and fixed prices on plate, shapes and bars which were based on the previous prices prevalent in the five pre-war years 1910-15, multiplied by certain differentials, which gave prices of \$2.90 per 100 lb. for steel bars, \$3 per 100 lb. for shapes and \$3.25 per 100 lb. for plates. By the terms of this agreement it was stipulated that there should be no reduction in the prevalent rate of wages in the industry. Subsequently the manufacturers of side frames, bolsters, couplers and similar articles, submitted to the Iron and Steel Institute a scale of prices which involved a reduction of 15 per cent from the prices in effect during the last quarter of 1917. Later, prices for malleable iron, springs, brake beams, etc., were submitted and verbally approved, though they have not been published. The iron and steel prices fixed have been mentioned in the published statements as "maximum" prices, but actually have been used as both minimum and maximum prices, and millions of dollars' worth of iron and steel products have been sold to the railway companies and other industries on the basis of these prices.

The contention of the Railroad Administration is that the iron and steel prices accepted by the War Industries Board are maximum, but not minimum prices, and that the railways should be sold iron and steel commodities at prices below the maximum. The railway specialty people point out, as already indicated, that millions of dollars' worth of commodities have been sold on the basis of these prices, that they have not been treated merely as maximum prices, and that since they were fixed there have been substantial increases in the wages of labor. One point which is urged with great force is that if the Railroad Administration succeeds in forcing down the government prices other government departments and commercial concerns will be left in the position of paying higher prices, that other government departments and commercial concerns will probably try to get the railroad prices and that the result will be to destroy the entire fabric of government iron and steel prices. Because of fear of this result the policy of the purchasing department of the Railroad Administration is arousing much antagonism among iron and steel manufacturers. It seems not improbable that the question of iron and steel prices to the railroads will get up to the War Industries Board and even to President Wilson before it is settled, as was the case with the question of prices of coal for the railroads.

Standardization Policies

The placing of the car and locomotive orders gives some additional indications of the government's policies as to

standardization. The statement issued regarding the locomotives says:

"The six standard types of locomotives, two sizes of each class, are expected eventually to supersede the many miscellaneous types and varieties of locomotives now in service, embracing engines built according to 500 or more varying specifications. This is the first time that any real forward step has been taken looking to the wide standardization of locomotive engines."

The announcement of the car orders also include the following:

"The five types of cars represent the standard forms of freight cars adopted by the Railroad Administration. These standards are the result of the labors of a committee of experts who for weeks past have been working upon the problem. The adoption of these standard types, it is believed, will eventually substitute a few scientifically worked out designs for the numerous miscellaneous varieties of cars, representing probably more than a thousand different old styles and specifications now in use, the accumulations of the past."

We have here a definite announcement that the standard types of car and locomotives are expected to represent a nucleus for eventually standardizing the entire motive power and car equipment of the railroads. They have not been adopted for the purpose of saving time in the placing of the car orders, for other orders for cars have been prohibited pending the adoption of the standard designs, and the fact that the five heavy Mountain type locomotives will be divided between the two companies, whereas they naturally could be turned out more quickly and at less expense if awarded to one company, indicates that they are expected to be the foundation for future similar orders to both companies.

While it is not expected that the six types (twelve designs) of locomotives and the five types of cars will meet all of the requirements in the way of varying conditions, it is understood that they have been selected as the types that will meet the greatest number of conditions, and will meet the most pressing demands. It is stated that the engines "will be allotted, upon completion, to the various railroad systems where they are most needed," that they will be lettered "U. S." and will remain the property of the government during its control of the roads. While the various railroads had been asked to signify how many of the standard locomotives they desired, they were given no opportunity to order any other kind, and they have filed their various requests for the number they desired to have allotted to them.

It is no secret that there has been a considerable difference of opinion in the Railroad Administration as to the extent to which the locomotive standards should be adhered to. Certain of the officers who have had to deal with the question have insisted on rigid standardization, while others have insisted that roads having special requirements should be allowed to order engines of their own designs. The memorandum recently addressed to the roads, in which it was stated that a road having unusual or unique situations to be met might make representation to the director general as to its individual necessity for a departure from the standard types, indicates a compromise between the two views. It has been stated that while it has never been expected that the types of locomotive adopted would serve all requirements, and that further variations would not be required, the intention is to make the more special types conform as closely as possible to those already ordered, using as many as possible of the standard parts. The requests for bids for specialties stated that no bid would be considered unless the device offered was interchangeable in its application with similar devices offered by other manufacturers, so that if various types of specialties are ordered a road may use the types it has on hand to replace others on any of the standard locomotives.

The list of car orders shows that the cars have been well distributed among the available plants, which will not only give each company a share of the business, but will probably insure more rapid delivery of a large number of cars than if the orders were placed with fewer companies. The distribution of the orders geographically will also simplify the distribution of the materials and avoid cross hauling. The Canadian Car & Foundry Company made strong efforts to secure a part of the orders, and at one time it was understood to have been awarded 7,500 cars, but the American companies opposed this, and the cars were later distributed to other companies. If later orders are found to take the capacity of the plants in this country the Canadian company will probably be considered.

The Railroad Revolution*

By W. G. McAdoo,

Director General of Railroads.

WITHIN THE LAST FOUR MONTHS we have gone through a tremendous revolution in this country, so far as the railroads are concerned. By one stroke of the pen, the President of the United States has transformed all these railroad systems, these separate, competitive systems, into one great unified transportation system for the purpose of making it certain that we, with the aid of our gallant soldiers and sailors, shall finish the military despotism of the Kaiser, and restore peace and liberty to a distracted world.

It is not only our soldiers and our sailors who are going to hand something to the Kaiser, but we railroad men are going to hand him something before we get through. We have it up our sleeves for him. He does not know it yet, but he will find it out before this war is ended.

The railroads of the United States have for a long time been the football of finance, of politics, and of all sorts of things. I am frank to say that I think it has been very hurtful to the country. I do not mean to reflect upon public bodies or officers or employees of railroads. I am not criticizing; I am only speaking of facts. The things that have happened back of us are of no consequence except in so far as they teach us useful lessons for the future. So long as the railroads of the United States were used primarily for private and selfish ends, so long as they were made a political question, the difficulties of reconciling contending and competitive interests with the public interest have been insuperable. Railroads have been controlled too much in times past by the financial powers of the country, and there again I speak in no critical sense. I speak of it only because I want you to understand the conditions and what it is that we must do in the future to handle the railroads wisely. We must learn useful lessons of the past and apply them in the way that will best serve the vital interests of America.

The old private control has been abolished. We have a competitive system of railroads in the United States no longer. When I look at a locomotive or a freight or passenger car passing me, I do not care what name is painted on it—I can not see it. The only thing I can see on them is "U. S." I see those great machines going by, pulsating with life and energy, representing the majesty of America with Uncle Sam's engineers and firemen in the box and Uncle Sam's freight men and trainmen in control, and I see Uncle Sam's officers, train masters, train dispatchers, clerks, yardmen, and trackmen and everybody else in the railroad service of the United States on duty and keeled up with a desire to make themselves of the greatest service

*Excerpts from an address to railroad employees at El Paso, Tex., April 7, 1918.

to the country in this hour of national peril. When I see these things it makes me very proud of you railroad men and very eager to be able to measure up to the great responsibilities that have been put upon me, to help you men do this great job for our beloved country. I doubt my own fitness and capacity, but as the President has chosen me for this service, like a good soldier I have responded, determined to do and to give the very best that is in me. Because I do not know it all, I want to learn all I can, and I know that I can not do this great job unless I have the loyal support and co-operation of the real soldiers of the railroads, because you, my friends, are soldiers in the ranks. You are soldiers of liberty. You are fighters for freedom. You and your officers are those upon whom I must rely if my services in this great railroad enterprise, this unified government control, are to be worth anything to the country or to you.

The railroads must function to the highest degree. Do you realize that we can not send our men across the high seas and protect them there, give them a chance to fight for their lives and for our safety, if the railroads do not function—not 50 or 60 or 90 per cent, not even 100 per cent, gentlemen, but 150 per cent, if necessary. If we make the railroads function even 150 per cent, is that comparable to the sacrifices that an American soldier makes upon the bloody battle field when he gives his life for us, or is maimed for life while fighting for us? By contrast, my friends, there is nothing we can do here that can compare with the sacrifices that our sons must make for us before the world is free again.

So I want to beg every railroad man—not only the officers, but the employees as well—to rededicate themselves to the service of their country. You are no longer the employees of any private railroad or corporation. You are employees of Uncle Sam. We are all enlisted in this one great service as fellow soldiers in the legion of liberty. If we pull together, if we do our work to the limit, if we spare ourselves in no way to accomplish the results, we shall certainly get them; there will not be an American soldier in Europe who will suffer because the railroads have not done their full part.

One thing we must all learn is this—that the old conditions have disappeared. We are all serving a common master—we are serving Uncle Sam. We are partners in a great and glorious enterprise. We must not encourage suspicion of each other. We must co-operate with each other. We must devote ourselves whole-heartedly to our work. We must respect our superior officers as we expect our superior officers to respect us. We must go forward with an unalterable determination that the rule of individual action must now be one thing and one thing only—an unselfish and unremitting

love of country—a pure and undefiled Americanism above everything else.

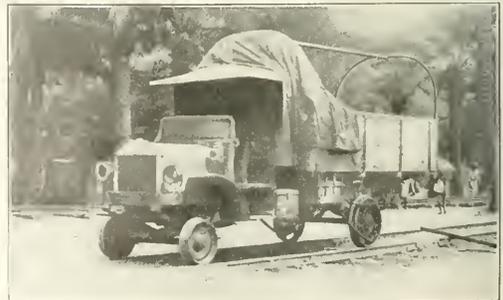
I have to speak judiciously about the question of wage increases for the moment, because, having selected a commission to investigate the subject, I must let the commission complete its investigations and make its recommendations before I take action. But when the report comes in, I shall make a decision as promptly as I can after I have read the report. I am as anxious as you are to get these questions back of us. Perhaps I may be inadvertently a benefactor of all the men and their wives who are involved in this problem, because if an increase is granted, the full amount will have been saved for them, and can be invested in Liberty bonds. You will not have spent the increase in the meantime. Sometimes enforced saving is a mighty good thing. I wish Uncle Sam would hold back some of my pay and enforce savings upon me, if I could stand it. But Uncle Sam does not give me, as you know, any pay whatever for running the railroads of the United States. I am serving as Director General of Railroads without a cent of compensation, but I am delighted to serve for nothing if thereby I can be of the least value to my country.

But I do not want you men to serve for nothing, and I do not want you to be inadequately paid or unjustly treated. Railroad men have been cuffed about the country a great deal during the last few years, when there has been so much prejudice against the railroads, and the public attitude toward railroad managements as well as toward railroad employees has not been sympathetic, to say the least. Now we are all servants of the people of the United States, and I am sure that the public attitude is going to be different. It rests with us to make it different. We can earn the respect, sympathy and good will of the public by giving it a square deal, as we want the public to give us a square deal. You railroad men are all my boys now, and so long as you do your duty I do not intend to let anybody kick you around. You will find that I will defend you to the limit of my power as long as you are right, and I know that you will not expect me to defend you if you are wrong, because I won't. I am sure, however, that you will not be wrong, because we have a new inspiration to service now—to serve our great and glorious country in this desperate war between our democratic ideals and the repulsive ideals of the German military autocracy. We are, therefore, serving no private interests but our own interest, so long as the government controls the railroads, and we can go forward shoulder to shoulder, as patriotic and loyal citizens, determined to do our best, and in doing our best to serve ourselves as well as to serve our country. I want to express my appreciation to the railroad men of the United States for the subscriptions they have made heretofore to Liberty bonds.



Photos from Underwood & Underwood, N. Y.

A Belgian Salvage Party Makes Use of the Light Railway



A British Motor Truck on the Baghdad Railway

Doings of the United States Railroad Administration

Director General Returns to Washington Where Many Important Affairs Await His Attention

DIRECTOR GENERAL McADOO returned to Washington on May 7 after an absence of nearly a month on his tour of the country making Liberty Loan speeches and a brief period of rest at White Sulphur Springs. There were many important matters awaiting his attention or decision, which had been developed by his staff during his absence, but an attack of tonsillitis compelled him to remain at his home for a few days.

One of the important matters which was expected to be decided soon after his return was the report of the Railroad Wage Commission. This has now been completed, or practically so, and a copy was taken to him to look over at White Sulphur Springs for his decision. It is understood, however, that the report is not yet entirely ready to be given out but it is known in a general way that it will recommend increases in wages for practically all classes of railway employees which will amount to several hundred million dollars a year.

Another matter which is practically ready for his approval is the contract with the express companies, which are to be merged into a single company and make a contract with the Railroad Administration for handling the express traffic on the basis of an approximately equal division of earnings. The negotiations have been carried on by the representatives of the express companies and the Division of Public Service and Accounts.

The question of what prices the railroads are to pay for coal, whether the standard government price or a lower price, is also expected to be settled as soon as Mr. McAdoo can be consulted. This has been the subject of a controversy between John Skelton Williams, director of finance and purchases, who insisted on the railroads being allowed to make contracts at a lower price than other consumers, and the Fuel Administration, which has insisted on the regular price. The question was referred to President Wilson. Involved with it is also the question of car distribution. It is reported that the President has approved a plan by which mines furnishing railroad fuel coal will no longer receive preference in car supply, but that the cars will be distributed ratably to all mines and the Fuel Administration will regulate the distribution of the coal. It is expected that Mr. Williams' efforts to break the other government standard prices on raw materials will also be taken up with Mr. McAdoo and possibly with the President.

Rates to Be Increased

Increases in freight and passenger rates are also expected to be taken up by the director general shortly. It is understood that the preliminary work looking to increased rates is now being done by the Division of Traffic and that the amount of the increases to be proposed will depend to some extent upon the amount of the wage increases to be made.

The preliminary reports issued by the Interstate Commerce Commission of earnings and expenses for the first three months of the year show alarming decreases in operating income even without the effect of the wage increase, which is to be retroactive from January 1.

Standardization of passenger fares, and possibly to some extent of freight rates, is to play a considerable part in the move for higher rates. Rate clerks from roads in all parts of the country are at work in Washington on the compilation of a national mileage table, showing the distances be-

tween all points, which it is understood is to be made the basis for a mileage system of fares and will obviate to a large extent the necessity for rate clerks and complicated tariffs because fares will be based largely on mileage, although equalized to a certain extent between common points. The basic rate of fare has not yet been determined, although there have been reports that it would be a minimum of three cents a mile.

Although the complete reports of earnings and expenses have not yet been issued for any month of this year, it is becoming well understood that without large rate increases the Administration is facing a large deficit and the proposed rate increase when announced is expected to make the increases formerly asked by the railroad companies, which have aroused such protracted and bitter controversies, seem rather insignificant in contrast.

The director general is expected also to interest himself in the negotiations regarding the standard form of contract governing the compensation of the railroad companies, which have been conducted by committees representing the companies and the Administration. The conferences on this subject have been protracted and although it is understood that the two sides are gradually approaching an agreement it is said to be possible that the presence of the director general may serve to expedite matters.

Consolidated Ticket Office at Washington

The United States Railroad Administration's consolidated ticket office at Washington, which in some respects is a model for the centralized ticket offices to be established throughout the United States, was opened on Monday, May 6. The office is centrally located at the corner of Thirteenth and F streets and replaces nine offices formerly maintained by the individual railroads. The general plans for the Washington ticket office were worked out by a committee of passenger officers appointed by the Railroad Administration, consisting of H. F. Cary, general passenger agent of the Southern; J. P. Anderson, passenger traffic manager of the Pennsylvania, and W. B. Calloway, passenger traffic manager of the Baltimore & Ohio.

The Washington office consists of a long, rather narrow room with a broad ticket counter about 80 feet in length running nearly the full length. Behind the counter are two large ticket cases, each of which carries a full set of ticket forms which can be used to reach any point in the United States, Canada or Mexico and Cuba. Sixteen ticket sellers are on duty and each one is expected to be able to handle ticket sales to any point and to complete the entire transaction, including the selling of Pullman accommodations and making arrangements for the transfer of baggage.

A special feature, which is to be used also in other offices is a new method of handling Pullman reservations. All Pullman diagrams are centralized at the ticket office in the Union Station and a private telephone system consisting of 22 direct lines has been installed between the ticket office and the station so that each ticket seller is able simply by lifting the receiver of his telephone to secure the attention of the diagram office, obtain the information desired and reserve space. The telephone calls do not pass through an exchange and the ticket clerk can talk to the Union Station office and fill out his ticket blanks more easily than he could look up a diagram in his own office. The fact that the ticket clerks sell both passage and Pullman tickets

avoids the necessity of passengers having to stand in line twice.

While a considerable saving in rentals was made by the discontinuance of the separate offices and the centralization in one office, the entire ticket selling force of the separate offices was taken over and in some cases salaries were increased. The office has been rather crowded thus far since it was opened, but it is expected that customers can be accommodated more rapidly as soon as the clerks become more accustomed to selling to all points. For example, the first ticket was sold by a man formerly in the Baltimore & Ohio office to an obscure point on the Southern Railway, while the second was sold by a Southern Railway man to a point in North Dakota. The clerks were naturally less familiar with the consolidated ticket stock than with the stocks they had been used to handling.

In the Washington office, as in each of the other consolidated ticket offices, a man is stationed to answer inquiries regarding freight transactions. While he is not equipped to quote rates or to issue bills of lading, he is expected to furnish general information desired by the public and if necessary to refer inquirers to the proper office of an individual road.

In the basement is a well equipped locker room for employees and here are also kept reserve ticket stocks, etc.

Tickets to Be Standardized

A ticket standardization committee appointed by the division of traffic of the Railroad Administration has been at work in Washington for the last week or so on plans for simplifying ticket contracts and ticket forms. It is probable that the work of the committee will also result in interchangeable tickets similar to that already adopted for use between Chicago and St. Louis, which will be good for passage over any route between the points named. The committee consists of O. P. McCarthy, formerly passenger traffic manager of the Baltimore & Ohio, chairman; C. A. Fox, secretary of the Central Passenger Association, secretary; J. D. Rehner, general passenger agent of the Florida East Coast, and J. V. Lanigan, assistant general passenger agent of the Illinois Central, representing the southeastern roads; W. J. Cannon, assistant general passenger agent of the Chicago, Milwaukee & St. Paul, and F. E. Batturs, general passenger agent of the Southern Pacific, representing the western roads, and W. L. Pratt, chairman of the New England Passenger Association, who, with Mr. McCarthy, represents the eastern roads.

Handling of Live Stock

The Car Service Section has issued a bulletin stating that it is advised by the Director of Inland Transportation, War Department, that it has been decided that all shipments of live stock made by that department shall be handled in strict accordance with the twenty-eight-hour law, and that attendants are directed not to sign release permitting confinement for a longer period without unloading for feed and rest in accordance with the law regulating the handling of live stock, except in the most extreme cases, when, due to unavoidable delays, it may be impracticable to unload within the twenty-eight-hour limit.

Weekly Financial Reports

All carriers subject to federal control are required by General Order No. 23 to render a weekly report of cash resources and requirements to the treasurer of the United States Railroad Administration, showing also estimated cash receipts and requirements during the remainder of the current month and the subsequent month.

GUATEMALA IMPORTED RAILWAY SUPPLIES to the value of \$128,170 in 1917.—*Commerce Reports*.

Orders of the Western Regional Director

DURING THE PAST WEEK R. H. Aishton, regional director of western railroads, Chicago, has issued the following orders to the lines under his authority:

Execution of Contracts

In a circular dated April 30, the regional purchasing committee has supplemented its letter of April 24, in reference to the submission of contracts to it for approval, as follows:

Contracts recommended for approval should be executed by the railroad and forwarded in duplicate, one copy to be retained by this committee. Your action in executing contract before submitting it, indicates that you assume responsibility for its being the most advantageous contract that you can secure as a result of competitive bids.

Please see that all contracts submitted for approval are complete in every respect. In those cases where a contract is executed by the seller before submitting, it must be understood that it is not binding and should not be delivered until approved by this committee.

Passenger Cars and Freight Cars on Order

Circular No. 94 asks for the following information on passenger and freight cars that railroads have on order: Name of builders, shop, date of contract, purchaser, description of cars, number due on January 1, 1918; number delivered January 1 to March 31, number due April 1, deliveries scheduled.

Inspection of Materials, Locomotive and Car Construction

Circular No. 91 calls for an inventory of the facilities and forces as now organized upon the various railroads for material inspection and construction inspection. The circular reads as follows: Herewith find blank forms and a sample form which has been filled out for the A. B. & C. Railroad to illustrate the way in which this form should be made out, showing the present organization of your material inspection forces. In connection with this form, please note that if the foreman in charge acts as field inspector for more than 50 per cent of his time, he should be classed as field inspector only.

There are also attached separate blank sample forms which are to be filled out showing the various construction inspectors carried by the railroads, one form for locomotive inspectors and one for car inspectors. If more forms are required, the railroad will reproduce the necessary number. If the forms as made out do not exactly cover the conditions on certain railroads, it is desired that supplemental data be furnished to cover the full intent of the form.

Also advise to whom communications should be addressed regarding: (a) Materials—inspection and test; (b) locomotive building inspection; (c) car building inspection.

This report does not include tie inspectors. Roads having a separate organization for inspection of ties will continue it under direction of the regional purchasing committee.

Selling or Reclaiming Scrap

Circular No. 92 reads as follows: On account of the shortage of iron and steel, the War Industries Board and the Council of National Defense call attention to the necessity for picking up and either selling or reclaiming every piece of scrap iron or steel, dismantled machinery, obsolete iron and steel material or machinery that can be found on each road.

The Railroad Administration directs that special attention be given this matter and all such scrap metals and material be disposed of to the best advantage as soon as possible. A thorough canvass of the entire situation should be

made, taking into consideration unused plants with obsolete machinery, or rail and fastenings laid in abandoned gravel pits, industry tracks, logging roads, etc., etc., which are no longer of use. Each road will please report to this office on or before May 31, what has been accomplished.

Employees' Magazines

Western railroads which publish employees' magazines have been requested to supply the regional director with copies of their last issues and the following information: 1 How frequently published; 2 Total expense of publication; 3 Revenue derived from advertising; 4 Net expense for publication; 5 Advantages expected to be obtained from publication.

Diversion or Reconsignment of Freight

In a communication dated May 4, the regional director says: The question has been raised on orders for diversion or reconsignment of freight traffic while in possession of rail carriers, whether the road receiving the diversion orders from the shipper or other party in interest, or the road in possession of the freight should determine whether the diversion order should be accepted and the diversion made; also with which road the financial responsibility lies in case of the acceptance of diversion order from an irresponsible party or for other reasons the acceptance and accomplishment of the diversion order results in the liability of one or more of the roads handling the freight.

It is held that the road receiving the order for diversion or reconsignment from the shipper or the party in interest shall determine whether that order shall be accepted and accomplished, and should any financial liability result from the acceptance and accomplishment of the order, then the road that received it from the shipper and determined that it should be accepted and accomplished will be financially responsible to its connections for any loss or liability that may result.

Tariffs Naming Intrastate Rates

In order to permit an intelligent consideration of the question of uniformity in state and interstate rates, western lines have been instructed to prepare an analysis in duplicate of freight tariffs published by them which contain rates, rules or charges applicable on intrastate traffic only. The purpose of this analysis is to have ready at the earliest possible moment a detailed statement of the tariff or tariff items which may have to be amended, cancelled or filed with the Interstate Commerce Commission, to eliminate conflicts, bring all rates to a new basis and have one rate and only one published for each service, and that rate applicable on all business, both state and interstate and filed with the Interstate Commerce Commission. The information asked for in this letter (dated April 30) is to be listed on two forms, one covering interstate tariffs naming intrastate rates and the other state tariffs not filed with the Interstate Commerce Commission.

Publication of Freight Tariffs

In Circular No. 93, the regional director gives the following instructions: The cost of compiling and printing freight tariffs in the United States is variously estimated from \$5,000,000 to \$8,000,000 per annum. An attempt will be made to reduce this cost by simplification and consolidation of tariff issues. For this purpose, you are asked to furnish in duplicate a statement of your tariff issues according to a form attached. One copy of this statement will be sent to Washington and the other copy will be retained here. It is understood that exact answers cannot be made to many of these questions, but the best possible estimate should be furnished and your report should show whether the figures are actual or estimated.

Among the questions asked in the form accompanying this circular are the number of freight tariffs and the number of supplements and amendments thereto published by each road in 1917, the cost of compiling, printing and distributing them; the total amount paid for freight tariffs (including amendments and supplements) issued by freight associations, bureaus or publishing agents, the proportion of space in all freight tariffs, amendments and supplements (issued by each road and in effect December 31, 1917), covering rates, rules, etc., applying locally between points on each road, and the proportion applying jointly with other lines; the proportion covering rates, rules, etc., on tariffs which have been competitive with other roads and which were a practical duplication of matter published by another road or by a publishing agent; and the proportion which were the same or substantially the same or exceptions to those printed in a classification or circular issued by a publishing agent.

Industrial and Agricultural Development Work

Circular No. 97, dated May 2, states that the staff of the director general has reached the following conclusions as to expenditures for industrial and agricultural development work:

- 1 Nothing should be expended in these days for industrial development. Our man power is too little for the industries already established other than those which relate to the immediate activities of the war.
- 2 Carriers may, to some extent, continue expenditures for agricultural development. In no case should expenditures for the year 1918 exceed those for 1917 and ordinarily they should be less.
- 3 It is felt that railroads in making these expenditures should get into close touch with the Agricultural Department (at Washington) and should permit that department to occupy what may be termed the scientific or special field of that work.

Conserving Supplies and Materials

The director of the division of Transportation has issued the following instructions dated May 6, which should be observed in connection with Circular No. R. P. C. 10:

"In view of the increasing difficulty in obtaining a sufficient amount of steel and iron products, it is more important now than ever that every effort be made to reclaim and make repairs to old material instead of using new, and under no circumstances must material be scrapped until

1. It is known positively that it cannot be satisfactorily repaired.

2. That the cost of repairs will be prohibitive.

"Each road will appoint a 'reclaim committee,' which will make a study of the proposition and put into effect the necessary methods to carry out the desired results and make recommendations for devices or apparatus that will best serve the purpose of conservation of all kinds of material."

Overtime Payments to Trackmen

Paragraph "G" under Section 2 of Circular No. 63 reads as follows: "Roads now paying, or under contract to pay, trackmen time and a half for Sunday and night work may continue this practice, and other roads in the same territory may adopt the same practice, if they so desire."

Statements have been made that some lines have not been observing these instructions. There should be no deviation from the rules as outlined in Circular 63 without definite approval from this office. Any railroad that was not paying time and a half for overtime for Sunday work to track labor when this circular was issued should not institute the practice without definite approval from this office.

Surety Bonds

In order to prevent any question as to whether surety bonds cover also the interests of the United States, it has been arranged to place a rider on all surety bonds issued to any railroad under Federal control to cover this point. Nine surety companies have been requested to arrange for its attachment to surety bonds.

Extensive Reductions in Western Passenger Service

Readjustments of Schedules Involving Elimination of
Nearly 12,000,000 Train-Miles a Year

ADDITIONAL REDUCTIONS in passenger train service on western railroads amounting to 11,728,218 train-miles per year will become effective on June 1, or shortly thereafter. The changes will be made in conformance with a detailed report recently prepared by the passenger traffic committee of the western region, P. S. Eustis, chairman, and approved by the director general. Changes recommended by this committee will be substantially as outlined in the report as summarized below, although a few additional alterations of the proposed schedules may yet be made before June 1. It will be observed that no radical reductions in train service have been made. On the contrary, it has been the purpose of the committee to provide through service ample for the needs of the traveling public, although in doing so the schedules of individual lines have been disregarded and the service of all the lines involved has been considered as a whole. At the same time, it has been the aim of the committee to preserve on each railroad sufficient trains to serve local needs as well as the needs of individual communities for through service.

Four northbound trains between Chicago and St. Paul have been removed and two new trains added, making a net reduction in service of two trains. Southbound between the same points five trains have been taken off and two trains added, making a net reduction of three trains. The new schedules, therefore, will provide 19 northbound and 16 southbound trains daily between Chicago and St. Paul, compared with 21 northbound and 19 southbound under the old schedules.

Under this plan the Chicago & North Western will operate two day trains and three night trains between Chicago and St. Paul as compared with two day and four night trains under the present schedules. Southbound it will have two day trains and two night trains as compared with two day and three night trains under the present plan. The North Coast Limited will not run south of St. Paul. The Chicago, Burlington & Quincy, Pacific coast train leaving Chicago at 10:30 a. m. and the southbound coast train leaving St. Paul at 11:30 p. m. have been removed, while the southbound coast train leaving latter point at 8:30 a. m. will remain in service. Under the revised schedules the Burlington will have two night trains and one day train northbound and one night and two day trains southbound. This is equivalent to a net reduction of one train each way on the Burlington. All four of the Pacific coast trains on the Chicago, Milwaukee & St. Paul have been retained. The only trains discontinued between Chicago and St. Paul are the northbound train now leaving Chicago at 9:40 p. m. and the southbound train leaving St. Paul at 7:30 p. m. The only additional change in service between Chicago and the Twin Cities is the lengthening of the schedule of the Chicago Great Western train leaving Chicago at 8:30 p. m. to 13 hours.

Between Chicago and Omaha a net reduction of three trains each way will be made. Westbound the North Western trains leaving Chicago at 9:40 and 10:00 p. m. and the St. Paul train leaving there at 10:05 a. m. will be discontinued, while eastbound the North Western trains leaving Omaha at 8:35 and 10:10 p. m. and the St. Paul train leaving at 7:50 p. m. will be eliminated. The schedule of the Illinois Central train leaving Chicago at 5:30 p. m. will be lengthened to 15 hours. All of the trains removed are Pacific coast trains.

Between Chicago and Kansas City there will be a reduc-

tion of three trains each way. The Atchison, Topeka & Santa Fe trains leaving Chicago at 10:30 and 4:45 p. m. and leaving Kansas City at 8:30 a. m. and 6:15 a. m. have been eliminated. The 10:30 p. m. train westbound has also been discontinued between Kansas City and the coast, while the train leaving Kansas City at 8:30 a. m. for Chicago has been discontinued from the coast to Kansas City.

On the Rock Island the Pacific coast trains leaving Chicago at 9 a. m. and 8:05 p. m. will be discontinued between Chicago and Kansas City, but will continue to operate from there to Tucumcari, N. M. Eastbound, the Pacific coast trains arriving in Kansas City at 10:40 p. m. and 7:35 p. m. will no longer operate to Chicago.

On the El Paso & Southwestern one train in each direction will be removed between Tucumcari, N. M., and El Paso, Texas.

The Great Northern and the Northern Pacific will continue to operate the same number of trains between St. Paul and the coast. One train in each direction has been discontinued on the Los Angeles & Salt Lake between Salt Lake City, Utah, and Los Angeles, Cal. The Southern Pacific will discontinue the operation of its westbound train leaving Ogden, Utah, for San Francisco at 1:30 a. m., and its eastbound train leaving San Francisco for Ogden at 12:40 p. m. The time of its westbound train from New Orleans to Los Angeles, leaving the former city at 11:30 a. m., has been lengthened to 64 hours, while the schedule of the eastbound train between the same points, leaving Los Angeles at 8:30 a. m. has been similarly lengthened. One train in each direction has been discontinued between Los Angeles and El Paso.

On the Union Pacific three westbound and three eastbound trains have been discontinued between Omaha and Ogden. In addition two trains in each direction have been consolidated.

The service between Portland and Seattle has been reduced by three trains in both directions. The schedules have been finally approved and will go into effect on May 14.

The committee is still studying the train service between St. Paul and Omaha, and it is not unlikely that one train will be removed between these points. It will also issue a supplementary report containing proposed changes in service between St. Louis and Kansas City and between St. Louis and Kansas City and Texas points. The readjustment of service outlined in this article involved a considerable number of changes in the times of departure and arrival which we have not attempted to cover. The following table shows the reductions in train-miles per year for the individual roads which will be affected by the new schedules:

PASSENGER TRAIN MILEAGE REDUCTIONS.	
A. T. & S. F.	1,560,010
C. & N. W.	815,738
C. St. P. M. & O.	298,570
C. B. & Q.	573,780
C. M. & St. P.	1,012,116
C. R. I. & P.	973,820
E. P. & S. W. System.	241,650
Great Northern	None
I. A. & S. L.	621,960
Northern Pacific	235,790
Southern Pacific	1,548,330
Union Pacific	2,383,450
Union Pacific (OSL)	178,850
Union Pacific (OW)	.....
Portland-Seattle Lines	403,690
Summer Service Off.	.....
C. B. & O.—Chicago-Colo.	442,552]
U. P.—Omaha-Colo.	249,252]
C. R. I. & P.—Belleville-Colo.	188,660]
Total	11,728,218



Philadelphia—Chestnut Hill Electrification

Latest Improvements in Catenary Construction Used on
This Branch of the Pennsylvania

THE CHESTNUT HILL electrification is an extension of the Philadelphia-Paoli electrification, connecting with it at a point near West Philadelphia, and extending over the main line to North Philadelphia and over the Chestnut Hill branch to Chestnut Hill. The distance from Broad Street to Chestnut Hill is twelve miles. The length of the new electrified Chestnut Hill line is 10 miles, 2.3 miles of which is four track and 7.7 miles double track.

There are at present in daily operation 21 trains, totaling 88 cars, in each direction. It is expected that this service

Hill was 55 minutes, or a schedule speed of 20 miles per hour. The electric service is at present operating on former steam schedule, but when the next time table is issued this schedule will be reduced to 33 minutes. The westbound schedule being chiefly down grade is three minutes shorter than the eastbound.

The average grade between North Philadelphia and the junction with the Philadelphia-Paoli electrification is .38 and the maximum grade is 1.3 per cent, near the easterly approach to 36th Street tunnel. The difference in elevation between the junction of the Chestnut Hill branch with the main line at North Philadelphia and the end of the track at Chestnut Hill is 297 feet, or an average grade .84 per cent. The maximum grade on this branch is 2.5 per cent between Highland station and Chestnut Hill. A map of the Chestnut Hill branch and its connection with the Philadelphia-Paoli line are shown in Fig. 1.

Of the total of twelve miles of Chestnut Hill electrification, eight miles are on tangent and four miles on curved track. The heaviest curve at North Philadelphia is 11 deg. and is about 2 miles in length. The remaining curve track varies from 0 deg. 40 min. to 50 deg. 20 min., most of which is on rising grade.

There are 11 stations on the Chestnut Hill branch, spaced about one half mile apart, except in one case where the distance between stations is one and one half miles.

Power System, Transmission and Distribution

Power for the Chestnut Hill electrification is furnished by the Philadelphia Electric Company. The power station is on the east bank of the Schuylkill river at Arsenal bridge. Three-phase power is generated at 13,200 volts, and is

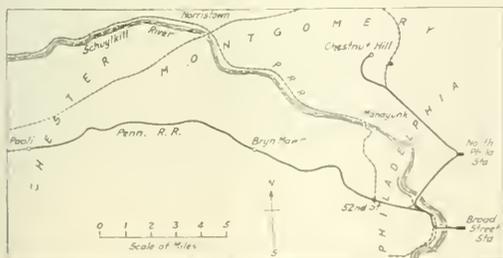


Fig. 1—Map Showing Location of Newly Electrified Section

will be increased when more normal traffic conditions permit. The electric equipment is designed to handle a service of 32 trains each way per day, the rush-hour service being eight-car trains on a five-minute interval. The running time of the steam trains eastbound from Broad Street to Chestnut

transmitted over four 350,000 c.m. three conductor submarine cables to the Arsenal bridge transformer station, which is located on the west bank of the river, about opposite the power house.

Power for the Paoli electrification was taken from one-phase of the Philadelphia Electric Company's system. With the Chestnut Hill load added, the three-phase power (somewhat unbalanced) is transmitted to the Arsenal bridge transformer station, in which two groups of Scott connected transformers are employed for transforming the supply into two-phase 44,000-volt power. Phase balancers are installed in the Philadelphia Electric Company's power house to correct the unbalancing which occurs due to the variation in load requirements of the Paoli and Chestnut Hill systems. From the high tension sides of the step-up transformers there are four 44,000-volt single-phase feeders, two for Paoli and two for the Chestnut Hill electrification. The middle point of the high tension winding on each of the transformers is connected to ground through a resistance, thus reducing the voltage between any wire and ground to 22,000 volts. From the Arsenal bridge transformer station the four single-phase transmission lines run to the West Philadelphia transformer station, where connections are made to each line. From the West Philadelphia transformer station they continue west, two running to the Bryn Mawr and Paoli transformer stations of the Paoli electrification, and two to the North Philadelphia and Allen Lane transformer stations of the Chestnut Hill electrification.

For the Chestnut Hill supply, transmission lines are of



Fig. 2—Transmission Pole Carrying 44,000 Volt Line

stranded aluminum steel reinforced wires, having a conductivity equivalent to 2/0 copper, carried on cross arms on separate transmission poles of sufficient height to clear all highway bridges and crossings. A signal power line of stranded aluminum steel reinforced wires, having a conductivity equivalent to 1/0 copper, is carried from North Philadelphia to Chestnut Hill on cross arms placed on the transmission poles below the power transmission cross arms. The signal power line of insulated copper wire, from

the source of supply at West Philadelphia transformer station, is carried underground in ducts to North Philadelphia, where a one to one ratio transformer separates it from the aerial aluminum line, thus sectionalizing the underground line from the aerial. The transmission lines are protected by a 3/8-in. Siemens-Martin galvanized steel ground wire carried on top of the transmission poles. A general view of a transmission pole is shown in Fig. 2. It was decided to use aluminum steel reinforced transmission wire because of the material saving in cost as compared with copper.

Safety ties of special design are used on both the power and signal transmission lines on poles adjacent to highway

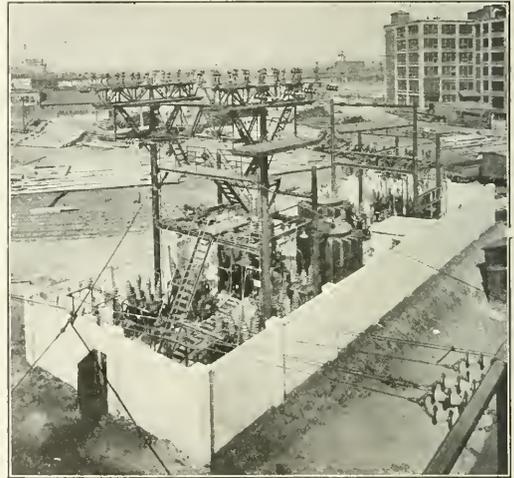


Fig. 3—North Philadelphia Transformer Station

crossings and station platforms in order to insure against burning off and falling of wires in case of insulator failure. These safety ties consist of flat galvanized iron plates, 3 1/2 in. wide, placed under and clamped to the transmission wire and to yokes on the insulators. The plates extend about 18 in. beyond the insulators. Two insulators are used at highway crossings and on sharp curves.

The equipment in the West Philadelphia transformer station originally consisted of two 2,000-kva oil insulated water cooled step-down transformers. In order to take care of the Chestnut Hill electrification, two 3,000-kva oil insulated water cooled transformers were installed in this transformer station and connected to the Paoli phase. The 2,000-kva transformers which they replaced were connected to the two Chestnut Hill transmission lines and trolleys. At the North Philadelphia transformer station, located 4.4 miles from the West Philadelphia transformer station, provision is made for sectionalizing the two transmission lines where they cross on the steel structure of the station, and each of the transmission lines is connected to the high tension bus through an oil circuit breaker. From this point the two transmission lines continue on for a distance of 5.3 miles to the Allen Lane transformer station, where they dead-end, and are connected through oil circuit breakers to the high tension bus.

Both the North Philadelphia and Allen Lane transformer stations are of the outdoor type and each is equipped with two 3,000-kva single phase radiator type self-cooled oil insulated transformers, stepping the voltage down from 44,000 to 11,000 volts. All of the transformer station

apparatus is designed for outdoor service. The terminals on all transformers and oil circuit breakers are equipped with high voltage porcelain insulators, and all of the live parts and operating mechanisms are enclosed in weather-proof cases. The transformer station equipment is protected from lightning discharges and surges by means of electrolytic lightning arresters on the high tension and trolley feeders. In each of the transformer stations there is a small brick or concrete building in which the relays for automatic circuit breaker tripping and the magnet or relay switches for closing the oil circuit breakers are located. These buildings also contain a filter press for cleaning and drying the oil in the transformers and oil circuit breakers.

In the case of the Allen Lane transformer station the building also contains a small storage battery and motor generator set for charging the battery, which is used for automatic circuit breaker tripping. Power for this purpose in the case of the North Philadelphia transformer station is obtained from a storage battery in GD Signal Tower. Each transformer station is equipped with a large tank of sufficient capacity to hold the oil from one transformer, and, in addition to this, small tanks are provided into which the oil from circuit breakers is pumped for cleaning and drying. All oil circuit breakers are mounted on angle iron frame work and are equipped with a tank lifter for raising and lowering the tanks to permit easy inspection and repairs to

down transformers in each transformer station. One of these transformers is connected to the 44,000-volt bus and the other to the 11,000-volt bus. The voltage used for remote control closing and tripping of circuit breakers is 440-volt A.C., while 60-volt D.C. current is used for automatic tripping by relays. A view of the North Philadelphia transformer station is shown in Fig. 3.

The catenary system is carried on bridges spaced about 300 ft. apart. Catenary construction consists of a steel messenger or supporting wire, secondary messenger or auxiliary trolley and a contact trolley. The secondary messenger and contact trolley are clamped together with bronze



Fig. 4—Structural Pole Without Guys for Two Track Construction



Fig. 5—Extra Heavy Tubular Pole Without Guys for Two Track Construction

clamps, spaced 15 ft. apart, and both are supported from the messenger by flat steel galvanized hangers every 50 ft. on tangent track, and 15 ft. on curved track. The type of catenary hanger is the same as that used on the Philadelphia-Paoli electrification.

The catenary is anchored approximately every mile on either overhead highway bridges or signal bridges designed to support the catenary over all tracks on either side of the bridge in case of a break in the catenary system on the opposite side. Catenary supporting bridges are of several types, designed to fit different conditions and locations. Wherever possible tubular pole construction with guys is used, shown in the illustration at the beginning of this article. This type of construction is used exclusively for supporting the catenary over the two tracks on the branch. Structural poles and extra heavy tubular poles, bracket type construction, without guys, as shown in Figs. 4 and 5, are used over the two track construction on the branch where space will not permit the use of guys. Other types of bridges are shown in Figs. 6 and 7.

The messenger wire is of 1 1/2-in. extra high strength seven wire steel strand galvanized, having a breaking strength of 27,000 lb. The secondary messenger is of 2/0 grooved

circuit breakers. Transformers are equipped with a thermostat alarm which operates in case of excessive heating.

The North Philadelphia transformer station is controlled from GD signal tower, which is located a short distance away, and the Allen Lane transformer station is controlled from CW signal tower located near the transformer station. Lead covered control cables, carrying the necessary conductors, are run from the transformer stations to the towers in trunking underground. Power for closing circuit breakers and for auxiliary purposes is obtained from two small step-

copper wire. The contact trolley is of 3/0 grooved copper alloy (phono-electric) wire. The cross catenary consists of a messenger wire of 3/4-in. extra high strength 19 wire steel strand galvanized with a body strand of 1/2-in. diameter wire of the same material.

The catenary system is insulated from supporting bridges by three shell suspension type Locke insulators, as shown in Figs. 4 and 5. The catenary system is insulated from the overhead highway bridges by Ohio Brass post type insulators, as shown in Fig. 8.

The rails of the main line tracks are double bonded at each joint with two pin type expanded terminal bonds of No. 1/0 B. & S. gage, each bond consisting of 37 strands

underground in trunking on the Chestnut Hill branch. These lines parallel the tracks at an average distance of 20 feet. Recent tests which have been made demonstrate the fact that booster transformers in the track circuits are

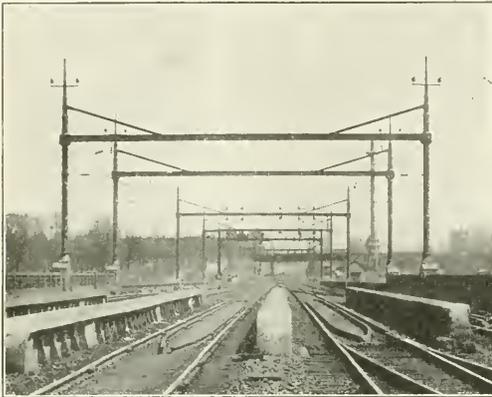


Fig. 6—Tubular Pole Type of Bridge for Use Over Four Tracks

of soft drawn copper wire. The rails carrying the propulsion current return are sectionalized at each signal block; the propulsion current flowing through impedance bonds which are connected around these points. These impedance bonds are designed to allow the flow of propulsion current

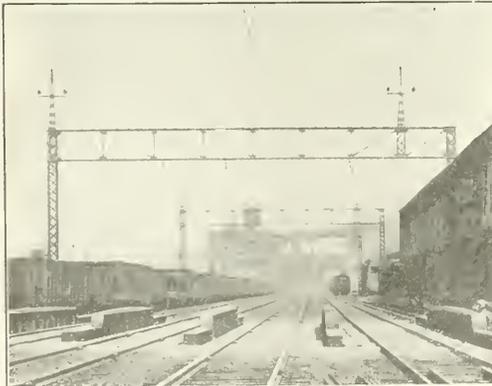


Fig. 7—Structural Bridge for Use Over Four Tracks

and to sectionalize track against the flow of the 60 cycle signal current. A view of the bond is shown in Fig. 9.

Telephone and Telegraph Lines

The telephone and telegraph lines of the railroad are carried underground in ducts along the main line, and



Fig. 8—Catenary Is Insulated from Overhead Highway Bridges by Post Type Insulators

not necessary with the transformer stations located about five miles apart.

Multiple Unit Car Equipment

The multiple unit car equipments are similar to the car equipments used for the Paoli electrification, except in the following principals: The compressor is driven from a separate motor instead of from the blower shaft. The main transformer is designed to operate on a lower magnetizing

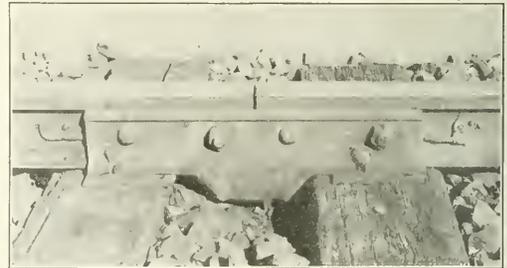


Fig. 9—Railroad Joint Showing Type of Bond Used. Note That Only a Small Amount of Copper Is Exposed

current and the insulation improved. Preventative coils are used in connection with switch groups instead of resistances, resulting in a reduced power consumption. A low voltage relay is provided, making it possible to operate cars with 1,000 volt greater variation of trolley potential. Increased illumination is provided in the cars.

Car inspection and repairs will be conducted in the car inspection building located in Paoli yard, where the inspection and repairs for the equipments of the Paoli line is also done. The multiple unit cars which are used on both the Paoli and Chestnut Hill lines are interchangeable for either line, and the repairs and maintenance will be handled in the one inspection building. The maintenance of the Chestnut Hill line equipment will be handled by the same main-

tenance force as formerly handled the maintenance of the Paoli line, its headquarters being at West Philadelphia.

Engineering and Construction

The design and construction was conducted by Gibbs & Hill, consulting electrical engineers for the Pennsylvania Railroad, in the same manner as the Philadelphia-Paoli installation. The multiple unit car equipments were installed by the railroad at the Altoona shops. All signal equipment and the necessary work in connection with telephone and telegraph lines was done under the direction of the railroad signal and telegraph departments.

Following is a list of the manufacturing concerns which furnish the principal materials for the equipment: Motor car equipments, transformer station equipment, Westinghouse Electric & Manufacturing Company; structural poles and signal bridges, Lackawanna Bridge Company; miscellaneous structural material, consisting of highway bridge supports, substation structural material, protection screens, Steward & Stevens Iron Works and Belmont Iron Works; tubular poles, National Tube Company; steel messenger, cross span and ground wire, J. A. Roebling's Sons Company; aluminum transmission wire and fittings, Aluminum Company of America; contact trolley wire, Bridgeport Brass Company; secondary messenger wire, Waclarke Wire Company; bonds, American Steel Wire Company, Electric Service Supplies Company, Ohio Brass Company; insulators, Locke Insulator Manufacturing Company, Ohio Brass Company; guy rods, Oliver Iron & Steel Company; steel castings, Atlantic Steel Castings Company; malleable iron castings, Eastern Malleable Iron Company; catenary fittings, bolts, nuts, hanger rods, pull-off rods, etc., West Philadelphia Shops, Pennsylvania Railroad Company, American Iron & Steel Company; sockets and turnbuckles, Thomas Laughlin & Co., J. A. Roebling's Sons Company; and block and automatic signal equipment, Union Switch & Signal Company.

trouled by one or more track circuits, and used for protecting trolleys at stations, etc.

The principal increases and decreases shown in the bulletin, as compared with January 1, 1917, are as follows:

Names of railroads.	Increase.		Decrease, nonautomatic.
	Automatic.	Nonautomatic.	
Aetehson, Topeka & Santa Fe System.....	40.0	39.7	143.5
Baltimore & Ohio System.....	77.7		
Central New York Southern.....		34.7	
Central of Georgia.....	131.6		19.4
Chicago & North Western.....	179.4		176.9
Chicago, Burlington & Quincy.....	257.3		295.2
Chicago Great Western.....	35.2		
Chicago, Milwaukee & St. Paul.....	263.8		171.1
Frio.....		34.0	
Illinois Central.....	207.8		
Los Angeles & Salt Lake.....	151.8	44.2	
Louisville & Nashville.....	72.0		49.7
Missouri Pacific.....	73.4		222.4
Monongahela.....	33.6		
Norfolk & Western.....	61.3		62.7
Northern Pacific.....	215.5	113.0	
Philadelphia & Reading.....	35.1		37.1
Richmond, Fredericksburg & Potomac.....	56.1		56.1
Southern.....	37.1		230.6
Southern Pacific (Pacific System).....	14.6	213.8	
Galveston, Harrisburg & San Antonio.....			76.5
Houston & Texas Central.....	33.4		
Toledo & Indiana.....		52.0	
Union Pacific.....	73.3		
Green Short Line.....	54.7		
Union Traction Co. of Indiana.....	26.3		
Washington Southern.....	26.5		26.5

† Roads which have zero reported block-signal mileage

Table No. 2 in the bulletin, showing kinds of automatic signals in use, gives the miles of road on which electric motor semaphores are used, as 31,702 (50,014 miles of track) an increase during the year of 3,169 miles of track. Other kinds of signals show slight changes, except that the column of "Not Classified" shows an increase of 169 miles of road (177 miles of track). This column includes light signals and miscellaneous designs used by trolley roads; but the principal increase is that shown by the Chicago, Milwaukee & St. Paul, 177 miles, this item covering the three-position light signals introduced on that road in connection with the introduction of electric traction on the line over the Rocky mountains. This road also shows a considerable increase in mileage of semaphores.

The length of railroad on which the Morse telegraph is used for the transmission of train orders is 142,119 miles, a decrease during the year of 7,337 miles; while the length of road on which the telephone is used for this purpose, 110,404 miles is 7,011 miles greater than the year before. The aggregate length of the roads reporting in regard to telegraph and telephones, is 244,356 miles.

Annual Government Signal Bulletin

THE LENGTH OF RAILROAD in the United States, January 1, 1918, on which the block system was in use, was 98,954 miles, as compared with 97,927 miles on January 1, 1917. These are the totals after deducting duplications, as shown in the annual bulletin which has just been issued by the Interstate Commerce Commission. These duplications, representing sections of road used jointly by two companies, and reported by both, aggregate no less than 577 miles. The increase in automatic block signal mileage is 2,242 miles and the decrease in non-automatic block signalling is 1,215 miles, making a net increase of 1,027 miles of road for the year. The commission's bulletin, making additions and deductions without eliminating the joint mileage, makes a net increase of 1,123.8 miles.

The totals for five years are shown below.

Miles of Road on Which the Block System Is in Use

	Jan. 1, 1918	Jan. 1, 1917	Jan. 1, 1916	Jan. 1, 1915	Jan. 1, 1914
Automatic.....	34,709	31,537	30,714	26,600	26,570
Manual.....	64,185	66,390	66,767	66,679	60,167
Total.....	98,954	97,927	97,481	93,279	86,737

There is a large mileage of road in the United States used exclusively for freight traffic, on which block signals are in service; some of these roads include such mileage in their statements and some do not. Four roads, the Baltimore & Ohio, the Pennsylvania, the Southern and the Wabash, report considerable lengths of automatic signals in manual block signal territory, not included in the tabular statements. These, presumably, are isolated signals, one in a place, con-

BRITISH RAILWAYS AND THE PALESTINE CAMPAIGN.—A British official war film, produced under the direction of the Ministry of Information—"With the Forces in Palestine"—throws an interesting sidelight on the extent to which the campaign in this theatre of war has been aided by railways and other forms of mechanical transport. Roadway has already been constructed over 140 miles of desert by British, Egyptian and Indian labor. The line is standard gage, and the sections shown on the film have involved practically no work in the way of excavation or embanking, thanks to the level nature of the country. As fast as the rails are placed in position, a construction train follows, the vehicle being only a few yards distant from railroad. One of these trains, as depicted on the film, was made up of Egyptian State Railway flat cars hauled by a standard London & Southwestern Railway 0-6-0 freight engine, an unusual combination which visualizes the way in which English railway companies have sent rolling stock to the various fronts.

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The Problem of the Short Line Railroads

A Discussion of the Intent of the Legislation Regarding Their Disposition and Operation During Federal Control

By Sanford H. E. Freund

Assistant General Counsel, Great Northern, St. Paul, Minn.

THERE ARE ABOUT 800 short line railroads, so-called, in the United States. There are strong roads and weak roads; roads which form valuable links between Class I roads; and roads for whose building or existence there is little excuse. There are some which are substantially plant facilities, and some which, in addition to bringing out the products of an industry, serve a developing community.

Should some or all of these roads be kept in federal control? And if not, who, pending final disposition, is responsible for their operation and how shall their operation be conducted and co-ordinated with the operations of roads under federal control after these have been relinquished? The first consideration for determining the answer to these questions is to be found in the purpose of the President in taking possession and assuming control of the railway lines in the United States.

The act of August 29, 1916, provided "the President in time of war is empowered . . . to take possession and assume control of any system or systems of transportation, or any part thereof and to utilize the same . . . for the transfer or transportation of troops, war material and equipment or for such other purposes connected with the emergency as may be needful or desirable." Acting in pursuance of the power thereby granted the President by proclamation on December 26, states: "*I . . . do hereby . . . take possession and assume control at 12 o'clock noon on the 28th day of December, 1917, of each and every system of transportation and the appurtenances thereof located wholly or in part within the boundaries of the continental U. S. and consisting of railroads and owned and controlled systems of coastwise and inland transportation engaged in general transportation, whether operated by steam or electric power, including also terminals, terminal companies and terminal associations, sleeping and parlor cars, private cars and private car lines, elevators, warehouses, telegraph and telephone lines and all other equipment and appurtenances, commonly used upon or operated as a part of such rail or combined rail-and water systems of transportation; . . .*"

He then directs that the possession and control, operation and utilization of such transportation systems shall be exercised by and through William G. McAdoo.

He continues, "by subsequent order and proclamation, possession, control and operation in whole or in part may also be relinquished to the owners thereof of any part of the railroad systems or rail and water systems, possession and control of which are hereby assumed." The proclamation further states "From and after 12 o'clock on said 28th day of December, 1917, all transportation systems included in this order and proclamation shall conclusively be deemed within the possession and control of said director without further act or notice."

A statement of the President accompanied the proclamation. In this statement the President says, "This is a war of resources no less than of men, perhaps even more than of men, and it is necessary for the complete mobilization of our resources that the transportation systems of the country should be organized and employed under a single authority and a simplified method of co-ordination which have not

proved possible under private management and control. The government itself will thereby gain an immense increase of efficiency in the conduct of the war and of the innumerable activities upon which its successful conduct depends.

"The public interest must be first served and, in addition, the financial interests of the government and the financial interests of the railways must be brought under a common direction."

In the address delivered at a joint session of Congress, January 4, 1918, the President says, "Transportation supplies all the arteries of mobilization. Unless it be under a single and unified direction, the whole progress of the nation's action is embarrassed. . . .

"It had become unmistakably plain that only under government administration can the entire equipment of the several systems of transportation be fully and unreservedly thrown into a common service without discrimination against particular properties. . . .

"It is necessary that the transportation of troops and of war materials, of food and of fuel and of everything that is necessary for the full mobilization of the energies and resources of the country, should be first considered. . . .

"Our first duty is of course to conserve our common interest and common safety and make certain that nothing stands in the way of the prosecution of the great war for liberty and justice, but it is also an obligation of public conscience and public honor that the private interests we disturb, should be kept safe from unjust injury, and it is of the utmost consequence to the government itself that all great financial operations should be stabilized and co-ordinated with the financial operations of the government. No borrowings should run athwart the federal treasury, and no fundamental industrial values should anywhere be unnecessarily impaired."

Extensive quotation has been made from the proclamation, statement and address of the President. Taking possession and assuming control of the railway lines of the United States, though done by legislative authority, was primarily an act of executive discretion, and as the problem to be considered is one which involves elements of fairness, of justice and economic expediency as well as of operating efficiency, the purpose of the government must be looked for in the words of the President acting as its spokesman, as well as in the letter of the law.

Further, by Section 9 of the Act of March 21, 1918, it is expressly provided that the act of August 29, 1916, shall remain in force and effect except as expressly restricted by the act of March 21, 1918, and that the President shall have such other and further powers as are necessary and appropriate to give effect to the powers conferred in both acts. The act of March 21, 1918, thus adapts and confirms what has been done.

The quotations above made seem to establish conclusively:

First that the short line railroads are in the possession and control of the federal government unless relinquished. The President took possession and assumed control of each and every system of transportation and appurtenances there-

of located wholly or in part within the boundaries of the United States and consisting of railroads, etc. This is comprehensive enough to include the short line railroads; and they are not covered by the only exception to wit: street electric passenger railways, including interurbans. The President himself states that all transportation systems included in his order and proclamation "shall conclusively be deemed within the possession and control of the said director without further act or notice."

Second: The purposes for which the control was assumed were:

(A) To use the transportation facilities of the country in the most efficient manner by having a unified control.

(B) To provide for the large financial requirements of the railroads without embarrassing the government in its financial operations and without putting too great a burden on the railroads by making them borrow in competition with the government.

(C) To protect the interests of the owners of the railroads in this emergency.

Has Congress in the Act of March 21, 1918, evidenced any different intentions? Or is there anything in that act which affects these conclusions?

In the first paragraph of the act it is stated, "The President having in time of war taken over the possession, use, control and operation (called herein federal control) of certain railroads and systems of transportation (called herein carriers), is hereby authorized to agree with and guarantee to any such carrier making operating returns to the Interstate Commerce Commission," etc. The language is different from that of the proclamation of the President but it does not exclude any of the railroads or systems of transportation taken by the President unless they do not fall within the definition of a "carrier making operating returns to the Interstate Commerce Commission."

Another pertinent paragraph of section one reads as follows: "That every railroad not owned, controlled, or operated by another carrier company, and which has heretofore competed for traffic with a railroad or railroads of which the President has taken the possession, use and control, or which connects with such railroads and is engaged as a common carrier in general transportation, shall be held and considered as within "Federal control," as herein defined, and necessary for the prosecution of the war, and shall be entitled to the benefit of all the provisions of this act: *Provided, however*, That nothing in this paragraph shall be construed as including any street or interurban electric railway which has as its principal source of operating revenue urban, suburban, or interurban passenger traffic, or sale of power, heat, and light, or both."

Section 9 of the act provides *inter alia*, the provisions of this act shall also apply to any carriers to which federal control may be hereafter extended.

In Section 14 it is provided "That the President may, prior to July first, nineteen hundred and eighteen, relinquish control of all or any part of any railroad or system of transportation, further federal control of which the President shall deem not needful or desirable; and the President may at any time during the period of federal control agree with the owners thereof to relinquish all or any part of any railroad or system of transportation. The President may relinquish all railroads and systems of transportation under federal control at any time he shall deem such action needful or desirable. No right to compensation shall accrue to such owners from and after the date of relinquishment for the property so relinquished."

From the foregoing it would seem that all of the short lines are within federal control; that prior to July 1, 1918, the President may relinquish control of any of them by his own act; or at any time before that, or thereafter, may relinquish control by agreement with the owners. Under Sec-

tion 9 the President can at any time resume control of a road that has been relinquished.

Though the proclamation of the President and the act of March 21, 1918, make it plain that control of the short lines was assumed, and though there has been no direct expression of opinion that they are not within federal control, nevertheless some doubt has been expressed as to responsibility for their operation at the present time. If it is correct to say that they are and remain in federal control unless relinquished, then the responsibility for their operation since December 28, 1917, is upon the United States Railroad Administration, and settlement must be made under the provisions of Sections 2 and 3 of the act of March 21, 1918.

Coming to the question of the disposition of the short line railroads, the determining criteria for retaining or relinquishing any road, should be (a) whether the short line railroad in question is needful in the mobilization of the transportation facilities of the country to the highest degree of efficiency; (b) whether a road so needed for that purpose could properly be operated and financed during the period of federal control of the railroad systems of the country without being included therein; (c) whether incommensurate hardship would be done the owners by relinquishing the road.

Applying these criteria the director general could at once release that class of road for whose existence there never has been any genuine reason or need, which is a financial cripple and which but for the intervention of federal control would have been sold, abandoned or scrapped.

The director general could also release the short line road which is essentially a plant facility, a road which the industry has maintained for its own benefit and is capable of and necessarily will maintain, in order to market its product. Such a road may be deemed neither needful nor desirable in a unified national transportation system. But the short line road which in addition to being a plant facility does general transportation from a fair sized community or through a country which is developing, may well be considered a proper part of a unified comprehensive transportation system.

The short line railroad which is in competition with the larger systems would seem to be covered by the paragraph quoted above from Section 1 of the act and held to be within federal control and *prima facie* necessary for the prosecution of the war; though like all other roads subject to relinquishment.

The argument on the one hand, of a short line railroad that needs financial assistance, of the hardship upon it of not being taken into federal control, or the argument, on the other hand, of the short line railroad that has been successful, that it does not need federal assistance, and prefer to be outside of federal control, is not conclusive in either case.

If a short line is a necessary part of a comprehensive transportation system and thereby may be deemed necessary for the prosecution of the war it should be retained even though it might need financial assistance. It should not be abandoned to finance itself amid the difficulties that exist for private financing today. But though the President specifically stated that it was intended that no hardship should be done to the owners of railroads by the taking of federal control, it was not intended, on the other hand, that federal control should be used to bolster a useless road.

On the other hand there is no reason because a road has been successful and its owners would prefer to keep it in their own control that it should be left out of the comprehensive national transportation system. The primary object now is the national needs, and if the mobilization of the transportation facilities of the country under unified control is essential, it should cover short lines as well, and

the preference of such lines should not be considered as against the national purpose.

Two other classes of short line railroads require consideration from another point of view: (a) the railroad in the course of construction but not completed and in operation on December 28, 1917, and (b) the road already in financial difficulty, either being in receivership or burdened with debts which it is unable to pay, and which in ordinary times would cause receivership, foreclosure or other legal proceedings.

The road which is not completed and in operation on December 28, 1917, can be taken under federal control under the provisions of Section 9 of the act of March 21, 1918. When such road had been taken, agreement might be made with it (though the case is not specifically covered) under that paragraph of Section 1 covering exceptional cases, which provides that "The President may make with the carrier such agreement for such amount as just compensation as under the circumstances of the particular case he shall find just," or payment might be made for use under Section 2. The provision in Section 9 conferring upon the President such other and further powers as are necessary or appropriate to give effect to the powers conferred, gives ample scope to care for exceptional cases.

If the conclusions previously stated are correct, that the President's proclamation covered each and every railroad, then the road in receivership was taken over, along with the others. The proclamation states that the director general of railroads may perform the duties imposed upon him so long and to such extent as he shall determine, through (among others) receivers. In the proclamation it is further stated "Except with the prior written assent of said director no attachment by mesne process or on execution shall be levied on or against any of the property used by any of said transportation systems in the conduct of their business as common carriers; but suits may be brought by and against such carriers and judgments rendered as hitherto until and except so far as said director may by general or special orders otherwise determine."

Section 10 of the Act of March 21, 1918, provides, "That carriers while under federal control shall be subject to all laws and liabilities as common carriers whether arising under state or federal laws or at common law, except insofar as may be inconsistent with the provisions of this act or any other act applicable to such federal control or with any order of the President. Actions at law or suits in equity may be brought against such carriers and judgments rendered as now provided by law; But no process, mesne or final, shall be levied against any property under such federal control."

Though the receivership would continue, the court under the provisions of Section 10 would give attention to the orders of the director general made pursuant to the act, it being the intention of the act that so far as the operation of railroad properties are concerned its provisions shall be paramount to other laws or law. In any event, no taking of property on execution and no foreclosure or sale of property would be directed.

Likewise, in the case of the road burdened with debt, but not in receivership, the creditors could bring their actions at law or suits in equity, but when judgment had been obtained no process would be levied against any of the property. Consequently, the use and operation of the property under federal control would not be affected or hampered. This, of course, interferes with the rights of creditors and is particularly an interference with what has been ordinarily considered the most valuable right of a bondholder. But there is no provision in the constitution imposing upon Congress the limitation placed upon the state to "pass no law which shall impair the obligation of contracts." Ulti-

mately, the rights of creditors are not lost; the exercise of some of them is temporarily postponed. The judgment remains in effect, and on the termination of the period of federal control can be enforced.

Further, debts incurred before December 28, 1917, are debts of the corporation. Whether or not payment could be obtained from the corporation during federal control need not now be decided. Though it would seem that if the corporation has ample funds and the operation of the properties under federal control would not be interfered with, there would be no reason why corporate funds should not respond to corporate debts previously incurred.

Can all the short line railroads be released and at the same time such arrangement made that a comprehensive national transportation system will be operated in which the short line railroads will do their part? The matters of chief concern to the short line railroads are these:

- (a) Financing;
- (b) Divisions of through rates;
- (c) Car supply;
- (d) Material;
- (e) Labor.

Fundamentally, there would be no difficulty or impossibility for the government to enter into agreements with the short line railroads which would adequately protect the short line railroads.

The ultimate question is whether the existence of the particular short line railroad is needful or desirable for the national purpose. If it is, the government must care for it either by retaining it under federal control, or by making arrangements with it that will protect it if left outside of federal control. If a large number of the short lines are to be relinquished, it would almost seem that it were better to relinquish all and work out a standard agreement between the short lines and the railroads operated under federal control. Whether operating the short line railroads or leaving them in the hands of their owners to be operated under such standard agreement would be better for the national purpose, is a question beyond the scope of this article.

AUSTRIA-HUNGARY TO MANUFACTURE LOCOMOTIVES.—The Hungarian State Railways intend to establish a new locomotive factory. They already possess one at Budapest, says the Neue Freie Presse, capable of turning out some 300 locomotives a year. As the Hungarian State owns suitable ironworks, a large new factory would add considerably to its output and its power to compete in exporting, especially to the Balkans. The question has also been raised whether the Austrian State should not undertake the manufacture of rolling stock. The Austrian locomotive factories produced over 400 locomotives per annum in time of peace, 366 in 1916, and 328 in 1917. The Skoda Works intend to establish a locomotive plant. — *Commerce Reports*.

HIGHER FRENCH RAILWAY CHARGES.—After very lengthy discussion among all the interests concerned, the French Chamber has passed a single-clause act empowering the railways to make an all-round increase of 25 per cent in their charges. This act applies to the main systems, and the Paris Ceinture Railways as well as private sidings. One of the most interesting details of the increase is that it is to be maintained for six years after December 31 of the year in which peace is declared, subject to the proviso that should the increase in revenue surpass a certain amount, the surplus is to be paid into the National Treasury. This proviso is hardly expected to become operative, but it was introduced in the bill to prevent the possibility of shareholders receiving more than the dividends guaranteed them under their agreements with the state.—*Railway Gazette, London*.

The Importance of Organized Safety Work*

A Plea for Universal Application of Methods of Reaching the Employee in Accident Prevention Campaigns

By H. W. Belnap

Manager, Safety Section, United States Railroad Administration.

IN OUR INDUSTRIAL LIFE, men engaged in manufacturing and transportation employed but a few laborers. In nearly every vocation employees knew each other by name, and were familiar with each other's work to such an extent that accidents which occurred were usually explainable and could in a measure be guarded against. But with the advent of the inventor came complicated labor-saving machinery. This labor-saving machinery led to the employment by one man or corporation, not of a few men but of hundreds, and by transportation companies of thousands. As an employee's safety was dependent upon influences which he could not control, accidents increased, until at last they became so serious in number and in character that an aroused public opinion was directed to their underlying causes.

It was quickly recognized that before any remedial action regarding accidents could be taken, accurate information as to the class, kind, and circumstances were necessary. This was particularly true in the great transportation industry, so in 1887, when Congress passed the Act to Regulate Commerce, the Interstate Commerce Commission, created by that Act, was required to gather statistics on accidents that were occurring upon interstate railroads.

When these statistics were available, the country was staggered by their total. The record of killed and injured by the use of the link-and-pin couplers then in general use and because the drawbars of cars were of uneven height clearly established a reason for legislation to correct the conditions that were responsible for so many of these distressing casualties. The first attempt of the Federal Government to deal in a legislative way in accident prevention on railroads, was the enactment by Congress in 1893 of the Safety Appliance acts. These acts have amply vindicated the wisdom of their enactment, and every representation made by those who advocated them has been established and confirmed by the practical results obtained. In the year 1893, 44.33 per cent of all accidents suffered by trainmen were due to coupling and uncoupling cars; in 1916 less than 6 per cent of all accidents to trainmen were due to this cause.

The hazard of railroad employment has been lessened and life has been made safer and injuries less frequent by the mandatory obligations of these laws. The enforcement of these acts so as to safeguard the lives and limbs of employees and travellers upon railroads marks the entrance of the Interstate Commerce Commission into its "safety first" activities.

The commission's safety work, in its scope and in its results, stands forth as a splendid example in effectively preventing death and injury on railroads. Its effectiveness has been demonstrated. Its whole basis has been accident prevention. Long before railroad managements were aroused to the necessity of more extreme vigilance to prevent the frequency with which employees were involved in fatal or serious injuries, the commission, in its annual reports, called the attention of Congress and of the public to the absolute necessity of preventive legislation in the interest of greater safety.

All accidents that occur upon interstate railroads are reported monthly to the Interstate Commerce Commission, and are made public in the Commission's "Accident Bulletin,"

issued quarterly. In these accident bulletins accidents are classified under five general heads, i. e.;

- Accidents to passengers.
- Employees on and off duty.
- Other persons not trespassing.
- Trespassers.
- Non-train or industrial accidents.

Bulletin No. 62, which gives the figures for the year ending December 31, 1916, shows that there were a total of 206,723 casualties reported for that year, 10,001 being deaths and 196,722 injuries. There were 291 passengers killed and 8,008 injured. Of train service employees on duty, 2,210 were killed and 48,310 injured, and of train service employees not on duty 303 were killed and 811 injured.

The Trespassing Evil

Of other persons not trespassing, 1,744 were killed and 5,060 injured, while in non-train or industrial accidents, 525 persons were killed and 129,740 injured. By far the largest number of deaths under one classification are those caused to trespassers upon railroad property, there being 4,928 deaths and 4,793 injuries in this class of casualties.

An analysis of these totals for the one year, which is indicative of every year's record, impresses one by the surprisingly large number of trespassers they include. There is no reason nor excuse for this class of accidents. When it is considered that more than one-half of all of the fatal accidents that have occurred upon the railroads in this country have occurred to persons who have no right upon railroad premises, it becomes apparent that there is a fertile field for reform in dealing with the trespassing problem. Several studies have been made of the death toll to trespassers, which show, contrary to the general opinion, that the large majority of these persons are not tramps or hoboes. Probably less than 20 per cent are really tramps. Two-thirds of these accidents occur to people who live in the immediate vicinity of the place where they are killed and injured, and nearly all are wage-earners. About 15 per cent are children under 18 years of age. That this matter has received serious consideration, is evident by the recommendations that have been made by the National Association of Railroad Commissioners, representing the railroad commissions and public service commissions of all the states in the union, recommending preventive legislation, as well as by the fact that the Interstate Commerce Commission in its last annual report to Congress recommended:

"That Congress consider the advisability of prohibiting by statute, under appropriate penalty, trespasses on the trains of interstate carriers and on the tracks of such carriers at places where there are two or more tracks, or within the limits of incorporated towns, or at places where the carrier by appropriate sign or warning gives notice that trespassing on its tracks is prohibited, providing that nothing therein is to be considered as making lawful any trespass which would be unlawful under state laws; and further consider the advisability of conferring concurrent jurisdiction upon federal and state courts for the enforcement of such statute."

Vigorous measures should be undertaken to make people

*Presented at the annual meeting of the Association of Railway Chief Surgeons held at Chicago on May 6.

understand that railroad tracks are not public highways, and the use of them as such should be prohibited by law.

Educate the Employees

Regardless of the splendid results that are so apparent as a result of the enactment and enforcement of the Safety Appliance Acts, railroads continue to have an ever increasing (casualty list up to the present time, and these casualties have not been classified in such a manner as to point out the specific legislation necessary to bring about substantial relief.

That certain legislation such as a law against trespassing will give some relief is admitted by all, but to the student of accident prevention, it is manifest that other methods and efforts are also essential in order to bring about a substantial reduction in accidents. Serious accidents have always received public attention, so that it is generally understood what was the cause and what can be done to prevent recurrences, but the casualties that swell the total and which demand our serious attention are the minor accidents which each year appear to become more and more frequent. Almost all, if not all students of this problem, have reached the conclusion that the best and most scientific method in accident prevention work is to reach the employee in an educational way, and by proper instruction and supervision keep constantly in the minds of all the necessity of exercising more than ordinary care in the performance of their work, as well as to bring about an elimination of all the useless and purposeless taking of chances, and by these means bring about the prevention of the little accidents as well as the big accidents that are constantly occurring on railroads.

Thirty per cent of all the people killed and 90 per cent of all the people injured on the railroads in this country are railroad employees. One employee is killed every 3½ hrs., and one employee is injured every 10 min. in train accidents alone, and taking into account all accidents, one employee is either killed or injured every 3 min. during the entire year.

The "safety first" movement has already accomplished much in bringing about safer conditions of employment, but its work has only begun; it is yet in its infancy. The crying need of the hour is to get every person who works for a railroad, regardless of the capacity, interested in the safety movement. No safety organization will be successful unless it has the active and sympathetic co-operation of all concerned. For that reason, the one main purpose of such an organization is to secure the co-operation of the employees, not only in suggesting additional safeguards to be provided so that existing hazards may be removed, but also, by educational means, to bring about an elimination of dangerous practices wherever found to exist.

Limitations of Safety Devices

The use of safety devices is an important factor in the prevention of accidents. Good results are undoubtedly obtained from their use, but no mechanical safeguard can fulfill its purpose without the co-operation of efficient and ever-alert human beings having a keen appreciation of their duties and responsibilities. Such devices can not be expected to eliminate accidents entirely, however, as the human equation must always be taken into account. Our efforts must therefore be directed to the training and the development of the human equation—of the employee—so that when the test comes he will take no chance. If it can be instilled into the minds of railroad employees that it is their duty at all times to be cautious and prudent and that they must not take unnecessary risks in the performance of their duties, a great reduction in accidents will most certainly result.

Judging by the experience of those who have given this matter the most careful thought, the best method to reach all

interested appears to be in the formation of safety committees. These committees are composed of officers and employees co-operating in striving to reduce accidents in every possible way. Such organizations should certainly be commended, and deserve the loyal and hearty support of each officer and of each employee of every railroad in the United States. The benefit of such organizations can not be measured. If it is true to its purpose, it means greater efficiency in every department of the service, greater security to the lives and limbs of the employees, and better and safer service to the public, all of which are of vital importance.

Safety Committees

Such safety committees on railroads have been in operation for a number of years. On some railroads these organizations reach out into every terminal and every shop. Other railroads have perfected organizations wherein the safety features have been discussed only by the officials in charge. Both plans evidently have done some good, but the record clearly establishes the fact that those which have accomplished the most have been those organizations in which the employees have participated the largest.

After all, it appears to me that unsafe conditions and unsafe practices are known and understood best by those who work in continual connection with the unsafe conditions and the unsafe practices. That this is evident is shown by the record of recommendations that have been brought to the attention of safety committees for the purpose of correcting the unsafe conditions or practices. A complete record of the safety suggestions made by employees through their safety committees of all the railroads is not available, but from a report of a large eastern railroad, which I have just recently received, in a five-year period, 27,496 recommendations were made. Of this number 20,918, or 76 per cent, were of sufficient merit to receive attention and correction. Upon another railroad in the western territory, in a four-year period 15,559 safety suggestions were received from employees, of which number 11,708, or 75 per cent, were practical suggestions and received consideration by the committees to which they had been reported.

As indicative of the opportunity that is today presented to every employee who carefully studies unsafe conditions or unsafe practices, and reports them so that they may be changed, one employee on a western railroad made 149 safety suggestions, in 12 months, 132 of which were considered practicable and placed in effect. This man was not used exclusively in safety work; he was following his usual occupation daily and was not even a safety committeeman, yet he was so observant of the conditions that prevailed that he was able to have many unsafe conditions and practices changed and rectified. This shows what a wonderful opportunity each employee of a railroad has, if he will but exercise judgment to see to it that safe conditions are at all times established and maintained.

Experience in organized safety work has shown that casualties can be materially reduced by proper methods of education, discipline and supervision. An analysis of the records of some of the railroads that have efficient, workable "Safety First" organizations is worthy of consideration.

Chicago & North Western Record

On the Chicago & North Western the organization of "safety first" committees was commenced in May, 1910, but a complete organization was not in effect until January, 1911. In the seven and one-half years ending December 31, 1917 during which time these "safety committees" were in operation, using as a basis the number of accidents occurring in the year ending June 30, 1910, the following reduction in accidents is reported as having occurred on this railroad: There were 315 fewer employees killed, a decrease of 8.9 per cent, 16,443 fewer employees were in-

jured, a decrease of 25.3 per cent; 7 fewer passengers were killed, a decrease of 8.8 per cent; 1,454 fewer passengers were injured, a decrease of 20.8 per cent; 337 fewer outsiders were killed, a decrease of 19 per cent; and 169 fewer outsiders injured, a decrease of 3.7 per cent. Considering the totals, there were 659 fewer persons killed, a decrease of 24.6 per cent; and 18,066 fewer persons injured, a decrease of 23.6 per cent. During this same period the business of this railway increased nearly 50 per cent; more than 500 miles of new line had been completed; and the number of employes, as well as the number of locomotives and cars in service, materially increased. In six years, 27,082 recommendations made to "safety committees" were adopted and put into effect, and during this same period only 1,201 recommendations were rejected. Six thousand individual employes have served as "safety committeemen." By rotating the men who serve as safety committeemen, it is believed that the permanent employes will sooner or later all have opportunity to serve on committees. Such service inspires every committeeman with the importance of the conservation of human life and limb.

Norfolk & Western

On the Norfolk & Western "safety committees" were first organized in 1912, and the record in the reduction in the number of accidents on this railroad since the organization of these committees shows splendid results. The volume of business of the railroad steadily increased, showing a 42 per cent increase in 1916, as compared with 1912, and casualties decreased all during this period. On the basis of the number of accidents occurring in the year ending June 30, 1912, the record shows a decrease in the number of employes killed of from 23 per cent in 1913 to 49 per cent in 1916, a decrease in the number of employes injured from 22 per cent in 1914 to 41 per cent in 1916, and a decrease of employes injured in industrial work of from 21 per cent in 1914 to 24 per cent in 1916, regardless of the fact that the volume of business handled on this railroad was constantly increasing during this five-year period. During this period 7,047 safety recommendations were made, of which number 5,989, or 85 per cent, were accepted as meritorious and acted upon, and only 619, or 9 per cent, of the number submitted by the employes were rejected.

New York Central

On the New York Central an employe was appointed as early as 1910, with instructions to devote his entire time to investigate and study the cause of accidents with a view of reducing them. The need of extensive work of this kind, as a result of this one man's endeavor, was soon appreciated and in 1912 the New York Central created its "safety bureau." The decrease in deaths and injuries on this road since the time "safety committees" were organized indicates the benefit derived from organized safety work.

Using the number of accidents occurring in the year ending June 30, 1913, as a basis, the records on this railroad show a decrease in the number of employes killed in all classes of work, of 45 per cent in 1914, 43 per cent in 1915, and 24 per cent in 1916, while the decrease of employes injured in all work is 30 per cent in 1914, 29 per cent in 1915, and 7 per cent in 1916. Since the organization of "safety committees" on the New York Central, more than 40,000 safety recommendations have been made, 93 per cent of which have received favorable consideration.

The substantial decrease in the number of accidents on these three railroads, taken from different parts of the United States and operating under entirely different conditions, each having an effective and efficient safety committee organization, indicates the possibility of what may be accomplished if organizations along similar lines are created upon every railroad in the United States.

Every effort, then, to promote the co-operation of all forces interested in the enforcement of industrial efficiency of railroad employes and to eliminate accidents should meet with the encouragement of all classes. And to the support of no movement should that common encouragement come more willingly and certainly than to a safety campaign, the sole purpose of which is the elimination of accidents. For those employes who work in constant risk, there should be ready sympathy and quick relief. Money wisely and carefully spent in protecting employes is not a burden on the industry, but is without question a splendid investment.

Safety Section of Railroad Administration

In this crusade against accidents we need the active, sympathetic co-operation of every officer and every employe of every railroad, and one of the purposes of the Safety Section of the Railroad Administration is to facilitate this co-operation, in order to prevent waste of energy. At the time this section was created, it was understood it was to deal directly with each railroad, to bring about uniformity in practice, supervise such organizations for safety as are already available, and suggest such others as are desirable.

In its "safety first" work the Safety Section of the Division of Transportation, United States Railroad Administration intends to utilize to the fullest extent the safety organizations now in operation on such railroads as have working organizations, and to assist those railroads not having a safety organization to perfect such an organization as will keep constantly in the minds of all officers and employes the necessity of care and caution so as to insure greater safety in every possible way.

This is a great humanitarian work in which science, labor, business enterprises, and the government must all unite. In science we appeal especially to the mechanical engineering professions to furnish us the safest equipment; to statistics and economics to furnish us with facts and to supply the methods of investigation and of prevention; but we need most of all the help of labor, which has the greatest immediate interest in the matter, but which is too often handicapped by the lack of scientific knowledge, or by a lack of means of making itself heard. All organizations and all societies can be of material benefit and of great service in pointing out fields of investigation, so that unsafe conditions may be corrected, but better still assist in instilling into the mind of every employe the fundamental rule—that no chances of any kind must be taken.

You may rest assured that the safety movement will have the hearty support and co-operation of all government agencies to assist in the advancement of any method that will bring about a reduction in accidents. Everyone can have a great part in this philanthropic work. To make the "safety first" movement on American railroads a vital, living, energetic force for good devolves upon the officials and employes of the great railroad systems, today unified into one splendid organization working untiringly for the welfare of the greatest nation on earth.

MARCH FOREIGN TRADE SHOWS INCREASE.—March imports and exports show a partial recovery from the decline in recent months, according to a statement issued by the Bureau of Foreign and Domestic Commerce, exports for March amounted to \$531,000,000, an increase of \$119,000,000 over February. For the nine months ended with March exports were valued at \$4,394,000,000, a decrease from the \$4,637,000,000 recorded for the nine-month period a year ago. Imports were valued at \$242,000,000, a gain of \$34,000,000 over February. During the nine months ended with March imports amounted to \$2,084,000,000, against \$1,818,000,000 a year ago.

Steam Railway Statistics to December 31, 1916

Interstate Commerce Commission's Annual Abstract of Year's Operations. Reduction in Mileage

THE INTERSTATE COMMERCE COMMISSION has issued its advance abstract of statistics of railway operations for the calendar year 1916, giving figures for roads of Class I, Class II and Class III, but excluding switching and terminal companies. Probably for the first time on record the physical mileage shows a decrease on December 31 as compared with June 30.

Mileage

The physical mileage (single track) of steam roads in the United States exclusive of switching and terminal companies, compiled from both official and unofficial information, excluding duplications, is shown below for recent years:

Year ended	Mileage at close of year	Year ended	Mileage at close of year
December 31, 1916	254,045.83	June 30, 1914	252,104.98
June 30, 1916	254,250.62	June 30, 1913	249,776.84
June 30, 1915	253,788.64	June 30, 1912	246,776.75

Item	Class I roads		Class II roads		Class III roads		Total	
	Number	Aggregate capacity (tons)	Number	Aggregate capacity (tons)	Number	Aggregate capacity (tons)	Number	Aggregate capacity (tons)
Box cars	1,021,757	37,096,432	8,892	274,400	1,215	29,624	1,031,864	37,399,156
Flat cars	117,355	4,426,449	12,579	984,135	3,614	91,068	133,553	4,507,412
Stock cars	82,559	2,674,685	1,300	46,805	7	1,387	83,931	2,722,879
Coal cars	884,860	42,155,468	221,177	986,601	1,543	28,662	908,533	47,090,711
Tank cars	9,507	383,630	261	8,146	134	4,332	9,802	396,108
Refrigerator cars	51,257	1,663,345	128	3,305	6	150	51,391	1,666,806
Other freight-train cars	85,796	3,880,826	6,653	18,876	2,011	50,134	94,782	4,159,836
Total	2,253,111	92,280,335	51,930	1,944,268	8,911	224,057	2,313,953	94,440,660

The following statement of mileage operated on December 31, 1916, represents the miles of all tracks covered by operating returns to the Interstate Commerce Commission and necessarily contains duplications because of the inclusion of 11,977.40 miles used under trackage rights and reported by more than one company:

Item	Class I roads	Class II roads	Class III roads	Total
Miles of road	123,674.00	19,215.78	8,812.31	151,702.18
Miles of second main track	4,232.87	1,060.00	5.33	5,298.20
Miles of third main track	716.3	5.04	.....	2,721.27
Miles of fourth main track	1,933.48	.....	.....	1,932.48
Miles of all other main tracks	152.33	.....	.....	257.30
Miles of yard tracks and sidings	98,334.34	3,615.16	154.46	102,103.81
Total of tracks	364,137.22	23,100.00	9,777.10	397,014.32
Number of roads represented	183	81	410	854

The number of operating switching and terminal roads that made annual reports to the commission not covered by the above statement is 209.

The growth in the number of miles of road operated and of all tracks operated, including duplications, as covered by reports of operations to the commission, is shown in the following statement for a series of years:

Year ended	Miles of road at close of year	Total miles of all tracks at close of year
December 31, 1916	123,674.00	397,014.32
June 30, 1916	123,111	394,944
June 30, 1915	122,569	391,142
June 30, 1914	120,547	387,208
June 30, 1913	114,220	379,508
June 30, 1912	109,852	371,238

Equipment

The number of locomotives in service on December 31, 1916, as reported by Class I, II, and III companies as compared with the number in service on June 30, 1916, is shown below:

Kind of locomotive	Number of locomotives in service	
	Dec. 31, 1916	June 30, 1916
Steam	68,716	61,178
Other	51	84
Total	68,767	61,262

For the same classes of roads, the number of cars in service was reported as follows:

Kind of car	Number of cars in service	
	Dec. 31, 1916	June 30, 1916
Freight train cars, all classes	2,436,999	2,400,997
Passenger train cars, exclusive of cars in service of the Pullman Co.	71,811	74,664
Company service cars	99,666	104,038

The following statement shows the number of freight-train cars that were classified. Caboose cars (28,504) are not included:

Item	Class I roads		Class II roads		Class III roads		Total	
	Number	Aggregate capacity (tons)	Number	Aggregate capacity (tons)	Number	Aggregate capacity (tons)	Number	Aggregate capacity (tons)
Box cars	1,021,757	37,096,432	8,892	274,400	1,215	29,624	1,031,864	37,399,156
Flat cars	117,355	4,426,449	12,579	984,135	3,614	91,068	133,553	4,507,412
Stock cars	82,559	2,674,685	1,300	46,805	7	1,387	83,931	2,722,879
Coal cars	884,860	42,155,468	221,177	986,601	1,543	28,662	908,533	47,090,711
Tank cars	9,507	383,630	261	8,146	134	4,332	9,802	396,108
Refrigerator cars	51,257	1,663,345	128	3,305	6	150	51,391	1,666,806
Other freight-train cars	85,796	3,880,826	6,653	18,876	2,011	50,134	94,782	4,159,836
Total	2,253,111	92,280,335	51,930	1,944,268	8,911	224,057	2,313,953	94,440,660

Employees

The number of railway employees is arrived at by averaging the number in service on four days, respectively, in the middle of January, April, July, and October. Thus the number of employees does not represent the number of full-time workers. The number of employees and their aggregate compensation were reported as follows for the years ended December 31, 1916, and June 30, 1916:

Item	Year ended	
	Dec. 31, 1916	June 30, 1916
Number of employees	1,131,076	1,131,076
Aggregate compensation	1,131,076	1,131,076

Capitalization and Dividends

In the returns to the commission securities issued are divided as between those actually outstanding, those nominally outstanding, and those nominally issued. Nominally outstanding securities are those required by or for the issuing company and held alive. Nominally issued securities are those which have been signed and sealed but not sold.

The following statement shows the outstanding capitalization reported for the years ended December 31, 1916, and June 30, 1916:

Item	Capitalization reported	
	Dec. 31, 1916	June 30, 1916
Stock and funded debt (not sold) outstanding	\$116,670,000	\$116,670,000
Class I roads	68,000,000	68,000,000
Class II roads	48,670,000	48,670,000
Class III roads	143,930,000	143,930,000
Non-operating companies	1,997,000,000	1,997,000,000
Total	\$1,867,600,000	\$1,867,600,000
Stock and funded debt nominally issued or nominally outstanding	\$2,316,314,711	\$1,701,170,117
Class I roads	66,100,000	66,100,000
Class II roads	6,811,719	7,711,383
Class III roads	2,243,400,000	1,627,358,734
Non-operating companies	30,500,000	41,931,309
Total	\$2,325,625,711	\$1,710,370,153

For the companies under consideration, the relation of capital stock and dividends was as follows:

Item	Year ended—	
	Dec. 31, 1916	June 30, 1916
Capital stock actually outstanding.....	\$8,755,403.517	\$8,743,106.639
Capital stock actually outstanding paying no dividends.....	\$3,325,280.282	\$3,463,678.685
Per cent paying no dividends.....	37.98	39.62
Amount of dividends declared during the year by operating and nonoperating companies.....	\$366,561.494	\$342,109.396
Ratio of amount of dividends declared to dividend-paying stock.....per cent	6.75	6.48
All actually outstanding stock.....per cent	4.19	3.91

Investment in Road and Equipment

The figures presented under this caption include returns for investment in road and equipment shown by operating roads of Class I and Class II, as well as by their subsidiary nonoperating roads (leased, operated under contract, etc.). The expenditures for additions and betterments, as well as the expenditures for new lines and extensions, during the year ended December 31, 1916, are analyzed in the following tabular statement:

Investment to December 31, 1916 (239,120.61 miles of line represented).....	\$17,681,126.339	
Investment to December 31, 1915.....	17,349,632.708	
Increase, 1916 over 1915.....		\$331,493.631
Investment during the year:		
In new lines and extensions.....	\$7,335,064	
In additions and betterments—		
On owned lines.....\$327,456.492		
On leased lines.....19,234,034		
	346,690,506	
Total investment during the year.....	354,025,570	
Adjustments.....	22,432,435	
Difference between record value of grantor and purchase price of grantee in cases of roads sold, merged, consolidated, etc.....	44,964,374	
Total during the year.....	22,531,939	
Net increase during the year.....		331,493.631

Public Service of Railways

The following table gives comparative figures for the years ended December 31, 1916, and June 30, 1916, pertaining to public service of railways and covers returns for roads having operating revenues above \$100,000 for the year:

Item	Year ended—	
	Dec. 31, 1916	June 30, 1916
Number of passengers carried.....	1,039,012,308	1,005,683,174
Number of passengers carried 1 mile.....	35,121,675,959	34,213,596,127
Number of passengers carried 1 mile per mile of road.....	141,305	137,818
Number of tons of revenue freight carried, including freight received from connections.....	2,316,088,894	2,225,943,388
Ton-mileage, or number of tons carried 1 mile.....	365,771,824,741	343,099,937,805
Freight density, or number of tons carried 1 mile per mile of road.....	1,470,274	1,380,349
Average number of ton-miles of revenue freight per train-mile.....	550.15	534.95
Average receipts per passenger per mile.....cents	2.046	2.006
Average receipts per ton per mile.....cents	0.715	0.716
Passenger-service train revenue per train-mile.....	\$1.44224	\$1.38619
Operating revenues per train-mile.....	\$3.03483	\$3.82828
Freight revenue per train-mile.....	\$2.90561	\$2.80074
Operating revenues per train-mile.....	\$1.90662	\$1.83279
Ratio of operating expenses to operating revenues.....per cent	65.62	65.44

Revenues and Expenses

The operating revenues for the year ended December 31, 1916, of the railways in the United States herein presented (average mileage operated 257,324.61 miles) were \$3,691,065,217, or \$14,344 per mile of line operated; their operating expenses were \$2,426,250,521, or \$9,429 per mile of line operated. The corresponding figures for the year ended June 30, 1916, were: Operating revenues, \$3,472,641,941, or \$13,485 per mile of line operated; operating expenses, \$2,277,202,278, or \$8,844 per mile of line operated. The following tables present a statement of the operating revenues in detail and a statement of the operating expenses assigned to the eight general classes:

RAILWAY OPERATING REVENUES, YEAR ENDED DECEMBER 31, 1916				
Item	Class I roads	Class II roads	Class III roads	Total
Freight.....	\$2,560,988,111	\$57,306,587	\$12,797,259	\$2,631,091,957
Passenger.....	706,608,630	13,376,857	2,373,884	722,359,371
Excess baggage train.....	6,064,359	93,448	14,844	6,172,651
Sleeping car.....	2,895,797	551	.....	2,896,348
Labor and chair car.....	1,365,037	13,340	14	1,378,391
Mail.....	61,195,800	1,108,962	255,222	62,559,984
Express.....	90,155,445	1,108,936	231,109	91,495,490
Other passenger-train.....	5,913,622	61,469	10,935	5,986,026
Milk.....	16,115,884	318,256	133,167	16,567,307
Switching.....	39,419,827	1,422,768	247,117	41,089,712
Special service train.....	1,688,398	97,646	11,477	1,797,521
Other freight train.....	273,619	27,757	7,044	308,420
Water transfs.—Frht.....	652,790	1,128	.....	653,918
Water transfs.—Pass.....	1,684,367	2,715	.....	1,687,082
Water transfs.—Live stock.....	2,325,202	.....	.....	2,325,202
Water transfs.—Other.....	1,221,751	36	.....	1,221,787
Total rail-line transportation revenue.....	\$3,498,568,439	\$74,940,456	\$16,082,242	\$3,589,591,137
Freight.....	\$14,222,511	\$477,977	\$10,581	\$14,711,069
Passenger.....	1,435,103	250,690	17,289	1,712,382
Excess baggage.....	4,524	141	116	4,781
Other pass. service.....	56,559	5,882	.....	62,441
Mail.....	27,871	19,551	4,915	52,337
Express.....	20,753	10,428	2,149	33,330
Special service.....	1,930	1,125	130	3,185
Other.....	330,650	351	3,305	334,306
Tot. water-line transportation revenue.....	\$16,100,201	\$775,145	\$38,485	\$16,913,831
Dining and buffet.....	\$17,466,683	\$3,083	.....	\$17,469,765
Hotel and restaurant.....	6,448,258	15,513	\$2,268	6,466,039
Station, train and boat privilege.....	3,897,093	202,309	3,583	4,102,985
Parcel room.....	1,050,812	3,229	.....	1,054,141
Storage—Freight.....	3,524,463	7,245	7,245	3,574,415
Storage—Baggage.....	669,082	10,388	225	679,695
Demurrage.....	18,372,713	600,354	135,320	19,198,387
Teleg'h and telephone.....	1,885,119	76,771	15,876	1,977,766
Grain elevator.....	2,311,400	.....	.....	2,311,400
Stockyard.....	1,491,392	.....	473	1,491,922
Power.....	2,184,400	73,638	910	2,258,958
Rents of buildings and other property.....	4,464,872	213,160	51,778	4,729,210
Miscellaneous.....	16,077,259	639,301	134,221	16,850,781
Total incidental operating revenue.....	\$79,762,985	\$1,973,519	\$351,392	\$82,087,896
Joint facility—Cr.....	\$3,830,343	\$64,528	\$9,135	\$3,904,006
Joint facility—Dr.....	1,396,202	35,206	745	1,431,653
Total joint facility operating revenue.....	\$2,434,141	\$29,222	\$8,990	\$2,472,353
Total railway operating revenues.....	\$3,596,865,766	\$77,718,342	\$16,481,109	\$3,691,065,217

RAILWAY OPERATING EXPENSES, YEAR ENDED DEC. 31, 1916				
Item	Class I roads	Class II roads	Class III roads	Total
Maintenance of way and structures.....	\$421,775,812	\$13,281,966	\$4,137,284	\$439,195,062
Maintenance of equipment.....	595,566,366	11,339,539	2,199,170	609,105,045
Traffic expenses.....	62,839,996	1,414,156	247,971	64,502,123
Transportation expenses—Rail line.....	1,164,274,088	24,934,730	5,709,851	1,194,918,669
Transportation expenses—Water line.....	9,713,687	448,728	19,709	10,182,124
Miscellaneous operations.....	26,858,441	154,715	31,037	27,044,193
General expenses.....	84,418,107	3,590,973	1,238,030	89,247,110
Transportation for investment—Cr.....	\$,048,055	27,864	6,506	8,082,425
Total railway operating expenses.....	\$2,357,398,412	\$55,257,763	\$13,594,346	\$2,426,250,521

¹ Includes \$120,820, unclassified. ² Includes \$17,800, unclassified. ³ Includes \$138,620, unclassified.

Income Account and Profit and Loss Account

The tables following present for the year ended December 31, 1916, the condensed income account and the profit and loss account of the operating roads and their subsidiary nonoperating roads. The figures given include such intercorporate payments as may be involved in the items stated. Returns for a few small roads have been omitted because of incompleteness. The accounts of the operating roads include both operating and financial transactions, while the accounts of the nonoperating roads are confined for the most part to receipts and payments under leases, contracts, and agreements.

INCOME ACCOUNT, YEAR ENDED DEC. 31, 1917	Operating roads				Non-operating roads			
	Class I roads	Class II roads	Class III roads	Total operating roads	Operating		Non-operating	
					Class I roads	Class II roads	Class III roads	Total non-operating roads
OPERATING INCOME								
Railway operating revenues	\$1,968,865,766	\$1,718,347,827	\$16,481,100	\$1,695,694,793				
Railway operating expenses	52,398,447	52,763	13,194,816	146,357,026				
Net revenue from railway operations	\$1,916,467,319	\$1,765,584,824	\$3,386,284	\$1,649,337,767				
Railway tax accruals	117,113,447	83,984,894	\$727,456	\$161,825,797	\$1,633,514	\$8,834	\$1,808	\$1,643,160
Uncollectible railway revenues	197,486	14,180	7,756	219,422				
Railroad operation income	\$1,808,156,386	\$1,848,588,854	\$3,151,651	\$1,855,906,891	\$1,635,328	\$8,834	\$1,808	\$1,644,970
Revenues from miscellaneous operations	\$6,813,927	847,331	\$174,471	\$4,105,728				
Expenses of miscellaneous operations	34,334,932	44,663	153,966	34,933,561				
Net revenue from miscellaneous operations	\$6,509,043	\$766,667	\$20,505	\$6,796,214				
Taxes on miscellaneous operating property	\$1,966,141	\$1,618	\$3,561	\$1,971,320				
Miscellaneous operating income	\$4,542,902	\$1,044	\$16,844	\$4,560,790				
Total net operating income	\$8,086,099,400	\$18,463,849	\$3,168,492	\$1,106,731,744	\$1,641,652	\$9,834	\$1,808	\$1,646,610
NON-OPERATING INCOME								
Head of freight cars. Credit balance	\$20,664,887	\$1,991,447	\$141,138	\$23,097,472				
Head of locomotives	540,671	5,957	2,957	5,915	11,427			
Head of passenger-train cars	11,567,286	1,904,511	6,647	13,478,444	11,493,744			
Head of floating equipment	90,837	6,137		96,974				
Head of work equipment	109,142	31,781	4,915	145,838				
Joint utility and real-estate income	4,211,969	1,223,177	196,906	5,632,052				
Income from Class I roads	4,387,493	488,651	17,359	4,893,503	361,436	\$196,996	\$174,218	150,545,437
Miscellaneous rent income	8,369,441	18,879	29,359	8,417,679	15,166	915	119,411	119,411
Miscellaneous non-operating physical property	956,131	64,593	17,727	1,038,451	116,979			112,919
Separately operated properties. Profit	30,514			30,514	7,898			35,898
Dividend income	104,874,671	158,596	1,415	106,434,682	87,243			37,243
Income from funded securities	56,830,614	219,152	497,391	57,547,157	1,044,834	644		3,045,478
Income from unfunded securities and accounts	17,037,177	326,877	76,705	17,440,759	103,697	4,055		177,150
Income from sinking and other reserve funds	8,903,661	72,326	5,583	9,081,570	156,444			536,644
Release of premiums on funded debt	95,881	959		96,840	44,735	937		45,672
Contributions from other companies	1,337,706	1,096,271	53,385	2,487,362				
Miscellaneous income	1,616,362	100,463	26,983	1,743,808	178,708		101	150,809
Total nonoperating income	\$7,710,971,34	\$6,388,488	\$866,984	\$7,906,444	\$10,104,424	\$261,697	\$999,475	\$157,797,364
Gross income	\$1,357,808,634	\$4,857,337	\$3,075,469	\$1,365,741,440	\$157,751,127	\$191,863	\$196,694	\$154,161,874
DEDUCTIONS FROM GROSS INCOME								
Head of freight cars. Debit balance	\$43,666,850	\$3,090,253	\$734,338	\$47,491,441		\$14	\$39	\$734,978
Head of locomotives	6,644,411	694,468	147,485	7,486,364	\$18,600			187,609
Head of passenger-train cars	11,981,578	340,611	59,801	12,381,990	9,615,691			2,766,300
Head of floating equipment	3,091,271	11,564	1,173	3,104,008				
Head of work equipment	520,411	31,766	7,870	560,047	3,317			1,317
Joint utility and real-estate	4,916,686	953,564	136,878	6,007,128	7,066,878			2,991,883
Head of leased rails	158,377,958	274,765	263,840	158,916,563	779,733			979,741
Miscellaneous non-operating physical property	1,337,004	128,079	85,947	1,551,030	14,410		50	131,450
Miscellaneous tax credits	20,698	39,758	3,793	64,249	3,811			303,511
Separately operated properties. Loss	7,451,977	1,172		7,453,149	67,883			67,581
Interest on funded debt	40,667,567	13,383,281	65,471	54,116,319	141,917	70,728	58,000,000	58,000,000
Interest on unfunded debt	14,874,425	1,447,154	3,346	16,324,925	7,766	41,64		3,811,317
Amortization of discount on funded debt	2,893,020	259,844	50,373	3,203,237	1,293	459		124,147
Maintenance of investment organization	702,653	6,010		708,663	886	7,486	3,204	3,630
Income transferred to other companies	5,702,470	432,587	14,171	6,149,228	67,152			1,177,197
Miscellaneous income charges	4,865,421	47,196	4,770	4,917,387	68,465		14	686,276
Total deductions from gross income	\$711,917,961	\$21,142,871	\$4,975,581	\$737,136,413	\$67,367,311	\$176,179	\$114,576	\$67,438,676
Net income	\$646,890,673	\$3,700,466	\$1,099,888	\$628,605,027	\$80,383,816	\$15,684	\$81,518	\$86,723,198
DISPOSITION OF NET INCOME								
Income applied to sinking and other res. of funded securities	\$15,977,355	\$374,282	\$4,999	\$16,356,636	\$9,076,678			\$1,438,000
Dividend appropriations of income	187,885,755	1,964,417	70,110	189,920,282	39,375,008	\$35,177	\$48,676	\$1,478,466
Income appropriated for investment in floating property	6,510,056	687,009	7,935	7,205,000	1,101,558		80	11,667
Stock discount (exclusive of floating property)	0,359,889	12,921	1,351	374,161				47,111
Miscellaneous appropriations of income		96,252	4,667	100,919				
Total appropriations of income	\$85,972,665	\$3,094,879	\$411,896	\$89,479,440	\$80,554,330	\$33,857	\$48,800	\$4,608,867
Income balance transferred to operating roads	\$560,918,008	\$614,587	\$2,582,758	\$563,105,353	\$143,829,486	\$17,827	\$132,718	\$42,114,331
PROFIT AND LOSS								
Operating roads								
Operating revenue	\$1,916,467,319	\$1,765,584,824	\$3,386,284	\$1,649,337,767				
Operating expenses	52,398,447	52,763	13,194,816	146,357,026				
Operating income	\$1,864,068,872	\$1,812,821,061	\$3,373,068	\$1,502,980,741				
Depreciation	43,666,850	3,090,253	734,338	47,491,441				
Interest on funded debt	40,667,567	13,383,281	65,471	54,116,319				
Interest on unfunded debt	14,874,425	1,447,154	3,346	16,324,925				
Amortization of discount on funded debt	2,893,020	259,844	50,373	3,203,237				
Maintenance of investment organization	702,653	6,010		708,663				
Income transferred to other companies	5,702,470	432,587	14,171	6,149,228				
Miscellaneous income charges	4,865,421	47,196	4,770	4,917,387				
Total debits during year	\$130,933,185	\$15,766,863	\$5,107,654	\$151,807,702	\$12,168,000	\$804,809	\$155,622	\$12,790,559
Net increase during year	\$165,565,419	\$1,144,042	\$5,888,887	\$172,600,348	\$131,661,486	\$84,929	\$67,897	\$14,319,635
Balance at beginning of year	1,696,353,26	21,940,474	17,600,551	1,735,894,285	1,333,338	459,415	696,441	1,343,453,723
Balance at end of year	\$1,861,918,678	\$23,084,516	\$23,489,438	\$1,859,482,623	\$1,465,004	\$796,344	\$764,339	\$1,357,773,358

Over \$100,000,000 Subscribed by Railway Employees

THE RAILWAY EMPLOYEES of the United States by their subscriptions to the Third Liberty Loan have shown themselves worthy to be represented by their railway engineer regiments in France. Their subscriptions in the Loan have considerably exceeded \$100,000,000 and are at least three and possibly four times as great as their totals in the Second Loan.

The total employees' subscriptions in the Second Loan were \$36,000,000. In the Third Loan the Liberty Loan Committee for the eastern regional district with incomplete returns reported on Wednesday subscriptions by 660,000 employees for \$45,000,000. Similarly the western regional district Liberty Loan Committee reported 650,000 subscribers for \$50,013,000.

The railroad employees in each of these districts handsomely exceeded the total subscriptions by employees on the railroads of the entire country in the Second Loan.

In the southern regional district incomplete returns on Wednesday showed \$9,628,000, making a total for the country of \$104,641,000.

The following table will show how well the employees of several important railroads in the east topped their totals in the Second Loan. The reports for the Third Loan, it will be understood, are not complete.

Lines	Subscribers	Amounts
Pennsylvania System		
Lines East and West	124,789	\$9,243,500
Second Loan	201,350	12,061,900
Third Loan		
New York Central System		
Second Loan	33,284	2,210,050
Third Loan	143,562	10,402,900
Erie Railroad		
Second Loan	15,610	1,097,000
Third Loan	34,867	2,134,100
Delaware, Lackawanna & Western		
Second Loan	17,671	1,071,500
Third Loan	20,920	1,282,250

Lehigh Valley		
Second Loan	9,915	625,650
Third Loan	22,801	1,396,100
Baltimore & Ohio		
Second Loan	6,496	501,800
Third Loan	53,182	3,872,450
Boston & Maine		
Second Loan	3,464	320,000
Third Loan	21,515	1,400,000
New York, New Haven & Hartford		
Second Loan	242	21,700
Third Loan	27,518	1,725,350

Reports received until noon Wednesday showed 650,000 subscribers to the Liberty Loan out of 731,000 employees of the railways in the Western Regional District. The total amount subscribed was \$50,013,000, and adding corporate subscriptions \$51,962,000. The average subscription by employees was \$77. Sixty-one roads reported that all of their employees had subscribed and 177 roads that over 70 per cent subscribed. The largest amount subscribed on any individual line was \$4,530,000 on the Southern Pacific System. The Santa Fe lines were next with \$4,000,000. Of thirteen roads with subscriptions totaling over \$1,000,000, the Rock Island Lines alone showed subscriptions for 100 per cent of their employees. The Missouri Pacific was next with 99.38 per cent. The highest average subscription on these roads was on the Northern Pacific, \$91.00.

TRAVEL PERMITS ON RAILWAYS.—In connection with the proposed issuing of permits for railway traveling in England, a correspondent points out that a scheme of the kind has for some time past been in operation in Belgium under the German military authorities, civilians being obliged to obtain official sanction before moving from one part of the country to another. It was apparently proposed to adopt the idea for Germany but the Prussian State Railways Administration decided against it on the ground that it would not be feasible in the present circumstances.—*Railway Gazette, London.*



Central News Photo Service

British Troops Boarding a "Leave" Train in the Rain

General News Department

The enginehouse of the Boston & Maine at South Vernon, Vt., was destroyed by fire on April 25; estimated loss, including a cottage adjacent and damage to two locomotives, \$20,000.

The freight house of the Baltimore & Ohio at Braddock, Pa., was destroyed by fire on May 2, estimated loss including a large amount of freight, \$225,000. The fire is believed to have been incendiary.

The union station at Houston, Tex., is now used by the passenger trains of the International & Great Northern, which, until the consolidation of interests following government control, ran to and from the I. & G. N. station at Congress avenue.

The Atlanta (Ga.) Chamber of Commerce has aided in securing positions in Atlanta for a number of the railroad traffic men whose offices in that city have been abolished. According to a local newspaper there are 114 men affected by the order discontinuing solicitation of passengers and freight, of whom about one-third desired to remain in Atlanta.

The Overman Bill, authorizing the President of the United States to reorganize government departments, which has passed the Senate, was on Tuesday reported favorably to the House of Representatives. The proposed amendment to exempt the Interstate Commerce Commission from the operation of this law was not included, having been defeated in the Judiciary Committee by a vote of 12 to 6.

The Brotherhood of Railroad Trainmen, according to statements of its officers in the newspapers, now has in its membership nearly all of the brakemen on the Louisville & Nashville. Until the issuance of the circular by the director general saying that there should be no discrimination between union and non-union men in the railroad service, the brakemen of the Louisville & Nashville had not belonged to any union.

Investigation of the fire which destroyed the shops of the Lake Erie & Western at Lima, Ohio, on April 24, mentioned in the *Railway Age* of May 3, page 1138, indicates that there is no substantial evidence that it was caused by an incendiary. The suspect who was arrested has been released. Less equipment was destroyed than was first reported, only six small locomotives, about 25 years old, one old baggage car and one old coach.

The United States Shipping Board, Edward N. Hurley, chairman, is now organized in six divisions, and the Emergency Fleet Corporation, subordinate to the Shipping Board, has eleven divisions; and the two organizations, the Shipping Board and the Emergency Fleet Corporation have agencies in 15 cities. An outline of these organizations, with a list of the officers and local representatives, is printed in the May number of the Official Railway Guide.

The Quartermaster's Department of the United States Army, following its reservation of space in the new Pennsylvania freight station in Chicago issued orders to those unions which were striking to resume work on the building immediately. Accordingly all have returned to work with the exception of electricians installing elevators in the building. These men refuse to return to work until the Otis Elevator Company meets an agreement made before the late arbitration board.

In a letter to western roads, dated May 7, regional director R. H. Ashton, of the Western Regional District, asks that officers best qualified to handle the full economy campaign, periodically attend the convention of the International Railway Fuel Association to be held in Chicago May 23 and 24. He has suggested that this representation include general managers, general

superintendents, superintendents of motive power, train dispatchers, master mechanics, traveling engineers, purchasing agents, superintendents, etc.

The locomotive boiler inspectors of the government will receive substantial increases of salary, if Congress accepts a report presented in the House this week by the Committee on Interstate and Foreign Commerce. By the bill as reported the chief inspector will be advanced from \$4,000 to \$5,000; two assistant chief inspectors from \$3,000 to \$4,000; and fifty district inspectors from \$1,800 to \$3,000. The report says that the legislative agents of the brotherhoods of enginemen, conductors and firemen, supported the bill.

Stenciling Freight Cars

The Executive Committee of the Master Car Builders' Association has issued Circular No. 40 requesting that the placing of reporting marks on freight cars between two horizontal bars be considered as a Standard of the Association.

The Railway Regiments' Tobacco Fund

Colonel Wildurr Willing of the 12th Engineers (Railway) has acknowledged receipt under date of April 10, of two shipments of tobacco. He states that "This tobacco was divided among the enlisted personnel of the regiment and I am sure the men have had no greater treat since entering the service of the government."

The Supply of Steel

Practically the entire output of steel has been commandeered for the government by the War Industries Board. The surplus remaining after the government's war needs have been met, together with a certain part of the output not required for such purposes, will have to answer for the non-war industries, under strict government supervision. This plan was outlined to a meeting of the American Iron & Steel Institute at New York last week by J. L. Replogle, the steel director for the War Industries Board, who said that altogether too much steel was being absorbed by non-essentials and that the government's requirements would require practically the entire output. Among the requirements for steel he mentioned the quantities needed for cars and locomotives and added that the director general of railroads had asked for 2,000,000 tons of rails.

To Guard Railroad Securities.

The National Association of Owners of Railroad Securities has issued a letter to the directors of railroads, now under government control and operation, calling to their attention the fact that they now have the responsibility of representing all classes of securities issued by their respective railroads as the contracting parties on behalf of the owners of the properties, in the execution of the proposed contract which each railroad is to make with the government.

The sub-Executive Committee of the association has held several conferences with railroad men and financiers, as a result of which there has been appointed a special committee representing owners of railroad securities, the same consisting of S. Davies Warfield, President of the Continental Trust Company, Baltimore, chairman; Gordon Abbott, chairman of the Old Colony Trust Company, Boston; James Brown, of Brown Brothers & Co., New York; Frederick H. Ecker, treasurer of the Metropolitan Life Insurance Company, New York, and John J. Pullyen, president of the Emigrant Industrial Savings Bank, New York. Samuel Untermyer and E. H. Inness Brown, the latter of the firm of Hornblower, Miller, Garrison & Potter, have been named as counsel to the committee.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1918

Table with columns: Name of road, Average mileage operated (during period), Freight, Passenger, Total, Operating revenues, Maintenance of way and Equip. structures, Net from operation, Railway use accruals, Operating income (or loss), Increase (or decrease) comp. with last year.

TWO MONTHS OF CALENDAR YEAR, 1918

Table with columns: Name of road, Average mileage operated (during period), Freight, Passenger, Total, Operating revenues, Maintenance of way and Equip. structures, Net from operation, Railway use accruals, Operating income (or loss), Increase (or decrease) comp. with last year.

REVENUES AND EXPENSES OF RAILWAYS

TWO MONTHS IN CALENDAR YEAR, 1918—Continued

Name of road.	Average mileage operated per cent.	Operating revenues.		Maintenance of way and equip.		Operating expenses.		General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) last year.
		Freight.	Passenger.	(inc. rise.)	(decr. fall.)	Traffic.	Trans. portation.							
Nevala, Northern.....	168	\$362,937	\$38,964	\$49,043	\$35,957	\$1,633	\$97,303	\$10,360	\$189,251	47.33	\$210,802	\$20,797	\$196,006	—\$779
New Orleans & Northeastern.....	203	232,843	219,239	101,145	87,406	37,333	36,679	13,179	228,081	47.03	175,062	10,033	165,029	—1,075
New Orleans Great Northern.....	284	53,634	306,145	34,847	58,814	5,615	114,495	19,197	228,081	74.50	78,964	1,753,316	501,883	\$2,612,227
New York, Central & St. L.....	6,079	20,276,676	8,998,388	33,129,150	4,529,289	8,285,438	438,267	17,076,806	991,729	31,073,489	96.21	1,255,750	501,883	\$2,612,227
New York, Central & St. L.....	6,079	1,901,103	1,23,973	2,107,793	361,334	475,091	79,852	1,332,556	2,334,281	110.75	226,489	115,000	111,489	—6,598.82
New York, N. Haven & Hartford.....	1,992	5,185,844	5,015,564	11,997,513	1,599,367	2,249,127	74,595	6,463,706	11,069,827	92.96	837,686	53,000	36,341	2,433,361
New York, Ontario & Western.....	56	1,041,343	145,868	1,366,632	157,397	314,576	16,819	40,516	1,302,631	95.32	64,019	43,600	46,519	1,738,280
New York, Susquehanna & Western.....	132	40,233	70,023	162,853	15,729	43,332	22,646	22,994	726,977	103.63	27,807	27,807	3,477	400,345
Norfolk & Western.....	688	8,173,031	1,264,137	9,804,097	1,212,714	2,597,224	118,130	4,095,803	214,894	105.28	66,507	59,233	6,774	1,074,684
Norfolk Southern.....	916	82,171	178,38	769,442	124,785	117,252	13,035	366,124	38,378	656,970	83	1,12,472	80,337	1,250,516
Norfolk Southern.....	6,807	348,64	244,880	662,937	178,233	284,436	17,522	5,535,547	268,320	916,710	78.94	2,569,076	1,072,497	1,496,579
Pennsylvania R.R.....	5,84	3,907,212	10,953,422	3,907,009	6,852,244	11,308,184	519,044	22,101,970	1,258,753	111.66	4,478,313	1,460,000	6,111,313	16,323,316
Petra & Pekin Union.....	19	37,619	11,681	175,600	3,343	33,655	28	136,133	199,667	113.67	34,006	18,950	15,057	39,884
Pere Marquette.....	345	2,035,143	436,315	2,894,553	538,374	664,643	62,465	1,661,387	132,275	3,054,510	108.92	352,914	534,144	1,514,444
Pittsburgh & Lake Erie.....	1,126	7,133,113	1,154,491	8,973,633	886,330	2,383,474	96,838	5,067,207	206,116	8,269,511	99.94	482,214	3,661,788	10,925,264
Pittsburgh & West Va. Ry.....	63	160,801	16,649	178,900	37,119	49,074	3,117	6,813	164,035	91.09	15,855	10,974	54,915	1,074,515
Port Reading.....	1	117,393	187,231	63,009	41,428	80	219,539	3,208	209,982	384.20	82,750	14,277	201,923	115,972
Rochester, Fred. & Pot.....	87	366,079	389,532	765,806	100,972	7,248	17,428	335,954	15,264	59,929	103.37	17,033	53,552	13,304
Seaboard.....	3,56	3,209,648	5,243,955	3,432,021	1,029,511	1,623,561	148,231	1,88,649	4,123,818	111.46	179,910	2,899	693,370	7,592,664
Seaboard Air Line Ry. Co.....	7	77,006	1,55,941	30,120	6,068	30,120	1,223	1,88,649	173,857	103.47	93,663	33,436	257,678	1,593,759
Seaboard International Ry. Co.....	165	191,890	35,143	131,009	17,491	32,444	3,602	46,913	87,363	66.68	43,646	16,327	745,484	56,286
St. Joseph & Grand Island.....	257	334,927	416,910	95,267	51,773	179,316	16,211	179,316	13,087	64,883	49.44	4,549	121,390	1,179,000
St. Louis, Merchants' & Bridge Terminal.....	409	785,745	857,163	1,773,143	109,959	3,830,653	270,254	7,399,955	86.8	1,177,008	9,050	1,703	33,552	13,304
St. Louis, San Francisco.....	4,761	5,176,407	785,745	8,577,163	1,773,143	2,019,380	109,959	3,830,653	270,254	7,399,955	86.8	1,177,008	447,368	2,577,678
St. Louis Southwestern.....	781	2,296,827	591,970	3,056,016	354,331	526,827	93,579	1,057,838	110,306	2,146,311	70.19	990,065	3,444,764	1,417,166
San Antonio & Aransas Pass.....	733	478,461	157,763	702,580	88,411	119,315	14,395	341,591	30,485	504,904	84.55	108,531	48,007	56,286
Southern.....	6,892	8,994,176	4,730,121	15,052,444	1,763,017	2,756,804	262,918	6,240,566	361,919	11,477,194	76.23	3,575,651	6,800	121,390
Southern.....	7,102	14,349,035	5,486,392	21,692,866	3,275,060	3,725,060	4,128	102,994	7,723	177,765	77.35	5,562	34,055	20,643
Staten Island Rapid Transit.....	4	47,009	14,987	43,616	35,274	12,244	2,221	12,244	12,244	2,221	70.36	69,311	111,702	1,117,702
Union R.R. of St. Louis.....	36	197,444	61,428	43,286	59,916	7,142	150,583	14,552	275,447	74.88	74,880	10,700	10,700	1,117,702
Union R.R. of St. Louis.....	81	1,35,435	1,78,989	18,195	10,148	4,571	2,552,660	1,947	451,527	15.79	71,801	52.3	1,436	1,117,702
Union R.R. of St. Louis.....	409	785,745	857,163	1,773,143	109,959	3,830,653	270,254	7,399,955	86.8	1,177,008	9,050	1,703	53,552	
Utah & Pacific.....	1,946	3,57,451	956,143	3,801,540	454,508	315,927	18,031	1,648,311	131,582	2,694,431	76.41	8,679	241,635	40,479
Utah & Pacific.....	44	139,750	63,441	181,667	63,465	84,285	115,615	115,615	115,615	106.32	191,846	56,47	48,881	58,348
Utah & Pacific.....	484	7,689,570	69,804	881,816	174,644	221,897	30,346	418,198	18,522	863,546	97.63	18,900	50,111	33,452
Utah & Pacific.....	60	141,173	17,417	150,538	46,816	67,229	3,721	11,107	17,103	46,575	1.73	46,575	14,400	16,441
Utah & Pacific.....	118	53,538	73,33	10,103	20,704	1,809	75,689	6,779	13,443	141.83	21,455	1,438	59,154	16,441
Union R.R. of St. Louis.....	36	197,444	61,428	43,286	59,916	7,142	150,583	14,552	275,447	74.88	74,880	10,700	10,700	
Union R.R. of St. Louis.....	81	1,35,435	1,78,989	18,195	10,148	4,571	2,552,660	1,947	451,527	15.79	71,801	52.3	1,436	
Union R.R. of St. Louis.....	409	785,745	857,163	1,773,143	109,959	3,830,653	270,254	7,399,955	86.8	1,177,008	9,050	1,703	53,552	
Utah & Pacific.....	1,946	3,57,451	956,143	3,801,540	454,508	315,927	18,031	1,648,311	131,582	2,694,431	76.41	8,679	241,635	
Utah & Pacific.....	44	139,750	63,441	181,667	63,465	84,285	115,615	115,615	115,615	106.32	191,846	56,47	48,881	
Utah & Pacific.....	484	7,689,570	69,804	881,816	174,644	221,897	30,346	418,198	18,522	863,546	97.63	18,900	50,111	
Utah & Pacific.....	60	141,173	17,417	150,538	46,816	67,229	3,721	11,107	17,103	46,575	1.73	46,575	14,400	
Utah & Pacific.....	118	53,538	73,33	10,103	20,704	1,809	75,689	6,779	13,443	141.83	21,455	1,438	59,154	
Utah & Pacific.....	36	197,444	61,428	43,286	59,916	7,142	150,583	14,552	275,447	74.88	74,880	10,700	10,700	
Utah & Pacific.....	81	1,35,435	1,78,989	18,195	10,148	4,571	2,552,660	1,947	451,527	15.79	71,801	52.3	1,436	
Utah & Pacific.....	409	785,745	857,163	1,773,143	109,959	3,830,653	270,254	7,399,955	86.8	1,177,008	9,050	1,703	53,552	
Utah & Pacific.....	1,946	3,57,451	956,143	3,801,540	454,508	315,927	18,031	1,648,311	131,582	2,694,431	76.41	8,679	241,635	
Utah & Pacific.....	44	139,750	63,441	181,667	63,465	84,285	115,615	115,615	115,615	106.32	191,846	56,47	48,881	
Utah & Pacific.....	484	7,689,570	69,804	881,816	174,644	221,897	30,346	418,198	18,522	863,546	97.63	18,900	50,111	
Utah & Pacific.....	60	141,173	17,417	150,538	46,816	67,229	3,721	11,107	17,103	46,575	1.73	46,575	14,400	
Utah & Pacific.....	118	53,538	73,33	10,103	20,704	1,809	75,689	6,779	13,443	141.83	21,455	1,438	59,154	
Utah & Pacific.....	36	197,444	61,428	43,286	59,916	7,142	150,583	14,552	275,447	74.88	74,880	10,700	10,700	
Utah & Pacific.....	81	1,35,435	1,78,989	18,195	10,148	4,571	2,552,660	1,947	451,527	15.79	71,801	52.3	1,436	
Utah & Pacific.....	409	785,745	857,163	1,773,143	109,959	3,830,653	270,254	7,399,955	86.8	1,177,008	9,050	1,703	53,552	
Utah & Pacific.....	1,946	3,57,451	956,143	3,801,540	454,508	315,927	18,031	1,648,311	131,582	2,694,431	76.41	8,679	241,635	
Utah & Pacific.....	44	139,750	63,441	181,667	63,465	84,285	115,615	115,615	115,615	106.32	191,846	56,47	48,881	
Utah & Pacific.....	484	7,689,570	69,804	881,816	174,644	221,897	30,346	418,198	18,522	863,546	97.63	18,900	50,111	
Utah & Pacific.....	60	141,173	17,417	150,538	46,816	67,229	3,721	11,107	17,103	46,575	1.73	46,575	14,400	
Utah & Pacific.....	118	53,538	73,33	10,103	20,704	1,809	75,689	6,779	13,443	141.83	21,455	1,438	59,154	
Utah & Pacific.....	36	197,444	61,428	43,286	59,916	7,142	150,583	14,552	275,447	74.88	74,880	10,700	10,700	
Utah & Pacific.....	81	1,35,435	1,78,989	18,195	10,148	4,571	2,552,660	1,947	451,527	15.79	71,801			

Railway Revenues and Expenses

The Interstate Commerce Commission has given out the following partial summary of railway returns for March and three months of the year, covering the reports of 114 large roads. Only partial summaries have thus far been given out for January and February as there has been a delay on account of a change in the monthly report form. The preliminary figures are as follows:

22, between the British Columbia Minister of Railways and the various individuals forming the Pacific Great Eastern and the subsidiary companies.

This agreement virtually gives the province of British Columbia complete possession of the entire railway, and the property and credits of the subsidiary companies, and provides that all claims by the several parties named against either of the companies shall be released to the government forthwith, and upon the performance of these terms the

Item	OPERATING REVENUES, EXPENSES AND INCOME OF 114 LARGE ROADS							
	United States		Eastern District		Southern District		Western District	
	1918	1917	1918	1917	1918	1917	1918	1917
1. Average No. of miles operated.....	165,265.38	164,727.19	48,319.97	48,375.65	32,483.54	32,255.93	84,461.87	84,095.61
2. Railway operating revenues.....	\$284,130.692	\$248,538.067	\$41,558.300	\$42,434.894	\$46,702.213	\$38,024.217	\$95,870.179	\$84,078.956
3. Railway operating expenses.....	221,794.995	179,938.050	117,464.006	96,687.121	37,467.446	25,316.762	71,863.343	57,934.197
4. Net revenue from railway operations.....	62,335.697	68,599.987	24,094.294	29,747.773	14,234.767	12,707.455	24,006.636	26,144.759
5. Railway tax accruals (excluding "war taxes").....	11,639.552	10,964.684	5,174.355	5,102.118	1,776.948	1,695.434	4,688.249	4,167.132
6. Uncollectible railway revenues.....	67,843	43,216	7,856	11,048	8,987	15,473	31,000	16,695
7. Railway operating income.....	50,628.302	57,592.087	18,912.083	24,634.607	12,448.832	10,996.548	19,667.387	21,960.932
8. Equipment rents.....	*2,233.119	*2,077.911	*2,901.850	*3,221.246	*4,494	1,005.152	713.434	138.183
9. Joint facility rent (debit).....	933.065	933.528	427.220	443.623	189.530	139.391	316.315	350.505
10. Net of items 7, 8 and 9.....	47,462.127	54,580.648	15,583.013	20,969.729	12,214.608	11,862.309	19,664.506	21,748.610
11. Revenues per mile.....	1.719	1.499	2.930	2.614	1.438	1.179	1.135	1.089
12. Expenses per mile.....	1.342	1.092	2.311	1.999	1.000	.785	.851	.680
13. Net revenue per mile.....	.377	.417	.499	.615	.438	.394	.284	.311
14. Railway tax accruals per mile.....	.71	.67	1.07	1.06	.55	.53	.56	.50
15. Uncollectible revenues per mile.....	.406	.260	.162	.229	.133	.147	.37	.20
16. Operating income per mile.....	.306	.350	.392	.509	.383	.341	.228	.261
17. Equipment rents per mile.....	.14	.13	.60	.67	.1	.1	.8	.2
18. It. facility rent per mile (Dr.).....	.5	.6	.9	.9	.6	.4	4	4
19. Net of items 16, 17 and 18.....	.287	.331	.323	.433	.376	.368	.232	.259
	FOR THE THREE MONTHS ENDING WITH MARCH							
20. Average No. of miles operated.....	165,257.88	164,733.36	48,310.34	48,376.05	32,481.46	32,255.95	84,466.08	84,101.36
21. Railway operating revenues.....	\$726,011,329	\$688,173,857	\$350,717,024	\$343,739,499	\$123,032,156	\$108,209,135	\$252,262,149	\$236,225,223
22. Railway operating expenses.....	637,784,608	512,775,367	336,573,751	273,820,245	94,168,159	72,890,341	207,044,698	166,064,779
23. Net revenue from railway operations.....	88,226,721	175,398,488	14,143,273	69,919,254	28,863,997	35,318,794	45,219,451	70,160,444
24. Railway tax accruals (excluding "war taxes").....	33,982,323	31,274,945	15,217,269	14,044,859	5,253,445	4,963,249	13,511,609	12,266,837
25. Uncollectible railway revenues.....	135,737	112,144	31,451	42,304	25,755	27,015	78,531	42,825
26. Railway operating income.....	54,108,661	144,011,399	*1,105,449	55,832,087	23,584,797	30,338,530	31,629,311	57,850,782
27. Equipment rents.....	*4,616,434	*6,323,260	*8,123,152	*10,004,249	193,090	2,866,584	3,313,638	814,405
28. Joint facility rent (debit).....	2,896,568	2,819,387	1,356,296	1,297,165	459,545	413,424	1,080,727	1,108,798
29. Net of items 26, 27 and 28.....	46,595,669	134,868,752	*10,584,895	44,530,673	23,318,342	32,781,690	33,862,222	57,556,389
30. Revenues per mile.....	4.393	4.178	7.260	7.165	3.788	3.355	2.986	2.809
31. Expenses per mile.....	3.859	3.113	6.967	5.660	2.899	2.260	2,451	1,975
32. Net revenue per mile.....	.534	1.065	.293	1.445	.889	1.095	.535	.834
33. Railway tax accruals per mile.....	.206	.190	.315	.290	.162	.154	.160	.146
34. Uncollectible revenues per mile.....	.411	.267	.165	.231	.133	.147	.37	.20
35. Operating income per mile.....	.328	.375	.392	.515	.376	.340	.228	.261
36. Equipment rents per mile.....	.18	.17	.619	.67	.1	.1	.8	.2
37. It. facility rent per mile (Dr.).....	.5	.6	.9	.9	.6	.4	4	4
38. Net of items 35, 36 and 37.....	.282	.319	*2.19	9.20	.718	1.016	.401	.685

*Debit item.
Note—There are included in this statement 56 roads in the Eastern District, 22 in the Southern District, and 36 in the Western District. Total 114 roads.

The Pacific Great Eastern Agreement

The controversy between the province of British Columbia and the promoters of the Pacific Great Eastern which has been a cause for extended litigation has been settled recently by an agreement signed by the parties involved. The Pacific Great Eastern is a line projected from Vancouver in a northerly direction about 400 miles to Prince George, a station on the Grand Trunk Pacific about 450 miles east of Prince Rupert. The company was incorporated in 1912, the promoters including among others, members of the contracting firm of Foley, Welch & Stewart, which firm agreed to build the line, and D'Arcy Tate, who had secured a traffic agreement with the Grand Trunk Pacific upon a guarantee of bonds by the British Columbia Government. Construction was started but the company got into financial difficulty and received further assistance from the government. In 1916 further assistance was asked but owing to a change of administration this request led instead to an extended investigation that disclosed a series of irregularities in the management of the project. These consisted primarily of overpayments estimated at \$5,700,000 and it was found that it would cost \$12,000,000 more to complete the line, which the contractors had undertaken to build upon a guarantee of \$20,160,000 in bonds. This investigation resulted in the issuance of writs against the Pacific Great Eastern, the subsidiary companies and all others concerned, for an accounting, for an injunction restraining them from proceeding with the work, for specific performance of the original agreement and for damages for breach of agreement. These were issued on May, 1917, since which time negotiations have been in progress, which led to an agreement signed on February

government will release the other parties from their engagement. Detailed provisions are made for the release of the several parties upon the fulfillment of their obligations in accordance with one or more options. The agreement is not to become operative until ratified by the legislature and the several parties have agreed, on request of the Province, to apply for the necessary legislation.

The Government has outlined a plan for the future of the railway. The first section of the line from North Vancouver is Whytecliffe, 15 miles, will be placed in good operating condition as soon as possible and connected with the North Vancouver lines of the British Columbia Electric Railway. The completed line from Squamish to Clinton, 167.7 miles, will have to be put in good condition, while the line from Clinton to Prince George, 185 miles, will be completed as speedily as possible.

Official Guide Fifty Years Old

The Official Railway Guide announces that with its current issue (May) it completes the 50th year of its publication. The first number was that for June, 1868. It was then called The Travelers Official Guide, and was published at No. 64 Broadway, New York City. Edward Vernon was the editor.

The issue for June, 1868, shows no road west of the Missouri River except the Union Pacific, which was in operation to Cheyenne, and the Central Pacific, building eastward from Sacramento, had arrived as far as Cisco—92 miles.

The size of the page at that time was 6 x 4½ inches, but the Guide has now become undoubtedly the largest monthly publication in the world.

Not only do its pages contain the history of the roads themselves, but they have a human interest. To a young man entering upon railroad work it has been one of the first signs of success when he achieved a rank which entitled his name to appear in *The Official Guide*; and as he advanced his name mounted, until many times it has reached the top line. The files of *The Guide* contain the most complete record of many phases of transportation development, particularly in the combination of through routes, the accelerated time of trains, improvements in comfort, and many other features which distinguish American travel. So far as is known, but one complete set exists. That has been placed in the New York Public Library, where future historians may have access to it.

Loyal L. & N. Employees

The letter of President Milton H. Smith, of the Louisville & Nashville, to the employees of the road, calling for patriotic devotion to their duties noticed in the *Railway Age* of April 12, page 997, was responded to by a committee of employees including representatives from all branches of the service, in a manifesto, expressing intelligent and earnest loyalty, which is quite unusual. This letter, addressed to President Smith, and signed J. D. Keen, chairman, reads in part as follows:

"We note with pleasure that you have regarded our loyalty and efficiency in the past, and you have urged us to maintain these distinctive characteristics as we now are elevated to a position of greater importance in the direct service of our government in time of war.

"Practically the entire organization of our company is composed of those who from their boyhood days have grown up in the service of the L. & N. Under your thoughtful leadership both officers and employees have been methodically trained and thoroughly skilled. As loyal employees, we have always gladly shared the misfortunes of our company, whenever the dark clouds of commercial depression lowered thick and heavy about us; but we have all rejoiced when the sunlight of prosperity returned. In comparing our wages with the dividends some of us may have felt at times that the divisions made were not equitable, but whether this be true or not, you may rest assured that the great majority of us have been able to understand that you were prudently providing not only for our vast army of employees, but also for meeting the many phased conditions of our natural growth and to provide reasonable accommodations in deference to the ever-changing demands of a restless public.

"While vast sums of money have been spent in driving our new extensions through the wilderness of the South, you have lifted thousands of miles of our old road out of the mud of the low and treacherous lands, and placed it upon a firm bed of good ballast, with heavy ties and rails. You have built beautiful stations at all our important terminals, and have encouraged the habitation and cultivation of boundless tracts of rich farm lands.

"As president of the Louisville & Nashville you have wisely developed and practically completed a vast structural and functional railway system of inestimable value to the civil life of our entire country, a grand monument to a clear perception, a steadfast purpose, boundless energy, a good heart and great executive ability.

"The timely act of our government in providing a suitable railroad commission and adjustment board, in the unusual circumstances, delegated to adjust wages and working conditions, seniority, etc., we look upon as wise. It will greatly reduce if not entirely eliminate the possibility of dissatisfaction. And, in the language of the director general, every employee may now devote himself unreservedly and patriotically to his work with the assurance that his rights and interests will be justly dealt with. Your kindly letter to us will promote a better understanding, a fuller and more certain knowledge of our obligations, and a more enthusiastic loyalty in our new relations. We, with you, pledge ourselves to make, willingly, whatever patriotic sacrifices are required, to give steadfast co-operation, devoted and unflinching service, and absolute loyalty to our government, that together we may all work for universal liberty and for a world made safe for Democracy."

Roadmasters' Association Work

Among the subjects which have been selected for committee investigation and report by the Roadmasters' and Maintenance of Way Association this year are the following:

Data on Mechanical Devices Used in Track Maintenance; J. B. Oatman, roadmaster, Buffalo, Rochester & Pittsburgh, Du Bois, Pa., chairman.

Labor Saving Devices; J. W. Powers, supervisor, New York Central, Rochester, N. Y., chairman.

Fencing, Including Cattle Guards, Farm Crossing Gates and Anchoring of Fences; Charles Newberg, roadmaster Chicago & North Western, Mayfair, Ill., chairman.

A paper will also be presented on Best Methods of Raising Track by George Beckingham, superintendent of track, Grand Trunk, Montreal, Que.

The convention will be held at the Auditorium Hotel, Chicago, on September 17, 18 and 19.

Traffic News

The United States Shipping Board announced, at Washington on May 2, that authority had been given for the construction of 50 new wooden barges for use in carrying coal to New England, each barge to be of 3,500 tons capacity.

The Kansas City Southern, the Texarkana & Ft. Smith, the Arkansas Western and the Poteau Valley have closed their commercial offices at New York City, Pittsburgh, St. Louis, San Antonio, Chicago, Dallas, Houston, and New Orleans.

A request for cheaper transportation for agricultural workers recruited by the United States Employment Service for distribution among agricultural communities has been filed by Louis F. Post, assistant Secretary of Labor, with the Railroad Administration.

The Louisville & Nashville announces the closing of its freight traffic offices in seventeen cities, namely, Augusta (Ga.), Buffalo, Cleveland, Chicago, Detroit, Dallas, Houston, Indianapolis, Jacksonville (Fla.), Kansas City, Little Rock, Macon, New York, Oklahoma City, Pittsburgh, Savannah and Tampa.

Between Houston, Tex., and Texas City, 43 miles, all freight in less than carloads must henceforth be sent by the Galveston, Houston & Henderson. Shippers offering freight at the stations of the other two roads, the Missouri, Kansas & Texas, and the Southern Pacific, will be directed to go to the freight station of the G. H. & H.

Special orders providing for the diversion of coal to New England, issued during the critical period of last winter, have been revoked by Fuel Administrator Garfield, this arrangement being superseded by the zone system. District representatives of the Fuel Administration will attend to the filling of emergency and other essential requirements for bituminous coal from the different producing fields.

The Railroad Commission of Georgia, after considering the subjects for many months, examining 35,000 pages of exhibits and taking thousands of pages of testimony, has announced its approval of a general advance in freight rates in that state, by percentages which are expected to increase gross freight revenues 8 per cent. It is said that intrastate freight constitutes only 15 per cent of the freight traffic of the Georgia Railroads.

The "Return Loads Bureau," of the Merchants' Association of New York city, established for the benefit of automobile trucks carrying freight to and from other cities, reports that hundreds of trucks have already been registered; and applications are constantly being received from out of town trucks for which loads are desired from New York. Somebody in New York is preparing to send trucks to Charleston, S. C., a distance of over 700 miles, to bring back 12 tons of merchandise.

The Post Office Department announces that aeroplanes, to carry letters, will begin making regular trips between Washington and New York on May 15. The price for letters is to be 24 cents an ounce, which will include special delivery. The announcement says that, during the early stages of the service, no attempt will be made to send out aeroplanes on days when rain or fog is likely to obscure the vision of the aviators. On such days the letters will be sent by special messenger, by railroad train, starting at 11 A. M.

The number of carloads of export freight on hand at North Atlantic ports on May 1, exclusive of coal and grain, was 28,588, of which 24,167 were consigned to the United States or to one of the Allied governments. The total compares with 41,202 cars on January 1, of which about three-fourths were government shipments. Of the total on the first of May, 13,256 carloads consisted of freight lying on the ground; 6,290 carloads were in warehouses and 9,042 were cars not yet unloaded. More than half of the 28,588 carloads reported on May 1 were at New York city.

The Merchants' Association, of New York city, has complained to the Railroad Administration, at Washington, that certain railroads have refused to accept silk for shipment from New York city, for the reason, it is said, that serious losses have been sustained because of thefts from freight cars. Some of the railroads have referred shippers to the express companies, but these do not wish to accept any lot of more than five bales.

Plans for the restriction of the movement of anthracite coal from the United States to Canada during the present coal year have been formulated by the United States Fuel Administration, in co-operation with the Fuel Controller of Canada. A representative of the Fuel Administrator attended a recent conference of representatives of coal operators, coal miners and railways in Canada at which this problem was discussed. Anthracite supplies to points in western Canada will be materially restricted. No American anthracite will be available for shipment to points west of Winnipeg.

Port and Terminal Improvement Commission

The United States Shipping Board has appointed a Commission on Port, Terminal, and Harbor Improvement, headed by Edward F. Carry, director of operations of the Shipping Board, and composed of representatives of the Army, Navy, Railroad Administration, and ship interests. The commission is designed to bring about a more economic arrangement and utilization of the ports and harbors of the Nation. In the interest of the army it will see to it that embarkation ports are so arranged that there will be adequate railroad, warehouse, and other facilities. It will deal with bunkering facilities, which is of interest to the Navy and will work to avoid wasteful journeys of freight. The program that will be considered by the commission is designed to eliminate all waste motion.

In addition to Mr. Carry, as chairman, the commission includes B. L. Winchell, S. M. Felton, Capt. A. C. Hodgson, George S. Dearborn, J. H. Rossiter, and Edwin F. Gay.

Coal Production

In the week ended April 27 the government reported not only the largest rate of production of bituminous coal during the past 12 months, but the third successive week of rising production, according to the weekly bulletin of the Geological Survey. Production of bituminous coal, including lignite and coal made into coke, is estimated at 11,668,000 net tons, an increase of 5.7 per cent over the preceding week. The average production per working day is estimated at 1,946,000 net tons compared with 1,840,000 net tons last week, and 1,680,000 net tons during April, 1917.

Production for the month of April, 1918, is estimated at 46,478,000 net tons, an increase of 4,400,000 net tons or 10 per cent over April of last year. Production for the four months ended April, 1918, is estimated at 181,992,000 net tons, an increase of over 5,000,000 net tons or 3 per cent compared with the same four months of 1917. Anthracite shipments slightly increased during the week of April 27, 9 roads reporting 39,522 carloads compared with 39,130 during the preceding week.

The percentage of full time output during the week ended April 20 was 72.2, the largest for several weeks, and the percentage of full time output lost due to car shortage was 16.2.

The Interstate Commerce Committee of the Senate, through its chairman, Senator E. D. Smith, of South Carolina, has instituted a preliminary inquiry into what efforts the Railroad Administration is making to furnish immediate adequate supplies of cars at the mines in order to avert a possible coal shortage next winter. Senator Smith has conferred with representatives of the Railroad Administration and secured information on the subject, and it is planned to obtain similar statements from the Fuel Administration and these will be considered by his committee to determine whether public hearings ought to be held.

Up to April 27 the railroads had moved 82,000 more cars of coal, including both anthracite and bituminous, than in the corresponding period of the previous year, after making up for a considerable decrease during January and the first part of February.

Commission and Court News

Court News

Federal Employers' Liability Act

The New Jersey Court of Errors and Appeals holds that, in a widow's proceeding to recover compensation for the death of her husband under the State Workmen's Compensation Act, the burden was on the petitioner in the court of first instance to show affirmatively that the deceased was engaged in intrastate service not regulated by the federal act, a fact not to be presumed in the absence of proof. *Lincks v. Erie (N. J.)*, 103 Atl. 176. Decided March 4, 1918.

Conductor's Duty to Passengers

In an action for damages alleged to have been caused by incorrect information given to the plaintiffs as to necessity for change of cars, the North Carolina Supreme Court holds that a conductor was not negligent in failing to volunteer information that the train did not stop at the station to which the plaintiffs had tickets, since he might assume that they intended to alight at a nearby station and continue the journey by a local train or otherwise.—*Hutchison v. Southern (N. Car.)*, 95 S. E., 181. Decided December 7, 1917.

Limitation of Time for Actions Against Railroads

The New Jersey Court of Errors and Appeals holds that, under section 58 of the State Railroad Act of 1903, as amended in 1912, all actions accruing from injuries to persons caused by the wrongful act, neglect or default of a railroad, shall be commenced within two years after the cause of action accrued and not after; and the infancy of the person injured will not exempt him from the operation of this statutory rule.—*Grabert v. Central of New Jersey (N. J.)*, 103 Atl., 212. Decided March 4, 1918.

Liability of Consignor for Freight Charges

Freight was shipped "charges collect," and a sight draft was drawn on the consignee, with bill of lading attached, which was paid. There was no special contract binding the carrier to collect the freight charges from the consignee. In the absence of this, the Georgia Supreme Court holds that although the carrier had delivered the goods to the consignee without payment of the freight, it could recover from the consignor.—*Southern Cotton Oil Co. v. Southern (Ga.)*, 95 S. E. 251. Decided February 15, 1918.

Regulation of Station Stops

Where the facts showed that the train service otherwise furnished a county seat, California, Mo., was reasonable and adequate, the Missouri Supreme Court affirmed a judgment setting aside an order of the Public Service Commission, requiring a certain interstate mail train to stop there on flag. The train stopped there only to let off passengers from St. Louis. It was held that the fact, standing alone, that the train stopped on flag at certain smaller places was of little, if any weight. *State ex rel. Mo. Pac. v. Commission (Mo.)*, 201 S. W., 1143. Decided March 5, 1918.

Recovery by Initial from Connecting Carrier

The Oklahoma Supreme Court holds that the words "required to pay," as used in the Carmack Amendment, authorizing recovery by the initial carrier against the connecting carrier of damages it may be required to pay the shipper for loss or injury occurring on the connecting carrier's line, mean asked to pay, or asked of right and by authority of law to pay, and do not require as a condition precedent to recovery that it shall have actually paid a judgment recovered against it by the shipper.—*St. Louis & San Francisco (Okla.)*, 171 Pac., 467. Decided December 11, 1917. Rehearing denied March 19, 1918.

Injury to Employee—Scope of Employment

A telegraph operator, while off duty, was injured by a defect in a roadmaster's gasoline speeder on which he was traveling to a nearby town to procure food supplies for himself. The Montana Supreme Court holds that the railroad was not liable to him as employee, since he was going neither to nor from his work, was engaged on his own private business, and was actuated in his choice of ways to reach his destination by motives entirely personal. Nor was the company liable on the theory that he was a passenger. He was a mere licensee, to whom the company owed no duty to keep its speeder in good order or to operate it with caution. And the roadmaster, by his invitation, had no authority to create any higher relation of such employee to the railroad than a mere licensee, his duties being circumscribed and confined to maintenance of way. Even if it were assumed the operator was a guest the railroad's only duty would be to use reasonable care for his safety; and if the happening was not necessarily inconsistent with ordinary care the rule of *res ipsa loquitur* could not apply.—*Glover v. Chicago, M. & St. P.* (Mont.), 171 Pac., 278. Decided February 26, 1918.

Employers' Liability Act Decisions

The Iowa Supreme Court holds that a conductor of a work train unloading ties to repair a track used for interstate traffic is employed in interstate commerce and therefore within the act, although the train is operated along a route wholly within the state, and although at the time of the accident he was not engaged in distributing ties, but was returning from work in charge of the train.—*Eley v. C. G. W.* (Iowa), 166 N. W., 739. Decided March 18, 1918.

A railroad company contracted with T. to keep coal chutes from which its locomotives were supplied filled with coal and to keep the ashes cleaned out of a turntable pit. He employed his own assistants, one of whom was injured in the work and sued the railroad. The South Dakota Supreme Court held that the evidence showed that the railroad did not retain control over the time of T. or his helpers, or over the manner of doing the work, but only reserved control of the results, and the plaintiff was not employed by the railroad so as to make it liable under the federal Employers' Liability Act.—*Polluck v. Minneapolis & St. Louis* (S. Dak.), 166 N. W., 641. Decided March 8, 1918.

Contract to Complete Logging Line—

Discrimination in Freight Rates

A railroad contracted to build and put in operation a line from a timber tract to a point on the main line. The road had until June 1 to finish construction of the line. The Tennessee Supreme Court holds that the construction of a line in which the curves were fully tied, but the straight portions of which were half tied, but which enabled an engine and cars with additional ties to be sent forward and to put it in condition to bear any traffic tendered by the lumber company, and where heavy mill machinery was hauled over the line early in April, and the road was thereafter steadily improved, it was constructed and placed in operation for general traffic; the word "constructed" having substantially the significance of the word "completed." The railroad contracted to transport lumber, etc., at a certain rate. The court holds that the shipper, if entitled to the part of the joint through rate paid by the connecting carriers to the railroad for originating traffic, would have an undue and forbidden preference over other shippers, and a contractual obligation that it should receive such distribution would not justify such discrimination, and it refused to enforce the contract.—*Caroline Spruce Co. v. Black Mountain* (Tenn.), 201 S. W., 154. Decided February 11, 1918.

Medical Attendance to Injured Employees

A foreman of track repairers, in attempting to board a moving freight train in the course of his employment, was thrown under the caboose, which cut off both his legs. His wife and several of his friends came up immediately after the injury and one of the friends went for the local doctor. They did

not object when the conductor proposed to take the injured man in the caboose to a hospital some miles distant, without waiting for the doctor, and the injured man assented to this course. He subsequently died from his injuries. His wife sued the railroad, alleging that death was caused by the railroad's failure to permit the deceased to remain at the point where he was injured, at least until the local doctor arrived. The Kentucky Court of Appeals held that it was incumbent on the plaintiff to show with reasonable certainty that, if such course had been pursued the deceased's life could have been saved. With regard to the railroad's duty in such circumstances, the court made the following rulings: Where a railroad servant is injured and adult members of his family are present when the accident occurs, or come to him before his removal by the company, or at any time thereafter, and express a desire to take charge of him, the railroad should deliver over to them the care of the case and do what they advise; also the wishes of the injured person, if he is capable of understanding conditions, should be respected. When the conductor, believing that the man could have more skilful treatment at another town, took charge of the matter of removing him thereto, such assumption of control, though with the consent of the injured man and his wife, carried with it the duty to exercise the required care. What a railroad must do necessarily depends on the time, place, character of the injury and surrounding circumstances. It was held that the conductor exercised reasonable care to save the life of the injured man, thus performing the railroad's duty to him. Judgment for the defendant was affirmed.—*Troutman's Adm. v. L. & N.* (Ky.), 200 S. W., 488. Decided February 5, 1918.

What Amounts to Conversion of Goods Transported?

The rule as commonly stated is that a common carrier is liable in conversion for misdelivery or nondelivery of property entrusted to it for transportation, and that on the making of an adverse claim and demand by a third person the carrier assumes the risk of correctly deciding between the claimant and the shipper or consignee. The result of this is that, though the carrier is without adequate means of information, it will be held in conversion if it errs in its decision. In the statement of the rule it is generally recognized as productive of much hardship to common carriers impartial as between the contending parties and desirous only of discharging the duties imposed on them by law. It has been suggested as a possible relief that a carrier in such a position might file a bill of interpleader and bring the parties in to settle their own controversy, but difficulties of jurisdiction, the loss of market, the perishable character of the property, etc., would seem to impair its adequacy. The hardship of the rule has resulted in adding the compulsion of legal process to the exceptions of "the act of God and the public enemies," and it is held that the carrier will be protected against the shipper or consignee if the property has been seized or taken from its possession by attachment, replevin, or search warrant at the instance of a third person. The carrier should, however, give notice of the proceeding. It is also settled that it will not be held liable should it decide correctly, and then voluntarily surrender the property to the adverse claimant who is in fact the true owner. The plaintiff in this case had owned and used hotel cars in its land business, and sold them to a third party, reserving title until the purchase-money notes were paid. Thereafter the plaintiff asserted a default. The purchaser, claiming to have paid in full, leased the cars for use in a traveling show. The railroad company, for a consideration, granted the lessee the use of the spur track near his residence as a space for storage of the cars; the agreement reserving to the railroad company no power or right of supervision. While the cars were on the storage track the plaintiff made formal demand thereon on the railroad. Thereafter the latter transported the cars for the lessee and redelivered them to him. The Circuit Court of Appeals, Eighth Circuit, holds that in view of the defendant's obligation as a common carrier to transport for any person it was not liable, for when the demand was made it had no control over the cars, and when it transported them it was not guilty of connivance with the lessee.—*Atchison, T. & S. F. v. International Land, Etc. Co.*, 247 Fed., 265. Decided November 26, 1917.

Equipment and Supplies

The Government Orders

Complete information concerning the Railroad Administration's orders for 1,025 locomotives and 100,000 cars will be found on page 1169 of this issue.

After this article was in type, however, announcement was made of the appointment of a committee consisting of W. G. Phelps, purchasing agent of the Pennsylvania Lines West; W. C. Bower, purchasing agent of the New York Central Lines East, and H. C. Pearce, general purchasing agent of the Seaboard Line, to arrange for the materials for the car and locomotive orders. The committee has held meetings with the producers and is working with the raw materials committees of the Council of National Defence. Whether the materials will be purchased by the government or by the car builders has not yet been determined.

Locomotives

THE ALABAMA & VICKSBURG has ordered 3 Mallet type locomotives from the Baldwin Locomotive Works.

THE ALTO CEDRO SUGAR COMPANY has ordered one Mogul locomotive from the American Locomotive Company.

THE FARROCARRILES DELNORTE DE CUBA have ordered five ten-wheel locomotives from the Baldwin Locomotive Works.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, is in the market for one second-hand Mogul type locomotive, with 19 by 24 in. cylinders, and having a total weight in working order of 60 tons and a steam pressure of 180 lb.

Freight Cars

THE UNITED STATES NAVY is inquiring for 6, 50-ton flat cars.

THE ILLINOIS CENTRAL is inquiring for 7 10,000-gal. tank cars.

THE TODD INTERESTS, Gainesville, Tex., are inquiring for 200 tank cars.

THE MUTUAL OIL, Kansas City, Mo., is inquiring for 50 tanks of 8,000-gal. capacity.

THE GENERAL ELECTRIC COMPANY, Erie, Pa., is inquiring for 3 all-steel gondola cars.

THE MARCELL INTERESTS, Chanute, Kan., are inquiring for 15 10,000-gal. capacity tank cars.

THE ZIMMERMAN ALDERSON CARR COMMISSION COMPANY, Dallas, Tex., is inquiring for 10, 8,000-gal. tank cars.

THE AMERICAN INTERNATIONAL STEEL CORPORATION, New York, is inquiring for 25, 18-ton and 25 22-ton wooden flat cars for export to South America.

Miscellaneous

THE HOCKING VALLEY has awarded a contract to the Roberts & Schaefer Company for the installation of Robertson coaling conveyers at Toledo, Ohio, and Marion.

THE CHICAGO GREAT WESTERN has ordered from the Railroad Water & Coal Handling Company, of Chicago, a coaling station of 100-tons' capacity to be built at Talmadge, Ia.

THE PENNSYLVANIA RAILROAD has awarded a contract to the Roberts & Schaefer Company, engineers and contractors, Chicago, for the installation of a 300-ton, two-track, automatic electric, reinforced concrete locomotive coaling plant and two separate "Rands" gravity sand plants of concrete construction for installation at Kane, Pa. A contract has also been given to the same company for the construction of a concrete 100-ton coaling plant at Rainey Junction, Pa.

Supply Trade News

John J. Cummings, president of the McGuire-Cummings Manufacturing Company, Chicago, died on May 4.

The Union Switch & Signal Company announces the removal on May 1, of its Montreal office from 510 Canadian Express building to 803 McGill building.

F. E. Lauderbach, in charge of southern territory for the National X-Ray Reflector Company, with office at St. Louis, Mo., has resigned, and that office has been abolished.

The Certes Supply Company, St. Louis, Mo., has been appointed selling agent for the Burden staybolt and engine bolt iron, and iron rivets for St. Louis and territory tributary thereto.

The Southern Railway Supply & Equipment Company, St. Louis, Mo., announces the purchase from the Scarritt-Comstock Furniture Company of that company's car seat department, and the reorganization of that end of the business as the Scarritt Car Seat & Manufacturing Company.

J. M. Riordan, until recently sales engineer of the Grant Lees Gear Company, Cleveland, and formerly representing the Fellows Gear Shaper Company of Springfield, Vt., in the central states, is now connected with the sales organization of the Cleveland Milling Machine Company, 18511 Euclid avenue, Cleveland, Ohio.

Press G. Kennett, southern railway sales manager for the Flint Varnish & Color Works, with headquarters at St. Louis, Mo., has been appointed western railway sales manager, with headquarters at Chicago, succeeding Rex W. Hudson, resigned to engage in other business. J. C. Jonas has been appointed southern railway sales manager at St. Louis, succeeding Mr. Kennett.

The property and plants of the Lehigh Foundry Company and the Lehigh Car, Wheel & Axle Works, of Fullerton, Pa., have been merged into one organization, the Fuller-Lehigh Company, with its office and works at Fullerton, Pa. The properties of the two companies are adjoining and have been for a number of years under the same management. The change is one of name only. The executive personnel remains the same.

E. C. Peck, superintendent of the Cleveland Twist Drill Company at Cleveland, Ohio, has received an appointment as lieutenant-colonel in the engineering bureau of the ordnance department. Mr. Peck will have charge of the gages used in the production of munitions and kindred materials for the above department. His duties will be the supervision of design of gages and the settling of limits of variance which will be satisfactory to both manufacturer and the ordnance department itself.

D. R. Morris, assistant engineer of the valuation department of the New York Central (Buffalo and East), resigned May 1 to accept a position with the Federal Signal Company as sales engineer. Mr. Morris graduated from the Chicago Manual Training School in June, 1898, and entered the signal field on the Chicago & North Western July 9, 1898, remaining with this company for four years. The next six years were spent on signal construction with the General Railway Signal Company. From 1908 to August, 1912, he was with the Illinois Central as signal inspector and general foreman of construction; from August, 1912, to April 15, 1914, he was signal engineer of the El Paso & South Western, and from April 15, 1914, to June, 1916, he was with the Federal Signal Company and Protective Signal Manufacturing Company; he became connected with the New York Central in June, 1916. Mr. Morris will be located at the company's New York office.

Jesse Lowe, contracting engineer, died at his home in Chicago on April 17. Mr. Lowe was born at Omaha, Neb., on January 17, 1861, and graduated from the Rensselaer Polytechnic Institute, Troy, N. Y., in 1885. For a short time after his graduation he was assistant to the city engineer of Omaha, and assistant engineer in locating the Omaha Belt line and in the preliminary and location surveys of the Missouri Pacific west of Omaha. In 1886 he was located at Lincoln, Neb., as resident

engineer of the Missouri Pacific. From there he went to Birmingham, Ala., as assistant manager of the Birmingham Bridge & Bolt Works. In 1887 he formed a partnership at Omaha with Andrew Rosewater and George B. Christie for the purpose of engaging in civil engineering work. The following year the firm was dissolved and the firm of Christie & Lowe was organized for similar purposes. This firm was continued until 1913. Among the projects completed by this firm are the following: The cable street railways, Denver, Colo.; piers for the Bellefontaine Bluffs bridge over the Missouri river and the Harlem street culvert at St. Louis for the Keokuk & Northwestern; the Fullerton avenue loop at Chicago, the first underground trolley line in America, and the Fifth street railway in Washington, D. C. He also constructed two miles of the Chicago drainage canal and the controlling works, including the Great Bear Trap dam which regulates the flow of water from the Great Lakes to the Gulf. The firm did considerable other railroad and bridge work for lines in the Middle West and river and harbor improvement work for the United States government.

Trade Publications

SMOOTH ON IRON CEMENT.—The sixteenth edition of the "Smooth-On" instruction booklet, which has just been issued, contains 144 pages, each one with an illustration showing in an interesting manner how the different "Smooth-On" iron cements are used for repairing purposes.

CLAM SHELL BUCKETS.—The Blaw Knox Company, Pittsburgh, Pa., has just issued an attractive 24-page booklet, printed in colors, describing its single line clam shell buckets. The booklet describes the uses to which this bucket may be adapted and shows it in various positions. The book also contains data regarding weights, dimensions and clearances.

BALANCE DRAFT.—The Engineer Company of New York has issued bulletin 16 entitled "Balance Draft," giving an analysis of combustion conditions and boiler operation when nearly atmospheric pressure is maintained in the furnace chamber. Bulletin No. 18 issued by the same company explains in detail the advantages of balance draft and describes the apparatus necessary to maintain it.

BOILER METERS.—In bulletin No. 41, issued by the Bailey Meter Company, Boston, Mass., and entitled "How to Save Coal," there is considerable useful information regarding boiler capacity, efficiency and the amount of air necessary for complete combustion. Bailey meters give continuous records of steam flow, air flow and temperature variations and this bulletin points out the necessity of such records for efficient boiler operation.

TRUCK BATTERY CHARGING.—Publication No. 234, issued by the Cutler-Hammer Manufacturing Company, Milwaukee, Wis., is a six-page illustrated folder describing the C-H sectional battery charging equipment for industrial electric trucks, which has been extensively used in public and private garages. Two pages are devoted to illustrating a number of large and small equipments in industrial establishments, piers and railroad terminals.

"AFTER FIFTY YEARS."—The United States Switch Company, Eau Claire, Wis., has issued an elaborate 32-page book describing its automatic switch lock for the protection of facing point switches. The design and construction of this device are described in detail, as well as its service on high speed main lines extending over a period of more than six years. The book is attractively prepared and the information is presented in a concise manner.

PUMPS FOR CUTTING COMPOUND.—The Fullo Pump Company, Cincinnati, Ohio, has recently issued a bulletin describing the impeller type of pump for the distribution of coolant which this company manufactures. It has also prepared for free distribution a booklet entitled "The Scientific Lubrication of Cutting Tools." This booklet gives a short history of cutting tool lubrication and describes the methods of application of cooling compounds which have been found most effective in increasing the life of tools.

INCREASED WAGES FOR MANCHURIAN RAILWAY EMPLOYEES.—Beginning with March 1 the employees of the South Manchuria Railway were granted a general increase in their wages.

Financial and Construction

Railway Financial News

CINCINNATI & OHIO.—See editorial comment elsewhere in this issue.

CHICAGO, BURLINGTON & QUINCY.—Howard Elliott of New York and Hale Holden have been elected directors for the term ending May 1, 1922. Mr. Elliott succeeds Maj. George T. Slade, who has gone to France in the United States military service.

MICHIGAN CENTRAL.—See editorial comments elsewhere in this issue.

NEW YORK CENTRAL.—See editorial comments elsewhere in this issue.

NEW YORK, CHICAGO & ST. LOUIS.—The board of directors was increased from thirteen to fifteen members at the annual meeting on May 1 by the election of T. H. Ginn and W. G. Turner, both of Cleveland, as new members. Mr. Turner is secretary of the company.

OZARK VALLEY.—The Bender Iron and Supply Company of Shreveport, La., purchased the 35-mile line on April 22 at Greenville, Mo., for the price of \$188,500.

PITTSBURGH & WEST VIRGINIA. Walter L. Hachulow has been elected a director to succeed E. R. Timker.

Railway Construction

ATLANTIC COAST LINE.—Work is to be started at once on the construction of a passenger station at Lakeland, Fla. The building will be two stories high, of brick construction, and the work will be carried out by the railroad company's forces.

ILLINOIS CENTRAL.—This company has awarded a contract to T. S. Leake & Co., Chicago, for the erection of an inbound freight house at East St. Louis, Ill., which will cost approximately \$150,000. The building will be a one-story structure, 50 ft. by 612 ft., except for a section at the middle of the building 38 ft. by 28 ft., where second story space will be provided for office purposes. It will be a brick building, similar to the outbound freight house constructed last year.

The Illinois Central has also given a contract to the Ferro Construction Company, Chicago, for the erection of the steel superstructure of the new St. Charles Air Line bridge, Chicago, and the removal of the old bridge. The steel for the new bridge was purchased from the American Bridge Company late in 1916.

PENNSYLVANIA RAILROAD.—Contracts have been given to Cuthbert Brothers, Pittsburgh, Pa., for putting up the following buildings at West Brownsville, Pa.: 5-stall engine house and machine shop, 132 ft. by 120 ft., on concrete foundations, to be of frame construction, with wood block floor, metal siding and slag roof; storeroom, office and oil house, 30 ft. by 75 ft., two stories high, on concrete foundations, to be of frame construction, with wood block floor and metal siding, and a power plant, 40 ft. by 80 ft., on concrete foundations, to be of frame construction with metal siding. The total cost of the work will be about \$65,000.

PHILADELPHIA & READING.—A contract has been given to C. P. Bower for rebuilding bridge No. 57 north of Hellertown, Pa., on the Bethlehem branch. The existing structure is a stone arch carrying two tracks. The new bridge is to be a concrete box structure with 26 ft. clear span over a public road with top reinforced with steel I-beams, and will carry 15 tracks.

BRITISH AMBULANCE TRAINS FOR U. S. ARMY.—The Great Western of England has supplied 104 locomotives and over 4,000 cars for the railways overseas. It is building two ambulance trains for the United States troops in Europe. Altogether, fifteen such trains are being or have been built by British railways.—*The Engineer, London.*

ANNUAL REPORTS

New York Central Railroad Company—Report of the Board of Directors to the Stockholders

To the Stockholders of

THE NEW YORK CENTRAL RAILROAD COMPANY:

The Board of Directors herewith submits its report for the year ended December 31, 1917, with statements showing the results for the year and the financial condition of the company.

The mileage covered by this report is as follows:

	Miles
Main line and branches owned.....	3,702.75
Leased line.....	1,527.02
Line operated under trackage rights.....	455.66
Total road operated.....	5,685.43

a decrease of 3.36 miles, due to reamendments made in connection with Government Valuation and the abandonment of trackage rights over small pieces of road of other companies. On January 15, 1917, the Dolgeville and Salisbury Railway Company was merged with this company and its mileage, 3.70, added to the Dolgeville Branch. On June 23, 1917, the Cornwall Bridge Company conveyed all its property to The New York Central Railroad Company and its mileage was added to the Ottawa Branch. These two acquisitions did not affect the total mileage operated but simply changed its classification.

The President of the United States, by his proclamation of December 26th and by virtue of the power vested in the Chief Executive in time of war by Acts of Congress, took possession and assumed control of the operation of the property of this company through the Secretary of War, at twelve o'clock, noon, on December 28, 1917, the accounts of the company to be continued to the end of the year.

SUMMARY OF FINANCIAL OPERATIONS AFFECTING INCOME

	1917	1916	INCREASE OR DECREASE
	miles operated	miles operated	3.36 miles
OPERATING INCOME	5,685.43	5,688.79	3.36
RAILWAY OPERATIONS			
Revenues.....	\$216,267,517.22	\$201,585,048.68	\$14,682,468.54
Expenses.....	153,597,905.35	129,738,369.19	23,859,536.16
NET REVENUE FROM RAILWAY OPERATIONS.....	\$62,669,611.87	\$71,846,679.49	—\$9,177,067.62
Percentage of expenses to revenues.....	(71.02)	(64.36)	(6.66)
Railway taxes accrued.....	\$11,239,638.42	\$8,481,549.11	\$2,758,089.31
Uncollectible railway revenues.....	19,395.51	17,906.84	1,488.67
RAILWAY OPERATING INCOME.....	\$51,410,577.94	\$63,347,223.54	—\$11,936,645.60
MISCELLANEOUS OPERATIONS			
Revenues.....	\$5,713.27	\$1,758.59	\$3,954.68
Expenses and taxes.....	5,969.43	4,964.80	1,004.63
NET REVENUE FROM MISCELLANEOUS OPERATIONS.....	—\$256.16	—\$3,206.21	\$2,950.05
TOTAL OPERATING INCOME.....	\$51,410,321.78	\$63,344,017.33	—\$11,933,695.55
OTHER INCOME			
Joint facility rent income.....	\$3,148,788.33	\$3,079,952.01	\$68,836.32
Income from lease of road.....	107,113.68	115,554.49	—\$8,440.81
Miscellaneous rent income.....	753,369.53	666,998.86	\$86,370.67
Miscellaneous non-operating physical property.....	628,965.02	515,630.71	113,334.31
Separately operated properties—profit.....	626,807.62	4,350,787.35	—3,723,979.73
Dividend income.....	7,464,993.74	11,099,697.29	—3,634,703.55
Income from funded securities.....	470,715.96	476,467.36	—5,751.40
Income from unfunded securities and accounts.....	2,209,506.46	2,235,811.67	—26,305.21
Miscellaneous income.....	52,443.75	82,529.27	—30,085.52
TOTAL OTHER INCOME.....	\$15,462,704.09	\$22,623,429.01	—\$7,160,724.92
GROSS INCOME.....	\$66,873,025.87	\$85,967,446.34	—\$19,094,420.47
DEDUCTIONS FROM GROSS INCOME			
Wear of equipment—debit balance.....	\$2,480,451.64	\$3,200,651.72	\$720,200.08
Joint facility rents.....	1,178,790.85	1,147,576.27	\$31,214.58
Miscellaneous rents.....	680,431.96	678,978.39	1,453.57
Miscellaneous tax accruals.....	131,165.20	116,557.81	145,607.39
Rent for leased roads.....	6,462,380.03	6,354,580.50	107,799.53
Interest on funded debt.....	29,099,071.94	28,891,299.62	227,772.32
Interest on unfunded debt.....	762,807.02	617,035.95	145,771.07
Amortization of discount on funded debt.....	344,954.32	255,816.00	89,138.32
Maintenance of investment organization.....	3,066.77	2,674.70	392.07
Other deductions.....	130,716.23	63,057.98	67,658.25
TOTAL DEDUCTIONS FROM GROSS INCOME.....	\$41,273,806.03	\$40,308,228.94	\$965,577.09
NET CORPORATE INCOME.....	\$25,599,219.84	\$45,659,217.40	—\$20,059,997.56
DISPOSITION OF NET INCOME			
Dividends declared—5 per cent.....	\$12,479,602.50	\$12,466,611.25	\$12,991.25

To equipment depreciation account.....	2,500,000.00	—2,500,000.00	
To sinking funds.....	115,563.45	115,563.45	
SURPLUS FOR THE YEAR CARRIED TO PROFIT AND LOSS.....	\$13,004,053.89	\$30,692,606.15	—\$17,688,552.26

Profit and loss account	
Balance to credit of profit and loss (free surplus) on December 31, 1916.....	\$65,282,934.36
Additions:	
Surplus for the year 1917.....	\$13,004,053.89
Sundry deferred credits and adjustments.....	463,933.94
Profit on road and equipment sold.....	305,485.55
	13,773,473.38
Deductions:	\$79,056,407.74
Expenses in connection with issue of capital stock.....	\$32,456.21
Discount, expenses and commission account issue of various securities.....	222,298.60
Depreciation prior to July 1, 1907, on equipment retired during 1917.....	596,493.56
Cash advances to Clearfield Bituminous Coal Corporation.....	309,244.64
Loss on sale of bonds of Sunday Creek Coal Company.....	1,077,849.00
Federal Government Income tax (including leased lines) for the year 1916, paid in 1917.....	1,005,239.65
Abandoned property.....	263,453.83
Charging off various uncollectible accounts and sundry adjustments of accounts.....	304,170.51
	3,811,206.00
BALANCE TO CREDIT OF PROFIT AND LOSS (FREE SURPLUS) ON DECEMBER 31, 1917.....	\$75,245,201.74

By action of the several State Commissions having jurisdiction, authority was given for the issue of \$25,000,000 of the capital stock of the company to reimburse its treasury for expenditures on capital account. Of the amount so authorized, however, only \$258,900 was actually issued during the year.

Authority was obtained from the Public Service Commissions of the states of Illinois, Michigan, New Jersey and New York in the months of April and May, 1917, for the issue of \$10,000,000 of this company's Refunding and Improvement Mortgage bonds, Series A, and authority from the same commissions was obtained in September for the issue of a further \$10,000,000 of bonds of the same series. The \$20,000,000 of bonds so authorized, and which will bear interest at the rate of 4½ per cent per annum, have been executed and pledged as collateral for \$15,000,000 of two-year Collateral Trust Gold notes, due September 15, 1919, bearing interest at the rate of 5 per cent per annum, payable semi-annually on March 15th and September 15th.

The New York Central Railroad Equipment Trust of 1917, authorized by the Board of Directors on October 19, 1916, has become effective, and of the equipment provided for in the agreement, 16 steam and 9 electric locomotives, 4,000 steel underframe box cars and 3,000 steel coal cars have been delivered. In February \$8,205,000 of the certificates, bearing interest at the rate of 4½ per cent, were sold at a small premium. Since that time it has been found impossible to secure a satisfactory market for the certificates, and in order to procure equipment as needed this company has purchased, at par, \$1,305,000 of the certificates, of which \$500,000 were pledged as security for short term loans and \$805,000 carried in the treasury of the company. On December 31st, \$87,000 of these certificates were redeemed.

There has been no long term debt matured during the year, but the usual installments on the various equipment trusts have been paid.

The changes in the funded debt of the company are shown in the following statement:

Amount as reported at the beginning of the year.....	\$672,929,007.38
which has been increased as follows:	
Refunding and Improvement Mortgage bonds, Series A, nominally issued and pledged as collateral for notes.....	\$20,000,000.00
Two-year Collateral Trust Gold notes.....	15,000,000.00
Mortgage, East Cambridge Land Company.....	100,000.00
Equipment Trust of 1917 certificates, \$9,510,000 of which \$1,305,000 were purchased by the company, \$805,000 of them being pledged as collateral for short term loans.....	9,510,000.00
a total increase of.....	\$44,610,000.00
and has been reduced as follows:	
Payments falling due during the year and on January 1, 1918, on the company's liability for certificates issued under equipment trust agreements as follows:	
N Y C Lines Trust of 1907, installment due November, 1917.....	\$1,492,884.74
N Y C Lines Trust of 1910, installment due January, 1918.....	1,406,413.74
N Y C Lines Trust of 1912, installment due January, 1918.....	688,398.90
N Y C Lines Trust of 1913, installment due January, 1918.....	742,117.61
Boston & Albany Trust of 1912, installment due October, 1917.....	500,000.00
N Y C R R Co Trust of 1917, installment due January, 1918.....	634,000.00
and by transfer of trust locomotives to the Michigan Central Railroad Company.....	192,106.20
a total decrease of.....	\$5,655,921.19
making the net increase during the year.....	\$38,954,078.81
leaving the funded debt on December 31, 1917, at.....	\$711,883,086.19

Since the date of the annual meeting on January 24, 1917, the number of stockholders has grown 5,530, the total number at the end of the year being 27,102, of whom 26,771 are in the United States and 331 abroad. The par value held by those here is \$24,579,960 and by those abroad \$2,269,400, the average holdings being 92½ and 68½ shares respectively. In 1915 the numbers reported were 22,270 here and 2,772 abroad, the general average holding being, approximately, 100 shares while now it is 92 shares.

The great increase in the cost of labor and material is reflected in the heavy operating expenses of 1917, which more than absorbed the aided revenue for the year. This, together with decreased returns from subsidiaries and investments, heavier taxes and added charges for interest on debt, reduced the company's net corporate income, as compared with the year 1916, by \$20,059,997.56.

In the operation of the Pension Department 233 employees were retired and placed upon the pension roll, of these retirees 128 were authorized because of the attainment of seventy years of age, and 105 because of total and permanent physical disability. 180 pensioners died during 1917, and at the close of the year 1,157 retired employees were carried upon the pension rolls. The average monthly pension allowance of these is \$25.78, and the total amount paid in pension allowances during the year was \$464,379.37.

Expenditures during the year for improvements on property were as follows:

Improvements on owned property, used in operation, and cost of acquisition of Dodgeville & Salisbury Railway Company and Cornwall Bridge Company.....	\$13,878,381.55
Equipment purchased and acquired, less equipment retired and transferred.....	15,973,048.32
Improvements on leased property.....	3,737,044.15
Improvements on miscellaneous physical property.....	682,399.46

the net increase in property investments, as shown in detail on other pages, during the year 1917, being..... \$34,270,873.48

The New York Central Railroad as constituted on December 31, 1917, was in operation three years. During these three years the gross revenue increased about one-half and the net income was about tripled. The percentage of gross revenue saved for net corporate income in 1914 was 6.1 per cent and in 1917 was 11.8 per cent.

A brief synopsis of the relative balance sheets of January 1, 1915, and December 31, 1917, is as follows:

Assets		January 1, 1915	December 31, 1917
Real and equipment		\$620,480,100	\$694,619,240
Improvements on leased property		82,942,900	92,132,200
Miscellaneous physical property		6,011,900	8,680,660
Securities of affiliated companies		24,678,900	194,534,900
Securities of other companies		34,312,800	44,429,300
Total property		\$968,425,500	\$1,034,396,200
Current assets		69,161,200	84,827,800
Deferred and unadjusted assets		10,781,900	39,577,900
		\$1,048,368,700	\$1,158,801,900

Liabilities		January 1, 1915	December 31, 1917
Capital stock		\$249,590,500	\$249,849,400
Debt		703,413,900	729,185,500
Total capitalization		\$953,004,400	\$979,034,900
Current liabilities		32,805,500	46,552,700
Deferred and unadjusted liabilities		33,152,900	57,410,600
Surplus		29,405,900	75,803,700
		\$1,048,368,700	\$1,158,801,900

The abnormal conditions during the year and the curtailment of working forces by enlistments, conscription and resignations, placed an unusual burden of work upon the officers and employees of the company, which has been faithfully borne, and grateful acknowledgment of their service under trying conditions is hereby made.

For the Board of Directors,
ALFRED H. SMITH,
President.

CONDENSED GENERAL BALANCE SHEET, DECEMBER 31, 1917

ASSETS		LIABILITIES	
INVESTMENTS		Stock	
Investment in road	\$460,514,249.12	Capital stock	\$249,849,360.00
Investment in equipment		LONG TERM DEBT	
Trust	\$95,106,669.96	Funded debt unamortized	
Other	138,998,261.64	Equipment obligations	\$1,218,000.00
	234,104,931.60	Mortgage bonds	20,000,000.00
		Debentures	105,500,000.00
Improvements on leased railway property	92,132,301.72	Notes	15,000,000.00
Miscellaneous physical property	8,680,660.82		711,883,086.19
Investments in affiliated companies		CURRENT LIABILITIES	
Stocks	\$133,799,976.96	Loans and bills payable	\$17,302,450.00
Bonds	9,952,035.88	Traffic and car-service balances payable	6,330,806.54
Notes	36,266,355.57	Audited accounts and wages payable	8,144,635.24
Advances	14,516,500.80	Miscellaneous accounts payable	7,161,505.47
	164,534,869.21	Interest matured unpaid	
Other investments		Matured, payable January 1, 1918	\$2,926,772.38
Stocks	\$31,139,974.31	Interest unclaimed	3,465.85
Bonds	1,046,344.52		2,969,238.23
Notes	11,480,026.03	Dividend declared, payable February 1, 1918	
Advances	750,039.12		3,119,902.50
Miscellaneous	12,765.00	Dividends matured unclaimed	186,635.05
	44,429,348.99	Funded debt matured unpaid	4,790.40
TOTAL INVESTMENTS	\$1,034,396,204.46	Unmatured interest accrued	5,344,260.35
		Unmatured rents accrued	824,329.50
CURRENT ASSETS		Other current liabilities	227,557.56
Cash	\$13,407,045.26		63,855,110.44
Special deposits	34,098.51	DEFERRED LIABILITIES	
Loans and bills receivable	43,960.22	Liability to lessor companies	
Traffic and car-service balances receivable	6,514,277.27	Amount	\$4,715,322.52
Net balance due from agents and conductors	9,616,893.84	Miscellaneous	569,541.50
Miscellaneous accounts receivable	16,131,617.97		15,284,864.02
Material and supplies	34,239,829.70	UNADJUSTED CREDITS	
Interest and dividends receivable	3,408,282.19	Tax liability	\$3,567,909.53
Other current assets	874,840.51	Insurance and casualty reserves	580,065.50
	84,827,845.27	Operating reserves	1,192,914.99
DEFERRED ASSETS		Accrued depreciation on equipment	33,159,007.29
Working fund advances	\$601,715.87	Liability to lessor companies for securities acquired	457,851.00
Insurance and other funds	737,893.45	Other unadjusted credits	3,168,016.65
Other deferred assets	4,749,840.71		4,733,764.96
	5,989,549.93	CORPORATE SURPLUS	
UNADJUSTED DEBITS		Additions to surplus	
Rents and insurance premiums and fire advance	\$37,769.17	and surplus	\$9,316,885
Discount on funded debt unamortized	6,883,107.79	Sinking fund reserves	464,918.47
Other unadjusted debits	5,589,656.74		
Securities issued or assumed—unpledged	730,000.00	Total appropriated surplus	\$5,554,713
Securities issued or assumed—pledged	20,500,000.00	Profit and loss—1917	75,245,017.74
Securities acquired from lessor companies (per contra)	457,851.00		75,803,749.06
	33,898,384.90		
	\$1,158,801,934.67		\$1,158,801,934.67

DETAIL OF EXPENDITURES FOR IMPROVEMENTS TO PROPERTY

Improvements in station, yard and terminal facilities

Enlargement of yards:	
Air Line Junction	\$24,639.30
Carson	41,307.01
Cleveland	197,369.24
East Buffalo	56,465.62
Gardenville	757,225.72
Rockport	\$401,973.25
Dock Junction	109,034.57
Wesleyville	115,015.91
West Albany	138,720.21
Toledo	20,976.62
	<u>\$1,862,727.45</u>
Freight terminal, Cleveland	1,543,974.91
Freight house, etc., Detroit	328,219.43
Improvement of freight facilities, West Lockport	96,146.32
Extension to Clark Street freight house, Chicago	11,500.00
Extension to brick freight house, Jackson	11,777.90
Transfer building for American Express Company, Buffalo	320,324.33
Forty-ton crane for West Street yard, Syracuse	17,016.71
New ice house, Elkhart	11,206.35
Increased ice house capacity, Rochester	17,290.37
Sundry small improvements in freight yards and facilities	75,105.39
Passenger station, track changes, etc., Poughkeepsie	233,950.98
Passenger station, etc., Massena Springs	46,095.75
Passenger station, etc., Utica	22,774.60
Union passenger station, 162nd Street, New York, Putnam Branch	14,081.38
Sundry small improvements in passenger facilities	63,104.13
Engine terminal and additional yard facilities, River Rouge	155,074.28
Engine terminal and yard improvements, Collinwood	80,227.83
New engine house, etc., Belle Isle	183,923.59
New engine house, etc., North White Plains	71,062.64
New turntable, West Seneca	23,495.40

New turntable with tractor, Lyons	15,886.68
Shop equipment, Elkhart	87,020.92
Improvements at shops, West Albany	64,722.85
Improvements at shops, Collinwood	29,647.48
New heating boilers in locomotive shops, Depew	19,587.73
Improvements at car shops, Ashtabula	19,429.80
Improvements at steel car shops, Ashtabula	17,898.42
Improvements in heating system at shops, Collinwood	17,665.90
Improvements at shops, Depew	13,356.55
Electric appliance building, Collinwood	42,977.66
Two brick stacks at power house, Collinwood	15,749.98
Heating plant for coaches, Cleveland	16,905.34
Improvements in shop machinery and tools, various places	146,166.99
Improvements in power plants at shops, various places	13,661.88
Sundry small improvements in shop and engine house facilities	129,553.15
Coaling plant, Carson	32,954.84
Extension of coal storage plant, DeWitt	18,872.27
Coaling plant and cinder pit, Adrian	17,445.26
Coaling plant and track changes, Ashtabula	16,376.81
Improved water line at pumping plant, Nottingham	31,940.39
New pipe line and pump house, Fox Ridge	18,119.10
Improvements in water supply, Gibson	12,060.09
New water station, Sloan	11,597.44
Sundry small improvements in station facilities	116,979.12
Assessments for public improvements, various places	74,134.77
Sundry small miscellaneous improvements	71,773.21
	<u>\$6,261,894.37</u>
Less sundry adjustments	394,621.58
	<u>\$5,867,272.79</u>

The Michigan Central Railroad Company—Seventy-second Annual Report

To the Stockholders of

THE MICHIGAN CENTRAL RAILROAD COMPANY:

The Board of Directors herewith submits its report for the year ended December 31, 1917, with statements showing the results for the year and the financial condition of the company.

The report covers the operation of the same mileage as the previous year, as follows:

Main line and branches owned	Miles	1,182.84
Line jointly owned .....		.71
Leased lines		578.16
Lines operated under trackage rights		100.06
Total road operated (as shown in detail on another page)		<u>1,861.77</u>

There was no change in capital stock during the year, the amount authorized being \$18,738,000.00 and actually outstanding \$18,736,400.00.

The funded debt outstanding December 31, 1916, was..... \$53,915,193.92

It has been increased during the year by:	
Additional liability for certificates outstanding under 1913 trust, account of transfer of 10 locomotives from The New York Central Railroad Company	192,106.20
	<u>\$54,107,300.12</u>

It has been decreased during the year by:	
Payment of pro-rata of installments on account of equipment trust certificates	
Trust of 1907, due November, 1917 (N. Y. C. Lines)	\$260,425.45
Trust of 1910, due January, 1918 (N. Y. C. Lines)	393,960.44
Trust of 1912, due January, 1918 (N. Y. C. Lines)	151,710.90
Trust of 1913, due January, 1918 (N. Y. C. Lines)	262,359.54
Trust of 1915, due October, 1917 (M. C. R. R.)	1,368,456.33
Total funded debt outstanding December 31, 1917	<u>\$52,738,843.79</u>

Certificates were issued under the Michigan Central Railroad Equipment Trust Agreement of 1917, to an aggregate amount of \$4,845,000.00, but as these were concurrently acquired by the company, there is no change in the funded debt in this connection.

The changes in the road and equipment account during the year, and as shown in detail on another page, were as follows:

The amount charged to December 31, 1916, was	\$86,134,182.07
Expenditures during the year, for additions and betterments—road	1,718,723.25
Cost of equipment acquired under trust agreements	\$6,144,861.47
Excess cost of new equipment purchased, and additions and betterments to equipment over value of equipment retired	746,428.67
	<u>6,891,290.14</u>
Total amount charged to road and equipment December 31, 1917	<u>\$94,744,195.46</u>

The changes during the year in the account showing amount of improvements on leased railway property, and as shown in detail on another page, were as follows:

The amount charged to December 31, 1916, was	\$2,241,578.40
Expenditures during the year, for additions and betterments—road	288,182.02
Total amount charged to December 31, 1917	<u>\$2,529,760.42</u>

At a meeting held on February 7, 1917, the stockholders authorized the execution of a Refunding and Improvement Mortgage, to be dated January 1, 1917, to secure the company's now outstanding debentures of 1909, amounting to \$7,634,000.00, and to secure equally and ratably with the debentures, bonds to be issued under the mortgage to an amount not exceeding \$10,000,000.00. By the terms of the mortgage the Board of Directors is given the power to authorize the issue of bonds in series, maturing on such dates not later than January 1, 2017, and bearing interest at such rates as shall be fixed and determined by the Board for the purposes specified in the mortgage; and it is provided that when the amount issued for the purposes other than refunding of debentures or prior debt shall be \$10,000,000.00, no additional amount of bonds shall be issued in respect of work done or of property acquired, in any amount exceeding 70% of the cost of such work or property. The execution of the mortgage and the issuance of short term loans acquired under the mortgage were authorized by the Michigan Railroad Commission and the Public Utilities Commission of Illinois, but as yet no refunding and improvement mortgage bonds have been issued.

Michigan Central Railroad Equipment Trust of 1917 was established by agreement dated March 1, 1917, which provides for a total issue of \$9,000,000.00 equipment trust certificates, bearing interest at 4 1/2% per annum. Under the provision of the trust 10 passenger train cars and 3,450 freight train cars were received, 80% of the cost of which was covered by certificates and the remainder by cash payments. The certificates issued during the year amounted to \$4,845,000.00, but owing to the fact that the general market has been practically closed to railroad securities, the company through the medium of short term loans acquired under the mortgage, is using the greater part of them as collateral, pending more favorable conditions for their sale.

On May 15, 1917, this company issued its one year promissory notes for \$8,000,000.00 bearing interest at the rate of 4 1/2% per annum, the proceeds being used to take up other notes aggregating \$6,000,000.00, and the balance for corporate purposes.

During the period July 1, 1912, to May 1, 1916, this company advanced to the Indiana Harbor Belt Railroad Company, for additions and betterments the sum of \$769,884.02, which amount was covered by notes of the Belt Company. In exchange for these notes The Michigan Central Railroad Company received 7,650 shares of the stock of the Indiana Harbor Belt Railroad Company of a par value of \$765,000.00 being its pro-rata of an increase in the capital stock of that company from \$2,450,000.00 to \$5,000,000.00, and it further received a demand note dated November 23, 1917, bearing interest at the rate of 5% per annum, for \$4,884.02. By acquiring this stock the company increased its holdings in capital stock of the Indiana Harbor Belt Railroad Company to 15,000 shares.

In addition to the \$769,884.02 above mentioned, this company on June 26, 1917, advanced to the Indiana Harbor Belt Railroad Company \$262,616.63, bearing interest at the rate of 5% per annum, to cover proportion of expenditures on additions and betterments, and on December 31, 1917, contributed its ownership percentage or \$150,000.00 towards an increase in the working fund.

The company acquired 4,068 shares of the capital stock, par value of \$406,800.00, and a demand note dated June 15, 1917, amounting to \$35,848.07 of the Detroit Terminal Railroad Company in liquidation of notes issued by that company to cover advances for additions and improvements. By the acquisition of this stock the company's holdings of the capital stock of the Detroit Terminal Railroad Company were increased to 5,000 shares. The Michigan Central Railroad Company had in its treasury \$27,000.00 par value of the first mortgage 3% gold bonds of the Bay City and Battle Creek Railway Company, the property of which had been acquired by purchase in 1916. On March 14, 1917, the Board of Directors authorized the cancellation of these bonds, and pursuant to such authority, they were destroyed by cremation on June 7, 1917.

On April 8, 1917, The New York Central Railroad Company became a tenant of this company's freight and passenger terminal facilities in Detroit, Michigan.

In the operation of the Pension Department, 46 employees were retired and placed upon the pension roll. Of these retirements 29 were authorized because of the attainment of seventy years of age, and 17 because of total and permanent physical disability. 30 retirements were authorized, and at the close of the year 293 retired employees were carried upon the pension rolls. The average monthly pension allowance of these employees was \$22.45, and the total amount paid in pension allowances during the year was \$79,560.81.

The President of the United States, by his proclamation of December 26th, and by virtue of the power vested in the chief executive in time of war by acts of Congress, took possession and assumed control of the operation of the property of this company, through the Secretary of War, at 12 o'clock, noon, on the 28th day of December, 1917.

SUMMARY OF FINANCIAL OPERATIONS AFFECTING INCOME

	1917	1916	Increase or Decrease
OPERATING INCOME	1,861.77	1,861.77	
RAILWAY OPERATIONS	miles operated	miles operated	
Revenues	\$52,879,434.29	\$46,418,790.11	\$6,460,644.18
Expenses	38,289,136.32	30,646,260.72	7,642,875.60
NET REVENUE FROM RAILWAY OPERATIONS	\$14,590,297.97	\$15,772,529.39	—\$1,182,231.42
Percentage of expenses to revenues	(77.41)	(66.02)	(6.39)
RAILWAY TAX ACCRUALS	\$1,972,236.73	\$1,066,010.06	\$286,226.67
UNCOLLECTIBLE RAILWAY REVENUES	13,405.98	10,349.90	3,056.08
TOTAL	\$1,985,642.71	\$1,696,359.96	\$289,282.75
RAILWAY OPERATING INCOME	\$12,604,655.26	\$14,076,169.43	—\$1,471,514.17
NON-OPERATING INCOME			
Joint facility rent income	\$25,778.53	\$15,376.79	\$401.74
Income from lease of road	274.67	274.67	
Miscellaneous rent income	2,547.61	5,107.55	—2,559.94
Miscellaneous nonoperating physical property	1,879.41	1,787.00	92.41
Dividend income	487,115.00	476,017.25	11,097.75
Income from funded securities	43,490.00	46,739.17	—3,249.17
Income from unfunded securities and accounts	107,305.70	180,669.73	—72,764.03
Miscellaneous income	1,411.50	1,457.23	—46.73
TOTAL NON-OPERATING INCOME	\$607,897.41	\$936,829.39	—\$67,027.97
GROSS INCOME	\$13,474,456.68	\$15,012,998.82	—\$1,538,542.14
DEDUCTIONS FROM GROSS INCOME			
Hire of equipment—debit balance	\$3,547,350.99	\$2,274,352.38	\$1,272,998.61
Joint facility rents	606,137.80	587,972.75	18,165.05
Rent of leased roads	2,775,914.04	3,259,907.22	—483,993.18
Miscellaneous rents	4,140.74	1,961.49	2,179.25
Miscellaneous tax accruals	6,952.78	2,466.01	4,486.77
Separately operated properties—loss	353,909.45	27,464.44	326,445.01
Interest on funded debt	2,138,504.28	1,768,138.09	370,366.19
Interest on unfunded debt	573,762.46	225,804.00	347,958.46
Amortization of discount on funded debt	22,704.00	—2,704.00	
Miscellaneous income charges	6,863.82	4,856.25	2,007.57
TOTAL DEDUCTIONS FROM GROSS INCOME	\$10,036,240.36	\$8,175,626.63	\$1,860,613.73
NET INCOME	\$3,438,216.32	\$6,837,372.19	—\$3,399,155.87
DISPOSITION OF NET INCOME			
Dividend appropriation of income (4%)	\$749,456.00	\$749,456.00	
Appropriated for investment in physical property			
Additions and betterments	24,440.57	1,459.19	\$22,981.38
Additions and betterments—leased lines	228,163.09	143,000.04	85,163.05
Capital stock purchased:			
Jackson Lansing and Saginaw RR Co.		1,151,150.00	—1,151,150.00
Grand River Valley RR Co.		405,375.00	—405,375.00
Miscellaneous appropriation of income			
To equipment depreciation account		500,000.00	—500,000.00
TOTAL APPROPRIATIONS	\$1,002,659.66	\$2,950,440.23	\$1,948,380.57

INCOME BALANCE TRANSFERRED TO CREDIT OF PROFIT AND LOSS	1917	1916	
	\$2,436,166.66	\$1,886,931.96	\$1,450,775.30
Profit and Loss account			
AMOUNT TO CREDIT OF PROFIT AND LOSS DECEMBER 31, 1916			\$1,113,432.94
ADD:			
Surplus for the year 1917			\$1,436,156.66
Proceeds from sale of unclaimed and refused freight			41,959.81
Insurance collections on property not re-placed			11,100.00
Sundry adjustments and cancellations net			15,373.01
			\$19,618,022.44
DEDUCE:			
Expenses, Michigan Central Railroad equipment trust of 1917			\$9,560.00
Discount, commission and expenses, NYC Lines equipment trusts of 1910 and 1913			5,305.87
Expenses, Michigan Central refunding and improvement mortgage			15,937.75
Depreciation unaccrued prior to July 1, 1907, on equipment retired during 1917			346,923.74
Federal excise tax on 1916 income (U.S.)			148,930.79
Business profits war tax on 1916 income (Canada)			404,665.25
Abandoned property			97,566.49
			\$18,589,136.74

The total gross revenue for the year was \$52,879,434.29, an increase of \$6,460,644.18, due principally to the general expansion of business conditions throughout the country, there having been an unprecedented volume of traffic incident to the war and the abnormal conditions resulting therefrom.

The total operating expenses were \$38,789,136.32, an increase of \$7,642,875.60. By groups the increases were as follows:

Maintenance of way and structures	\$223,269.43
Maintenance of equipment	1,351,215.46
Traffic	45,457.07
Transportation	5,804,513.44
Miscellaneous operations	1,349,279.91
General	94,927.41
Total	\$7,642,875.60

The increase in operating expenses can be attributed in a large measure to greater traffic, higher rates of wages and increased cost of fuel and other supplies.

The railway tax accruals for the year were \$1,972,236.73, an increase of \$286,226.67 as compared with the previous year, due principally to war tax in the United States and the Dominion of Canada, partly offset by a reduction in rate of ad valorem tax in the state of Michigan.

The total deductions from gross income were \$10,036,240.36, an increase of \$1,860,613.73. The principal fluctuations were as follows:

Hire of equipment increased \$1,272,998.61, due to higher rates and increased traffic, partly offset by additional equipment purchased and put in operation the latter part of the year.

Separately operated properties—loss increased \$326,445.01, of which \$318,020.11 was operating guarantee to the Indiana Harbor Belt Railroad Company.

Interest on unfunded debt increased \$347,958.46, on account of the larger amount of short term notes outstanding.

Interest on funded debt increased \$370,366.19 and rent for leased roads decreased \$483,993.18, due almost entirely to the absorption of various leased lines mentioned in the 1916 report.

We regret to record the death on the eighteenth of October, 1917, of Louis D. Heuser, Assistant General Passenger Agent, who was for many years a faithful and valued employee.

George H. Webb, Chief Engineer of this company, was commissioned Lieutenant Colonel of the 10th Regiment Railway Engineers, United States Army in June, 1917, and is now in active service in France.

The following appointments were effective during the year:

- January 1st Henry Russel, Vice President
- January 1st Frank E. Robson, General Counsel
- March 14th Edmond D. Bronner, Vice President and General Manager
- June 28th James F. Deimling, Acting Chief Engineer
- July 1st Arthur L. Survey, Valuation Engineer
- August 15th Carl Howe, Traffic Manager
- August 15th Preston G. Finlay, General Freight Agent

Acknowledgment is hereby made to officers and employees for their faithful and efficient service.

For the Board of Directors

VERLIE H. SMITH
President

Cleveland Cincinnati Chicago & St. Louis Railway Company Twenty-ninth Annual Report

To the Stockholders of THE CLEVELAND CINCINNATI CHICAGO AND ST. LOUIS RAILWAY COMPANY: The Board of Directors herewith submits its report for the year ended December 31, 1917, with statements showing the results for the year and the financial condition of the company.

The mileage embraced in the operation of the road is as follows:

	Miles
Main line and branches owned.....	1,693.03
Proprietary lines	126.09
Leased lines	202.42
Operated under contract	201.37
Trackage rights	164.00
Total road operated.....	2,386.91

By the corporate action of this company and that of the Saline Valley Railway Company, approved by the State Public Utilities Commission of Illinois, the latter company conveyed its railway and other property to this company and a merger thereof with the railway of this company was effected on the tenth day of April, 1917. For this reason the table above shows an increase in the mileage of main line and branches owned of 5.16 miles and a corresponding decrease in mileage of leased lines as compared with the year 1916.

A statement showing in detail the mileage of road operated will be found on another page.

The President of the United States, by his proclamation of December 26th and by virtue of the power vested in the chief executive in time of war by acts of Congress, took possession and assumed control of the operation of the property of this company through the Secretary of War, at 12 o'clock, noon, on the 28th day of December, 1917.

SUMMARY OF FINANCIAL OPERATIONS AFFECTING INCOME

	1917	1916	INCREASE OR DECREASE.
OPERATING INCOME	2,386.91	2,386.91	
RAILWAY OPERATIONS	miles operated	miles operated	
Revenues	\$52,650,920.24	\$46,678,240.44	\$5,972,679.80
Expenses	38,059,421.05	31,221,976.50	6,837,444.55
NET REVENUE FROM RAILWAY OPERATIONS	\$14,591,499.19	\$15,456,263.94	—\$864,764.75
Percentage of expenses to revenues	(72.29)	(66.89)	(3.40)
RAILWAY TAX ACCRUALS.....	\$2,738,985.98	\$1,686,719.93	\$1,052,266.05
UNCOLLECTIBLE RAILWAY REVENUES	9,632.13	9,677.64	—\$45.51
	\$2,748,618.11	\$1,696,397.57	\$1,052,220.54
RAILWAY OPERATING INCOME.....	\$11,842,881.08	\$13,759,866.37	—\$1,916,985.29
MISCELLANEOUS OPERATIONS			
Revenues	\$18,203.96	\$16,277.44	\$1,926.52
Expenses and taxes.....	12,880.08	12,441.35	438.73
MISCELLANEOUS OPERATING INCOME	\$5,323.88	\$3,836.09	\$1,487.79
TOTAL OPERATING INCOME.....	\$11,848,204.96	\$13,763,702.46	—\$1,915,497.50
NON-OPERATING INCOME			
Joint facility rents.....	\$513,947.26	\$463,873.72	\$50,073.54
Miscellaneous rents	367,757.60	186,885.37	180,872.23
Miscellaneous non-operating physical property	76,134.06	84,111.60	—7,977.54
Separately operated properties profit	3,618.31	.....	3,618.31
Dividend income	136,870.55	162,205.96	—25,335.41
Income from funded securities.....	233,749.22	281,278.02	—47,528.80
Income from unfunded securities and accounts.....	89,150.54	67,778.48	21,372.06
Release of premiums on funded debt	1,951.42	1,191.78	759.64
Miscellaneous income	140,446.52	50,318.39	90,128.13
TOTAL NON-OPERATING INCOME	\$1,563,625.48	\$1,297,643.26	\$265,982.22
GROSS INCOME	\$13,411,830.44	\$15,061,345.72	—\$1,649,515.08
DEDUCTIONS FROM GROSS INCOME			
Hire of equipment debit balance	\$1,804,641.57	\$519,460.62	\$1,285,180.95
Joint facility rents	609,829.83	562,562.76	47,267.07
Rent for leased roads.....	566,679.00	571,641.00	—4,962.00
Miscellaneous rents	315,014.18	185,116.04	129,898.14
Miscellaneous tax accruals.....	478.93	456.07	22.86
Separately operated properties—loss	97,934.82	72,353.22	25,581.60
Interest on funded debt.....	4,607,270.39	4,718,774.25	—111,503.86
Interest on unfunded debt.....	129,996.94	79,313.62	50,683.32
Amortization of discount on funded debt	9,402.78	10,165.30	—762.52
Miscellaneous income charges.....	12,774.90	10,400.26	2,374.64

TOTAL DEDUCTIONS FROM GROSS INCOME	\$8,154,023.34	\$6,729,643.14	\$1,424,380.20
NET INCOME	\$5,257,807.10	\$8,331,702.38	—\$3,073,895.28
DISPOSITION OF NET INCOME			
Income applied to sinking fund Dividends (preferred stock 5% in 1917, 3 3/4% in 1916).....	\$30,309.57	\$28,966.67	\$1,342.90
Income appropriated for investment in physical property.....	499,925.00	374,943.75	124,981.25
To equipment depreciation account	70,600.41	177,827.93	—107,227.52
	.....	750,000.00	—750,000.00
TOTAL APPROPRIATIONS	\$600,834.98	\$1,331,738.35	—\$730,903.37
SURPLUS TRANSFERRED TO CREDIT OF PROFIT AND LOSS.....	\$4,656,972.12	\$6,999,964.03	—\$2,342,991.91
Amount to credit of profit and loss December 31, 1916.....	.....	.....	\$5,147,009.09
Surplus for year 1917.....	.....	.....	4,656,972.12
			\$9,803,981.21

ADD:

Unrefundable overcharges accumulated since July 1, 1914	\$528,467.23		
Adjustment of sundry accounts (net).....	127.33		
			\$528,594.56
DEDUCT:			
Unaccrued depreciation prior to July 1, 1907, on equipment retired during 1917	\$398,696.52		
Federal income tax based on 1916 results and paid in 1917	169,912.80		
Losses sustained by fires in storage coal.....	84,019.06		
Surplus appropriated for investment in physical property	9,522.58		
Property abandoned	9,291.09		
			671,442.05

Balance to credit of profit and loss December 31, 1917..... \$9,661,133.72

Gross operating revenues for the year were \$52,650,920.24, an increase of \$5,972,679.80, of which \$5,778,718.82 was in transportation revenue and \$193,960.98 in incidental and joint facility revenues. Total revenue tonnage carried was 35,802,523, an increase of 2,899,940, of which 2,871,367 was in bituminous coal, smaller fluctuations in the other classes of traffic practically offsetting one another. The average revenue per ton per mile was 5.66 mills, an increase of 1 mill, due largely to increases in rates granted by the federal and state commissions during the year. The revenue train loading was 691 tons, an increase of 37 tons or 5.66 per cent, while freight revenue per train mile was \$3.91, an increase of \$.27.

The total railway operating expenses were \$38,059,421.05, an increase of \$6,837,444.55, due to fluctuations by groups were as follows:

Maintenance of way and structures—decrease.....	\$169,478.39
Maintenance of equipment—increase	1,122,166.70
Traffic—increase	13,936.80
Transportation—rail line—increase	5,643,656.10
Miscellaneous operations increase	46,811.04
General—increase	124,599.27
Transportation for investment—credit—decrease.....	\$5,753.03
Net increase	\$6,837,444.55

Pay rolls increased \$3,848,262.76, of which \$2,323,944.21 was due to increases in rates scheduled in the various departments made necessary by industrial competition and increased cost of living. An analysis of the prices on a representative list of material items used in large quantities by the company shows an increase of about 40 per cent in the prices on such material over the previous year. There is also an increase in the item of fuel for locomotives of \$2,099,848.57, of which \$1,607,894.60 is due to increase in prices.

The net income for the year was \$5,257,807.10, a decrease of \$3,073,895.28. Dividends aggregating 5 per cent or \$499,925.00 on the outstanding preferred stock of the company, were paid and charged against the net income. The surplus for the year was \$4,656,972.12, a decrease of \$2,342,991.91.

During the year there was charged to income the company's proportion of the deficit resulting from the operation of the Central Indiana Railway for the year amounting to \$60,627.35 or \$1,027.26 more than the previous year.

The operations of the Kankakee and Seneca Railroad (for which separate accounts are maintained) show revenues for the year \$119,303.93, operating expenses of \$148,876.68 and a net deficit of \$29,572.75, which deficit is one-half of which \$34,787.26, was assumed by this company and charged to income in 1917.

The Mount Gilead Short Line (for which separate accounts are maintained) shows revenues for the year \$975,218, operating expenses and taxes \$12,404.26, non-operating income \$132.50, deficit \$2,519.61, all of which was charged to income by this company in 1917.

The summary of financial operations affecting income includes the operations of the Peoria and Eastern Railway, Indianapolis, Indiana, to Peoria, Illinois. Separate accounts for this line are maintained, and the operations for the year 1917 show revenues amounting to \$2,544,826.30, operating expenses and taxes \$2,248,046.37, operating income \$296,779.93, non-operating income \$460,116.91, gross income \$756,896.84, deductions from gross income \$653,943.32, surplus \$102,953.52. Sundry adjustments of profit and loss and other items during the year aggregated \$61,437.54, leaving \$41,615.93

net surplus for the year, which deducted from \$456,788.66 due this company for advances on December 31, 1916, makes the indebtedness on December 31, 1917, \$415,172.73.

In connection with the federal valuation of the company's property, the work of investigating the cost of grading, bridges and buildings was continued by the valuation forces during the year. Complete survey of the cost of adjacent lands was made independent of that made by the Government land appraisers, which force made during the year investigation of the cost of adjacent land upon about two-thirds of the line. The work of compiling quantities in the company's structures was continued, and the engineering forces are ready to check tentative valuation. The Government forces have been getting their data together, and it is expected that tentative report will be made some time during the year 1918.

In the operation of the Pension Division 46 employees were retired and placed upon the pension roll. Of these retirements 30 were authorized because of the attainment of seventy years of age, and 16 because of total and permanent physical disability. 39 pensioners died during 1917, and at the close of the year 370 retired employees were carried upon the pension rolls. The average monthly pension allowance of these retired employees is \$21.58, and the total amount paid in pension allowances during the year was \$37,176.86.

There was no change in the capital stock during the year the amounts authorized and issued to December 31, 1917 being as follows:

Preferred stock authorized	\$10,000,000.00
Common stock authorized	50,000,000.00
Total stock authorized	\$60,000,000.00
Preferred stock issued	\$10,000,000.00
Common stock issued	57,056,300.00
Balance common stock authorized but not issued, December 31, 1917	\$2,943,700.00

The funded debt unamortized outstanding December 31, 1916, was \$100,586,224.16.

It has been decreased during the year as follows:

Big Four Ry equipment trust certificates payable June 1, 1917	\$373,000.00
Big Four Ry equipment trust certificates payable July 1, 1917	115,000.00
Pro rata New York Central Lines equipment trust certificates payable November 1, 1917	246,689.81
Pro rata New York Central Lines equipment trust certificates payable January 1, 1918	476,249.73

C & S T & C Ry Co general first mortgage bonds retired	73,000.00
C & S T & C Ry Co first mortgage bonds retired	6,000.00
Central Grain Elevator Co general first retired	25,000.00
C & S T & C Ry Co (St Louis Division) first collateral trust mortgage bonds purchased for sinking fund	40,000.00
Total funded debt outstanding December 31, 1917 (detail on another page)	\$99,128,642

Under Big Four Railway Trust Agreement of June 1, 1917, authorized by the Board of Directors, May 9, 1917, thirteen locomotives, seven hundred and fifty freight train cars and fifty passenger train cars were contracted for at an estimated cost of \$1,993,000.00. Trust certificates were issued during the year to the total amount of \$1,488,000.00, but as these were concurrently acquired by the company, there is no change in the funded debt in this connection. Of the new equipment contracted for, fifteen locomotives, fifteen passenger train cars and all of the freight train cars were received and put in service during the year.

Additions and betterments road	\$1,221,971.89
Equipment acquired under trust agreement	\$3,084,987.49
Owned equipment in excess of retirements	4,006,753.61
Total (see detail on another page)	\$6,313,712.99

In the six years ended December 31, 1917, there were marked increases in the growth of business and train loads. These increases are reflected in the average net corporate income of the Company which for the three years ended June 30th, 1917, was nearly three times that for the year 1911, and in surplus of the Company which at the close of 1917 shows an increase of \$7,500,000 for the period. Along with these favorable results it should be borne in mind that this Company has absorbed in the six year period the losses entailed by the flood in 1913. The per cent of gross revenue saved for net corporate income was about six per cent in 1911 and ten per cent in 1917.

On June 1, Walter R. Gibbons was appointed Real Estate and Tax Agent and William J. Hiner, Purchasing Agent.

Thanks and appreciation are extended to the officers and employees for their loyal and efficient service during the year.

For the Board of Directors,

ALFRED H. SMITH,
President

The Chesapeake and Ohio Railway Company—Fortieth Annual Report

Richmond, Va., April 8, 1918.

To the STOCKHOLDERS:

The Fortieth Annual Report of the Board of Directors, for the fiscal year ended December 31, 1917, is herewith submitted.

The average mileage operated during the year by The Chesapeake and Ohio Lines was 2,412.1 miles, an increase over the previous year of 33.4 miles. The mileage at the end of the year was 2,478.3 miles, an increase of 6 miles over mileage on December 31, 1916.

RESULTS FOR THE YEAR.

Operating Revenues were	\$54,643,793.52
(Increase \$4,806,481.34, or 9.65%)	
Operating Expenses were	38,105,805.89
(Increase \$5,407,130.04, or 16.54%)	
Net Operating Revenue was	\$16,537,987.63
(Decrease \$597,648.70, or 3.49%)	
Taxes were	2,439,331.04
(Increase \$802,727.03, or 49.05%)	
Operating Income, Taxes deducted, was	\$14,098,656.59
(Decrease \$1,400,375.73, or 9.04%)	
Miscellaneous Income was	2,697,161.50
(Increase \$1,050,019.52, or 43.87%)	
Rentals and Other Payments were	1,139,645.04
(Increase \$40,184.00, or 4.5%)	
Income for the year available for interest was	\$15,656,173.05
(Decrease \$393,541.81, or 1.5%)	
Interest (\$4.87% of amount available, amounting to)	8,589,794.60
(Increase \$206,961.51, or 2.47%)	
Net Income for the year, equivalent to 1.5% on capital stock outstanding, amounting to	\$7,066,378.45
(Decrease \$600,503.32, or 7.33%)	
Dividends paid during year: Two dividends of 2 1/2% each, aggregating	\$1,311,044.00
Residue devoted to improvement of physical and other assets	\$4,555,114.45

RETURN ON PROPERTY.

The following table shows the amount of return to your Company, including subsidiary companies, from transportation operations only, upon the investment in road and equipment at the termination of each year of the six year period ended December 31, 1917.

	Property Investment	Total Operating Income	Per-centage of Return
Year ended December 31, 1917	\$263,397,068.67	\$14,871,450.45	5.64%
Year ended December 31, 1916	250,247,098.33	15,359,715.14	6.14%
Year ended December 31, 1915	244,068,206.05	12,465,058.24	5.11%
Year ended December 31, 1914	243,144,711.90	9,314,430.78	3.83%
Year ended December 31, 1913	236,165,971.07	9,382,649.18	3.97%
Yearly average for five years ended December 31, 1917	\$247,384,611.20	\$12,278,662.54	4.96%

FINANCIAL.

The changes in funded debt in the hands of the public during the year were as follows:

	Sold	Retired
4 1/2 per cent Equipment Trust Certificates—Series "P"	\$2,500,000.00	
4 1/2 per cent Equipment Trust Certificates—Series "R"	3,780,000.00	
4 per cent Big Sandy Ry. First Mortgage Bonds		\$53,000.00
4 per cent Coal River Ry. First Mortgage Bonds		20,000.00
4 per cent Greenbrier Ry. First Mortgage Bonds		20,000.00
4 per cent Raleigh & Southern Ry. First Mortgage Bonds		12,000.00
Equipment Trust Obligations		1,150,000.00
Net Increase	\$6,280,000.00	\$1,255,000.00
Other changes in obligations shown under funded debt on balance sheet at the end of 1917, were as follows:	\$5,025,000.00	

	Payments
5 per cent Equipment Contract—Standard Steel Car Co	\$660,047.01
5 per cent Equipment Contract—Central Locomotive and Car Works	71,411.24
6 per cent Equipment Contract—American Locomotive Co	170,602.43
4 1/2 per cent Equipment Contract—Central Locomotive and Car Works	450,000.00
Total	\$1,552,062.68
Less	\$1,350,059.73

Four and one-half per cent. Equipment Trust Certificates, Series "P," \$2,500,000.00, and Series "R," \$3,780,000.00, in amounts, were issued and sold to provide funds for payment of equipment shown in table on page 19.

Your Company acquired during the year 9,450 additional shares of the capital stock of The Chesapeake and Ohio Northern Railway Company, payment for which was made with cash derived from sale of stock of The Kanawha and Michigan Railway Company. From the proceeds of the sale there is still deposited with the Trustee for future investment the sum of \$528,600.00.

There were also acquired 1,450 additional shares of the capital stock of the Pond Fork Railway Company, and 150 additional shares of the capital stock of the White Sulphur Springs, Inc.

Your Company has purchased the entire capital stock, 1,500 shares, of the Piney River and Paint Creek Railroad Company at a cost of \$270,000.00, and also the Price Hill division of the White Oak Railway Company for \$77,500.00.

Additional First Mortgage Bonds of The Chesapeake and Ohio Railway Company of Indiana were issued in respect of the cost of certain additions and betterments made to that line, and were pledged under your Company's First Lien and Improvement Mortgage.

During the past year your Company acquired at par the entire capital stock, 10,000 shares, and \$500,000.00 par amount of coupon notes of the Western Pocahontas Fuel Company, a corporation owning the Dorothy and Sarita coal properties in West Virginia, so as to protect the Company's fuel requirements.

A statement of charges to property accounts will be found on page 16, showing a net addition of \$10,583,655.63; that is, \$2,632,648.04 was added to cost of road and \$7,951,007.59 was added to cost of equipment.

During the past nine years your Company's increase in capital liabilities in hands of the public, its principal acquisition of stocks and bonds of other companies, and its expenditures for equipment, branch line construction, second track and other additions and betterments, have been as follows:

CAPITAL OBLIGATIONS ISSUED OR ASSUMED:	PAR VALUE.
General Mortgage 4½% Bonds.....	\$4,306,000.00
General Funding and Improvement Mortgage 5% Bonds.....	11,000,000.00
First Consolidated Mortgage 5% Bonds.....	2,000,000.00
Convertible 4½% Debentures.....	31,390,000.00
Three Year 4½% Collateral Trust Notes.....	25,000,000.00
One Year 5% Collateral Trust Notes.....	3,500,000.00
Five Year 5% Collateral Trust Notes.....	33,000,000.00
Convertible 5% Secured Gold Bonds.....	40,180,000.00
Coal River Railway Co. First Mortgage 4% Bonds.....	3,000,000.00
Raleigh and Southwestern Railway Co. First Mortgage 4% Bonds.....	860,000.00
Big Sandy Railway Co. First Mortgage 4% Bonds.....	229,000.00
Virginia Air Line Railway Co. First Mortgage 5% Bonds.....	900,000.00
Equipment Trust Certificates Series "N".....	1,760,000.00
Equipment Trust Certificates Series "O".....	3,160,000.00
Equipment Trust Certificates Series "P".....	2,500,000.00
Equipment Trust Certificates Series "R".....	3,780,000.00
Equipment Contracts, Various.....	4,809,390.00

\$171,314,390.00
\$162,667,314.49

REALIZING:	LESS:
CAPITAL OBLIGATIONS PAID OR PURCHASED:	
Six Per Cent. Collateral Gold Notes.....	\$5,000,000.00
Collateral Gold 6% Notes.....	2,500,000.00
Peninsula Division First Mortgage 6% Bonds matured January 1, 1911.....	2,000,000.00
Greenbrier and West Virginia Railway Co. First Mortgage 5% Bonds redeemed February 1, 1911.....	339,000.00
General Funding and Improvement Mortgage 5% Bonds.....	7,302,000.00
Greenbrier Railway Co. First Mortgage 4% Bonds retired November 1, 1911.....	2,000.00
Three Year 4½% Collateral Trust Notes.....	25,000,000.00
One Year 5% Collateral Trust Notes.....	3,500,000.00
Five Year 5% Secured Gold Notes.....	33,000,000.00
Kincaid Coal Co. First Mortgage 5% Bonds.....	200,000.00
Equipment Trust Payments.....	13,407,016.00
Through Sinking Funds:	
Big Sandy Railway Co. First Mortgage 4% Bonds.....	490,000.00
Coal River Railway Co. First Mortgage 4% Bonds.....	244,000.00
Greenbrier and West Virginia Railway Co. First Mortgage 4% Bonds.....	177,000.00
Raleigh and Southwestern Railway Co. First Mortgage 4% Bonds.....	55,000.00

\$93,216,000.00
93,926,424.59
\$68,740,889.90

ACQUISITIONS:	STOCKS OF:
The C. & O. Railway Co. of Indiana.....	\$5,998,800.00
Elkhorn and Beaver Valley Railway Co.....	30,000.00
Gauley and Meadow River Railroad Co.....	116,300.00
The Hocking Valley Railway Co.....	7,671,900.00
Cincinnati Inter-Terminal Railway Co.....	56,000.00
Logan and Southern Railway Co.....	292,100.00
Levisa River Railroad Co. (of Ky.).....	50,000.00
The Levisa River Railroad Co. (of Va.).....	50,000.00
Kanawha Bridge and Terminal Co.....	400,000.00
The Silver Grove Land and Building Co.....	200,000.00
White Sulphur Springs, Incorporated.....	2,575,000.00
First National Bank Building Corporation (Richmond, Va.).....	180,000.00
The Chesapeake and Ohio Railway Co.....	3,497,900.00
Pond Fork Railway Co.....	204,100.00
Piney River and Paint Creek Railroad Co.....	150,000.00

Western Pocahontas Fuel Co.....	1,000,000.00
Miscellaneous.....	32,300.00
Costing.....	\$22,504,400.00
Bonds and Notes of.....	\$23,959,341.89
Canadian Pacific Railroad Co. Equipment Certificates 4½%.....	\$30,000.00
The C. & O. Railway Co. of Indiana First Mortgage 5%.....	7,270,000.00
Elkhorn and Beaver Valley Railway Co. First Mortgage 5%.....	1,031,000.00
Illinois Central R. R. Co. Equipment Certificates 4½%.....	10,000.00
New York Central Lines Equipment Certificates 4½%.....	65,000.00
New York Central Railroad Co. Equipment Certificates 4½%.....	33,000.00
Western Pocahontas Fuel Co. Coupon Notes 5%.....	500,000.00
Miscellaneous.....	334,000.00
Costing.....	\$9,273,000.00

Properties of:	7,775,642.52
Coal River Railway Co.....	\$2,360,359.88
Raleigh and Southwestern Railway Co.....	816,562.42
Virginia Air Line Railway Co.....	1,071,947.12
Costing.....	\$4,192,869.42
Construction of:	4,192,869.42
Extension of Branch Lines, costing.....	\$3,420,959.63
Second Track (185.01 miles) and Additions and Betterments, costing.....	19,901,232.26
Costing.....	22,322,191.89

(Excluding \$2,680,955.25 expended on Chicago Line to October 31, 1917, for which securities have been acquired.)	
Equipment:	
Additional equipment acquired (less retired). (Excluding—Credit—\$27,319.93, included in Statement of Expenditures on Chicago Line to October 31, 1917, for which securities have been acquired.)	31,169,535.44
Costing.....	\$89,419,581.16

GENERAL REMARKS.

At the annual meeting of the stockholders held October 23, 1917, the by-laws were amended by changing the date of the annual meeting from the Tuesday preceding the last Tuesday of October to the Tuesday preceding the last Tuesday of April in each year, so as to correspond with the change in the fiscal year of the Company, which as noted in last year's report, now ends on December 31st.

The equipment inventory as of December 31, 1917, was as follows:	
Locomotives owned.....	645 Dec. 3
Locomotives leased.....	228 Inc. 50
Total.....	873 Inc. 47
Passenger train cars owned.....	334 Dec. 1
Passenger train cars leased.....	62 Inc. 13
Total.....	396 Inc. 12

Freight train and miscellaneous cars owned.....	32,427 Inc. 5,616
Freight train cars leased.....	17,006 Dec. 2,696
Total.....	49,433 Inc. 2,920
Floating Equipment.....	19 Inc. 1

There were undelivered December 31, 1917, 856 steel gondola cars purchased under Equipment Trust Series "R," as shown on page 19 of this report, that are not included in the above.

The changes during the year in the accrued depreciation of equipment account were as follows:

Balance to credit of account December 31, 1916.....	\$5,846,710.51
Amount credited during year ended December 31, 1917, by charges to:	
Operating expenses.....	\$1,352,053.82
Profit and Loss.....	297,472.07
Charged to account for:	\$1,649,525.89

Accrued depreciation on equipment retired during year—	
3 locomotives and 372 freight train and work cars.....	\$73,963.31
Balance to credit of account December 31, 1917.....	\$1,576,562.58

Increased wages affecting all branches of the service were effective during this year. Revenue tonnage per train mile was 37,877.75 tons, a decrease of 1.5 per cent. Freight revenue per ton-mile was \$42,998,222.58, an increase of 7.8 per cent. Freight train mileage was 9,841,024 miles, a decrease of 5.1 per cent. Revenue ton miles were 10,262,440,801, a decrease of 1.7 per cent. Ton mile revenue was \$4.19 mills, an increase of 9.7 per cent. Revenue per freight train mile was \$4.369, an increase of 13.6 per cent. Revenue tonnage per train mile was 1,043 tons, an increase of 3.6 per cent; including Company's freight, the tonnage per train mile was 1,112 tons, an increase of 4.0 per cent. Tonnage per locomotive, including Company's freight, was 979 tons, an increase of 3.5 per cent. Revenue per loaded car was 35.6 tons, an increase of 4.4 per cent. Tons of revenue freight carried one mile per mile of road were 4,254,567, a decrease of 3.0 per cent.

Operating Revenues	1917	1916
amounted to.....	\$54,643,793.52	\$49,834,312.18
Net Operating Revenue.....	\$16,537,926.63	\$17,135,226.33
Operating Ratio.....	69.7%	65.6% Inc.
Tons of Revenue Freight carried one mile.....	10,262,440,801	10,437,225,643
Revenue ton miles.....	1,043	1,007
Revenue tons per loaded car.....	35.6	34.1

The revenue coal and coke tonnage was 26,230,768, a decrease of 3.9 per cent; other freight tonnage was 11,648,957, an increase of 4.4 per cent. Total revenue tonnage was 37,877,725 tons, a decrease of 1.5 per cent. Freight revenue per ton-mile was \$42,998,222.58, an increase of 7.8 per cent. Freight train mileage was 9,841,024 miles, a decrease of 5.1 per cent. Revenue ton miles were 10,262,440,801, a decrease of 1.7 per cent. Ton mile revenue was \$4.19 mills, an increase of 9.7 per cent. Revenue per freight train mile was \$4.369, an increase of 13.6 per cent. Revenue tonnage per train mile was 1,043 tons, an increase of 3.6 per cent; including Company's freight, the tonnage per train mile was 1,112 tons, an increase of 4.0 per cent. Tonnage per locomotive, including Company's freight, was 979 tons, an increase of 3.5 per cent. Revenue per loaded car was 35.6 tons, an increase of 4.4 per cent. Tons of revenue freight carried one mile per mile of road were 4,254,567, a decrease of 3.0 per cent.

There were 7,557,732 passengers carried, an increase of 7.8 per cent. The

ASSETS		GENERAL BALANCE SHEET		DECEMBER 31, 1917		LIABILITIES.	
(Excluding Stocks and Bonds owned of The C. & O. Ry. Co. of Indiana and of The C. & O. Equipment Corporation.)				Excluding Stocks and Bonds owned of The C. & O. Ry. Co. of Indiana and of The C. & O. Equipment Corporation.)			
<i>Property Investment.</i>				<i>Capital Stock.</i>			
Cost of Road.....	\$182,904,094.45			Common.....	\$62,792,600.00		
Cost of Equipment.....	68,440,185.25	\$251,344,279.70		First Preferred.....	3,000.00		
			4,628.78	Second Preferred.....	200.00		
Improvements on Leased Railway Property				Common—The Chesapeake and Ohio Rail- way Co. of Indiana.....	\$62,795,800.00	1,200.00	\$61,797,000.00
<i>Securities of Proprietary, Affiliated and Con- trolled Companies—Pledged.</i>				<i>Unfunded Debt.</i>			
Stocks.....	\$14,558,999.44			First Mortgage, Terminal, etc. 6% Bonds, 1923.....	\$142,000.00		
Bonds.....	4,110,407.01			General Funding and Improvement, 5% Bonds.....	3,698,000.00		
	\$18,669,406.45			Convertible, 4½% Bonds.....	31,300,000.00		
<i>Securities—Issued or Assumed—Pledged.</i>				First Mortgage, R. & S. W. Railway, 4% Bonds.....	845,000.00		
Bonds.....	45,920,001.00			First Consolidated Mortgage, 5% Bonds 1936.....	29,858,000.00		
(Includes First Lien and Improvement Mortgage 5% Bonds \$45,920,000.00. See Contra.)				First Mortgage, Craig Valley Branch, 5% Bonds.....	650,000.00		
	\$64,589,407.45			First Mortgage, Greenbrier Railway, 4% Bonds.....	1,742,000.00		
<i>Miscellaneous Investments.</i>				First Mortgage, Warm Springs Branch, 5% Bonds.....	400,000.00		
Physical Property.....	378,900.23			First Mortgage, Big Sandy Railway, 4% Bonds.....	4,510,000.00		
<i>Special Funds, and Funded Debt Issued and Reserved.</i>				First Mortgage, Paint Creek Branch, 4% Bonds.....	539,000.00		
First Lien and Improvement Mortgage Bonds—Drawn for Additions and Better- ments.....	1,345,000.00			First Mortgage, Coal River Railway, 4% Bonds.....	2,756,000.00		
R. & S. W. Ry. Co., First Mortgage Bonds —Reserved for Construction.....	40,000.00			Convertible 5% Secured Gold Bonds, 1946 1941.....	40,180,000.00		
Potts Creek Branch—Cash.....	47,081.47			First Mortgage, Potts Creek Branch, 4% Bonds.....	600,000.00		
Special Deposits account of Construction and Equipment.....	1,807,696.98			First Mortgage, Va. Air Line Railway, 5% Bonds.....	900,000.00		
(Includes Cash Balance Proceeds K. & M. Ry. Co. Stock Sale.)				First Mortgage, R. & A. Division, 4% Bonds.....	6,000,000.00		
	\$3,239,778.45	68,108,086.33		Second Mortgage, R. & A. Division, 4% Bonds.....	1,000,000.00		
		\$319,556,094.61		General Mortgage, 4½% Bonds.....	48,129,000.00		
<i>Working Assets.</i>				Equipment Trust Obligations and Contracts	\$173,339,000.00	183,963,327.16	
Cash in Treasury.....	\$1,037,375.90					\$246,760,327.16	
Cash in Transit.....	1,222,490.09			First Lien and Improvement Mortgage, 5% Bonds not in hands of public (see Contra).....	1930	47,265,900.00	
Cash deposits to pay Interest and Dividends		\$2,259,866.08		<i>Working Liabilities.</i>			
Cash deposits to pay Matured Bonds and Scrip.....	13,234.17	1,238,394.18		Loans and Bills Payable.....	\$95,000.00		
Cash deposit to pay C. & O. Grain Elevator Insurance Claims.....	1,021.77	617,965.48		Traffic Balances.....	992,616.09		
Loans and Bills Receivable.....	1,000,632.13	2,573,543.42		Audited Vouchers and Pay Rolls.....	6,640,980.48		
Traffic Balances.....	2,573,543.42	2,305,860.93		Unpaid Wages.....	950.01		
Agents and Conductors.....	2,305,860.93	165,156.57		Miscellaneous Accounts Payable.....	537,427.55		
Miscellaneous Accounts Receivable.....	165,156.57	\$10,175,674.73		Matured Interest and Dividend Unpaid.....	1,411,117.58		
Other Working Assets.....		6,131,266.54		Matured Mortgage and Secured Debt Un- paid.....	13,234.17		
Materials and Supplies.....		6,234,223.45		Other Working Liabilities.....	156,519.20		
<i>Securities in Treasury—Unpledged.</i>		1,402,815.50			\$9,847,845.08		
Stocks.....	6,234,223.45			<i>Deferred Liabilities.</i>			
Bonds.....	1,402,815.50			Unmatured Interest and Rents.....	\$2,478,785.64		
	\$7,637,038.95			Taxes Accrued.....	1,196,113.71		
<i>Deferred Assets.</i>				Employes Payments on Liberty Loan Bonds	156,155.10		
Unmatured Interest, Dividends and Rents	98,582.08			Accrued Depreciation—Equipment.....	7,423,273.09		
Advances to Proprietary, Affiliated and Controlled Companies.....	514,895.98			Sundry Accounts.....	569,006.61		
Advances, Working Funds (Fast Freight Lines, etc.).....	45,053.01				\$11,823,934.15	21,671,779.23	
Special Deposits with Trustees, Various Mortgage Funds.....	100,035.82			<i>Appropriated Surplus.</i>			
Special Deposit, Cash and Securities Ac- count Liberty Loan.....	604,659.50			Additions to Property through Income and Surplus.....	\$23,859,636.38		
Cash and Securities in Sinking Funds.....	70,757.50			Reserve Invested in Sinking Funds.....	43,442.46		
Cash and Securities in Insurance Reserve Fund.....	72,992.02			Reserve Invested in Insurance Fund.....	72,992.02		
Sundry Accounts.....	881,439.59				\$23,976,070.86		
	\$2,388,415.50	6,332,395.72		<i>Profit and Loss—Balance.....</i>	6,216,213.08		30,192,283.94
		\$345,880,300.33					\$345,889,390.33
Total.....				Total.....			

The Hocking Valley Railway Company—Nineteenth Annual Report

Columbus, Ohio, April 8, 1918.

To the Stockholders:

The Nineteenth Annual Report of the Board of Directors, for the fiscal year ended December 31, 1917, is herewith submitted. The average mileage operated during the year was 349.6 miles, a decrease compared with the previous year of .6 miles. The mileage at the end of the year was 349.7 miles.

RESULTS FOR THE YEAR.

Operating Revenues were.....	\$10,696,434.22
(Increase \$2,496,014.30 or 30.44%)	
Operating Expenses were.....	7,409,122.60
(Increase \$1,811,233.68 or 32.36%)	
Net Operating Revenue was.....	\$3,287,311.53
(Increase \$684,780.62 or 26.31%)	
Taxes were.....	832,747.51
(Increase \$242,277.41 or 41.03%)	
Operating Income, Taxes deducted, was.....	\$2,454,564.02
(Increase \$684,780.62 or 26.31%)	
Miscellaneous Income was.....	716,899.02
(Increase \$429,905.22 or 37.49%)	
Rentals and Other Payments were.....	\$3,171,463.04
(Decrease \$540,094.73 or 94.68%)	
Income for the year available for interest was.....	\$3,141,107.64
(Increase \$552,692.72 or 21.35%)	
Interest (38.43% of amount available) amounted to.....	1,207,195.17
(Decrease \$5,092.97 or 0.42%)	

Net Income for the year amounted to..... \$1,933,912.47
(Increase \$557,785.69 or 40.53%)

Dividends paid during the year
One dividend of 2%..... \$219,990.00
One dividend of 3½%..... 384,982.50 604,972.50

Remainder, devoted to improvement of physical and other assets..... \$1,328,939.97

RETURN ON PROPERTY.

The following table shows the amount of return to your Company, from transportation operations only, upon its investment in road and equipment at the termination of each year of the five year period ended December 31, 1917:

YEAR ENDED DECEMBER 31:	PROPERTY INVESTMENT.	TOTAL OPERATING INCOME, (including hire of equipment and other items).	PER CENT. OF RETURN.
1917	\$46,237,480.24	\$3,060,174.97	6.62
1916	45,198,144.03	3,052,123.37	6.75
1915	44,802,665.64	2,041,149.36	4.56
1914	45,475,978.73	1,673,012.19	3.68
1913	42,525,047.49	2,547,540.52	5.99
Average	\$44,847,863.23	\$2,474,800.08	5.52

Railway Officers

Executive, Financial, Legal and Accounting

J. A. McCort has been appointed assistant auditor of the Wheeling & Lake Erie, with office at Cleveland, Ohio.

F. W. Pullen has been appointed general agent of all departments of the Nacozari Railroad Co., with office at Chicago.

Charles Donnelly, assistant general counsel of the Northern Pacific, with headquarters at St. Paul, Minn., has been appointed general solicitor.

Henry L. Adams, assistant attorney for Iowa of the Chicago & North Western, has been promoted to attorney for Iowa, with headquarters at Des Moines, Iowa, succeeding **J. C. Davis**, promoted to general solicitor.

L. B. Shepherd, southwestern passenger agent of the Chicago & Alton, at Dallas, Tex., has been transferred to the controller's office at Chicago and the position of southwestern passenger agent, at Dallas, Tex., has been abolished.

A. A. McLaughlin, whose appointment as assistant general solicitor for the Chicago & North Western Company, with headquarters at Omaha, Neb., was announced in these columns on April 26, was born at Webster City, Iowa, on May 13, 1868. He was educated in Iowa State College at Ames, Iowa, and in the University of Michigan, at Ann Arbor, Mich., graduating in the law department in 1892. After graduation Mr. McLaughlin began the general practice of law at Des Moines, Ia., and on March 1, 1903, was appointed assistant attorney for the Chicago & North Western for the State of Iowa, which position he held until his appointment on October 1, 1912, as attorney for the State of Nebraska for the same company. He continued in this position until his recent promotion to assistant general solicitor as mentioned above.



A. A. McLaughlin

Operating

Peter Groome has been appointed safety agent of the Union Pacific, with headquarters at Omaha, Neb., vice **J. M. Guild**, resigned to enter military service.

L. G. Waldrop, general agent of the Louisville & Nashville, with office at Nashville, Tenn., has been appointed assistant superintendent of the Nashville Terminals.

H. N. Atwood, general agent of the freight department of the Missouri Pacific at St. Louis, Mo., has been appointed inspector of freight transportation, and **J. G. Hollenbeck**, general passenger agent at St. Louis, has been appointed inspector of passenger transportation; both with headquarters at St. Louis.

J. W. Deneen, superintendent of the Monongah division of the Baltimore & Ohio, with office at Grafton, W. Va., has been appointed superintendent of the Cumberland division, with office at Cumberland, Md., succeeding **George D. Brooke**, who has been assigned to special duty, with headquarters at Baltimore.

J. W. Farrell, trainmaster of the Grand Trunk at Richmond, Que., has been appointed trainmaster of the First district, with headquarters at Island Pond, Vt., and **N. P. North** has been

appointed trainmaster of the Second and Third districts, with headquarters at Richmond. The position of assistant trainmaster, First and Second districts, has been abolished.

Charles B. Rodgers has been appointed general manager of the Davenport, Rock Island & North Western, with headquarters at Davenport, Iowa, succeeding **O. B. Grant**, effective May 1. Mr. Rodgers was born at West Point, Iowa, on October 4, 1861. He entered railway service with the Chicago, Burlington & Quincy in 1880 and has been with that road continuously until his recent appointment as mentioned above.

E. K. Fleming, general agent in the freight department of the Chicago, Burlington & Quincy, at Chicago, has been appointed on the vice-president's staff to look after over, short and damage matters, with headquarters at Chicago, succeeding **C. B. Rodgers**, resigned to accept service with another company. **H. R. Freed**, general agent at Clinton, Iowa, has been appointed on the vice-president's staff to look after station matters, with headquarters at Chicago, effective May 1.

C. B. Floyd has been appointed assistant to the general safety agent of the New York Central, with office at New York, succeeding **R. S. Jarnagin** who has gone to Washington to take a position in the Safety Section, Department of Transportation. Mr. Floyd has been for several years past a division safety agent, located in the Chicago territory of the New York Central Lines. He will be succeeded in that territory by **J. W. Johnston**, who for past two years has been division safety agent on the Big Four at Indianapolis, Ind.

H. J. Humphrey, superintendent of the Canadian Pacific at Brownville Junction, Me., has been appointed superintendent of the Laurentian division, with office at Montreal, Que., in place of **W. Tansley**, transferred; **J. H. Boyle**, superintendent at Farnham, Que., has been appointed superintendent of the Brownville division, succeeding Mr. Humphrey; **J. B. Blair**, assistant superintendent of the Montreal Terminal division, has been appointed superintendent of the Farnham division, with office at Farnham, in place of Mr. Boyle; **W. E. McGill**, assistant superintendent at Sudbury, Ont., has been appointed assistant superintendent of the Montreal Terminals division, in place of Mr. Blair, and **C. E. Towle** has been appointed assistant superintendent, with headquarters at Sudbury, vice Mr. McGill.

W. B. Darrow, superintendent of transportation of the first division of the Atlantic Coast Line, at Rocky Mount, N. C., has been appointed superintendent of transportation, with authority over the system, with office at Wilmington, N. C.; **J. Lowell White**, district superintendent at Norfolk, Va., has been appointed superintendent of transportation of the First division, with office at Rocky Mount; **C. M. Cobb**, trainmaster at Tarboro, has been appointed superintendent of the Norfolk district, with office at Norfolk; **R. B. Hare**, assistant superintendent at Florence, S. C., has been appointed superintendent of the Columbia district, with office at Florence, vice **G. G. Lynch**, retired, and the position of assistant superintendent of the Columbia district has been abolished; **W. H. Newell, Jr.**, has been appointed trainmaster of the Norfolk district, with office at Tarboro.

Frank W. Taylor, whose appointment as general manager of the Missouri, Kansas & Texas, with headquarters at Parsons, Kas., was announced in these columns on April 12, was born at Water Valley, Miss., on October 24, 1875. Mr. Taylor began his railroad career as a machinists' apprentice with the Illinois Central at Water Valley, in June, 1892. After serving four years in this capacity he was transferred to the Burnside shops, Chicago, where he remained a short time. He then returned to Water Valley, Miss., and worked as a journeyman machinist until October, 1901, when he was appointed night roundhouse foreman. On October 1, 1902, Mr. Taylor was transferred to Jackson, Miss., as general foreman at that point, and in the following year he was transferred to Louisville, Ky., in the same capacity. In October, 1908, he was promoted to master mechanic, at Mattoon, Ill., and on April 1, 1912, was transferred to Waterloo, Iowa, as master mechanic of the Minnesota and Iowa divisions. On January 1, 1915, Mr. Taylor was appointed superintendent of motive power of the International & Great Northern, with headquarters at Palestine, Tex. On January 1, he became

superintendent of motive power of the Missouri, Kansas & Texas, with headquarters at Denison, Tex. On March 1, of this year he was promoted to general manager on the Missouri, Kansas & Texas, as mentioned above.

J. E. Fairhead, whose appointment as general superintendent of the Pittsburgh & West Virginia, with headquarters at Pittsburgh, Pa., has already been announced in these columns, was born on August 4, 1879, at Urbana, Ill., and was educated in the common and high schools at Covington, Ky. He began railway work in November, 1901, as clerk to trainmaster on the Chesapeake & Ohio, and later served consecutively as stenographer in the general manager's office of the Cleveland, Cincinnati, Chicago & St. Louis, secretary to president of the Wabash-Pittsburgh Terminal Railway, at Pittsburgh, Pa.; chief clerk to superintendent of the same road; secretary to general manager of the Cincinnati, Hamilton & Dayton, with office at Cincinnati, Ohio, and secretary to president of the Kansas City Southern. From February, 1907, to August, 1912, he served as chief clerk to general manager and vice-president and general manager, and then was appointed superintendent of car service of the same road, remaining in that position until April 1, 1918, when he became general superintendent of the Pittsburgh & West Virginia.

Traffic

William T. Price, commercial agent of the Union Pacific System, at Pueblo, Colo., has been appointed traffic manager and property agent of the Denver (Colo.) Tramway and the Denver Interurban.

Charles H. Ryan, Jr., commercial agent of the Louisville & Nashville, at Indianapolis, Ind., has been appointed general agent, with office at Nashville, Tenn., to succeed L. G. Waldrop, transferred.

A. C. Odenbaugh, general agent in the passenger department of the Northern Pacific, at Chicago, has resigned, to become connected with the bond department of the Chicago Savings Bank in that city.

Henry Adema, lake grain agent of the Delaware, Lackawanna & Western, with office at Buffalo, N. Y., has resigned to become secretary of the White Pine Association of the Tonawandas, with office at Tonawanda, N. Y.

John B. Mordecai has been appointed traffic manager of the Richmond, Fredericksburg & Potomac and the Washington Southern, with office at Richmond, Va., to succeed the late Colonel Warren P. Taylor.

B. H. DaCosta, commercial agent at New York, and **J. W. Jones**, commercial agent at Cincinnati, Ohio, of the Central of Georgia, have been assigned to service on the line and the agencies at both places have been closed.

H. P. Cornick, assistant general freight agent of the Louisville & Nashville at Evansville, Ind., has been appointed general freight agent, with headquarters at Evansville, vice **Lee Howell**, deceased, and his former position has been abolished. **C. H. Ryan, Jr.**, has been appointed general agent, with headquarters at Nashville, Tenn., vice **L. G. Waldrop**, promoted to other duties in the transportation department.

Engineering and Rolling Stock

Tazwell Ellett, Jr., assistant division engineer of the Baltimore & Ohio, with office at Cumberland, Md., has resigned.

E. S. FitzSimmons, mechanical superintendent of the Erie, with office at New York, has resigned to go into other business.

T. R. Stewart, master mechanic of the Baltimore & Ohio, at Connessville, Pa., has been transferred as master mechanic to Cumberland, Md.

H. P. Creighton has been appointed bridge and building master of the Canadian Pacific, with headquarters at Schreiber, Ont., vice **E. T. Draper**, transferred.

The authority of **E. C. Sasser**, superintendent of motive power of the Southern Railway, with office at Charlotte, N. C., has been extended to cover the entire lines east; **W. S. Murrian**, having resigned to engage in other business, the position

of superintendent of motive power of the middle district has been abolished.

H. L. Archbold has been appointed division engineer of the Tucson division of the Southern Pacific, with office at Tucson, Ariz., succeeding **J. D. Mathews**, resigned.

F. C. Haney, signal foreman of the Chicago, Rock Island & Pacific, on the Chicago terminal territory, has been appointed signal supervisor, with headquarters at Ft. Worth, Tex., succeeding **J. G. Stoll** transferred to the Chicago District and assigned to other duties, effective May 1.

H. J. Hanlin has been appointed sanitary engineer of the St. Louis Southwestern lines, with headquarters at Texarkana, Ark., succeeding **H. W. Van Hovenberg** who has resigned to become sanitary engineer in the United States Public Health Service. This appointment was effective May 1.

H. C. Phillips, general secretary of the Railroad Presidents' Conference Committee on Federal Valuation of Railroads, with headquarters at Philadelphia, Pa., has resigned to become chairman of the Western Group of the Engineering Committee at Chicago. The offices of the Western Group were moved on May 1 to 110 South Dearborn Street, Chicago, where facilities have been provided for meetings of sub-committees which are making special studies of cost data and unit prices.

W. H. Winterrowd, whose appointment as chief mechanical engineer of the Canadian Pacific, with headquarters at Montreal, Que., has already been announced in these columns, was



W. H. Winterrowd

born on April 2, 1884, at Hope, Ind. He attended the public schools at Shelbyville, Ind., and graduated in 1907 from Purdue University. In 1905 he was employed for a short time as a blacksmith's helper on the Lake Erie & Western, at Lima, Ohio, and in 1906 he was a car and air brake repairman on the Pennsylvania Lines West, at Dennison, Ohio. After graduation he became a special apprentice on the Lake Shore & Michigan Southern, and in 1908 he went with the Lake Erie, Alliance & Wheeling as enginehouse foreman at Alliance, Ohio. In 1909 he became night enginehouse foreman of the Lake Shore & Michigan Southern at Youngstown, Ohio, and in 1910 was made roundhouse foreman at Cleveland. Later in the same year he was promoted to assistant to the mechanical engineer of the Lake Shore. Since September, 1912, he has been with the Canadian Pacific, at first as mechanical engineer, and in May, 1915, was appointed assistant chief mechanical engineer.

H. O. Whitney, roadmaster of the Denver & Rio Grande, with headquarters at Glenwood Springs, Colo., has been promoted to general roadmaster of the Utah lines, with headquarters at Salt Lake City, Utah, effective April 29. **R. C. Violett**, roadmaster on the St. Louis South Western at Mt. Pleasant, Tex., has been appointed general roadmaster of the Colorado Lines of the Denver & Rio Grande, with headquarters at Denver. **B. T. Johnson** has been made supervisor of maintenance equipment.

J. A. McFerran, master mechanic of the Louisville & Nashville, at Covington, Ky., has been appointed master mechanic of the Mobile & Montgomery divisions and branches, with office at the Montgomery (Ala.) shop; the position of **T. A. Nelson**, assistant master mechanic at Montgomery, has been abolished, and **J. D. Maxwell**, master mechanic at Mobile, has been relieved of supervision over mechanical matters on the Mobile & Montgomery division and branches; **C. W. Mathews** has been appointed master mechanic of Cincinnati terminals and Kentucky division, with office at Central Covington (Ky.) shop, vice **J. A. McFerran**; **B. E. Dupont** has been appointed master

mechanic of the Howell (Ind.) shops, Henderson and St. Louis divisions and St. Louis terminals, vice **Henry Hardie**, deceased; **F. W. Oakley** has been appointed master mechanic of the Eastern Kentucky division, with office at Ravenna (Ky.) shops, vice **Harry S. Hills**, deceased, and **T. F. Ryan** has been appointed assistant master mechanic of the Cincinnati terminals and Kentucky division, with office at Central Covington shop.

Railway Officers in Government Service

F. P. Pfahler, master mechanic of the Baltimore & Ohio at Cumberland, Md., has been appointed mechanical engineer of the Locomotive Section, United States Railroad Administration.

A. K. Morris, freight coal agent at the Erie, New York, has been granted a furlough to serve as director of tidewater coal traffic on the Anthracite Committee of the Fuel Administration, with headquarters at New York.

W. S. Basinger, general passenger agent of the Union Pacific, and **C. A. Fox**, secretary of the Central Passenger Association, have been appointed assistants to Gerrit Fort in the passenger department of the division of traffic at Washington.

Paul A. Bevan, motive power inspector, Central System, Pennsylvania Railroad, Western Lines, has been granted a furlough to enter the Ordnance Department of the United States Army, as engineer of tests. Mr. Bevan is located at the United States Cartridge Company, Lowell, Mass.

Charles M. Anderson, superintendent of safety of the Nashville, Chattanooga & St. Louis, has been appointed supervisor of safety of the southern railroads with headquarters at Atlanta, Ga. Mr. Anderson is the first of three regional safety officers to be appointed to assist **H. W. Belnap**, manager of the Safety Section of the United States Administration at Washington. Mr. Anderson was born at Owingsville, Ky., in February, 1887. He began his railroad career in 1906 as a clerk in the office of the superintendent of the Louisville & Nashville at Middlesboro, Ky. He was advanced to chief clerk in that office and in 1912 he was appointed chief clerk in the office of the superintendent of construction. In 1914 he entered the service of the Nashville, Chattanooga & St. Louis, and in 1916 was placed in charge of the organization of safety work on the system with the title of superintendent of safety. Mr. Anderson is also secretary of the steam railroad section of the National Safety Council. He will open his office in Atlanta on June 1.



C. M. Anderson

Obituary

Charles D. Porter, master mechanic of the Pennsylvania Railroad, at Pittsburgh, Pa., died in that city on May 2, at the age of thirty-five.

S. L. Bean, mechanical superintendent of the Atchison, Topeka & Santa Fe coast lines, who died at Los Angeles, Cal., on March 24, as announced in the *Railway Age* on April 12, was born in Franklin, N. Y., on March 25, 1851. He learned the machinist's trade in the Manchester Locomotive Works and entered railway service with the Wisconsin Central in 1873. On June 10, 1903, he was appointed division master mechanic for the Santa Fe at Albuquerque, N. M. and on April 20, 1914, he was promoted to mechanical superintendent, with headquarters at Los Angeles, Cal., which position he held until his death. Mr. Bean was 67 years of age.

William H. Barnes, director of the Pennsylvania Railroad and formerly president of the Allegheny Valley, died on May 5, at his home in Philadelphia, Pa. He was born in July, 1829, in Philadelphia and entered the service of the Pennsylvania Railroad in March, 1848, with an engineering corps at Greensburg, Pa. Mr. Barnes was one of the charter members of the Pennsylvania company, and in 1871 served as treasurer of that company. In 1884 he became receiver of the Allegheny Valley and later, when it was reorganized, he became president of that road. Since December, 1889, he was a director of the Pennsylvania Railroad Company and was also director of a number of other corporations affiliated with the Pennsylvania Railroad system.

Robert Morrison Olyphant, chairman of the executive committee of the Delaware & Hudson Company, died on May 2, 1918, at his home in New York City. Mr. Olyphant was born on September 9, 1824, at New York, and graduated from Columbia College in the class of 1842. On September 15, 1876, he was appointed assistant president of the Delaware & Hudson Canal Company, and had served continuously in the service of that company and its successor, the Delaware & Hudson Company, until his death. From May, 1882, to August, 1884, he was vice-president and then served as acting president until October of the same year. He was elected president in October, 1884, and since May 14, 1903, has been chairman of the executive committee.



R. M. Olyphant

IN MILITARY SERVICE

Major Charles G. Baird, commanding officer of the 413th Telegraph Battalion Signal Corps now in service in France, died in France on April 28. Major Baird was born on February 10, 1880. He entered the service of the Pennsylvania Railroad on March 9, 1893, and became interested in telegraphy. He left the Pennsylvania Co.'s service on September 25, 1901, to enlist in the U. S. A. Signal Corps, and served four years in the Philippines. On March 23, 1905, he returned to the service of the Pennsylvania Railroad, and in 1910 he had charge of the construction and installation of all the signal, telegraph and telephone lines in the Pennsylvania station, New York. He was division operator on the New York division at the time he was furloughed for service in France. Major Baird was a veteran of the Spanish War, and it was largely through his efforts that the 413th Telegraph Battalion was organized. The unit consists of telegraph operators and electricians, nearly all of whom were Pennsylvania Railroad employees. His executive abilities were promptly recognized, for even though he had been in France but a short time, he was recently appointed to the position of superintendent of telephone and telegraph traffic of the American Expeditionary Forces.



Major C. G. Baird

EDITORIAL

Railway Age

EDITORIAL

Railroad men did their part splendidly in making the Third Liberty Loan a big success. Doubtless many of those who

Your Duty as an Individual

subscribed will have to suffer various inconveniences in order to meet the payments; your country needed your support in order to play its full part in the world war for democracy and you did your duty in backing it up. At the same time you made a safe and sound investment for yourself which will serve you well in the future. Next week is Red Cross Week and you will give fully—without thought of investment for self—to back up this magnificent organization in ministering not only to the wounded and dying on the battle field, but in relieving distress wherever it is found. An agency of mercy truly; also a great force for the upbuilding of the morale of our armies. Your support of the Liberty Loan and Red Cross is fine, but there is another big thing for you to do. Our boys on the other side are working under great hardships in spite of all we can do for them. Their souls are being tried to the limit and they are laying down their lives, or suffering injury with a smile on their faces. The successful outcome of the war depends on many things, but a vital link in the chain is transportation in this country. For humanity's sake be an optimist. Be an inspiration to those about you. Give of yourself as you have never given before. Don't slack on the job because you think, or know, you are not getting as much out of it as you should or as someone else is. We have all got to make sacrifices, if we are to win the fight. Can you afford to be a dollar chaser, or slacker, when your brothers are giving their very lives in the great cause? The call to military service, the draft and the competition of industries which are paying excessive wages and salaries have depleted the railroad ranks of skilled and experienced workers and executives. A great responsibility rests upon you.

One of the most flagrant evils of unrestricted competition between railroads has been the building of duplicate lines

The Elimination of Duplicate Lines

where one could serve the territory adequately. This country has witnessed examples of this practice in practically every period of its railway development. Probably the most conspicuous examples of earlier days were the construction of the West Shore and the Nickel Plate roads parallel to what is now the New York Central. In more recent years the most active competition of this character has been in the northwest, where the struggle between the Hill and Harriman systems led to the construction of duplicate lines in several instances. The most notorious example was the building of the Oregon Trunk and the Des Chutes railways down opposite sides of the narrow canyon of the Des Chutes river for approximately 100 miles to reach a territory which, after several years, has not yielded enough traffic to justify even one line. With unified control of the roads the waste of funds for the construction of duplicate lines has been stopped. As an instance, arrangements are being completed whereby the Chicago, Milwaukee & St. Paul may be enabled to use a belt line of the Chicago & North Western northwest of Chicago and thereby avoid the construction of a parallel line which it had been contemplating for several

years. Steps are also being taken to correlate existing facilities already built to afford greater economy and capacity without any sacrifice of service. The Wyoming Railway Commission has already asked that the Chicago & North Western line be abandoned between Shoshoni, Wyo., and Orin Junction, a distance of over 100 miles, and that the trains of this road be operated over the parallel line of the Burlington. A similar suggestion has been made relative to the two lines in the Des Chutes canyon, while the Western Pacific and the Southern Pacific are negotiating for the operation of their two single track lines as a double track road for a couple of hundred miles in Nevada. Railway men will agree that changes such as these are in the interest of efficiency and economy, regardless of whether the roads are operating under unified or individual control. For this reason the contracts now being made should extend for a sufficient number of years to insure the continuance of the plan after the roads have been returned to their owners.

The Railroad Wage Commission touched in its report upon the salaries of railway officers. It says, "It is reasonably

The Salaries of Railway Officers

certain from the facts gathered by the commission that a substantial readjustment of such salaries can be made and the efficient operation of the properties thereby promoted. . . . Some salaries may well be abolished altogether, others greatly reduced, while in some cases of lesser paid officials an increase would be warranted." There can be no serious question that a large part of the lower paid officers of the railways, from division superintendents downward, are paid too little. In many cases conductors and locomotive engineers earn more than yardmasters, trainmasters, roadmasters, traveling engineers, master mechanics and division engineers; and in some cases they actually earn more than superintendents. Officials as well as employees who are receiving less than \$250 a month will receive advances if the recommendations of the Wage Commission are adopted. Many division officials, however, should be given increases in excess of those recommended by the Wage Commission. It is anything but conducive to discipline and efficiency for officials to receive less pay than employees who are working under their direction. In practically every such case either the employee is being paid too much or the official too little. The statistics of the Interstate Commerce Commission show that in the year ended June 30, 1916, there were 14,401 general and divisional officers who received less than \$3,000 a year, and that their average wage was only \$1,064, or less than \$140 a month. Many advances in salary have been made since then, but they have not been numerous enough or great enough; and a careful survey of the situation should be made by those in charge of railway management with a view of putting the salaries of the lower paid officials on a proper basis. What should be done about the salaries of the higher paid officials—say, from the general managers and their staffs upwards? Since the adoption of government control there has been much talk about the reduction of salaries, but nothing definite has been said officially as to whether any reductions are to be made, and

if so where they are to begin and end, and how large they are going to be. The average salary of the 4,247 general officers receiving over \$3,000 in 1916 was \$6,462. This is not a "fancy" sum. It is modest, indeed, considering the responsibilities and duties of railway general officers. It includes, however, some very high salaries; and perhaps it was merely these that the wage commission referred to in saying that some salaries should be "greatly reduced."

The reduction of railway salaries has now been a subject of agitation for almost five months. If the Railroad Administration intends to do anything along this line more than it has done, the sooner it does it the better. Railway officers, like other human beings, are not able to work as efficiently when their minds are disturbed as when they are easy; and the man who can have an easy mind with a reduction of his income hanging over him which may affect his standard of living, has not been born, no matter how large his income is. Just how it can be thought that any considerable economy will be effected by a reduction of the salaries of the higher paid officers we do not understand. The total compensation paid to all railway officers receiving over \$5,000 is \$30,000,000 a year. That is about 1 per cent of operating expenses. The really high salaries probably do not constitute one-tenth of one per cent of operating expenses. The Railroad Administration needs the loyal and enthusiastic support of all the able men on the railways much more than it needs to secure the negligible saving that could be effected by reducing the salaries of these men or losing them from the service. Railway expenses are increasing fast already. The less first-class brains there are kept in the railroad business, and the less opportunity and incentive the first-class brains are given to work to their full capacity, the faster expenses will continue to increase.

Should Railroads Furnish Detailed Plans for Steel Bridges?

FEW RAILWAY NECESSITIES are purchased on so strictly a competitive basis as steel bridges. The patented device or design plays only a minor part in these structures, and variations in practice in the design or construction of different bridges arise rather through differences of opinion on the parts of railway bridge engineers than from an exploitation of particular proprietary features on the part of the individual bridge companies. Contracts for railway bridges are advertised, estimated and awarded on the basis of plans submitted by the railroad, there being exceptions to this only in the case of movable spans, where there may be a preliminary consideration of several patented designs.

Some variations as to this custom arise in the degree of detail shown on the plans supplied by the railroads. Some companies provide only a bare outline of the structure, together with specifications for the design, while others submit detailed shop drawings. The more common procedure is a mean between these two; in other words the preparation of general drawings showing the makeup of the members and limiting dimensions, while leaving the completion of the shop drawings to the bridge company.

The present tendency is almost entirely toward the preparation of at least the designing plans by the railroad, coupled with a thorough check of the shop drawings prepared by the bridge shop. The basis of payment in bridge contracts is now almost universally the pound price. The lump sum price with its various abuses is a matter of the past, but with inadequate engineering supervision, even the pound price has its disadvantages. The fabricator is

naturally interested in selling as large a tonnage of structural steel as possible, and while the design under which he furnished the bridge may result in a most excellent structure, it may not be the most economical structure for the site. The submission of comparative designs considered clearly from the standpoint of the advantages to the railroad may easily result in a much cheaper structure which will fulfill all the requirements just as well. In view of these considerations there seems to be little question but that the railroad should supply the design, and where it has no staff competent to execute the work it should retain a consulting bridge engineer.

A more perplexing problem arises in connection with the preparation of the shop drawings. In most cases this work is left to the bridge company, but a few railroads have obtained no small degree of success in doing this work in their own drafting rooms. The real question as regards the preparation of the detailed plans is one of economy, including both the cost of preparing the drawings and the relative cost of the shop work as done from plans prepared under the two arrangements. The structural steel fabricators maintain that their own drawing rooms, through training, experience and close relation with the shop can prepare the detailed plans for less money, and that the finished drawings are better adapted to obtain shop economies than plans prepared in the railroad offices. In view of this, it is their contention that the price which they submit for a job for which they prepare the plans, will show a definite saving to the railroad company.

Without doubt the small railroad cannot economically maintain a force of detailers for the average run of work. On the other hand a few of the larger roads prepare detail drawings of all their bridge work. There are also special circumstances in which it has been found particularly advantageous for the railroad to prepare drawings in detail, for while the bridge company lays special emphasis on the close relation of its drawing rooms to the shop, it may ignore the relation of the drawing room to the field. Some structures involve such complications as to alignment, grades and clearances that the details can be worked out efficiently only by the man who has been in close touch with the project from the start.

Following this idea railroads have on occasion developed their own organizations and accomplished results that have been eminently satisfactory. Only recently a railroad in the middle-west built a complicated city viaduct structure and found that by following this practice it could not only prepare plans much faster with its own forces than could have been done by a bridge shop force unfamiliar with the job, but it also completed the plans at a very satisfactory cost per ton. As a further example, some years ago another railroad renewed a great many high timber trestles with steel viaducts. A large force of draftsmen was organized, standard designs and details were prepared which were applied to the various structures and although the work was subdivided among a number of fabricating shops the designs were uniform throughout, since they were all prepared by one group of men rather than by the widely separated drafting rooms of the several bridge companies.

Success of this kind depends as much on the service of skilled structural detailers as on the character of the supervision, and owing to the well known transitory nature of this work it has been possible during normal times to secure an adequate number of men with a thorough knowledge of bridge shop practice. It must be borne in mind, however, that structural detailing is virtually a trade, and while it is best done by men who follow this work as a vocation, such men cannot as a rule be used efficiently on other classes of drawing room work. There is therefore no economy in maintaining a force of steel detailers unless there is plenty of work to keep them busy.

In presenting the advantages and disadvantages of these two plans for the preparation of shop drawings, it would be well to call attention to some intermediate plans which have been found of advantage in certain cases. Briefly these consist of various forms of close co-operation between the office of the railway bridge engineer and the drafting room of the fabricator. In the case of one of the largest railroad bridges built in recent years, the bridge engineer desired to have the shop drawings prepared in his own office where he could keep in close touch with the work, but, to insure that the plans would be completed in a way that would facilitate the shop work to the utmost, an arrangement was made whereby a squad foreman from the bridge shop drawing room supervised the work in the railroad office. Another and probably more common practice for accomplishing the same results, is to have the man who designed the bridge for the railroad assigned to the bridge company's drawing room during the time that the shop plans are in preparation.

The Proposed Advances in Railway Wages

THE REPORT of the Railroad Wage Commission, which was appointed by Director General McAdoo soon after the adoption of government control of railways, was made public last week. The appointment of this commission and the assignment of its duties constitute one of the best pieces of work Mr. McAdoo has done since he has been director general. The commission was instructed not merely to investigate and pass upon the claims of railway employees who had complained about their wages, but to investigate and make recommendations regarding what ought to be paid to all classes of employees. The selection of Secretary of the Interior Franklin K. Lane as chairman was ideal, and the rest of the personnel of the commission was good.

The report and recommendations made are what were to be expected from a body having such high character and which was given the opportunity it was to deal in a big way with so important a problem. The commission did not attempt to decide the many difficult questions which can be raised as to the reasons why some classes of railway employees receive much higher wages than other classes, and as to just what the relationship of the wages of the various classes should be. Nor did it give any weight to the amount of organized pressure which any particular class had brought or could bring to bear in support of its demands. It did recognize the "one dominating fact," to which attention repeatedly has been called in these columns, that the lower grades of railroad employees are paid much less in proportion than the higher grades. Therefore, it recommends an advance of 43 per cent with a minimum of \$20 a month, in the wages of all employees receiving less than \$50 per month, and smaller percentages of increase for the higher paid. For example, employees who were receiving from \$51 to \$75 a month on December 31, 1915, would under its plan receive an advance of 41 per cent, those receiving \$115 a month, 25 per cent, those receiving \$239 a month, 4.56 per cent; while employees receiving \$250 or more would receive no advance at all.

As above indicated, the proposed advances are not based on the wages being paid at present but on those which were being paid in December, 1915, and they are predicated almost entirely on the increases in the cost of living which have occurred during the last two years. The commission made a thorough investigation and found that the increase in the cost of living had been about 40 per cent. It will be seen, therefore, that under its plan the advance in the wages of the lowest paid employees would be in proportion to the

increase in the cost of living since 1915, while for the higher paid employees the advance would be less, and for the highest paid much less, in proportion, than the increase in the cost of living.

The commission was not empowered to determine what should be done, but merely to make recommendations to Director General McAdoo. It will hardly be questioned by any humane and well-informed person that the advances it recommends should be made. They ought to be made as a matter of justice to railway employees. They practically must be made as a matter of public expediency, because the wages paid by the government and by other large industries are so large that without further advances in railway wages the roads cannot hold enough men to operate efficiently.

The advances which the Railroad Wage Commission recommends would aggregate about \$300,000,000 a year. That part of the press which is bent upon using all the results of government control that it can as an argument for government ownership is exploiting them as evidence of the fairness and generosity with which railway employees may expect to be treated under government ownership, the implication being that under private management the railways made practically no advances in wages. Those who discuss the subject in this way ignore a significant statement made by the Railroad Wage Commission. This appears on page 13 of its report, and is as follows: "It is hardly realized that the roads themselves have in two years, 1916 and 1917, increased wages approximately \$350,000,000 per year if applied to the present number of their employees."

It is worth while in this connection to review the advances in wages which the railways have made over a still longer period. The system of federal regulation which prevailed until it was supplanted by government control was adopted in 1906. In the fiscal year 1906 the average wage paid to railway employees was \$588. In the calendar year 1917, as shown by the Wage Commission's report, the average wage per employee of the Class I roads was \$988. The Class I roads had 1,939,399 employees in 1917. The increase in the average annual wage having been \$400, it follows that in 1917 the Class I roads paid to their employees \$775,760,000 more than they would have if the average wage had been the same as in 1906.

The increase in the average wage between 1906 and 1917 was 68 per cent. Meantime, the average passenger rate remained about stationary and the average freight rate declined from 7.48 mills in 1906 to 7.15 mills in 1916, the last year for which the figure is available. The advance in wages recommended by the Railroad Wage Commission would amount to \$288,000,000 for the Class I roads, and would make the average wage paid by them \$1,137 a year. This would represent an advance over the average wage of 1917 of 15 per cent. During the period of 11 years when the railways under private control were being steadily forced to make large advances in wages their managers repeatedly went to Washington and appealed to the Interstate Commerce Commission for offsetting advances in rates. The commission in most cases told the managers to go home and manage their railways more efficiently; and that thereby they would be able to effect economies which would offset the increased expenses. The railway managers returned home as bidden, and they did achieve increases in efficiency which enabled the companies to absorb most of the advances in wages and other expenses. They were not able, however, to absorb anywhere near all of them, and, in consequence, the ratio of expenses to earnings constantly increased and the percentage of operating income earned constantly decreased.

The railroads are now under government control. What will the Interstate Commerce Commission say to the Director General of Railroads if and when he makes advances in rates to offset the advances in wages and other expenses which are occurring under government control?

The Heavy Losses of Railway Net Income

HOW CLOSE THE RAILWAYS of the United States were to financial disaster when government control was adopted is shown by statistics regarding their earnings and expenses in the first three months of 1918, which have been compiled by the Interstate Commerce Commission. The statistics in question are for only 114 roads operating 165,258 miles, but probably they accurately forecast what the figures for all lines will disclose when they are available.

The reports of these 114 roads show that in January, February and March their total earnings were \$726,000,000, an increase of almost \$38,000,000 over the same months of 1917. Their operating expenses, however, were almost \$638,000,000, an increase of \$125,000,000 over the same months of 1917. In consequence in these three months these roads suffered a decline of almost \$87,200,000 in net revenues. Their net revenues in the first three months of 1917 were \$175,400,000, while in the first three months of 1918 they were only \$88,200,000. The decline in their net earnings in these three months was almost 50 per cent. The ratio of their operating expenses to their earnings increased from 74½ per cent in the first three months of 1917 to 80 per cent in the first three months of 1918.

The statistics of "operating income" have become unusually interesting recently because the compensation the government is to guarantee the companies for the use of their properties is based on the average operating income earned by them in the three years ended on June 30, 1917. Operating income is what is left of earnings after the payment of expenses and taxes, including "war taxes." In the first three months of 1917 the operating income of these 114 roads was \$144,000,000, while in the first three months of 1918 it was only \$54,000,000, a decline of \$90,000,000 or 60 per cent.

The railways in all three territories, eastern, southern and western, had increases in their total earnings, but still greater increases in their operating expenses and taxes during these three months, with the result that in every territory there was a heavy decline in operating income. The showing made by the eastern lines, however, was much the worst of all. In the first three months of 1917 these railways earned almost \$56,000,000 in operating income, while in the first three months of 1918 they did not earn any operating income at all, but had an actual deficit in this item of over \$1,000,000.

Relatively the greater parts of the increase in operating expenses, and the loss in operating income, were due to the severe weather and difficult operating conditions in January and early in February. In March, however, the weather was very good and still the increase in operating expenses was so great as to cause declines in net revenue and in operating income. The total operating revenues of these 114 roads in March, 1918, exceeded \$284,000,000, an advance over March, 1917, of almost \$36,000,000. Their operating expenses, however, increased about \$42,000,000 over the same month of last year and in consequence there was a decrease of net revenue of over \$6,000,000. The operating ratio of these roads in March, 1917, was less than 72 per cent, while in March, 1918, it was over 77 per cent. In March, 1917, their operating income was almost \$57,600,000, while in March, 1918, it was only \$50,630,000.

These statistics do not tell the whole story even for the roads on whose reports they are based. A general advance in railway wages is soon to be made and it will be retroactive to January 1. This will add about \$25,000,000 a month to operating expenses or approximately \$75,000,000 to the expenses of these three months. This will wipe out all of

the operating income earned in the first quarter of the year.

When railway security owners and railway managers contemplate these statistics they may well breathe a sigh of relief because at the commencement of the present year the government relieved them of the responsibility of providing for the financial requirements of the companies. It might be interesting, but it would be futile, to speculate as to whether the increase in operating expenses would have been so great if the railways had been left under private control. If private control had been retained there certainly would have been a very great increase in operating expenses and probably many of the railways, including some of the largest systems, would have been thrown into bankruptcy, and there would have been a financial cataclysm in this country. The increases in expenses were coming very fast in 1917, especially during the latter part of that year, under private control, and no human ability or energy could have prevented them from continuing to come. Whether it was or was not desirable for the government to assume control of the operation of the railways is a question which is still debatable; but that for the protection of the railway companies and the country it was necessary for it to come to the rescue of the companies financially, there can be no doubt.

These great increases of operating expenses which were occurring when government control was adopted, which have come still faster since it was adopted, and which promise to continue at an accelerated rate, throw light on some questions which were much agitated before the adoption of government control. One of the most important of these is that of advances in rates. When the reports of earnings and expenses in February, 1917, began to come in, the managers of the railways, especially those of the eastern lines, became much frightened and appealed for a 15 per cent advance in rates. They submitted during the ensuing weeks much testimony and statistical data to show that the increases in expenses were sure to continue and to become larger because of the rapid advances in wages and labor and in the prices of materials and fuel. The Interstate Commerce Commission, as usual, heard them with doubt and suspicion, decided that they were unduly alarmed, and in June granted only part of the advances asked for. Subsequently the case was reopened, and finally in March, after government control was adopted, the commission granted the eastern lines practically all the advances in rates they had originally sought. By that time, however, the increases in expenses had so completely justified the ominous anticipations of the railway managers that an increase of 15 per cent was entirely insufficient.

With expenses increasing as they are and with an enormous advance in wages to be added to them, it is evident that the Railroad Administration will very soon have to make a large advance in rates or be confronted with an enormous deficit. Theorists regarding railway matters have contended that very large economies could be effected by operating the railways of the United States as a single system. One of these doctrinaires estimated in his testimony before the Newlands committee that a saving of \$400,000,000 a year could be made in this way. It is possible that by unified operation savings amounting to as much as one-fifth or one-fourth of this amount may be made, but when all of them that can be made have been made they will be small compared with the increases in expenses produced by advances in wages and prices, and by other causes.

It is assumed that the total compensation guaranteed by the government to the railway companies will be about \$950,000,000 a year. If the operating results of the first three months of the year indicate what results may be expected during the rest of the year the operating income of the roads in 1918, in the absence of any advances in rates or of wages, would be insufficient by at least \$500,000,000 to pay the guaranteed compensation. The proposed wage

increase of \$500,000,000 would increase the deficit to \$800,000,000 a year. It is evident that the Railroad Administration is facing a very serious situation.

It would be highly undesirable from every standpoint to allow the railways to have a huge deficit which would have to be paid in taxes. Therefore, steps ought to be, and, indeed, already are being taken toward general advances in both passenger and freight rates much greater than any ever heretofore suggested.

Is It Necessary for the Roads to Use Bessemer Rails?

IN AN EDITORIAL entitled "Shall the Roads Return to Bessemer Rails" published in the *Railway Age* of May 3, we referred to the reports emanating from Washington to the effect that the railways would be required to use Bessemer instead of open hearth rails this year, and urged that this be done only after a legitimate effort had been made to use the Bessemer steel output for those essential military purposes where it could be employed without detriment so that, if possible, the roads would not have to return to a grade of steel which they had discarded in large measure in recent years as inferior, both in wearing qualities and breakage. In its issue of May 9, the *Iron Age* takes exception to these statements in an editorial which implies that (1) the transition from Bessemer to open hearth rails was made at the instance of the roads, (2) that Bessemer rails are not inferior to open hearth for service and (3) that there has been practically no reduction in the Bessemer production capacity of the steel mills of this country, and that it is necessary to roll the Bessemer steel in order to utilize the capacity which might otherwise be idle.

We do not question the advisability of reverting to Bessemer rails if the open hearth steel output of the country is actually needed for war purposes for which Bessemer steel will not serve as well. However, we do think it a mistake to take this backward step until it is shown that a legitimate effort has been made to substitute Bessemer for open hearth, where this can be done without detriment to service or to production capacity. As we stated in the previous editorial existing practices should not be disturbed unless such disturbance will contribute to the success of our military efforts.

The *Iron Age* implies that the transition from Bessemer to open hearth was made at the instance of the roads. It also takes exception to our reference to the depletion of "high grade" (used in the sense commonly understood in this connection, viz., a low-phosphorus content) ores and makes the statement that "much Bessemer ore is available and it is of such character as to produce as good Bessemer steel as formerly." These statements are surprising in view of the fact that it has been common knowledge among all familiar with the negotiations between the manufacturers and the railways during the last ten years that the manufacturers have pointed out to the roads the necessity of going to open hearth steel for at least a large proportion of the rail requirements because of the unquestioned depletion of low-phosphorus ores. As early as 1908, the Committee on Standard Rail and Wheel Sections of the American Railway Association reported that "In the matter of chemistry specifications for Bessemer steel rail statistics were obtained from the officers of the Ore Producers' Association which convinced the committee that it would be impossible for the mills to furnish more than a small percentage of the total rail requirements of the railroads with a phosphorus specification less than 0.10 (per cent). . . . Members desiring to obtain low phosphorus rails will have the further option of using open hearth steel. The committee conferred with a number of disinterested experts . . . on the phosphorus question. These gentlemen all agreed that . . . it would be unreasonable to require less than 0.10 (per cent) phosphorus in a specification for Bessemer rails intended to cover purchases for all American railroads." The importance of the phosphorus content lies in the fact that the Bessemer process does not affect the amount of this element originally contained in the iron, while in the open hearth process the phosphorus can be easily removed to the desired point, enabling iron high in phosphorus to be used.

Further on, the *Iron Age* brands as untrue our statement that "a return to this class of steel (Bessemer) can only be made at the sacrifice of service and of safety in the track," the implication being that the *Iron Age* contends that Bessemer rails do give as good service as open hearth. Such a statement indicates a lack of knowledge regarding the service of steel products which is surprising. It is common knowledge among railway men that open hearth rails give a life considerably greater than Bessemer rails, and this life is commonly estimated as approximately twice that of Bessemer rails. Further, with respect to safety the best information regarding breakage is that contained in the annual analyses of rail failures made by the American Railway Engineering Association. In its latest report for the year ending October 31, 1916, and published in Bulletin No. 199, dated September, 1917, the failures are classified according to their years' service in the track as follows:

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FAILURES OF OPEN-HEARTH AND BESSEMER COMPARED

Year Rolled	Failures per 100 track miles		Comparative failures	
	Open-Hearth	Bessemer	Open-Hearth	Bessemer
1911	161.9	214.1	100	132
1912	74.2	107.7	100	145
1913	43.3	60.1	100	135
1914	18.9	32.3	100	171

This report also states that "It will be noted that the failures of Bessemer rails per 100 track miles were considerably greater than those of the open-hearth rails." It is probably also true that the open-hearth rails were, in general, in more severe service, so that the actual difference under the same conditions may have been greater.

Furthermore, the best evidence that open-hearth rails are superior to Bessemer is the fact that the roads have been willing to pay the premium of \$2 per ton which the mills have charged for these rails and at the same time the ratio of open hearth rails to the total has risen until in 1916 (the latest year for which the figures have been made public) over 80 per cent of all the rails rolled were of this character.

The *Iron Age* also challenges the statement that "the reduction in the Bessemer capacity of the country which has taken place also acts as a controlling factor," and goes at length into an effort to show that there is a large Bessemer capacity in this country which can be utilized to manufacture rails at present. To intimate that mills such as the Ohio works of the Carnegie Steel Company and the Lorain Steel plant are available for the rolling of rails, when they have not been so employed during recent years when the steel manufacturers have been more congested with orders than at any previous time in their history and when manufacturers now have 2,000,000 tons of rails on order, a large part of which are overdue, only serves to belud the issue. It is to be assumed that, owing to the urgent demand for steel for government and other uses, all of the steel mills of the country have been and are working to their maximum capacities, and that those which have Bessemer as well as open hearth furnaces are operating them in a manner to produce the maximum tonnage. This is borne out in the statement of the *Iron Age* itself of April 25 that the leading producer in the Pittsburgh district was operating to 98 per cent of its Bessemer and open hearth steel capacity, although in the more recent editorial an attempt is made to convey the impression that this plant has a Bessemer capacity available

for rails of 1,000,000 tons. In view of its own statements that the plants are working to capacity it is difficult to understand its attitude in its issue of May 9, in which it urges the substitution of Bessemer for open hearth rails as a means of "utilizing our steel making capacity."

One need only turn to the statistics of the American Iron and Steel Institute (the association of the steel manufacturers) to verify our statement that there has been a reduction in the Bessemer capacity of this country in recent years. The proceedings of this institute for 1916 (the latest available) show a capacity of 12,054,658 tons, a reduction of 2,410,067 tons or 17 per cent in the one year. It is difficult to reconcile the implication of the Iron Age that there has been no material reduction in the Bessemer capacity with these figures.

If the steel mills of this country were free to disregard other orders, there is no question but that they could roll a sufficient tonnage of Bessemer rails to meet the demands of the railways which J. Leonard Replogle, director of steel supply of the government, stated a few days ago have been placed at 2,000,000 tons by the Railroad Administration. However, this is not the situation. The mills are overwhelmed with orders, and it has become necessary to separate the essential from the non-essential and to adopt other expedients to increase production. To take a Bessemer converter now employed in duplexing in the open hearth process from this service and allow it to make straight Bessemer rail steel will gain little in ultimate tonnage. Likewise, the rearrangement of plant operation which would be necessary to roll rails at another mill referred to by the Iron Age as having 250,000 tons rail capacity and three times this of Bessemer steel making capacity would be so radical as to result in a reduction of tonnage in other departments probably as great as that gained in Bessemer steel. Therefore to refer to such plants as being available for the manufacture of rails only serves to becloud the issue and in no way assists in increasing the output. The fact that the mills have not followed this suggestion in the time of their greatest congestion and accumulation of orders indicates that the expedient offered by the Iron Age has not been taken seriously by steel makers.

The problem now confronting the steel mills of this country is that of producing the maximum tonnage of rails and other essential materials. This cannot be done while methods are being changed with the resulting disorganization of forces. Bessemer rails have largely ceased to be rolled for heavy sections. To return to them under present conditions would, therefore, appear to be unwise from the standpoint of the mills as well as of the roads unless it is necessary solely as a war measure.

New Books

Regulation of Railways. By Samuel O. Dunn, Editor of the *Railway Age*. 354 pages. 5¼ by 7½ in., bound in cloth. Published by D. Appleton & Co., New York. Price, \$1.75 net.

This book really covers three different phases of the railway situation in the United States. It describes the conditions which existed on the railways during the last year before this country entered the Great War and the first year after it entered the war, and tells of the work done by the Railroads' War Board in the effort of the railways voluntarily to co-ordinate the operation of their facilities, and of the events which led to the adoption of government control. It shows that the railways had become unable because of the reduction of their net earnings, their arrested development and restrictive laws, to solve without some form of government assistance the problems presented to them by this country's entrance into the war.

Having reviewed the developments which more immediately preceded the adoption of government control, the book shows that these developments were very largely, and even mainly, the result of the policy of regulation of railways which had been followed in the United States since 1906. In other words, government control was precipitated at the end of 1917 by the rapidly rising expenses of the railways, the inability of most of them to raise new capital, the inadequacy of their facilities and the fact that laws designed to enforce competition between them hampered them in making the arrangements necessary in order to secure the kind of operating efficiency needed to enable them to meet war conditions. It is pointed out, however, that their declining net earnings, the inadequacy of their facilities and their inability to operate as far as it was desirable as a single system were due to the system of regulation which had been applied to them in spite of every effort which the managers could make to secure reforms in regulation.

It is assumed that, as the railroad control law specifically provides, government control is to be used exclusively as a war emergency measure, and that therefore the question of what shall be done with the railways after peace has returned is entirely unsettled. The experience of the past affords the best guide as to what ought to be done and what ought to be avoided in the future. Therefore about one-half of the book is devoted to an account and a discussion of the policy of railway regulation followed up to the end of 1917. The headings of the chapters in this part of the book indicate the nature of their contents and are as follows: "What Is the Matter with Railway Regulation?" "Functions of Government in Relation to Railways," "Commission Versus Legislative Regulation," "Federal Versus State Regulation," "Regulation of Rates," "Valuation in Relation to Regulation of Rates and Securities," "Regulation of Securities," "Regulation of Railway Operation."

The author outlines the reforms in regulation which he believes should be adopted if the railways are to be returned to private management after the war. He recognizes the fact, however, that there probably will be a great struggle over the question whether they shall be returned to private management, or government ownership and management shall be adopted. Therefore, a large part of the book is devoted to discussion of the general subject of "Government Regulation Versus Government Ownership." The headings of the chapters dealing with this general phase of the matter indicate their contents, and are as follows: "Railway Ownership and National Defense," "Efficiency of Production as Affected by Private or Government Management," "Equity of Distribution as Affected by Government Management or Government Regulation," "Some Political Phases of Government Ownership," "The Failure of Government Ownership in Canada."

In the last two chapters of the book the discussion which has preceded is summarized. The general conclusion reached is against government ownership and in favor of private management subject to an improved system of regulation. The changes which should be made in regulation if the railways are to be managed in the future as heretofore, as numerous separate systems, are outlined. The fact is recognized, however, that it may be considered undesirable by both the government on the one side and the owners and managers of the railways on the other, for the railways to be operated in future as many separate systems, as has been the case in the past. Therefore, a plan is tentatively outlined for the reorganization of the railways into five to ten regional groups, each of which group would be owned by a regional holding company.

The book is strictly up to date in point of both the information and the discussion in it, as it was finished, and all parts of it which had been previously written were carefully revised, after the adoption of government control of railways

A Discussion of the Pneumatic Method of Concreting*

Describing the Equipment Used and Illustrating Practical Applications of the Process

By H. B. Kirkland

President, Concrete Mixing and Placing Company, Chicago

THE PNEUMATIC METHOD of mixing, conveying and placing concrete is a comparatively recent development in engineering methods of construction. This method should not be confused with the cement gun process, which is a plastering process and is entirely different in operation and purpose. Both methods are patented. The pneumatic method is adapted for heavy, difficult concrete work, using ordinary ingredients with aggregates up to 4 or 4½ in. in diameter.

Briefly described, this method consists simply in blowing



The Pneumatic Mixer

batches of concrete through a pipe from a central point of supplies to their place in the concrete forms. The materials for a batch of concrete (½ cu. yd.) are proportioned in a measuring device and dropped into the pneumatic mixer without previous mixture.

Equipment

The plant for pneumatic mixing and placing consists of a mixer, a pipe conveying system and a compressed air plant. The mixer consists of a steel shell having the shape of an inverted cone surmounted by a cast steel cylinder in which a door is operated by a small air piston. The door is opened by releasing the air in the cylinder, allowing it to drop open by its weight. At the bottom of the inverted cone

chamber is a 90-deg. elbow which forms the connection to the discharge pipe. The door and piston is the only moving part of the mixer and the inside contains no mechanical mixing apparatus and is entirely smooth and free from obstructions. An air jet located at the heel of the bottom elbow of the mixer is the prime means of conveying and mixing the concrete. It is supplemented by other air jets located at the top of the mixer. The main air jet is directed into the center of the discharge pipe where it catches the material as it falls from the cone-shaped hopper above. The upper air jets create a pressure from above the batch, forcing it downward into the discharge pipe where it is caught by the main jet. To admit air to the mixer, two valves are used, one located on the air supply line leading to the lower jet and the other on the line leading to the upper jets placed above the level of the batch.

In operating, after the batch containing cement, aggregate and water is placed in the mixer the door is closed and the main jet is opened. This is followed by opening the valve to the upper air jets. Many operators vary this method but the effect of this sequence of control is to start the batch forward at the bottom of the machine, detaching successive portions of the batch at the tip of the cone. The materials in the mixer flow downward in the same manner that sand flows from the upper chamber of an hour glass, but the speed of the flow is accelerated by the air pressure.

The conveying pipe consists of any standard smooth steel pipe with joints made with bolted flanges or any type most easily and rapidly handled in making connections. The most rapid wear on the pipe occurs at the points where there is apt to be a slight irregularity or a shoulder. Threaded pipe is also thinner where the threads are cut and of course wears through there first. For making deflections of the pipe line, cast elbows are used. An ordinary cast iron elbow will last sometimes less than a day, but a case-hardened steel elbow will usually last a few weeks. The best elbow is cast manganese, which will almost outlast the pipe itself. These elbows are made in 45 deg. with a thickness of 5/8 in. on the inner curve and 7/8 in. thickness on the outer curve. This gives a weight of about 220 lb. for an 8-in. elbow. The radius of the elbow is 5 ft. minimum, as a shorter radius is too sharp a turn and causes plugs in the line. Shorter radius elbows may be used, however, at the discharge end of the pipe. A split elbow of 90 deg. has also been used for 6-in. pipe. This elbow is split lengthwise so that the outer half of the curve which usually wears rapidly may be replaced.

A means of deflecting or guiding the discharge of concrete in the forms consists of a series of slightly tapered pipes, fitting together like stovepipe. Two or three sections of this light pipe about three or four feet long are all that are needed in a tunnel form for diverting the discharge from one side wall to the other and for guiding the concrete discharge around points of rock projecting from the roof. Where the tunnel is very wide, however, as in a double track railroad tunnel, a wye branch is used in the line, so there are two lines of pipe entering the tunnel form. A side valve or gate is placed in the wye for diverting the batches through one line or the other.

A suitable type of compressor is used and the one ordi-

* Abstracted from a paper presented before the Western Society of Engineers, Chicago, May 13.

narily employed is a straight line, one- or two-stage machine, compressing to 80 to 125 lb. per sq. in. The motive power may be steam, oil or electricity as is most economical under the conditions prevailing. When possible it is desirable to locate the plant near the mixer, but it is necessary to provide air storage close to the mixer sufficient at least to store enough air to discharge a batch of concrete at the maximum distance required. This storage should be at least 100 ft. capacity with 30 cu. ft. capacity added for each 100 ft. of pipe line. There should be additional storage at the compressor if the mixer is located a considerable distance away (for example, more than 300 ft. away).

The amount of air required to convey concrete depends upon the specific gravity of the materials, the smoothness of the pipe, the number of bends in the pipe line and their radii, the distance conveyed vertically and horizontally and upon the pressure or velocity of the air used. For the standard size mixer this is about 2 cu. ft. of actual free air compressed to 100 lb. per sq. in. per lin. ft. of pipe per batch. In other words, to convey one batch 500 ft. it will take 1,000 cu. ft. of actual free air compressed to 100 lb.

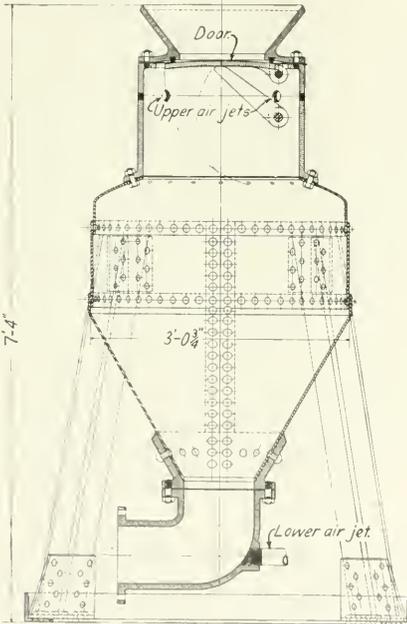
Based upon this figure, the diagram shows the amount of air required to convey concrete at various distances. This curve is based upon practical observations on a number of

capacity of the compressor should be great enough to build up the air pressure in the storage tank in the time required to shoot a batch.

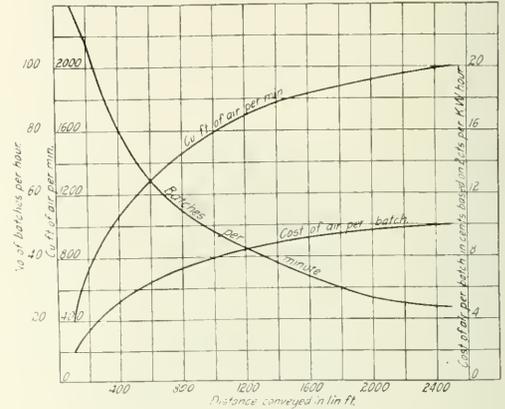
The Mixing Process

One of the first questions asked by the engineer is, "How is the concrete mixed?" This is explained by a study of the conditions which affect the batch from the time it is placed in the mixer until it is delivered in place in the forms.

In loading the mixer the ingredients, cement and water, are usually placed in a measuring hopper, so that when the hopper is emptied into the mixer the first commingling of



Vertical Section of the Mixer with the Door Closed



Air Consumption and Cost of Air

the ingredients takes place. This first commingling is not particularly important, as it is very slight. When the air is turned on that portion of the batch which is at the bottom of the mixer, in front of the conveying air jet, is first to move and is instantaneously followed by portions dropping from above. As the mixer has the shape of an hour glass, the central portion of the batch in the mixer flows down first, and the portion in the sides follows in the stream from the upper part, exactly as sand flows in an hour glass. During this operation the mingling of the different ingredient parts causes the smaller ingredients to flow into the voids between the larger ingredients. As the portions of the batch drop into the lower air stream, which has a velocity of about 5,000 ft. per sec., these portions are carried along in suspension much as dust is carried along in a storm, except that the particles are much closer together. Although the speed of the air jet is very high, the speed of the concrete materials is much lower. The speed of the concrete varies according to the amount of voids in the materials which permit the air to pass through. The air in passing through tends to carry with it the smaller ingredients; that is, the sand tends to fill the voids between the rocks and the cement tends to fill the voids remaining, and, as the voids become filled up with the smaller ingredients passing through, the speed of the mass increases, the pressure of the air behind the mass increases with the decrease of the voids in the mass, and the speed of the mass concrete increases.

Now, in this explanation of the mixing process, I have assumed that the air velocity passing through the pipe is sufficient to keep the materials in suspension, and it is important to have a sufficient air pressure to keep the materials in suspension, because when the air velocity is reduced the

jobs, and certain assumptions have also been made in order to complete the figures. It is assumed in this curve that certain conditions of the concrete operations are as follows: 20 sec. are allowed for opening the door and charging the mixer after each batch has been discharged and the air valves closed; 5 sec. are taken as the length of time to convey a batch each 100-ft. and as the distance becomes greater the number of batches per hour decreases until at 2,500 ft. the number is 24, and the amount of air at this distance is 2,000 cu. ft. per min. It should be borne in mind that if it is desired to get the maximum output possible the ca-

materials simply roll and tumble along the bottom of the pipe. The concrete will also mix in this manner, but it is not conducive to good operation and makes a dirty pipe line, which is liable to become plugged. In shooting concrete, therefore, it will be found that with an 8 in. pipe and with materials of the specific gravity of limestone, the pressure should not fall below 50 lb. per sq. in., as the materials will then commence to drag along the pipe. Any air expended below 25 lb. is wasted when blowing concrete through an 8-in. pipe.

Three general types of pneumatic installations have been

developed through the requirements of different classes of work. These are central plant or scheme of locating the mixer at a central point from which the conveyor pipe is laid to the forms, portable plant or outfit upon which the mixer is carried and is either loaded from bins carried on the same conveyance or supplied by a belt or other loading device, and the scheme of loading the mixer at various points as at the bottom of manholes in shallow tunnels and supplying it with materials through a chute from the various corresponding points along the surface. The last is a form of central plant made semi-portable.

Doings of the United States Railroad Administration

Rate Increases Expected Shortly; Proposed Amalgamation of Railroad Associations; Information for Shippers

WASHINGTON, D. C.

ALL SIGNS POINT to early action by the Railroad Administration to bring about a general increase in both freight and passenger rates and while those who are in touch with the work that is being done in that direction are not talking about it, there is no attempt to deny the statements which are being published that the amount of the proposed advance will be such as to make railroad officers who have on several occasions spent a year or more at a time in efforts to secure increases of 10 or 15 per cent, marvel at their timidity. An examination of the available figures of railroad earnings and expenses for the first three months of this year, although the complete figures have not yet been given out, when taken in connection with the proposed \$300,000,000 wage increase, is enough to show that the kind of relief the railroads used to ask when they were facing a similar situation would amount to merely a drop in the bucket under the present conditions.

Based on these figures, rough estimates are being made that a deficit of from \$800,000,000 to \$1,000,000,000 would be shown for the year, and while it may be expected that operating conditions will be more favorable than they were in January, February and March, there are many other factors, such as the prospective increase in the price of coal, which will tend to keep expenses on an upward trend. Figuring in this way it is easy to reach a conclusion that an increase of at least 25 per cent in freight rates and an increase in passenger fares from an average of about 2 cents to 3 cents a mile would hardly more than meet the situation even if the increases could be made available throughout the year. On the contrary the operating deficit, when the wage increases are put into effect as of January 1, will have prevailed for about six months before any relief can be expected from rate increases if they can be made available by July 1. Based on last year's earnings a 25 per cent increase in freight rates would amount to about \$700,000,000, while a similar increase in passenger fares, on the assumption that a basic rate of 3 cents a mile would increase the average rate by no more than that proportion, would add about \$200,000,000 more, making a total of \$900,000,000.

It is understood that a report recommending the increase in passenger fares is now about ready for the director general's consideration and that the matter of freight rate increases is being worked out by the various committees that have handled similar subjects for the railroads in all parts of the country. It is stated also that Mr. McAdoo has given some consideration to the matter, although he has been confined to his home by illness ever since his return from the Liberty Loan tour. He has not yet acted upon the report of the Railroad Wage Commission, and no definite announce-

ment as to rates is expected until he has, but as soon as the wage increase is an accomplished fact the rate matter will probably take definite shape.

Under the terms of the railroad control bill the President, who has delegated his authority to the director general, may initiate increased rates and have them put into effect at once by filing with the Interstate Commerce Commission a certificate that the increases are necessary to defray expenses, after which the Interstate Commerce Commission may enter upon an investigation as to the reasonableness of the rates. Nothing is said in the law about any investigation by state authorities nor has any one suggested audibly that the state commissions be consulted in the matter. In fact there is a general belief that a part of the increase is to be accomplished by leveling up state rates to the interstate basis.

In order that agencies or lines publishing tariffs may be prepared to make quickly any changes in rates that may be decided upon, all publishing agents, bureaus and individual railroads under government control, that publish tariffs have been requested to prepare an analysis of freight tariffs which contain rates or charges applicable on intrastate traffic only, including tariffs filed with the Interstate Commerce Commission, which contain such rates and tariffs filed with state commissions but not filed with the Interstate Commerce Commission. The circular letter says: "The purpose of this analysis is to have ready at the earliest possible moment a detailed statement of the tariffs or tariff items which may have to be amended, cancelled, or filed with the Interstate Commerce Commission as amended, to eliminate conflicts, bring all rates to a new basis and have one rate and only one published for each service, and that rate applicable on all business, both state and interstate, and filed with the Interstate Commerce Commission."

Furnishing Information to Shippers

Edward Chambers, director of traffic for the Railroad Administration, has addressed a letter to the regional directors giving instructions, to be carried out under their direction, for rendering the service to the shippers formerly performed by the off-line traffic offices in the way of furnishing information. The letter, which refers to his previous letter of April 5 in connection with the director general's order on the subject, follows:

"There seems to be some alarm on the part of the shipping public that they are not going to receive from the existing traffic organizations as complete and satisfactory service as heretofore given in the larger cities together by the home railroad offices and foreign line offices, the changed conditions now placing the responsibility for the entire serv-

ice upon the home line office. It was suggested in my letter above that the latter equip itself so as to be in position to render service completely.

"In the principal commercial centers railroads have joint tariff bureaus fully equipped with expert tariff men. The tariff files in these bureaus can be readily adjusted to contain all the rate information which the business interests in the particular city or territory may need. They are the very best source for proper and correct tariff information. For example, either Central Freight Association or Western Trunk Line office in Chicago could readily and with very little additional expense carry a complete set of the principal tariffs of all railroads placing itself in position to answer all inquiries promptly. This in addition to the tariff files in the general offices of individual lines would, I am sure, fully satisfy the need of the shipping public. The principal tariff bureaus are located at New York, Chicago, St. Louis, Atlanta and San Francisco with sub-bureaus in most of the larger shipping sections. The sub-bureau could also be equipped with such tariffs as necessary in the section of the country it covered.

"As to passing reports on high class non-perishable traffic, this is a service the responsibility for which is largely upon the individual line and is a necessary service to the shipper but not to the extent, however, that it has been given in the past under competitive conditions. Traffic officers of railroads should be instructed to confer with interested shippers for the purpose of determining the information of passings needed by the shippers. It should be a mail service. I do not anticipate any difficulty in shippers and carriers agreeing upon a plan satisfactory to both interests. The point at which the passing report should be made in the different sections of the country are well established by the practice of the past.

"As to passing reports on livestock and perishable traffic, this is largely a telegraphic service. The points at which these reports should be made have been established by long practice. The shippers' marketing plans are based upon them as well as the railroads' diversion arrangements. As to this service it is not necessary to continue the amount of telegraphing which has been done in the past and shippers do not now expect it. The responsibility for this work is also largely upon the individual carrier. I am sure from my discussion of the subject with representatives of shippers' organizations that no difficulty will arise to prevent a plan being adopted satisfactory to shippers and carriers alike with minimum amount of telegraphic service. Some consideration, I understand, has already been given this subject by carriers and shippers and it may be that arrangements have already been completed. I suggest in this connection that it is very desirable the routing through to destination so far as possible be shown on the waybills at the shipping point so as to have minimum of rerouting in transit of perishable traffic. This may be accomplished by traffic officials at point of origin keeping in close touch with the transportation conditions on railroads, particularly east of Chicago and Mississippi River, and advising shippers.

"As to tracing delayed freight, passing reports would save a vast amount of telegraphic inquiry for goods delayed in transit, but where evidence of unreasonable delay is presented to representative of any carrier in the through route of the freight, such representative should take whatever action might be necessary either using wire or mail to secure prompt information. For service of this character between agents of carriers no charge should be made to the shipper, but where inquiry is made by a shipper which requires answer by commercial telegram such answer should be sent at the expense of the applicant. There may be some objection by the shippers to this rule but unless there is a check of this kind, many duplications and unnecessary telegraphing will take place. Railroads should give special

attention to this character of service. This rule should be uniform on all railroads.

"Many inquiries have been received as to where shippers, particularly in New York, would go to secure through bills of lading on export traffic via the Pacific ports after foreign line offices in New York City are closed, it having been the practice for many years for the representative in New York City of the Pacific Coast terminal line delivering the traffic to the water carrier at the port to take up the railroad shipping receipt and issue in its place a through export bill of lading. These bills of lading are generally negotiated through New York banks. Through rail and water bills of lading on export traffic today are practically confined to New York and to the routes via Pacific ports. I suggest Pacific Coast terminal railroads authorize Mr. C. C. McCain, secretary of the Eastern Freight Committee, to act as their agent in issuing these through export bills of lading. Mr. McCain's committee has taken the place of the Eastern Trunk Line Association. He is, therefore, equipped with a large office space and an organization which can properly supervise issuance of bills of lading. With comparatively little additional expense he can add to his present force, if necessary, a sufficient number of clerks experienced in this work who are now employed in the New York offices of the Pacific Coast terminal lines and who will shortly be released.

"I would like for you to get these matters shaped up as soon as possible because shippers are concerned regarding this service. It may, however, occur to either of you that a somewhat different plan would better serve the shipping interests in your section, in which event it will be satisfactory to me to have you work it out in your own way, but the tracing rules should be uniform."

Proposed Amalgamation of Railway Associations

The director general of railroads has started a movement for the amalgamation of the leading railway technical associations of the country. At his suggestion a meeting was held in New York on May 2 which was attended by the acting president of the American Railway Association and the presidents of the American Railway Engineering Association, the American Railway Master Mechanics' Association, the Master Car Builders' Association, the Association of American Railway Accounting Officers and representatives of some other organizations. The general plan was discussed at this meeting and the heads of the various associations were asked to prepare and submit to the executive committee of the American Railway Association their suggestions as to how the scheme could best be carried out. Their suggestions will be considered in about ten days or two weeks at a meeting of the executive committee of the American Railway Association. It is expected that after that a series of meetings of representatives of the various associations will be held and that finally a report with recommendations regarding the whole subject will be made to Director General McAdoo.

One plan which probably will be considered will be that of uniting all associations in a single organization. Another will be the establishment of relations between them, which will make the other associations subsidiaries of the American Railway Association. Under this plan recommended practice adopted by the subsidiary associations would be referred to the American Railway Association and if approved by it would be submitted to the director general. If the recommended practices received his approval they would, it is assumed, be put into effect and made obligatory upon all of the railroads.

In the past the various associations have adopted recommended practice, but as they have been unable to enforce their recommendations, in most cases they have been adopted

only by part, although in many cases a large part, of the railways

Inland Traffic Service War Department

A reorganization of the Division of Inland Transportation of the War Department, effective on May 1, is announced in a circular just issued by H. M. Adams, manager of the division. The circular says in part:

Effective May 1, 1918, the Transportation Field Force of the Division of Inland Transportation will be known as the Field Force of the Inland Traffic Service, War Department, and branch and district offices, in charge of the persons indicated, will be located as follows:

New York Branch—Room 526, 45 Broadway, New York, N. Y.; B. M. Flippin in charge.

Albany District—1 Post Office building, Albany, N. Y.; Captain L. S. Lansing in charge.

Atlanta District—Forsythe building, Atlanta, Ga.; Captain F. E. DuBois in charge.

Baltimore District—Light and German streets, Baltimore, Md.; Captain S. A. Fulman in charge.

Boston District—25 Huntington avenue, Boston, Mass.; Captain E. H. Pillsbury in charge.

Buffalo District—530 Federal building, Buffalo, N. Y.; Captain L. M. Turnbull in charge.

Charlotte District—202 Mint building, Charlotte, N. C.; Lieutenant J. B. Beddingfield in charge.

Chicago District—Southern Pacific building, 35 Jackson boulevard, Chicago, Ill.; R. B. Robertson in charge.

Cincinnati District—213 Post Office building, Cincinnati, Ohio; Captain C. V. Link in charge.

Indianapolis District—314 Post Office building, Indianapolis, Ind.; Captain F. A. Leith in charge.

Jacksonville District—707 Heard building, Jacksonville, Fla.; Willis Callaway in charge.

New York District—Room 526, 45 Broadway, New York, N. Y.; Lieutenant Miles Ross in charge.

Philadelphia District—742 Weidner building, Philadelphia, Pa.; Captain S. A. Tubman in charge.

Pittsburgh District—Tenth floor, Chamber of Commerce building, Pittsburgh, Pa.; Lieutenant R. O. Roberts in charge.

Richmond District—425 Post Office building, Richmond, Va.; Lieutenant D. Mayer in charge.

San Francisco District—San Francisco, Cal.; Captain H. A. Manning in charge.

St. Louis District—826 Pierce building, St. Louis, Mo.; J. L. Hohl in charge.

Toledo District—415 Ohio building, Toledo, Ohio; Captain J. D. Anderson in charge.

The duties of those in charge are as follows:

Will represent the Inland Traffic Service in all matters within its jurisdiction.

Will promptly and effectively respond to all requirements of shipping officers of the War Department in matters pertaining to the securing of cars required and the movement of same, when loaded, subject to the methods of procedure established by the Inland Traffic Service from time to time.

Will exercise supervision at all depots, posts, camps, aviation fields, warehouses and other War Department institutions over matters within the jurisdiction of the Inland Traffic Service, including those pertaining to maximum loading of cars, prompt unloading of cars, demurrage charges, expediting the movement of property, tracing, freight rates, prompt accomplishment of bills of lading, etc.

Will periodically visit all points to and from which government property is shipped, review the methods and conditions prevailing, suggest such changes in methods as are necessary to establish a uniform system, and shall check and review the manner of accomplishment of bills of lading, requiring, when necessary, a check with the carriers or by

other method, to determine whether or not unaccomplished bills of lading are held covering property which has been received.

Will, as the opportunity may offer, confer with railroad officials for the purpose of determining whether or not War Department property is being delayed en route, and for such other review of the situation as may be necessary from time to time.

The practice heretofore followed of tracing cars in person will be discontinued. The Railroad Administration will establish at Washington, D. C., on May 15, 1918, a Car Record Bureau wherein the shipment, interchange, junction passing and arrival at destination of government shipments in carloads will be recorded, and this record will be resorted to in tracing delayed shipments. Those in charge of Inland Traffic Service Branch and district offices will rely upon the Tracing Section of this office for data available from this record, and discontinue, so far as may be practicable, personal tracing of property shipments.

Will keep in touch with the situation at important centers and junction points, and will promptly report all congestion of railroad facilities involving government property and causes therefor.

Will review records of such express shipments of government property as may be made within their respective districts, and where such shipments appear to have been unnecessary, report the facts to this office for further action.

Will make such visits as may be necessary to the several ports within their jurisdiction, noting conditions, and render such assistance as may be necessary to avoid congestion, and make such recommendations as may be pertinent to overcome any apparent difficulty.

Will exercise and perform such other functions and duties as may be prescribed by the Chief, Inland Traffic Service War Department, or by his authority from time to time.

The services of the branch and district offices are available to all bureaus of the War Department alike, and their activities will be exercised in connection with the property of all such bureaus without preference or prejudice.

New England Protest Against Abolition of Differentials

A large delegation of New England shippers called on the traffic department of the Railroad Administration last week to protest against the proposed elimination of the differential rates from New England to western points via the Canadian lines. All differential rail-and-lake rates have been abolished and the Canadian lines have been asked to concur in taking out their differentials from New England. The protest was based on the ground that some of the shippers are located directly on the differential routes and would be put to a disadvantage if their rates were advanced with out relation to the rates of competitors in other localities.

Reduction in Western Passenger Service

Some additional details regarding the plan for a readjustment of passenger service on the western roads, which was described in last week's issue, are contained in an announcement issued this week from the office of the director general. The announcement states that the director general has approved the recommendation of Regional Director Ashton for a reduction in the train service west of Chicago amounting to 11,728,000 miles per annum, effective on June 7 and continues:

"This economy has been accomplished by abandoning duplicate service between Chicago and the Pacific Coast cities and assigning to the short and direct routes to each city the fastest through service. Under this plan the Atchison, Topeka & Santa Fe will be the preferred route to Los Angeles, Chicago & North Western (Union Pacific-Southern Pacific to San Francisco) Burlington-Northern Pacific to Portland and the Chicago, Milwaukee & St. Paul to South-

The fast trains will make the run in 72 hours to each city. There will be a secondary train carrying all classes of equipment scheduled in 78 hours. The other trans-continental roads will operate such service as may be necessary to accommodate their intermediate travel on reasonable schedules.

"On the same date the mail schedules will be adjusted so that there will be a parity of mail service between Chicago and each of the rival commercial centers on the Pacific coast. The fast mail trains will cover the distance between Chicago and Pacific coast terminals in 65 hours.

"The public will be adequately served under the new arrangement, although it is probable that more upper berths will be sold in the future than in the past.

"The passenger committee for the Western district has now started working on the rearrangement of the schedules to the Southwest, where important economies can also be effected without affecting public convenience."

Steel Supply Limits Car and Locomotive Increase

Some interesting facts regarding the relation of steel supply to the car and locomotive situation are contained in a letter addressed by C. R. Gray, director of transportation of the Railroad Administration, to Senator E. D. Smith, chairman of the Senate Committee on Interstate Commerce, who has been making a preliminary inquiry for the committee as to what action has been taken by the Railroad Administration to supply the deficiency in motive power and cars for the transportation of coal.

The fundamental need is for motive power, Mr. Gray said, and it is the intention to utilize the maximum capacity of the locomotive plants, both commercial and railroad, to the limit, but the steel supply is the controlling factor and the orders just placed for cars and locomotives would have been greater, particularly in the case of engines, if the steel had been available. The orders will consume all the steel which the War Industries Board could place at the disposal of the railroads.

Mr. Gray estimated that the railroads under peak load are short approximately 4,000 locomotives and from 200,000 to 250,000 freight cars. On April 1 the builders had on hand unfilled orders for 2,127 locomotives, while the 1,025 just ordered make a total of 3,152, and the director general stands ready to place orders for the balance as rapidly as they can be produced.

The unfilled car orders on April 1 amounted to 27,525 and orders have been placed for 100,000, including 50,000 box cars, 45,000 coal cars and 5,000 cars for steel products. The average production of freight cars for American railroads in the seven years ended December 31, 1917, was 98,215 annually.

On January 1, 1918, Mr. Gray showed, there were on order 2,448 locomotives. In three months the builders had delivered only 321, due to shortage of material and the construction of locomotives for Russia and for our military railroads in France. In addition, however, the railroads have received 147 Russian locomotives and 105 U. S. A. locomotives which were allotted to them temporarily. The builders estimate that the order for 1,025 locomotives placed this month, together with the locomotives on order for the railroads and for the War Department, will consume their capacity for the balance of the year. On January 1 there were also on order 42,696 freight cars, of which 15,171 had been received up to March 31.

Mr. Gray showed also that up to the third week of April the railroads had handled 3,522,919 cars of coal, an increase of 49,638 over the corresponding period of 1917.

Mr. Gray's figures indicate that the lack of sufficient steel is likely to prevent any considerable net addition to the car equipment of the railroads this year, because the addition of 98,000 new cars per year during the past seven years was sufficient only to increase the total of freight cars in serv-

ice from 2,195,511, in 1911, according to the Interstate Commerce Commission statistics, to 2,342,699 on December 31, 1916. This represents an increase of 148,000 over the number of cars retired during the period. Since 1915 there has been a decrease. On June 30 of that year there were 2,356,338 freight cars. On June 30, 1916, 2,326,987 were reported and on December 31, 1916, there were 2,342,699. The 1917 figures showing the number of cars in service are not yet available.

The number of locomotives had increased from 61,327 in 1911 to 64,073 in December 31, 1916. In this case also there was a decrease from 1915 when there were 65,099.

Additions and Betterments

The director general on May 8 issued Circular No. 25, directing the roads to make a report as to additions and betterments, as follows:

"Each carrier shall at once make a report in duplicate, sending one original to the Director of the Division of Capital Expenditures and the other original to the Regional Director, giving full advice as to whether the carrier is proceeding with all practicable expedition to construct and put into operation all additions and betterments on its lines which may have been approved by the Director of the Division of Capital Expenditures, and all equipment which may have been so approved, and which the carrier may be constructing in its own shops.

"If a carrier shall not have commenced any project so approved, or, having commenced it, shall not be prosecuting it vigorously to completion, the carrier shall specify in the above-mentioned report each such project and state fully the reasons why it has not been commenced or why, if commenced, it is not being vigorously prosecuted to completion.

"If a carrier shall not have, on hand or arranged for, the necessary funds to construct and put into operation without delay all the additions and betterments which have been so approved, and if it anticipates that this condition is likely to delay any of such work, the carrier shall in addition make a report at once to the Director of the Division of Finance, stating its financial needs in order to enable it to complete all such work expeditiously."

Car Record Office for Government Freight

The Car Service Section announces, in Circular No. CS—8, the establishment on May 15 of a car record office, by the Car Service Section, at Washington, D. C., for the purpose of recording the movement of carload shipments of United States government freight as follows:

- (a) Supplies and materials consigned to an officer, depot, warehouse, or port of embarkation, for account of the War Department (Army).
- (b) Supplies and materials consigned to the Navy Department, to Navy Yards, Naval Stations, or the Marine Corps.
- (c) Supplies and materials consigned to or for account of the United States Shipping Board, Emergency Fleet Corporation.
- (d) Supplies and materials consigned to: the United States Treasury Department, the United States Post Office Department, the Bureau of Engraving and Printing, the Department of the Interior, the Public Printer.

Before executing bills of lading for United States government freight, agents must ascertain from shipper the department to which the shipment is consigned, and must plainly indorse the bill of lading accordingly. The waybill must be stamped on both face and back "UNITED STATES GOVERNMENT FREIGHT," in order that such freight may be readily identified.

Agents executing bills of lading for United States gov-

ernment freight designated in paragraph 1 must mail one legible copy of each such bill of lading to Car Record Office, Car Service Section, Washington, D. C., on the date the shipment is received for.

Agents at the junction points named in a list of 56 points must mail daily to Car Record Office a report, Form CS—2, covering all carloads of United States government freight, delivered to connecting lines. This report must be made for each 24 hours ending at midnight, and must be completed and deposited in the mail prior to noon of the following day.

It may develop that it will be advisable to have interchange reports mailed direct from other points, in which case supplementary instructions will be issued.

Agents at all junction points of the railroads receiving these instructions must show in the remarks column of their standard interchange report, opposite each car of government freight, "U. S. Govt."

The officer in charge of car records of each railroad receiving these instructions will report daily to Car Record Office all cars of United States government freight delivered to connecting lines at other than the junction points named. Reports rendered each day must include all cars of United States government freight shown on interchange reports received in the office during the previous day. More than one date may be included on one report, but the date of interchange must be shown for each car.

When a carload of United States government freight is transferred, a report of the transfer showing old and new car initials and numbers, must be rendered to Car Record Office by the agent of the delivering line at the first junction point after the transfer has been made.

Destination agents—that is, agents who take the waybills into their accounts—must report daily to Car Record Office arrival of all cars of United States government freight. These reports must be compiled and placed in the mail before noon of each day.

Director General Saves N. Y. C. 1 Per Cent

Director General McAdoo issued the following statement with regard to application of the New York Central for authority to issue \$6,000,000 collateral trust notes for six or twelve months for the purpose of paying off certain obligations of the New York Central System maturing this week.

The director general was informed by the company that the best terms on which the money could be obtained at this time would be 7 per cent per annum. The New York Central was advised that a 7 per cent rate on notes of this character was not justified, as such a transaction would have the effect of encouraging high rates for money. The director general thereupon made inquiry of the Central Trust Company of New York as to whether it could arrange to place the \$6,000,000 needed by the New York Central for six months at 6 per cent per annum interest, and was promptly informed that the Central Trust Company would gladly provide the funds on the terms suggested.

Interline Waybill Order

C. A. Prouty, director of public service and accounting, has issued the following circular regarding the interpretation of the interline waybill order:

"Paragraph 3 of General Order 11 provides: 'Waybills for carload freight must move with the cars. Waybills for less carload freight must be moved with the cars when practicable; otherwise so as to reach the transfer point or destination with or in advance of the cars.'

"In order to expedite the moving of meats and packing-house products from Chicago and other points from which these commodities are shipped, the following telegram was

addressed to Regional Director Aishton: 'Am advised Car Service Committee at Missouri River and other packing house shipping points decline to move cars without copy bill of lading. Please advise all concerned that they may disregard first sentence paragraph three, General Order 11, on eastbound packers' traffic from Chicago, applying merchandise car practice there outlined to packers' cars, pending further consideration here. See no reason why card waybills cannot be used, mailing waybills to destination or division points as heretofore.'

"The rule announced in this telegram cannot be said to be in conflict with the principles contained in paragraph three of General Order No. 11. It provides that the cars containing meats and packing-house products of a perishable nature may be forwarded in advance of the waybills therefor, and such waybills will be sent forward as quickly as possible so as to catch the cars before their arrival at destination or will reach destination in advance of the cars. Commodities shipped by packing interests other than those named herein and which are not of a perishable nature, shall be waybilled as provided in General Order No. 11."

Regional Director Confers With Western Short Lines

OVER 200 REPRESENTATIVES of western short lines convened at the Hotel Muehlebach, Kansas City, on May 8, for the purpose of discussing the relations between the Railroad Administration and short line roads. The meeting was opened with the election of D. M. Swobe, president of the Western Association of short line Railroads, as chairman of the conference, and C. M. Oddie, secretary of that organization, as secretary of the meeting. R. H. Aishton, regional director of western railroads, was present, with a number of the members of his staff, and explained in detail why some short lines will be relinquished from government control while others will be retained. He stated that those lines which will be retained will be operated by the trunk lines with which they connect and intimated that if this is done the officers of the short lines in question will be removed and the short line shops closed. The owners of lines which are taken over by the government will be reimbursed, provided they enter into a particular form of agreement which will be prescribed by the Railroad Administration.

Mr. Aishton's remarks relative to the disposition of short lines which will be retained led to a general discussion of the treatment which should be accorded to those lines which will pass out of government control. In general, the following policy was recommended by the meeting:

1. Short lines not retained under government control should be affiliated as a class with the government and conducted under a uniform policy, which will insure them a proper division of all through rates and, in the event of any advance in rates on the trunk lines, a proportionate share of the increased revenue.
2. The non-controlled lines should receive their fair share of equipment in car distribution and should not be forced to pay excessive car rentals.
3. The prices for supplies and equipment paid by the controlled roads through their regional purchasing agents should also apply to the non-controlled roads.
4. Non-controlled companies should receive fair treatment with respect to routing over their lines.
5. Agreements should be made by all short lines to accept all priority orders of various freight and passenger traffic which are promulgated by the Railroad Administration.

Those members of Mr. Aishton's staff who attended the conference were M. J. Gormley, operating a assistant to the regional director; Ralph Budd, assistant in charge of capital expenditures; and J. G. Woodworth, traffic assistant.

Developments in Western Railroad Region

AMONG RECENT CIRCULARS issued by R. H. Aishton, regional director of western railroads at Chicago, are the following:

Routing of Freight by Shippers

Circular No. 101, dated May 7, gives detailed instructions on the routing of freight: Paragraph 4 of the director general's Order No. 1 provides that the designation of routes by shippers is to be disregarded when speed and efficiency of transportation service may be thus promoted. To prevent misunderstandings and to observe uniformity in applying this rule, the following rules should be observed:

- 1.—A rate, charge or privilege covered by tariff properly published and filed cannot be embargoed or canceled except by correction of the tariff in the manner required by law.
- 2.—A route covered by tariff properly published and filed may for sufficient reasons be temporarily embargoed, but cannot be discontinued except by correction of the tariff in the manner required by law.
- 3.—Where a shipper specifies a route to which under the tariffs transit privileges and terminal rights apply, when such route is not under embargo, the transit privileges and terminal rights must be protected without additional cost to the shipper should his routing be disregarded by the railroads for efficiency reasons.
- 4.—When traffic is forwarded by the railroads for efficiency reasons via a route to which a higher rate applies than over the route specified by shipper, the rate via the shipper's route must not be exceeded as a charge for the movement over the substituted route.

It is the intent of Paragraph 4 of Order No. 1 that while the railroads may in the interest of efficiency make use of the most desirable routes without regard to the directions of the shippers, the rates, charges and privileges as published and filed in tariffs of the carriers will not be denied, and the Interstate Commerce Commission has issued an order authorizing the adjustment of charges in accordance with this principle. It is desired that all reasonable and economical routes shall be properly published so that they may be available when needed, and if in an emergency a route not provided by tariff is used such route should be covered by tariff immediately, unless it is of such a character as not to warrant its permanency. Nothing in these instructions shall be considered as giving to shippers the right to rates, charges or privileges applying to routes which may be embargoed at the time of shipment.

Authority for Expenditures

Circular No. 105, dated May 11, reads as follows: A number of the railroads are submitting D. C. E. forms 3 and 4 with the word "blank" or "nothing to report" typed thereon. Please do not submit D. C. E. forms 3 and 4—requests for authorities—unless there is something to report or authority is requested in connection with some work chargeable to capital account.

Reservations—Sleeping, Parlor Car, Etc.

Circular No. 102, dated May 8, sets forth the following rules governing sleeping car reservations, etc.:

- 1.—Railroad agents or representatives will not pay for telegraph or telephone messages covering sleeping, parlor car or steamer reservations. Passengers desiring such reservations made for them by railroad representatives will be required to pay the established charges for the necessary telegraph or telephone service in both directions.
- 2.—Assignments of space to offices located off the line of sleeping and parlor car runs must not be made.
- 3.—Agents at intermediate points on sleeping or parlor car runs, at which space is not available, or to which space is not assigned for the sale of tickets, may make use of railroad wires, without charge to passengers, in arranging for accommodations to be taken at such points.

Shipments of Government Lumber

Circular No. 95, dated April 30, sets forth the details of a plan for the consolidation of shipments of government lum-

ber from Pacific coast territory, effective May 6. According to the plan as outlined, shipments will be consolidated, kept intact, and given continuous movement from concentrating points in solid trains. Fifteen cars will be considered a minimum number for any one train, to be filled out with other tonnage to rating, provided there is not sufficient tonnage for a full train of government lumber. Concentrating points for this lumber are as follows: Great Northern, Delta, Wash.; Northern Pacific, Auburn, Wash.; Chicago, Milwaukee & St. Paul, Cle Elum, Wash.; Oregon-Washington Railroad & Navigation Company, Portland, Ore.

Joint Live Stock Offices

Terminal committees reporting to the regional director of western railroads are working out plans for the consolidation of live stock agencies at Kansas City, Mo.; Omaha, Neb.; St. Louis, Mo., and Chicago. The handling of live stock shipping activities from one large office in these cities will effect a considerable saving in office rentals and, it is believed, will prove advantageous to shippers, in that it will give them a choice of routes which will make for more expeditious car movement. It is probable that the plan will be extended to other cities if local conditions make it appear advisable.

Responsibilities of Railroad Men*

By Robert Quayle

General Superintendent of Motive Power, Chicago & North Western.

"THERE IS A GREAT RESPONSIBILITY attached to railroad men today. I sometime think that we should stop occasionally and consider what our responsibilities are. What can we do that will make for greater efficiency, that will make for success? What will allow us to reduce the man power in our shops, to do work with less men? The man who does this now, will be the man who will stand in the forefront, because he is doing something worth while. When you have a job that you must do you respond to the call and do it. We have a big task now; let us be on the job all the time, so that we can make good at it. We are at war, let me emphasize it, we are at war, and we are just beginning to realize it. We are expecting a great deal of the railroads, but we are not going to expect too much, because railroad men are thoroughly loyal, thoroughly efficient, and will measure up to what is demanded of them. One thing you must do now and that is your level best. This is no time for pessimism, this is a time for optimism. We must cheer everyone with whom we come in contact.

"We must be loyal and give men here and there, even though we are having a hard time. Let us do our part to back up our men, that the stars and stripes may shine with more glory than ever before. Let us do our work with clean hands. Democracy must prevail—democracy will prevail! Let us as a nation do something to lift the world out of the depths it is in, that the world may rise up and call us blessed. But let us not forget those who are close to us. The men in your shops need more than knocking. It has been said that you can't saw wood with a hammer. It is just as certain that you can't lift men with a hammer. We are going to do our part if we help those about us; we are going to do our part by doing our work cheaper and better than ever before. And when the country asks more of us we are going to take another notch in our belt, and march forward, and do the best we can."

*From an address before the Western Railway Club.



Looking North toward Pier 8. Photo copyrighted in Canada by W. G. MacLaughlin

Salvaging the Railway Facilities at Halifax, N. S.

An Account of the Damage Done by the Disaster of
December, 1917, and Work of Restoration

By F. B. Tapley

Assistant Engineer Maintenance of Way, Canadian Government Railways, Moncton, N. B.

THE COLLISION OF THE STEAMERS "Imo" and "Mont Blanc" in the narrows of Halifax harbor, on December 6 last, caused an explosion of the cargo of the "Mont Blanc," which wrecked about one-third of the area of the city and water front, and damaged the railway facilities in the vicinity of Richmond yard and North Street station, and along the water front at Deepwater, which is farther south. The evidence on the ground would lead one to believe that the "Mont Blanc" exploded in the vicinity of Piers 6 and 8, the greatest damage being done there, and extending southwesterly to the North Street station, and northeasterly to Willow Park Junction,—the radius of the greatest force of the explosion extending about 5,000 ft. While there were evidences of the force of the explosion all over the area of the city, the greatest damage was within the radius mentioned.

Extent of the Damage

On Pier 9, which is the most northerly railway pier along the water front, a wooden shed was so badly shaken by the force of the explosion that it collapsed in a heap. The sub-structure of the pier was not damaged, although with the large amount of wreckage piled on it, it took considerable time to find it out. Pier 8, next down the water-front, was destroyed from the water level up, a portion of the old crib below the water level remaining. It was a wooden pier of crib construction, ballasted with stone. Pier 6, a wooden pile pier, without a shed, was completely blown away, and no trace of it remains to mark the spot where it stood.

At Richmond Yard station, the car repair buildings and cattle pens were blown to atoms, while the switchmen's

shanties throughout the yard were so badly wrecked as to be unfit for repair.

The North Street passenger station sustained very heavy damages. The front and back thirds of the tram shed roof were blown upward with the blast of the explosion, and then collapsed and fell down inside the brick walls. Thirteen of the roof trusses in the centre of the shed, with the roof boarding, framing and sash on them, remained standing, but were later pulled down for safety. The glass was blown out of all the windows, and the doors out of the casings, but, being vertical, counterweighted, sliding doors, many could be operated afterwards. In the head-house of the station, which is a solid brick structure, the damage was very heavy. Downstairs all the doors, windows and fixtures were blown off. The main partitions stood up under the force of the explosion, but the light wood counters, ticket wickets and similar fixtures were blown down and badly broken. The brick walls were found to be in good condition, except for a few loose bricks next to the roof timbers; these, no doubt, were loosened by the disturbance in the roof.

On the second floor, all doors and windows were blown off, and the plaster partitions bulged and broken. The damage to the third floor was practically the same as on the second floor, and a portion of the roof on the monitor was blown upward. Later in the heavy storm of Sunday, December 9, this portion of the roof collapsed. The power plant and power house, adjoining the station, suffered broken pipe-connections and a wrecked roof, all doors and windows being blown off or broken.

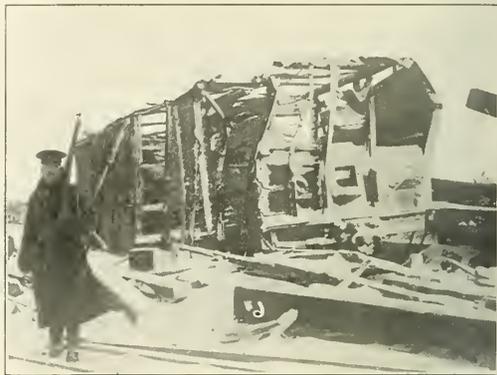
The damage at Deepwater, where the local freight and ocean-passenger facilities are situated, was heavy, but fortunately did not put the facilities entirely out of business.

Further down the harbor, at Pier 5, which was abandoned for shipping purposes last summer, the latrines erected for the sanitary convenience of troops last fall were badly shaken up and had to be rebuilt. Pier 4 is a wooden pile pier, with two outside tracks, and a wood shed of the single-deck type. Repairs were underway when the explosion occurred. The pier was unharmed, but the shed was completely wrecked. Pier 3 is a wooden pile pier, with single story wooden shed and four tracks, two outside and two inside of the shed. The pier was not damaged, but the roof trusses on the north half of the shed were all broken and all the doors and windows blown off. The electric wiring fell down onto the floor. The south half of the frame was not damaged.

Old Pier 2, an open wood pile pier with two tracks, was not damaged. New Pier 2 is a passenger pier, built of reinforced concrete pile construction with a slab deck and has a double-deck reinforced concrete shed with four tracks, two outside and two inside the shed. The shed and pier proper were practically undamaged. That it was under heavy stress was evidenced by the condition of the fixtures. The heavy steel doors were all blown off the north side, both upstairs and down, and practically all the glass broken. On the south side of the pier, eight of the large steel doors downstairs were blown off, and a number damaged. The upstairs doors were also damaged, but not to the same extent as on the north side. Some of the north side doors were blown nearly across the shed, and one or two were found wrapped around the concrete columns in the middle row.

In the military hospital upstairs, the light wood temporary partitions were badly shaken up, and in falling broke some of the steam radiators clear of the pipes, and carried down some of the temporary electric wiring fastened to them. The power plant was not damaged, although the building housing it was shaken up. The glass in this shed was wire glass set in metal frames, and while it was practically all broken, a large proportion of it remained in the sash, affording some protection from the weather, and it did not fly out in the

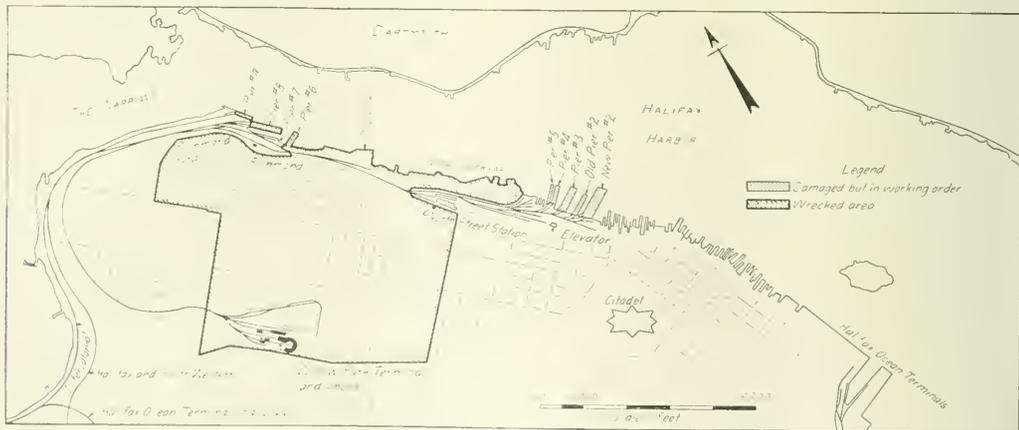
The 500,000-bu. grain elevator, which is of wood construction, had the roof over the bins so badly damaged that it had to be rebuilt. All of the windows in the working house and shipping galleries were blown out, and a hole was blown in the northerly side of the working house. This hole blew outward and toward the explosion, showing that it



Damage to Freight Cars Near Richmond

was caused by reduced air pressure outside the building. The power plant was not harmed, and was put under steam on the afternoon of the seventh.

At Willow Park, where the engine terminal is located, the damage was quite severe. By looking at the map, it will be seen that Willow Park is situated directly behind Pier 6, in front of which the explosion occurred. It is on top of a hill from which the land slopes down to the harbor. The doors



Map of a Part of Halifax, Showing the Affected Area

form of fine particles like the plain glass, which caused so many cases of blindness.

The Deepwater local freight shed, a brick structure, situated behind the piers, was not greatly damaged, except for a short section of the roof next to the office portion, which opened up along the ridge for a distance of 60 ft., and the loss of the glass in the office windows and transoms over the freight doors.

and windows in the car shop, stores, planing mill, oil house and engine house were blown out; the roof of the engine house was badly damaged, and the greater portion of it collapsed. The roofs of the machine shop, boiler house and blacksmith shop were found to be badly shaken up, and had to be rebuilt. These roofs were of concrete, reinforced with expanded metal, and were of poor construction. The reinforcement was badly rusted and the concrete very lean in

ement. The condition of the roofs was probably a contributing factor to their giving way under the shock of the explosion. The power transmission line from Willow Park to North street and Deepwater, which ran along the city streets, was wrecked, and the power had to be obtained from the Nova Scotia Power Company's plant in the south end of the city. The Willow Park power plant was damaged, but was repaired and put into service in two days.

The telephone train despatching line between North Street station and Rockingham was wrecked, but was repaired, and put into service temporarily on December 9. All automatic signals between North Street station and Willow



How Rails Were Bent at Richmond

Park Junction, a distance of 7,000 ft., were badly damaged, and would not work; they have since been restored. Train operation was carried out without their aid while repairs were being made. The new ocean terminals in the south end of the city were practically unharmed, some slight damage being done to the windows and doors of sheds 23 and 24.

The loss to rolling stock was heavy, consisting of 122 sleeping, dining, commissary, hospital, tourist, first and second class and baggage cars. There were 93 box cars wrecked, and 342 damaged. The passenger cars were immediately shipped at Moncton and Amherst, and the repairs completed, and cars put back into service as quickly as possible.

Restoring Train Service

Although the damage to the railway property was heavy, it was fortunate that the two main tracks leading to the North Street station were intact, as this gave the wrecking cranes a chance to start work immediately. By Saturday noon, two heavy cranes had cleared the tracks to the North Street station, and preparations were made to tear down the standing portion of the train shed roof. At 6 p. m., Saturday, December 8, 1917, the first passenger train was sent out of the North station, and full train service was resumed on Monday the tenth. Meanwhile, trains were run over the main line of the Halifax Ocean Terminals Railway, a belt line which girdles the city to the South End terminals. All passenger and relief trains were handled here, while the work of clearing up the wreckage at the North Street station was progressing. Train despatching was done between the South End terminals and Rockingham yard by city telephone, and trains were re-despatched from there on the regular railway telephone circuit from the despatching office at Truro. The accommodations at the South End terminals were rather crude, and delays were encountered, as the engines hauling trains between there and Rockingham had to be of small size to clear the falsework of structures being erected.

Accommodation was provided for doctors and nurses in

sleeping cars heated by locomotives. The office work was carried on in the office building of the Halifax Ocean Terminals' engineering staff. After full train service was resumed out of North Street station on December 10 less delay was encountered. The walls of the North Street station were left standing, and a covered concourse was built next to the head house to form a covered way for the protection of passengers. The station will not be rebuilt as the passenger business will be shifted to the South End terminals next summer, plans now being under way for a passenger station and the necessary facilities at that point.

Immediately after word was received of the explosion, wrecking and relief trains were started from Moncton, Truro, Stellarton, and Sydney, and all the men who could be spared were taken along, as it was feared that the loss of life had been heavy, and the railway would be handicapped in handling the traffic which was bound to pour into Halifax as soon as the extent of the damage was known. First estimates were found to be surprisingly accurate, and all the men taken along on the first trains were not sufficient to fill all the gaps in the railway forces, and more men had to be sent for, and an almost entirely new working force recruited from the railway service outside.

The Salvage Work

After the train service was restored, the work of surveys and repairs was at once organized. A diver was sent down to examine all the structures below water level, and careful surveys of the damage to all structures above water and on land were made.

The forces working on these surveys were taken from the Halifax Ocean Terminals' staff, the division engineer's staff at Moncton, the resident engineer's at Truro, and the chief engineer's office at Moncton.

An organization was at once made up to handle the work of rehabilitating the railway structures, which was later extended to include the repairs to the Naval dock yard. This consisted of a manager of construction, an architect, and a naval man, assisted by two contracting superintend-



Boat Blown from the Water Onto Pier 9

ents, who acted in a consulting capacity. Under this board there were assembled office and field engineers, draughtsmen, auditors, purchasing agent, storekeeper, material men and commissary men.

The office of manager of construction is held by C. B. Brown, assistant general manager of the Canadian Government Railways, and the execution of the work is under the

direct charge of W. A. Duff, the assistant chief engineer.

The damage to the railway property is estimated as follows:

Structures in Halifax, piers, buildings, tracks, machinery, power, telegraph lines and signals.....	\$751,600
Structures in Dartmouth (across the harbor).....	52,700
Rolling stock.....	178,000
Commissary stores.....	17,700
Steamer.....	70,000
Miscellaneous costs, operating department, labor, relief trains, supplies, etc., in cleaning up and relief work.....	155,000
Total.....	\$1,225,000

Such warehouse and dock space as was lost in Richmond will be duplicated in restoring it at the south end. Work has been underway since the explosion, and is now practically complete so far as the lost warehouse space is concerned, two warehouses having been erected on the shore end of Pier A. The remainder of the damaged structures have been pretty well restored at this time, some four months after the explosion. Tenders for the South End passenger station have been taken, but the work has not been contracted for to date.

Frictionless Side Bearings and Coal Conservation

By A. M. Engineer

TO DETERMINE THE VALUE of frictionless side bearings in a practical way the Union Railroad recently made a unique test in which no outside factor was permitted to come into play. It was decided to use the same car, the same load and the same curve in all the tests and to use only gravity in starting the car.

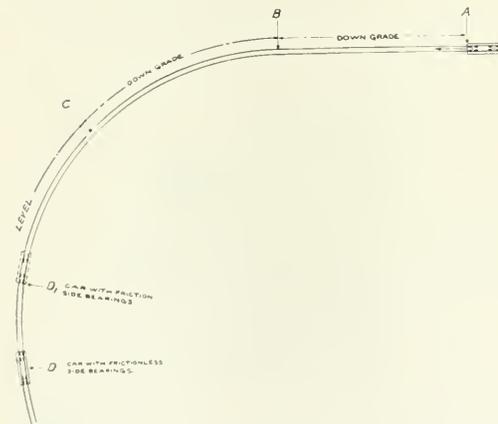
An old car, loaded with ore, was taken from the yard. It was equipped with a frictionless side bearing, which the railroad had adopted some years ago as its standard. It

The car was turned loose at the point *A* and after it came to rest at *D*, its position was carefully determined, and as a check, the car was dropped the second time. Then the side bearings were converted into plain bearings, by blocking all the movable parts. This was done within an hour, so that the track and weather conditions remained unchanged. Likewise, the journal box conditions and the journal lubrication were the same. The car was again turned loose twice from the same starting point. This time it came to a standstill sooner, as shown in dotted lines, or 545 ft. from *B*. With the frictionless side bearings it had run 602 ft., hence gained 57 ft., or 10.4 per cent.

Such a saving in track resistance must be appreciated by everyone and as there was no calculation necessary, other than measuring the distances, this test can be repeated at will.

It should be borne in mind that the car was loaded with ore, which means a low center of gravity. Had it been loaded with coal, the relieving influence of the frictionless side bearing would have been still greater. The curve is a gradual one. Had it been shorter, the above percentage would again have been increased; and the further fact that the distance from *B* to *C* was on the down grade instead of on a level, affected the results again very materially in the same direction; so that the percentage measured on the track would be greatly enhanced by compensating for these three items. This was not done, as it was deemed more desirable to have an absolute concrete result, one that could be duplicated at will, instead of a figure obtained by theoretical deductions.

The saving of 10.4 per cent of power on the curves of course means much more tonnage per engine in a train and a saving of coal, which ultimately would mean a conservation of millions of tons. Besides that, it also is evident that there must be a great saving in wheel flanges and rails and a decided reduction of wheel flange pressure against the rail, thus keeping the wheel from climbing the rail and causing derailments.



Track Over Which Side Bearing Test Was Made

was taken to Gascola and run over a curved track as indicated in the illustration. The approach to the curve from *A* to *B* was straight and down grade, which permitted the car to accumulate a fixed amount of momentum at the beginning of the curve. The portion *B-C* of the curve was also down grade, while the remainder of the curve and the track from there on was practically level. Points *A* and *B* were marked carefully and the rail from *B* to *D* was measured off and marked every 25 ft., so as to facilitate the measuring afterwards and to eliminate any possibility of error in doing so.

PROPOSED INCREASE IN ARGENTINE RAILROAD RATES.—The leading railroads serving the Rosario district have given notice of a further increase in freight rates of 10 per cent, to take effect May 1, 1918. An increase of 10 per cent was put into effect October 1, 1915, and an increase of 22 per cent was made effective October 20, 1917. With the increase now contemplated the rates would be approximately 47.6 per cent higher than they were three years ago. Rising cost of material and labor is given as the reason for the proposal. A protest has been made by the Rosario Chamber of Commerce, and other opposition is expected. Current railway receipts are showing very substantial increases as compared with the last year.—*Commerce Reports*.

FUEL OIL CONSUMPTION BY RAILROADS IN 1917.—The Geological Survey authorizes the following: The immense increase in railroad traffic due to the active participation of the United States in the war increased correspondingly the quantity of petroleum and of petroleum distillates consumed as locomotive fuel in 1917, despite their mounting cost and growing scarcity. Statistics compiled under the supervision of J. D. Northrop, of the United States Geological Survey, from reports submitted by all railroad companies that operated oil-burning locomotives in the United States, show that the quantity of fuel oil consumed by them in 1917 was 45,707,082 barrels, a gain of 3,580,665 barrels, or 8.5 per cent over 1916, and a larger consumption than in any other year. The total distance covered by oil-burning engines in 1917 was 146,997,144 miles, and the average distance covered per barrel of fuel consumed was 3.2 miles. Oil-burning locomotives were operated in 1917 over 32,431 miles of track in 21 states.

The Trade Acceptance in the Supply Field

Would the Use of Acceptances Help the Railways Catch Up on Their Present Overdue Accounts?

A DETAILED DISCUSSION of the use of the trade acceptance in the railway supply field naturally divides itself into two parts: (1) its use in sales to railway supply companies, and (2) in sales to railways.

There are many essential differences between the financing of sales to supply companies and those to railways.

The supply companies buy goods for resale to the railways or to other supply companies or for manufacture into goods which are so sold. They sell on credit and are considered on the whole good paying customers, the discounting of bills for cash, where such discounts are allowed, being the rule rather than the exception.

The railways, on the other hand, buy goods only for consumption, and there is no resale. They sell their only commodity—transportation—for spot cash, but despite the fact that they operate what has been termed the greatest cash business in the world, they are proverbially poor payers. They buy on terms such as 30 days net cash, but pay not at the expiration of 30 days, but in 60, 90, 120, 150 days. In fact, the situation in the railway field today is causing no small anxiety to the supply companies, conditions having actually gotten considerably worse since the government took over control of the railroads.

The operations of supply companies seem, on the whole, to lend themselves in great degree to the use of the trade acceptance. A few companies are already planning to put the trade acceptance into use in their dealings with fellow manufacturing companies.

The use of the trade acceptance in the railway field is at present largely for the government, through the Railroad Administration, to determine. Nevertheless, something must be done, and done at once, to secure more prompt payment of invoices of supplies sold to railways. It is essentially wrong that the railways should sell for cash and pay for goods on invoices that are months overdue. Perhaps, the trade acceptance may prove the remedy.

As was noted in a previous article on this subject in the *Railway Age* of March 1, page 463, the trade acceptance is defined by the Federal Reserve Board in regulation A, series of 1917, as a draft or bill of exchange drawn by the seller on the purchaser, of goods sold, and accepted by such purchaser; and a bill of exchange, within the meaning of this regulation, is defined as an unconditional order in writing, addressed by one person to another other than a banker, signed by the person giving it requiring the person to whom it is addressed to pay, in the United States, at a fixed or determinable future time, a sum certain in dollars to the order of a specified person.

The trade acceptance is meant primarily to cover sales of goods by a manufacturer to a jobber or by a jobber to a retailer who expects to sell the goods and realize upon them before the 60 or 90 day maturity of the acceptance. Its idea, in any case, is to change the open book account, with its indefinite terms of payment, to a definite obligation, and with definite maturity. No hindrance, whatever, is offered to the merchant who wishes to discount for cash, as it is the rule to allow the seller to pay in time to take his discount or to give his trade acceptance instead.

The sale of goods to railway supply companies does not partake absolutely of the nature of a sale to a jobber or retailer, but there are many points of similarity. The producer of raw materials or the specialty house sells to the

railway supply firm, which in turn deals with the railways directly, or uses these raw materials or specialties in the manufacture of goods which he then sells. The supply houses, as a rule, are in a position to discount their bills, but, of course, this by the very nature of things, cannot be invariable. This is where the trade acceptance comes in. It helps finance the transaction between the time the goods are sold and the time their manufacture into other goods is completed and they are sold as a finished product to the next party in line. Thus the raw material producer, to take the first firm in the entire transaction, on selling his goods will draw a trade acceptance on the house to which he sells. This trade acceptance, the buyer will accept and the original producer can consider the open book account closed. At the end of 90 days the trade acceptance is paid. In the meantime, the producer may need funds. He will take the trade acceptance to his bank, discount it as he would a note, and he will find it very much to his advantage to do so should the necessity arise. He can usually borrow only to the extent of 50 per cent of his open book accounts. On the trade acceptance he can realize on 100 per cent, and owing to the favor with which the Federal Reserve Board looks on the trade acceptance, he can also secure his money at a lower discount.

In the meantime, the buyer will have sold the goods or have fabricated them into a finished or semi-finished product which he in turn has sold, possibly with the discount for cash, or on a trade acceptance. The second trade acceptance, in such a case, would, if necessary, be available to pay for the first. As the first acceptance comes due, our original buyer, now a seller, will take this acceptance, the second in this transaction, to his bank, discount it and funds will be available at the bank for payment of the first acceptance. This, of course, is more or less of an ideal case, but it is not impossible. At any rate, it will be seen how the trade acceptance will help carry the accounts even if conditions may not let it carry them entirely.

The advantage of having, instead of an open book account with its indefinite term of maturity, an obligation with a definite term and in a security which can be realized upon at the bank at any time on most favorable terms is evident.

In these times when prices are so high, when deliveries are so poor that big inventories of material are an absolute necessity and when conservation of men, materials and money is the order of the day, the advantages of the trade acceptance where it can be used are immeasurable. The men behind the trade acceptance include many of the country's leading bankers and business men. These two facts make certain the prophecies of the trade acceptance enthusiasts that it is only a question of time when the acceptance idea will be in general use. The railway supply industry can certainly be put down as one of those fields in which the trade acceptance, once its advantages are understood and realized, will meet with increasing favor.

Railway Purchases

The manner in which the railways have been making payments on invoices from railway supply companies during the past few months is becoming of serious moment to the railway supply field. Bills that should have been paid in 30 days are running over to 90, 120, 150 and even 180 days, and under government control, payments instead of becom-

ing more prompt have been becoming slower and slower. This condition is beginning to prove serious to many supply companies and everybody is hoping that remedies will be taken and taken at once to overcome a situation that is manifestly wrong and unfair.

No supplyman will read into the foregoing, it is hoped, a supposition that the railways have been noted for their prompt payment of invoices in the past. Some roads have paid their bills promptly, but others, including many of excellent financial standing, have actually had to be imprompted to make some kind of reasonably quick payment. There are, of course, many reasons why payments might be delayed to some extent—delay in receiving the goods, the necessity of carefully checking the shipment and in reporting its receipt complete and in good order, as well as the complexities of putting vouchers for payment through a large and busy organization. But the fact that some roads have paid in reasonably quick time shows that others should be able to do the same. It certainly is not right in the very nature of things that a big railway receiving spot cash for everything it sells, and particularly a railway company with a good balance of cash in its treasury, should make the supply companies finance its purchases over an unreasonable length of time.

Many remedies are being suggested—among them the trade acceptance. Is the trade acceptance a possible solution and is its introduction in railway purchases a likely event?

The introduction of the trade acceptance into the railway field today depends almost entirely upon the Railroad Administration. Mr. McAdoo has not expressed himself as yet on the trade acceptance, but that is only because, with his many other activities, he has not had opportunity to pass upon its merits. It should always be borne in mind that Mr. McAdoo is a member ex-officio of the Federal Reserve Board, and that both the board and the law which created it are decidedly favorable to the use of trade acceptances.

There are many objections to the introduction of the trade acceptance in the railway field and much hard work will be required to overcome them. One of these objections is the competition in the supply field. If one company alone in a particular branch of the field should begin asking for acceptances from the railway customers, it would find that it had uphill work. The railways, presuming that they were not particularly enthusiastic over the idea, could say that its competitors were not asking for acceptances and declare that if acceptances were necessary in doing business with that company they might prefer to trade elsewhere. But it should in all fairness be shown that the railways might be converted to the idea of using acceptances and that if a few big manufacturers or a group of manufacturers in a similar line could work together, the idea might easily be put over.

Another objection lies in the fact that, on the whole, the railway supply companies are large, well-backed financially, and do not need the advantages that go with the trade acceptance. The argument is backed by the fact that many supply companies do not allow discounts for cash payments and that even when discounts are allowed they are proportionately small. It is quite different from the hardware trade, that is to say, where discounts of 2 per cent for cash payment in 10 days are a common rule. This is a valid argument—not, however, against the use of the trade acceptance but against taking the efforts that would be required in extending its use. Conditions of the present day, however, emphasize features that may not have been considered so important in times past, particular reference being made to the unusual need for available funds and to the necessity, because of uncertain deliveries, of holding unusually large stocks of material to ensure steady production. The use of the trade acceptance should help immeasurably in financing

these inventories, and the fact that the trade acceptance may be converted into cash at a favorable discount at any time is an advantage that is not to be despised.

The introduction of the trade acceptance in the railway field meets with another objection in that the purchases of a railroad include a staggering total of transactions and that to enter and keep track of trade acceptances would be a tremendous task. In view of the fact that acceptances might be given for monthly accounts and that adjustments could easily be made if necessary, this does not seem a real obstacle. Those who are already using trade acceptances say, in fact, that by their use they save work rather than create more of it for their accounting forces to handle.

No stock need be taken in the plea that for the railways to catch up on their payments from 150 to 180 days to the 60 or 90 days preferred for trade acceptances would necessitate large sums of money. The railways have got to catch up on these accounts somehow and the trade acceptance may be just the thing that will enable them to do it. It should be further noted that trade acceptances can be made out for any maturity, 60, 90, 120 days, or any other term—60 or 90 days is preferred because the Federal Reserve Board will only discount acceptances within 90 days of their maturity. It is also patent that no concern, especially one selling for cash, buying on a 30-day term, should feel justified in taking three, four or five times that term.

How Trade Acceptance Might Be Used

In considering how the trade acceptance might be used in the railway field let us take a hypothetical case in which a company sells to a railway a consignment of sizable value. When the goods are shipped the supply company will draw on the railway a trade acceptance with maturity of 60 or 90 days. This the railway will accept, making it payable at its bank, and return to the seller of the goods. The seller as has been noted above, may hold the acceptance or he may discount it at his bank, realizing on his sale in such case not in 90, 120, or so days, from the date of his invoice, but immediately. By the end of the 60 or 90 days—that is by the time of maturity—the railway will have received the goods, will have been able to check them and pass the vouchers, so that when payment of the acceptance is made by the railway's bank, the transaction will be entirely completed.

The large consignment of this kind would undoubtedly prove the ideal one for the use of the trade acceptance. It could also be used, however, in the case of monthly accounts, covering several sales of smaller amount.

In view of the foregoing, the advocates of the trade acceptance feel it safe to say that the trade acceptance could be used to good advantage in railway purchases. There is good reason to believe, they add, that the objections to its use represent the difficulties of introduction rather than possible hindrances to its use after introduction.

The use of the trade acceptance would certainly put railway purchases on a firmer basis, substituting, as it would, definite obligations with definite terms of maturity for open book accounts with most indefinite terms. It would help the supply field by giving it a considerable amount of liquid assets rather than the open book accounts. Liquid assets at this time particularly are one of the things most to be desired in business, and in the supply field they would prove of special value to assist in the financing of large stocks of materials which must be kept on hand to insure continued and steady production.

What benefits the supply field will indirectly benefit its railway purchasers. The matter of continued production may be taken as a leading example, for to a railway now, deliveries of equipment, appliances or material are more to be desired than fine gold.

There is no doubt, despite all the arguments for or against

the use of the trade acceptance in railway purchases, that its introduction is going to take time and is going to be uphill work. Government control, in itself, adds another complication, and, as has been noted, the question today is almost entirely up to the Railroad Administration and to Mr. McAdoo himself.

Something must be done and done immediately, however, to get out of the slough of despond into which the payments of railway bills has fallen. Some say that one of the reasons

is that the government has been so slow in paying its transportation bills to railways. Whatever the reason may be, it is a fact that the supply companies are becoming hard pressed for cash by reason of having to finance railway purchases over such unusual lengths of time. If conditions go on as they are going now, for the railways to catch up to a reasonable basis of payment will become more and more difficult. No doubt, however, the Railroad Administration will shortly be able to remedy present conditions.

Report of the Railroad Wage Commission

Increases Amounting to \$288,000,000 to Be Added to Increases of \$306,000,000 Made By Railroads

THE SALIENT FEATURES of the report of the Railroad Wage Commission to Director General McAdoo, recommending increases estimated to aggregate \$300,000,000 a year in the wages of all railway employees receiving less than \$250 a month, including officers whose salaries are less than that amount, were published in last week's issue. The report itself, including appendices and statistical tables, makes a book of 150 pages comprising a comprehensive statement of the railway wage situation and detailed explanations of the application of the scale of increases to various classes of employment. An abstract of the main report, as signed by the commissioners, Franklin K. Lane, C. C. McChord, J. Harry Covington and William R. Wilcox, is as follows:

To make an investigation of the wages and hours of the more than 2,000,000 railroad workers now in the employ of this government has been a matter of engrossing interest. To ask of a man, "What wages should you in justice receive?" is to ask perhaps the profoundest of all human questions. He must go into the whole involved problem of his relationship with his fellows, and to answer the question aught he must in the end come to a judgment which will be nothing less than a determination of what policy or plan of wage adjustment will make for the permanent well-being of the state.

We have searched for no such ultimate answer, if there can be one. But our investigation sought to reveal the insistent problems that confronted these workers, and such recommendations as we make are the practical answers to an immediate and direct question: What does fair dealing at this time require shall be done for these people who are rendering an essential service to the nation in the practical conduct of this industry? The existing state of war prohibits anything approximating a determination of ideal conditions. The exceptional call that has been made upon the railroads, and upon practically all other forms of industry in the country, since the United States entered the war over a year ago, has created an abnormal demand for labor.

As a result of the war, the prices of the necessities of life have been mounting to unheard of levels. The railroads, with the pressure upon them for greatly increased transportation facilities, have been confronted with the problem of asking increased exertion on the part of labor at a time of extreme competitive labor demand and at a time when the purchasing power of the pay is shockingly small. The commission has consequently considered the railroad wage problem with the idea that the government must courageously direct its attention toward the maintenance of rates of wages for the railroad employees which are still adequate for those who, as they patriotically labor, recognize that the war has brought to us all the necessity for sacrifice.

Requests for \$1,000,000,000 a Year

The requests which have come to us for wage increases would, if fully granted, involve an additional outlay in wages of somewhat over \$1,000,000,000 per year in excess of the wage fund of last year, which exceeded two billions. Some asked for an increase of 100 per cent in their pay, and from this they graduated downward to 10 per cent. None were satisfied with their present wages.

If we assume that this total sum should be given, the problem would at once arise as to its distribution. Quite evidently the need or the desert of each class of labor is not to be measured by its demands. The bolder should not be given all they ask merely for their boldness, while the more modest are insufficiently rewarded for the service they render because of their modesty. Some had evidently thought out their claims with particular respect to their power to compel concessions, while others based their demands upon the exceptional character of the services given, the long experience, and the training or character required. Still others found this a proper time to put forward claims which they felt were but a slender part of what justice would award were the whole scheme of wage making to be taken up afresh under a new order of things.

To reclassify the many hundreds of employments in which the 2,000,000 railroad workers engage would be a task calling for more time, skill, insight, and knowledge than we possess. At the outset, it was seen that there were grave inequalities in the rates of wages paid. But who should say what relationship each class of employees should bear to the other?

In the world of economics this situation has been met by the simple application of supply and demand, which is in turn now varied, affected, and modified by those limitations arising out of the artificial but necessary and historic methods of collective bargaining.

Lower Grades Deserve Greater Increase

These forces have classified employments. In the growth of the railroads there has consequently been evolved no other plan for such classification, and no scientific relationship between the wages paid. The proposal that a new classification should be attempted is one which, to say the least, may not be accepted now. Nevertheless, there stands out one dominating fact, recognized by railroad workers as well as by railroad officials—a conclusion compelled by that large sense of equity which governs where logical processes fail—that the lower grades of railroad employment, those in which the supply of labor has been less restricted, and where organization has been difficult, if not impossible, deserve wage increases out of proportion to the increases for those in superior grades.

Should there be any increase in wages to these men in the railroad service? The railroads themselves have for the past two years been answering this question by yielding, some with a wise prevision, and others too slowly for their own good, to the requests of their employees. It took neither tables nor charts nor briefs to make evident that, if the roads were to hold those men they had, concession must be made to the imperious demand of rising prices for the staples of living.

\$350,000,000 Increase in Two Years

Furthermore, an unprecedented call had come for men of certain trades in connection with the new industries that had been created by the war in Europe. To meet this competition the roads had advanced wages by slow steps at first, and later more rapidly. It is hardly realized that the roads themselves have in two years, 1916 and 1917, increased wages approximately \$350,000,000 per year, if applied to the present number of their employees.

But these advances were not in any way uniform, either as to employments or as to amounts or as to roads. The situation had been dealt with as pressure made necessary, and naturally those who, by organization or through force of competition, could exert most pressure fared best. Things came to a head just before the government took over the railroads. Another three months of private management and we would have seen much more extensive concessions in wages, or there would have followed an unfortunate series of labor disturbances. The government, therefore, has now to meet what would have come about in the natural course.

Government's Distinctive Position

The government now enjoys this position of distinction—it is not yielding to threats; it is not compelled to a course by fear of any unpatriotic outburst; it is not making concessions to avoid disaster. There has been no hint that such a policy would be pursued by those who have it within their power. By what amount have the railroad workers been disadvantaged by reason of the war and how may that disadvantage be overcome with the largest degree of equity, assuming that, in common with all who do not wish to exploit the opportunities which the war affords, these workers can not have and will not expect a full meeting of the entire burden?

The course of first suggestion is to allow a uniform increase of so many dollars per month to each worker. This is the policy England has pursued. It has the advantage of simplicity; but to our minds it fails primarily in drawing the distinction between those whose need is greatest and those who have largest leeway for sacrifice. To make a uniform wage increase of, say, \$20 per month, would increase the railroad budget by nearly \$500,000,000 a year. It would be a boon to many whose wages are low, but in its uniformity it would fail to adapt itself to the varying needs of those whom it is intended to serve.

We have had a most exhaustive study made of the cost of living today as contrasted with the cost of living in the latter part of 1915, when by the reaction of the European war the American people first felt keenly the increase in the burdens of life and the need for higher wages. And to our minds it conclusively establishes two things, (1) that the cost of living has increased disproportionately among those of small incomes, and (2) that there is a point up to which it is essential that the full increased cost shall be allowed as a wage increase, while from this point on the increase may be gradually diminished.

This study of the cost of living was not made from paper statistics exclusively, by the gathering of prices and comparisons of theoretical budgets. It was in no inconsiderable part an actual study from life, one of the most interesting and valuable groups of figures having been gathered by the

newspapers of the country, by interviews with those of the working class, and the inspection of their simple books of accounts. Roughly, it may be said that the man who received \$85 a month on January 1, 1916, now needs 40 per cent additional to his wage to give him the same living that he had then. Below that wage a larger percentage must be allowed, because the opportunity for substitution and other methods of thrift decline almost to a vanishing point; while above that wage a growing proportion of the increase will go to those things essential to cultured life, but non-essential to actual living.

Increase to Meet Living Cost

In fairness, therefore, a sufficient increase should be given to maintain that standard of living which had obtained in the prewar period, when confessedly prices and wages were both low. And upon those who can best afford to sacrifice should be cast the greater burden.

Another argument that is compelling as against the uniform increase in existing wages is the unalterable fact that to give an equal amount, now, to all, would be giving to some a double increase, that which they had received from the railroads during the last two years, and that which the government might award. For not all of the railroads made increases to the same classes, and no two made awards in the same percentages, even within the same groups of employments.

Average Railroad Wages

It has been a somewhat popular impression that railroad employees were among the most highly paid workers. But figures gathered from the railroads disposed of this belief. Fifty-one per cent of all employees during December, 1917, received \$75 per month or less; and 80 per cent received \$100 per month or less. Even among the locomotive engineers, commonly spoken of as highly paid, a preponderating number receive less than \$170 per month, and this compensation they have attained by the most compact and complete organization, handled with a full appreciation of all strategic values. Between the grades receiving from \$150 to \$250 per month, there is included less than 3 per cent of all the employees (excluding officials) and these aggregate less than 60,000 men out of a grand total of 2,000,000.

The greatest number of employees on all the roads fall into the class receiving between \$60 and \$65 per month, 181,693, while within the range of the next \$10 in monthly salary there is a total of 312,761 persons. In December, 1917, there were 111,477 clerks receiving annual pay of \$900 or less. In 1917 the average pay of this class was but \$56.77 per month. There were 270,855 section men whose average pay as a class was \$50.31 per month; 121,000 other unskilled laborers, whose average pay was \$58.25 per month; 130,075 station service employees, whose average pay was \$58.57 per month; 75,325 road freight brakemen and flagmen, whose average pay was \$100.17 per month; and 16,465 road passenger brakemen and flagmen, whose average pay was \$91.10 per month.

These, it is to be noted, are not prewar figures; they represent conditions after a year of war and two years of rising prices. And each dollar now represents in its power to purchase a place in which to live, food to eat, and clothing to wear, but 71 cents as against the 100 cents of January 1, 1916. That there has been such steadfast loyalty to the railroads, and so slight a disposition to use the lever of their necessity and their opportunity to compel, by ruthless action, an increase of wages, is not without significance and should not be passed without public recognition.

With the various conditions which have been detailed all in mind, the commission has reached the conclusion that the fairest method of dealing with the problem of wage increases is to award increases on the following scale:

THE SCALE RECOMMENDED

1	2	3	4	5	6	7	8
The monthly rate of pay of men receiving in December, 1915, the amounts named in this column	Add the per cent named in this column	Equivalent amount in this column	Making new rate per month as shown in this column	The monthly rate of pay of men receiving in December, 1915, the amounts named in this column	Add the per cent named in this column	Equivalent amount in this column	Making new rate per month as shown in this column
Under \$46.00		\$50.00		152.01 to 153.00	1.56	153.80	176.80
\$46.01 to 47.00	43.00	56.71	56.71	153.01 to 154.00	1.56	154.56	177.61
47.01 to 48.00	43.00	54.64	54.64	154.01 to 155.00	1.56	155.62	178.10
48.01 to 49.00	43.00	50.57	50.57	155.01 to 156.00	1.56	156.84	178.79
49.01 to 50.00	43.00	46.50	46.50	156.01 to 157.00	1.56	158.16	179.58
50.01 to 51.00	43.00	42.43	42.43	157.01 to 158.00	1.56	159.52	180.47
51.01 to 52.00	43.00	38.36	38.36	158.01 to 159.00	1.56	160.92	181.46
52.01 to 53.00	43.00	34.29	34.29	159.01 to 160.00	1.56	162.36	182.55
53.01 to 54.00	43.00	30.22	30.22	160.01 to 161.00	1.56	163.84	183.74
54.01 to 55.00	43.00	26.15	26.15	161.01 to 162.00	1.56	165.36	185.03
55.01 to 56.00	43.00	22.08	22.08	162.01 to 163.00	1.56	166.92	186.42
56.01 to 57.00	43.00	18.01	18.01	163.01 to 164.00	1.56	168.52	187.91
57.01 to 58.00	43.00	13.94	13.94	164.01 to 165.00	1.56	170.16	189.50
58.01 to 59.00	43.00	9.87	9.87	165.01 to 166.00	1.56	171.84	191.19
59.01 to 60.00	43.00	5.80	5.80	166.01 to 167.00	1.56	173.56	192.98
60.01 to 61.00	43.00	1.73	1.73	167.01 to 168.00	1.56	175.32	194.87
61.01 to 62.00	43.00	-2.34	-2.34	168.01 to 169.00	1.56	177.12	196.86
62.01 to 63.00	43.00	-6.41	-6.41	169.01 to 170.00	1.56	178.96	198.95
63.01 to 64.00	43.00	-10.48	-10.48	170.01 to 171.00	1.56	180.84	201.14
64.01 to 65.00	43.00	-14.55	-14.55	171.01 to 172.00	1.56	182.76	203.43
65.01 to 66.00	43.00	-18.62	-18.62	172.01 to 173.00	1.56	184.72	205.82
66.01 to 67.00	43.00	-22.69	-22.69	173.01 to 174.00	1.56	186.72	208.31
67.01 to 68.00	43.00	-26.76	-26.76	174.01 to 175.00	1.56	188.76	210.90
68.01 to 69.00	43.00	-30.83	-30.83	175.01 to 176.00	1.56	190.84	213.59
69.01 to 70.00	43.00	-34.90	-34.90	176.01 to 177.00	1.56	192.96	216.38
70.01 to 71.00	43.00	-38.97	-38.97	177.01 to 178.00	1.56	195.12	219.27
71.01 to 72.00	43.00	-43.04	-43.04	178.01 to 179.00	1.56	197.32	222.26
72.01 to 73.00	43.00	-47.11	-47.11	179.01 to 180.00	1.56	199.56	225.35
73.01 to 74.00	43.00	-51.18	-51.18	180.01 to 181.00	1.56	201.84	228.54
74.01 to 75.00	43.00	-55.25	-55.25	181.01 to 182.00	1.56	204.16	231.83
75.01 to 76.00	43.00	-59.32	-59.32	182.01 to 183.00	1.56	206.52	235.22
76.01 to 77.00	43.00	-63.39	-63.39	183.01 to 184.00	1.56	208.92	238.71
77.01 to 78.00	43.00	-67.46	-67.46	184.01 to 185.00	1.56	211.36	242.30
78.01 to 79.00	43.00	-71.53	-71.53	185.01 to 186.00	1.56	213.84	246.09
79.01 to 80.00	43.00	-75.60	-75.60	186.01 to 187.00	1.56	216.36	249.98
80.01 to 81.00	43.00	-79.67	-79.67	187.01 to 188.00	1.56	218.92	253.97
81.01 to 82.00	43.00	-83.74	-83.74	188.01 to 189.00	1.56	221.52	258.06
82.01 to 83.00	43.00	-87.81	-87.81	189.01 to 190.00	1.56	224.16	262.25
83.01 to 84.00	43.00	-91.88	-91.88	190.01 to 191.00	1.56	226.84	266.54
84.01 to 85.00	43.00	-95.95	-95.95	191.01 to 192.00	1.56	229.56	270.93
85.01 to 86.00	43.00	-100.02	-100.02	192.01 to 193.00	1.56	232.32	275.42
86.01 to 87.00	43.00	-104.09	-104.09	193.01 to 194.00	1.56	235.12	280.01
87.01 to 88.00	43.00	-108.16	-108.16	194.01 to 195.00	1.56	237.96	284.70
88.01 to 89.00	43.00	-112.23	-112.23	195.01 to 196.00	1.56	240.84	289.49
89.01 to 90.00	43.00	-116.30	-116.30	196.01 to 197.00	1.56	243.76	294.38
90.01 to 91.00	43.00	-120.37	-120.37	197.01 to 198.00	1.56	246.72	299.37
91.01 to 92.00	43.00	-124.44	-124.44	198.01 to 199.00	1.56	249.72	304.46
92.01 to 93.00	43.00	-128.51	-128.51	199.01 to 200.00	1.56	252.76	309.65
93.01 to 94.00	43.00	-132.58	-132.58	200.01 to 201.00	1.56	255.84	314.94
94.01 to 95.00	43.00	-136.65	-136.65	201.01 to 202.00	1.56	258.96	320.33
95.01 to 96.00	43.00	-140.72	-140.72	202.01 to 203.00	1.56	262.12	325.82
96.01 to 97.00	43.00	-144.79	-144.79	203.01 to 204.00	1.56	265.32	331.41
97.01 to 98.00	43.00	-148.86	-148.86	204.01 to 205.00	1.56	268.56	337.10
98.01 to 99.00	43.00	-152.93	-152.93	205.01 to 206.00	1.56	271.84	342.89
99.01 to 100.00	43.00	-157.00	-157.00	206.01 to 207.00	1.56	275.16	348.78
100.01 to 101.00	43.00	-161.07	-161.07	207.01 to 208.00	1.56	278.52	354.77
101.01 to 102.00	43.00	-165.14	-165.14	208.01 to 209.00	1.56	281.92	360.86
102.01 to 103.00	43.00	-169.21	-169.21	209.01 to 210.00	1.56	285.36	367.05
103.01 to 104.00	43.00	-173.28	-173.28	210.01 to 211.00	1.56	288.84	373.34
104.01 to 105.00	43.00	-177.35	-177.35	211.01 to 212.00	1.56	292.36	379.73
105.01 to 106.00	43.00	-181.42	-181.42	212.01 to 213.00	1.56	295.92	386.22
106.01 to 107.00	43.00	-185.49	-185.49	213.01 to 214.00	1.56	299.52	392.81
107.01 to 108.00	43.00	-189.56	-189.56	214.01 to 215.00	1.56	303.16	399.50
108.01 to 109.00	43.00	-193.63	-193.63	215.01 to 216.00	1.56	306.84	406.29
109.01 to 110.00	43.00	-197.70	-197.70	216.01 to 217.00	1.56	310.56	413.18
110.01 to 111.00	43.00	-201.77	-201.77	217.01 to 218.00	1.56	314.32	420.17
111.01 to 112.00	43.00	-205.84	-205.84	218.01 to 219.00	1.56	318.12	427.26
112.01 to 113.00	43.00	-209.91	-209.91	219.01 to 220.00	1.56	321.96	434.45
113.01 to 114.00	43.00	-213.98	-213.98	220.01 to 221.00	1.56	325.84	441.74
114.01 to 115.00	43.00	-218.05	-218.05	221.01 to 222.00	1.56	329.76	449.13
115.01 to 116.00	43.00	-222.12	-222.12	222.01 to 223.00	1.56	333.72	456.62
116.01 to 117.00	43.00	-226.19	-226.19	223.01 to 224.00	1.56	337.72	464.21
117.01 to 118.00	43.00	-230.26	-230.26	224.01 to 225.00	1.56	341.76	471.90
118.01 to 119.00	43.00	-234.33	-234.33	225.01 to 226.00	1.56	345.84	479.69
119.01 to 120.00	43.00	-238.40	-238.40	226.01 to 227.00	1.56	349.96	487.58
120.01 to 121.00	43.00	-242.47	-242.47	227.01 to 228.00	1.56	354.12	495.57
121.01 to 122.00	43.00	-246.54	-246.54	228.01 to 229.00	1.56	358.32	503.66
122.01 to 123.00	43.00	-250.61	-250.61	229.01 to 230.00	1.56	362.56	511.85
123.01 to 124.00	43.00	-254.68	-254.68	230.01 to 231.00	1.56	366.84	520.14
124.01 to 125.00	43.00	-258.75	-258.75	231.01 to 232.00	1.56	371.16	528.53
125.01 to 126.00	43.00	-262.82	-262.82	232.01 to 233.00	1.56	375.52	537.02
126.01 to 127.00	43.00	-266.89	-266.89	233.01 to 234.00	1.56	379.92	545.61
127.01 to 128.00	43.00	-270.96	-270.96	234.01 to 235.00	1.56	384.36	554.30
128.01 to 129.00	43.00	-275.03	-275.03	235.01 to 236.00	1.56	388.84	563.09
129.01 to 130.00	43.00	-279.10	-279.10	236.01 to 237.00	1.56	393.36	571.98
130.01 to 131.00	43.00	-283.17	-283.17	237.01 to 238.00	1.56	397.92	580.97
131.01 to 132.00	43.00	-287.24	-287.24	238.01 to 239.00	1.56	402.52	589.96
132.01 to 133.00	43.00	-291.31	-291.31	239.01 to 240.00	1.56	407.16	599.05
133.01 to 134.00	43.00	-295.38	-295.38	240.01 to 241.00	1.56	411.84	608.24
134.01 to 135.00	43.00	-299.45	-299.45	241.01 to 242.00	1.56	416.56	617.53
135.01 to 136.00	43.00	-303.52	-303.52	242.01 to 243.00	1.56	421.32	626.92
136.01 to 137.00	43.00	-307.59	-307.59	243.01 to 244.00	1.56	426.12	636.41
137.01 to 138.00	43.00	-311.66	-311.66	244.01 to 245.00	1.56	430.96	645.90
138.01 to 139.00	43.00	-315.73	-315.73	245.01 to 246.00	1.56	435.84	655.49
139.01 to 140.00	43.00	-319.80	-319.80	246.01 to 247.00	1.56	440.76	665.18
140.01 to 141.00	43.00	-323.87	-323.87	247.01 to 248.00	1.56	445.72	674.97
141.01 to 142.00	43.00	-327.94	-327.94	248.01 to 249.00	1.56	450.72	684.86
142.01 to 143.00	43.00	-332.01	-332.01	249.01 to 250.00	1.56	455.76	694.85
143.01 to 144.00	43.00	-336.08	-336.08				
144.01 to 145.00	43.00	-340.15	-340.15				
145.01 to 146.00	43.00	-344.22	-344.22				
146.01 to 147.00	43.00	-348.29	-348.29				
147.01 to 148.00	43.00	-352.36	-352.36				
148.01 to 149.00	43.00	-356.43	-356.43				
149.01 to 150.00	43.00	-360.50	-360.50				
150.01 to 151.00	43.00	-364.57	-364.57				
151.01 to 152.00	43.00	-368.64	-368.64				
152.01 to 153.00	43.00	-372.71	-372.71				

1915, as listed in Column 1, the amount named in column 4, on the same line.

The inclusion of the percentages contained in column 2 is merely to explain the method of arriving at the amounts contained in column 3, which added to the maximum amount for each group named in column 1 produces the "new rate per month" shown in column 4, on the same line.

Application of these new wages to the present pay rolls of the railroads, as nearly as may be, indicates that the net wage increases granted will approximate \$300,000,000 a year. The magnitude of this amount is not staggering when the whole expenditure for wages on the railroads is considered. And whatever its effect upon the mind may be, we regard such an expenditure as necessary for the immediate allaying of a feeling that can not be wisely fostered by national inaction, and as not one dollar more than justice at this time requires.

Application of the Scale

These increases are to be applied to the rates of wages in effect on December 31, 1915. They do not represent a net increase at this time. Because our figures as to the increase of living costs have been gathered with reference to the two-year period January, 1916, to April, 1918, the wage increases are reckoned with respect to the same dates. The telegrapher who holds the same position today that he did the last day of December, 1915, and who then received \$75 a month and has received no increase since, will receive an additional wage of \$30.75 per month. If he has received an increase in these two years of \$10 per month, the recommended increase of his wage will be cut down by that much, making his net advance \$20.75. The section hand who on December 31, 1915, received a wage of \$50 per month will receive an increase of \$21.50 per month, less whatever his monthly wage as section man may have been advanced in the intervening two years.

In the application of the scale the wage runs with the place. If in the past two years an employee has been promoted, his new wage is based upon the rate of increase applicable to the new schedule governing the new place.

Reductions in hours are not to be regarded as increases in pay. This rule is made necessary, first, by its justice, for it is not to be contemplated that hours are reduced to decrease earnings; and, second, by the impracticability of applying any other rule. In some cases the decrease in daily hours did effect an increase in total wages paid, by reason of overtime, but in other cases, where the railroads adjusted themselves to an eight or a nine-hour day, there was no increase in the monthly compensation. To differentiate between these cases would be an interminable task. Moreover, we assume the good faith of all reductions in hours as being what they pretend to be.

There are some few cases where the roads, by reason of abnormal conditions, largely local, and arising out of the extreme competition in certain trades, have granted wage increases which will well-nigh cover, if not altogether cover, the increases here made. As to those who have received such increases, we advise no other course than that the scale be adhered to, for it has its foundation in principle and not in the compelling force of any unusual competitive conditions. In no event, however, should there be any reduction in wages from those now obtaining.

In the application of the scale, that percentage of increase is to be applied which is awarded to the normal time wages paid to the individual in each position in the railroad service on December 31, 1915. There are, however, employees of certain classes, and upon a number of roads, whose wages are paid upon a piecework basis, and there are also numbers of employees on practically all the roads whose hours of service at times run beyond the straight hours of service established for a day's work of the kind they perform. A

practical plan for wage increases, in harmony with the scale, has been devised for application to piecework wages and wages for recognized overtime.

We have found much difficulty in adapting the plan to the elaborate and intricate schedules of the trainmen, from which there is apparently no desire on the part of the railroad operators or the trainmen to depart. This, however, we have succeeded in doing in such manner as to translate the increases into mileage rates, thus maintaining the existing schedules relating to the method of pay. Accepting the average monthly earnings of employees in the train and engine service for the fiscal year ended 1915 as accurately reflecting the rates paid to those classes we have adopted, as the percentage of increase to be applied to the mileage rates obtaining for the several classes of trainmen, that percentage of increase which is awarded to employees generally whose earnings are equal to the average earnings of each of the several classes of trainmen. Thus, in the case of road passenger engineers, their average earnings in 1915 were \$178.46. The individual employee in any other branch of the railroad service whose monthly wage is \$178.46 will receive a wage increase of 11¼ per cent, and the road passenger engineers as a class will receive an increase of 11¼ per cent in their existing mileage rates. And the same method obtains for each of the classes of trainmen paid on the mileage basis.

The Question of a Shorter Work Day

Slowly and steadily, by force of law somewhat, but also by the voluntary act of the employers, a shorter workday is being put into effect. This tendency will continue, and the shorter day will come to be regarded, not as a means of minimizing the returns which the worker gains, but as a conservator of the human material upon which industry rests. This matter of work time must be submitted to the pragmatic test. Society will come to see that there is a maximum which is beyond the plimsoll mark of wisdom, and a minimum that makes society in many ways the sufferer. The line of moderation, the medial line, is one that must be proved by experience. The wise employer will look with sympathetic eye to find it, and the wise employee will attempt in good faith to make it manifest. It would be a splendid achievement if we could at this time crystallize the experience of the world into a conclusion concerning the length of the workday that would be of universal application. But this is not possible now for many reasons, not the least of which is an insufficiency of data touching so many and such diverse employments.

This, moreover, is not the time, in the judgment of the commission, to make experiments which might lessen the output of that commodity which railroad men produce—tons of freight hauled and numbers of passengers carried. The one thing now imperative is volume of and speed in railroad output.

Hours of Labor Cannot Be Shortened

The railroad employees have asked for the shorter day, saying frankly that they did not wish an increased rate for overtime save as a means of compelling the observance of shorter hours—a penalizing of the employers for too long a work day. At this time, however, when urgent and serious necessity compels sacrifice from all, to penalize the government for working its men as long as they have been in the habit of working under their private employers, the railroad companies, is to take advantage of the two-fold embarrassment of the government—its need for the work and its inability to call in outside men. The commission does not believe that the railroad employees really want thus to hamper the transportation facilities of the country in its hour of need.

While the commission is strongly disposed to a standard

day, in so far as the nature of the service will permit it, its firm judgment consequently is that the existing hours of service in effect on the railroads should be maintained for the period of the war.

But with this we earnestly urge that a most exhaustive study be made of this matter of hours of service, not with a view to the adoption of some arbitrary and universal policy which shall have no regard to the kind of work done, or to the effect upon the railroad service, but with these very considerations in mind.

Overtime Pay

Closely allied to the matter of hours of service is that of extra pay for overtime. In fact, the whole theory of those who speak for labor is that extra pay for overtime is the logical way to force the standard day of reasonable hours with no work thereafter. In that theory there may or may not be force; but quite apart from such view, certain it is that in harmony with the broader idea that fair hours of rest and recreation are the laborer's right, the use of those hours in industry may well be obtained only at a wage much above the normal. With overtime as with hours of service, however, the commission believes that the existing rules and conditions of payment should not be disturbed during the period of the war. But at the time when the study of the matter of hours of service is made, that study must sympathetically cover also the broad and kindred field of compensation for the overtime which is necessary in certain classes of service.

Apprentices

Organized labor realizes that at a time when men are being speeded up in the colleges by being given special courses in chemistry and other scientific subjects necessary for war work, the rules of inhibition touching the term of apprentices must be liberalized so that those who are competent shall the more quickly be enabled to place their full skill at the Nation's service. It is the view of the commission that the full measure of the increases herein suggested shall go only to those above 21 years of age, and that those from 18 to 21 shall have three-fourths of such increases, and those under 18 one-half of such increases. This rule, however, might well be modified to this extent, that if apprentices are graduated into the full status of journeymen before they have reached 21 years they shall have the full pay of this new status.

Floating Equipment Employees

This award shall be construed to apply to employees of railroads operating ferries, tugboats, lighters, barges and any other floating equipment operated as terminal or transfer facilities, but shall not be construed as applying to railroad employees on, or in connection with the operation of, cargo and passenger carrying equipment on lakes or rivers, or in coastwise or ocean traffic.

Wage Adjustment by Other Boards

The award of the commission shall not be applicable to those employees whose compensation is the result of adjustments by or through any agency established for the purpose by the Navy Department, the War Department, the Department of Commerce, the United States Shipping Board, or any other government agency created since the entry of the United States into the war.

Effective as of January 1

The wage increases provided for in the scale shall be effective as of January 1, 1918, and are to be paid to all who were then in the railroad service or who have come into such service since and remained therein, according to the time served. The proper ratable amount shall also be paid to

those who have been for any reason since January 1, 1918, dismissed from the service but shall not be paid to those who have left it voluntarily, because remaining in the service was the consideration of the promise to make the increases effective from the date mentioned. Men who have left the railroads to enter the army or navy shall be entitled to the pro rata increases accruing on their wages up to the time they left, as they have continued in the service of the Nation. The same rule shall apply to those who have passed from one branch of the railroad service or from one road to another.

Employment of Women

The employment of women is one of the important problems confronting those in charge of the actual operation of the railroads. Up to the time of the abnormal demand for labor created by the European war, women were not extensively employed by the railroads except as stenographers and clerks in the offices, and as charwomen, car washers, and cleaners, and other employments of like character. Since the war they have entered the shops, have engaged in handling freight and baggage, and have even been employed upon the tracks. Much of this work requires a physical effort beyond the strength of women, and some of it is carried on under conditions menacing to health, safety and morals.

The labor in our shops and elsewhere must be diluted as the war takes to itself an increasing number of men. Women must, to some degree, take these places. They should be cared for. Their burden should not be such as to hazard their health. Their hours should be reasonably short. Their working conditions should be healthful and fitted to their needs. And their pay, when they do the full work of men, should be the same as that of men.

Discrimination Against Employees

The investigation of the commission disclosed many inequalities of pay in the same branch of service, not only as between different sections of the country but in the same section. The attention of the railroad managers should be directed to these inequalities, with a view to removing them whenever the discrimination is not justified by differences in the efficiency of the labor, the cost of living, or other conditions legitimately affecting the rate of wages. In every case where the same service is rendered there should be the same pay without regard to sex or race.

Members of organizations and non-members must stand upon the same footing. In some branches of the service, and this is peculiarly true of those least paid, there are no organizations, or, if any, they are limited in their membership and restricted in their locality. But, whether organized or unorganized, the purpose must be duly to consider every branch of the service and to accord fair treatment to all.

Salaries of Officers

In carrying out the direction to "make a general investigation of the compensation of persons in the railroad service," the investigation obviously included a consideration of the compensation of those persons who are classed as officials. The commission, therefore, by an individual questionnaire which all officials were required to answer and also by a report obtained from each railroad, secured the names of all persons receiving a compensation of \$5,000 and upward, together with a full statement of the services performed by each of them.

The total compensation for the year ending December 31, 1917, paid to such officials is approximately \$110,000. The individual salaries varied from \$5,000 to \$100,000. It is reasonably certain from the facts gathered by the commission that a substantial readjustment of such salaries may be made and the efficient operation of the railroads promoted

thereby. Such readjustment of salaries, however, presents an individual proposition as applicable to each official. Some salaries may well be abolished altogether, others greatly reduced, while in some cases of lesser paid officials an increase would be warranted.

The commission recommends that during the period of government conduct of the railroads no salaries paid to officials who are not essential to the operation of the roads shall be charged as part of the operating expenses, and that a careful study be made of the proper relation between the salaries of the higher officials and those of their subordinates with a view to readjustments in the interest of the highest efficiency of the service.

There should be constituted a tribunal or tribunals to continue the study of railroad labor problems composed, in part at least, of men experienced in this kind of work, for as to these problems there can be no finality. Many complaints have been made to us by individuals and groups of men which it was impossible for us to investigate, and which should be investigated and redress afforded if the complaints are well founded. Among these are differences of pay where there are no, or only negligible, differences in the services rendered. Conditions of employment are described which, if the descriptions be true, demand amelioration. A commission for each of the general divisions of the railroad system would undoubtedly be fully occupied for a long time in dealing with such matters. In the meantime the managers or other officials operating the several roads could do much to improve the situation by dealing with the conditions on their respective roads.

Importance of Railroads

It would be impossible to magnify the importance of the American system of railroads in the conduct of the war. That England should want for bread because American railroad equipment was unwisely distributed or unnecessarily immobile is a thing not to be explained to the Englishman, who regards our system of railroads and our method of railroading as the model for the world, excelling either public or private systems elsewhere.

For our needs and for our pride this standard of superiority must be maintained, and to this end no other one thing will so greatly conduce as wisdom and justness in dealing with the actual workers on the roads. What has been done is perhaps all that can be done now. The spirit which prompted the commission should not be permitted to languish or to flatten out into expansive inefficiency. The labor problem is never one exclusively of wages or hours. When it does become no more than the human element has gone out of the management; it has become too remote in space or in spirit to make good. The table of wage increases presented in this report we urge should be construed in the largest spirit of liberality, so as to draw forth from the men a recognition of that sense of reciprocity which it speaks—good wages for good service. The policy comes from above; its sympathetic application must be left to those below.

We desire in closing this report to express our most sincere appreciation of the services rendered to the commission by Frederick W. Lehmann, as counsel; by William A. Ryan, as secretary; by Edward J. Barcalo, Riley L. Redpath, and Lathrop Brown, as the board of examiners; and by William A. Hathaway, J. C. Bowen, Charles P. Neill, Fred A. Burgess, A. O. Wharton, and C. W. Hillman, as special statisticians.

Appendix

Appendix 1 is a report of Special Statistician W. A. Hathaway of studies of the methods adopted by the British and French governments to adjust the wages of railroad employees to meet the war emergencies.

Cost of Living

Appendix 2 gives the results of an exhaustive inquiry instituted by the commission into the question of the cost of living during 1917 and 1918 compared with the pre-war period. The investigation was divided into two parts, Relative Price Changes, and Family Budgets. Since there was no material rise in prices until the latter part of 1915 the investigations were confined to the period 1915 to 1917. The increases in the various items of the family budget from January 1, 1916, to January 1, 1918, were ascertained to be: Food 52 per cent, rent 10 per cent, clothing 44 per cent, fuel and light 31 per cent, sundries 35 per cent. Weighing these increases according to the proportion of expenditure for each item for different sized incomes, the following percentages of increase in the cost of living were obtained:

Families with incomes up to \$600.....	40 per cent
Families with incomes from \$600 to \$1,000.....	38 per cent
Families with incomes from \$1,000 to \$2,000.....	37 per cent

These figures were later revised in a supplementary report on April 25, based on later price changes to 43 per cent, 41 per cent and 40 per cent, respectively. It is stated that these figures show how much more it would have cost to live in 1918 than on January 1, 1916, provided the standards of living remained the same, but because of the difficulty in determining accurately the relative increase in the cost of living the figures were interpreted conservatively and applied in a general rather than in a precise way.

The 265 family budgets collected by the commission through the newspapers are grouped by districts and by incomes. The average annual income of the 265 families in 1915 was \$1,031 and in 1917, \$1,162, while the average annual expenses were \$955 in 1915 and \$1,210 in 1917. In 1915 the average family, therefore, had a surplus of \$76 while in 1917 the average family had a deficit of \$48. In 1915, 169 families had a surplus, while 73 had a deficit. In 1917, 96 families had a surplus, while 140 had a deficit.

Monthly Wages

In Appendix 3 is given a statement compiled from the returns of Class 1 railroads and certain switching and terminal companies showing the rates of pay for the month of December, 1917, graded according to the monthly rates. These rates are discharged of all compensation for overtime or extra service and, therefore, constitute a table of wages, not of earnings. The table is as follows:

NUMBER OF EMPLOYEES OF ALL CLASS 1, SWITCHING AND TERMINAL RAILROADS IN THE UNITED STATES, GRADED ACCORDING TO MONTHLY RATES OF PAY

(Col. 1)	Eastern District (Col. 2)	Southern District (Col. 3)	Western District (Col. 4)	Total for United States (Col. 5)	Per cent by classes (Col. 6)	Cumulative per cent (Col. 7)
\$30 or less	8,319	10,173	8,871	27,363	1.41	1.41
\$30 to \$35	5,626	18,450	8,464	32,540	3.09	3.09
\$35 to \$40	8,259	25,362	17,716	51,337	2.65	5.74
\$40 to \$45	11,167	18,381	17,930	47,478	2.45	8.19
\$45 to \$50	14,841	20,961	44,173	79,975	4.11	12.30
\$50 to \$55	40,185	18,727	50,964	109,876	5.67	17.97
\$55 to \$60	71,060	17,553	67,952	156,565	8.07	26.04
\$60 to \$65	101,054	15,480	65,159	181,693	9.37	35.41
\$65 to \$70	76,078	15,514	45,767	137,359	7.08	42.49
\$70 to \$75	70,947	20,347	74,108	165,402	8.53	51.02
\$75 to \$80	77,285	17,416	54,323	149,024	7.72	58.74
\$80 to \$85	60,660	13,575	48,244	122,479	6.32	65.06
\$85 to \$90	53,759	11,726	35,881	101,357	5.23	70.29
\$90 to \$95	49,497	10,653	36,316	96,466	4.97	75.26
\$95 to \$100	45,374	7,838	39,459	85,171	4.55	79.81
\$100 to \$110	35,688	16,391	45,589	117,668	6.07	85.88
\$110 to \$120	42,618	10,613	31,307	84,538	4.36	90.24
\$120 to \$130	32,895	4,865	20,252	58,012	2.99	93.23
\$130 to \$140	18,080	5,412	18,323	41,815	2.16	95.39
\$140 to \$150	13,074	4,748	14,802	32,624	1.68	97.07
\$150 to \$160	9,119	1,924	5,246	16,289	.84	97.91
\$160 to \$170	5,814	2,153	5,833	13,800	.71	98.62
\$170 to \$180	4,693	1,035	3,342	9,070	.47	99.09
\$180 to \$190	2,672	702	1,947	5,321	.27	99.36
\$190 to \$200	2,436	698	2,015	5,149	.26	99.62
\$200 to \$210	1,113	296	711	2,120	.11	99.73
\$210 to \$220	714	238	551	1,503	.08	99.81
\$220 to \$230	714	262	558	1,534	.08	99.89
\$230 to \$240	338	74	258	670	.03	99.92
\$240 to \$250	717	210	644	1,571	.08	100.00
Totals	884,818	291,777	762,804	1,939,399	100.00	

Wages by Classes

Another table shows the average earnings per month of employees in each occupational class in each district and for the United States as a whole separately presented for each of the years 1915, 1916 and 1917, compiled as to 1915 and 1916 from reports to the Interstate Commerce Commission and for 1917 from reports to the Railroad Wage Commission, as follows:

The aggregate annual compensation of the same men based on the average monthly earnings during the year ended December 31, 1917, is \$1,917,419,220, showing that the railroads during that period had made increases amounting to \$306,000,000. The aggregate annual compensation based upon the application of the commission's schedule to the average monthly earnings for the year ended June 30, 1915, is \$2,205,432,938, showing an increase compared with 1915

AVERAGE MONTHLY EARNINGS OF EMPLOYEES OF CLASS 1 RAILROADS IN THE UNITED STATES DURING THE FISCAL YEAR ENDED JUNE 30, 1917, AND THE CALENDAR YEARS ENDED DEC. 31, 1916 AND 1917, RESPECTIVELY

Occupations	1915				1916				1917			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	East ern district	West ern district	West ern district	Total U. S.	East ern district	South ern district	West ern district	Total U. S.	East ern district	South ern district	West ern district	Total U. S.
1. General officers, \$3,000 p. a. and upwards.....	\$161.02	\$222.12	\$102.18	\$151.88	\$169.36	\$136.09	\$147.42	\$151.91	\$168.02	\$131.13	\$124.47	\$151.61
2. General officers, below \$3,000 per annum.....	146.47	113.80	153.23	147.62	147.00	136.74	154.64	147.04	154.95	144.88	161.68	151.77
3. Division officers, below \$3,000 per annum.....	88.55	88.54	91.06	94.05	101.09	95.57	98.53	99.16	102.35	101.36	101.66	101.98
4. Clerks, \$900 p. a. and upwards (except No. 37).....	55.50	50.98	52.21	54.17	58.28	53.94	55.81	56.86	57.84	54.66	55.97	56.77
5. Messengers and attendants.....	40.60	29.51	39.36	36.12	42.42	32.93	41.93	37.26	45.78	36.83	40.43	40.84
6. Assistant engineers and firemen.....	97.75	93.72	88.02	93.42	93.66	98.63	95.45	93.76	94.72	96.26	95.26	94.89
7. M. W. & S. foremen (excluding Nos. 10 and 81).....	88.13	82.57	100.49	92.26	93.56	86.71	97.47	94.36	99.57	9.52	102.77	100.00
8. Section foremen.....	66.68	59.60	63.42	64.30	71.60	63.17	67.08	67.98	67.68	66.65	73.11	73.89
9. General foremen, M. E. department.....	136.78	137.88	134.45	127.77	129.59	124.39	132.01	131.13	130.27	138.69	133.99	137.73
10. Long and other foremen, M. E. department.....	93.06	96.84	100.30	97.24	100.95	103.21	104.84	102.68	111.79	114.59	113.37	112.76
11. Machinists.....	80.71	83.83	94.89	85.87	95.61	97.72	102.98	100.42	100.87	117.89	124.99	116.45
12. Boiler makers.....	84.15	86.97	98.32	89.68	96.00	99.00	110.89	101.46	112.15	120.37	126.88	118.85
13. Blacksmiths.....	76.05	71.30	81.41	77.21	89.63	84.93	93.41	90.22	103.41	102.32	108.17	104.94
14. Masons and bricklayers.....	68.55	50.51	78.75	65.74	67.47	65.76	85.31	77.47	81.61	59.50	67.00	77.15
15. Structural ironworkers.....	71.16	43.38	106.71	74.84	80.49	67.24	107.92	85.88	81.74	75.66	93.10	84.38
16. Carpenters.....	66.80	56.85	64.79	64.00	74.61	60.63	73.75	71.55	80.11	70.15	80.08	78.45
17. Painters and upholsterers.....	63.19	55.20	66.83	63.15	73.77	63.14	72.23	71.44	80.66	73.37	79.90	79.10
18. Electricians.....	74.98	73.18	88.80	78.44	78.42	78.42	79.74	83.79	81.52	89.47	87.03	86.03
19. Air-brake men.....	66.26	62.40	70.84	67.24	79.28	72.89	79.57	78.49	91.57	91.07	104.41	90.41
20. Car inspectors.....	69.20	77.18	80.30	73.48	77.01	83.67	86.98	81.11	91.08	104.21	98.63	95.24
21. Car repairers.....	62.72	55.37	66.40	62.24	71.34	62.68	68.82	68.80	85.92	79.88	80.44	82.78
22. Other skilled laborers.....	71.49	61.18	75.77	71.07	80.66	70.38	77.26	77.99	91.02	84.05	87.80	88.90
23. Mechanics, helpers and apprentices.....	52.14	49.32	57.31	50.39	60.35	50.35	59.92	58.01	71.44	69.25	68.56	68.58
24. Section men.....	19.81	29.93	39.43	37.68	48.34	31.64	42.15	42.41	57.19	36.64	50.95	40.31
25. Other unskilled laborers.....	48.66	39.25	48.24	46.44	53.42	40.21	53.48	50.71	63.01	45.34	60.18	58.75
26. Foremen of coast, gangs and work trains.....	79.76	80.27	93.79	84.36	81.96	77.81	71.83	77.54	90.35	82.10	80.73	85.78
27. Other men in coast, gangs and work trains.....	40.98	36.20	48.83	42.88	51.95	30.50	48.30	46.35	59.56	32.87	55.51	52.44
28. Traveling agents and solicitors.....	16.83	117.37	124.65	123.83	131.88	126.00	131.28	130.54	135.65	129.83	140.39	136.73
29. Employees in outside agencies.....	75.46	70.15	102.01	81.65	78.23	71.87	107.17	86.81	85.09	72.15	102.43	88.10
30. Other traffic employees.....	77.70	68.96	90.91	79.97	74.90	118.85	123.10	139.56	92.84	117.97	128.91	110.68
31. Train dispatchers and directors.....	133.88	127.37	148.83	132.90	134.20	132.26	157.92	143.45	139.92	138.94	164.41	149.76
32. Telegraphers, telephoners, and block operators.....	63.17	64.12	71.81	66.15	68.92	69.71	76.54	71.55	73.79	79.14	80.25	76.29
33. Telegraphers and telephoners operating interlockers.....	68.42	70.80	66.69	68.47	73.20	71.76	68.65	72.50	80.30	82.55	71.64	79.60
34. Levermen (non-telegraphers).....	60.05	53.53	64.82	60.90	65.62	59.11	65.85	64.73	73.07	63.06	69.74	71.69
35. Telegrapher-clerks.....	62.33	63.69	70.54	66.32	67.24	66.53	71.59	69.24	72.80	73.15	75.72	73.31
36. Asent-telegraphers.....	60.36	66.20	71.16	68.50	70.33	70.73	72.92	71.69	76.81	70.99	84.75	73.04
37. Station agents (non-telegraphers).....	81.25	70.94	77.97	77.63	84.31	64.38	82.90	79.37	90.01	70.74	91.75	86.61
38. Station masters and assistants.....	100.00	76.31	82.03	91.29	112.13	78.58	84.28	84.08	115.03	108.79	90.36	106.96
39. Station service employees (except Nos. 5, 6, 37, 38, 39, 40 and 66).....	52.53	34.65	56.15	50.22	57.27	37.59	59.87	54.73	60.99	43.72	62.14	58.57
40. Yardmasters.....	131.40	121.20	135.83	131.00	134.12	131.14	139.03	135.35	150.08	140.24	157.88	151.16
41. Yardmaster's assistants (not yard clerks).....	119.69	108.21	123.44	118.79	128.79	119.63	136.25	129.29	140.31	131.17	157.68	143.43
42. Yard engineers and motormen.....	126.50	20.52	131.24	126.76	135.57	127.26	141.32	134.39	147.50	146.74	155.27	149.78
43. Yard firemen and helpers.....	78.15	64.99	78.24	75.90	81.99	80.99	88.66	82.30	91.70	81.57	95.94	91.66
44. Yard conductors (or foremen).....	113.41	104.66	116.30	110.62	117.97	109.50	123.93	118.61	126.63	123.83	138.19	138.77
45. Yard brakemen (switchmen or helpers).....	96.38	87.65	104.51	91.93	100.23	85.91	105.89	99.81	111.35	96.13	118.04	111.18
46. Yard switch tenders.....	60.90	55.13	58.26	59.99	64.68	56.33	59.15	62.99	72.73	58.87	67.52	70.48
47. Other yard employees.....	51.68	48.97	46.34	51.48	53.89	29.08	50.98	46.71	59.17	43.26	58.56	56.01
48. Hoolders.....	79.09	80.12	83.03	80.95	85.13	83.53	94.23	87.93	100.92	101.83	109.19	103.68
49. Enginehouse men.....	57.68	44.59	61.26	56.58	64.24	48.96	60.67	60.18	76.50	55.89	68.57	69.78
50. Road freight engineers and motormen.....	149.22	159.20	154.71	152.75	145.04	148.48	159.05	154.32	167.38	171.06	188.39	175.64
51. Road freight firemen and helpers.....	94.44	88.71	96.41	94.10	90.61	79.09	105.11	93.82	104.09	90.14	116.22	106.19
52. Road freight conductors.....	131.25	125.87	135.15	131.59	129.09	124.73	146.01	134.77	151.50	144.53	162.51	154.56
53. Road freight brakemen and flamen.....	85.19	76.89	87.09	85.83	83.88	80.69	89.95	87.70	97.90	80.69	110.19	108.77
54. Road passenger engineers and motormen.....	170.38	190.24	182.68	178.46	165.03	185.89	187.89	177.04	171.68	202.16	196.64	185.91
55. Road passenger firemen and helpers.....	100.10	100.32	113.69	106.87	101.48	100.09	118.73	108.11	103.93	110.12	124.17	111.83
56. Road passenger conductors.....	155.28	146.82	154.33	153.57	153.99	150.09	161.23	156.41	161.87	166.81	166.17	163.75
57. Road passenger brakemen and flamen.....	92.31	84.31	68.77	87.03	83.63	80.85	85.66	61.49	99.50	90.11	91.55	98.00
58. Road passenger firemen and flamen.....	90.51	72.30	82.43	85.23	89.06	76.30	84.96	85.94	94.61	84.68	88.21	81.16
59. Other road train employees.....	73.73	68.07	67.67	69.00	85.87	47.94	68.51	65.75	86.19	51.17	71.63	68.14
60. Crossing flamen and gatemen.....	39.97	35.48	40.27	39.50	42.06	34.44	40.03	40.89	46.04	37.11	43.74	43.74
61. Drawbridge operators.....	60.38	40.82	58.30	55.33	60.21	45.19	68.63	58.69	68.63	64.33	64.63	64.63
62. Floating equipment employees.....	63.55	56.35	68.62	54.61	74.82	58.00	74.30	74.36	78.76	74.34	84.17	79.74
63. Express service employees.....	29.88	36.00	.....	.....	63.67	.....	67.85	8.14	6.82	.....	.....	.....
64. Policemen and watchmen.....	58.75	50.05	65.91	59.15	69.95	54.17	69.85	65.23	75.56	58.63	85.64	74.34
65. Other train employees.....	50.00	50.05	47.50	50.00	52.00	47.50	50.00	51.00	60.47	50.11	59.11	59.11
66. All other employees.....	50.05	40.34	.....	50.53	54.57	49.37	49.37	51.84	59.50	53.52	55.48	55.48

Effect on Operating Cost

The commission made an estimate of the probable effect of the new rates upon the cost of operating the railroads during 1918 by applying to the average monthly earnings of each class of employees the rate per cent of increase prescribed for that amount, as disclosed by the table of increased rates in the main body of the report. This estimate was based only on Class 1 railroads, including 1,939,399 employees. The aggregate annual compensation based upon the average monthly payment of men in the same classes during the year ended June 30, 1915, is \$1,611,567,384.

of \$89,805,554 or 5.58 per cent, and an increase as compared with December 31, 1917, of \$288,013,718, or 15.02 per cent.

The report also includes tables of increases of daily wages for a 26-day month or a 31-day month and of hourly wages. For example, where the old rate per day was 75 cents, the new rate is \$1.52 for a 26-day month and \$1.40 for a 31-day month. These figures are arrived at by computation from the table of percentages applied to the monthly earnings. Where the old hourly rate was 10 cents the addition of \$20 per month makes a new hourly rate of 19.75 cents.

for eight-hour workers, 18.5 cents for nine-hour workers, 17.75 cents for ten-hour workers, 17 cents for eleven-hour workers and 16½ cents for 12-hour workers. The following illustrations are given of the application of the rates to employees on daily, hourly and monthly rates of pay:

Application of Rates to Employees on a Daily Rate of Pay

Sectionman C was employed in 1918, but not in 1915. The rate of pay on the division where he is employed in 1918, in 1915 was \$1.10 per day of 12 hours, 7 days a week. The 1918 rate of pay is, on the same division, \$1.50 per day, for the same hours. The monthly rate in 1915 was therefore \$33. It is now \$45. Under the commission's plan of increases he will be entitled to \$53 per month (\$20 increase), or \$8 per month more than his present rate for straight time. He will, therefore, be entitled to receive from January 1 to April 30, \$32 back pay and in the future to receive \$53 per month of 360 hours. His back pay will be computed in the same manner for all overtime worked since January 1, 1918.

Employees on an Hourly Rate of Pay

Machinist "D" was employed in the same shop in 1915 and in 1918 on the same class of work. His hourly rate in 1915 was 35 cents for 9 hours, 26 days a month. He was paid for overtime and Sunday work at time and one-half. In 1918 his hours were reduced to 8 and his rate increased to 40 cents.

According to the commission's plan his increase will be computed on the basis of his standard 1915 hours at the 1915 rate, viz.: 234 hours per month, \$81.90 per month, entitling him to 40 per cent increase in his hourly rate, or 49 cents per hour. In 1918, from January 1 to April 30, he worked 234 hours per month, or an average of 1 hour daily overtime, on the 1918 schedule. This for four months gives him 104 hours overtime. He has been paid as follows:

832 hours straight time at 40 cents.....	\$332.80
104 hours overtime at 60 cents.....	62.40
	<hr/> \$395.20

His back pay will be computed as follows:

832 hours straight time at 49 cents per hour.....	\$407.68
104 hours overtime at 73½ cents per hour.....	76.44
	<hr/> \$484.12
Deduct payment at 1918 rates.....	395.20
	<hr/> \$88.92

and his future rate per hour will be 49 cents.

If the rate per hour for this particular position had been increased to 50 cents on January 1, 1918, there would be no back pay due, and the rate of 50 cents per hour would be continued.

In the case of machinist "E" who was employed in a shop where the rate for his position was 35 cents per hour for 8 hours work in 1915, with time and one-half for overtime, but in the same position and same shop with the same hours in 1918 his rate is 45 cents per hour; his earnings in 1915 in the standard 208 hour month would be \$72.80 per month, and he would be entitled to 41 per cent increase in his hourly rate, viz.: to 49½ cents per hour. His straight time and overtime earnings and back pay would be computed in exactly the same manner as machinist "D." The principles illustrated will apply to all men paid by the hour, whatever their occupation may be.

Employees on a Monthly Rate of Pay

Chief Clerk A occupied the same position in 1915 and in 1918:

1915 salary	\$150 per month
1918 salary	175 per month

Commission's basis of increase on salaries of \$150 per month is 16.17 per cent, or \$24.25 per month. Increased

salary under commission's plan, \$174.25; present salary, \$175. Present salary undisturbed.

Clerk B in 1915 received \$100, and on the same desk in 1918 received \$112.50 per month. Commission's basis of increase on \$100, 31.75 per cent, or \$31.75. Increased salary under commission's plan, \$131.75. Present salary \$112.50. Clerk B is entitled to receive back pay from January 1 to date of the award, at the rate of \$19.25 (the difference between \$131.75 and \$112.50) and to receive monthly, hereafter, \$131.75 instead of \$112.50. Back pay due January 1 to April 30, \$77.

Application of Increases to Pieceworkers

The piece worker is to receive for each hour worked the same ratio of increase per hour as is awarded to the hourly worker engaged in similar employment in the same shop. If the hourly rate has been increased since 1915 to an amount greater than the increase awarded by the commission, then the higher rate shall prevail. Where there was no piece rate for an item or operation in the piece rate schedule of 1915, the current price is to be adjusted by such an amount as a similar item or operation has been increased or decreased since December 31, 1915, or as near such a plan as practicable. When a pieceworker works overtime or undertime, he is to receive that proportion of the increase provided in the schedule, which the time actually worked bears to the normal time in the position.

The plan devised for translating the increases applied to employees generally into mileage rates as applicable to employees in train and engine service is stated in Appendix 6 as follows: There are nine classes of train and engine employees in the Interstate Commerce Commission's classification.

The commission has computed the average monthly earnings of each of these classes for the fiscal year 1915 and applied to the mileage rates paid to these classes in 1915 the same rate per cent which is awarded to the other employees whose monthly straight time wages equal that average. This process is more clearly disclosed by the following table:

	Average monthly earnings 1915	Rate per cent increase in mileage rates
Road freight engineers and motormen.....	\$152.75	15½%
Road freight firemen and helpers.....	94.10	34½%
Road freight conductors	131.59	20½%
Road freight brakemen and flagmen.....	85.83	39½%
Road passenger engineers and motormen.....	178.46	11½%
Road passenger firemen and helpers.....	106.87	28½%
Road passenger conductors	153.57	15½%
Road passenger haggagemen	87.03	38½%
Road passenger brakemen and flagmen.....	85.23	39½%

The actual application of this percentage system has been worked out in tables showing that for the rates for passenger engineers and motormen in 1915 ranging from \$4.10 per 100 miles to \$7 per 100 miles will be substituted new rates ranging from \$4.56 per 100 miles to \$7.79 per 100 miles. This plan will apply to all employees of the train and engine service that are paid on the mileage basis. On railroads upon which men in the train and engine service are paid on a monthly wage the employees will be entitled to the increased rates provided in the standard table. Rates for overtime now in effect are to be increased by the same percentage as straight time rates. If there were mileage rates in effect in 1915 which are not included in the tables they are to be increased in accordance with the percentages contained in the standard table. The following illustration is given of the method of applying increases to employees paid on a mileage basis.

Increases to Employees Paid on a Mileage Basis

Engineer "G" received \$4.25 per 100 miles in 10 hours in 1915. According to the commission's plan, although in 1918 this rate was \$4.25 per 100 miles in 8 hours, the rate

will be increased $11\frac{1}{2}$ per cent to \$4.75 per 100 miles (47281 equalized as \$473). He will be entitled to back pay, for every 100 miles run, at the rate of 48 cents per 100 miles.

If the schedules provide for time and one half for overtime or any other rate in excess of the straight time rate, then he shall be entitled to receive a proportionate increase of pay for overtime mileage.

If the schedules provide for pro rata payment for overtime, back pay will be computed on that basis.

Rates for future earnings will be as fixed by the commission's schedule of increases to employees paid on the mileage basis. If any increase has been made in the mileage rates of employees paid on that basis in 1915 it will be understood that the per cent of increase allowed by this commission is inclusive of such interim increases and that the new rate per 100 miles is computed from the base rates of 1915.

Hours of Service

Charts are presented in Appendix 7 showing the prevailing hours of service in railroad employment in December, 1917, based on a study of 262,637 employees. Of these 64.25 per cent worked six days a week and 35.75 per cent worked seven days a week. Of the six-day workers 1.17 per cent worked 12 hours or more per day regularly, 1.42 per cent worked 11 hours, 40.12 per cent worked 10 hours, 7.3 per cent worked nine hours and 14.25 per cent worked eight hours. Of the seven-day workers 11.75 per cent worked 12 hours, 3.21 per cent worked 11 hours, 12.59 per cent worked 10 hours, 2.35 per cent worked nine hours and 5.84 per cent worked eight hours. Another series of charts shows the percentage of employees working six or seven days per week who regularly perform overtime service. Of the six-day workers 96.8 per cent worked no overtime, 1.74 per cent worked one hour overtime, .67 per cent worked two hours overtime, .76 per cent worked three hours overtime and .05 per cent worked four or more hours overtime. Of the seven-day workers 93.28 per cent worked no overtime, 2.32 per cent worked one hour overtime, 1.85 per cent worked two hours overtime, .67 per cent worked three hours overtime, and 1.88 per cent worked four or more hours overtime.

In Appendix 8 is given a table for the years ended June 30, 1915, December 31, 1916, and December 31, 1917, showing the average earnings per year of each class of railroad employees. From this table may be ascertained the extent of the increases made by the carriers and the wages of their employees in each district in the past three years.

In Appendix 10 are given separately statistics concerning the rates of wages and conditions of employment of employees of the Pullman Company which it was not found feasible to combine with those of the roads. These are presented as an indication of the effect which the commission's plan of increases may have upon that company and its employees.

SOLDIERS USE OLD RAILWAY TIES—Condemned and discarded railroad ties have been utilized by American soldiers stationed at Fort Hancock, Texas, to build semi-permanent houses for the headquarters and other buildings of the army camp patrol headquarters. The ties are stood on ends to make the walls of the houses and discarded railroad rails are used for rafters. Ties are then laid over these to form the flat roof and a coating of adobe mud spread over these clinked ties to make the roof watertight. The crosstie houses are more comfortable in winter and summer than tents. The orderly room, the day room and canteen and the quartermaster supply room are all made of these materials, the canteen having a brick floor and plastered roof.

Proceedings of the Air Brake Association Convention

THE TWENTY-FIFTH ANNUAL CONVENTION of the Air Brake Association was held at the Hotel Winton, Cleveland, Ohio, on May 7 to 10 inclusive, with C. H. Weaver, supervisor air brakes, New York Central Lines west of Buffalo, presiding.

Opening Addresses

In opening the convention President Weaver reviewed the circumstances which led up to the decision of the executive committee to hold the convention, and said in part as follows:

At no time in the history of our association can the air brake man be of such value to his company as at the present war period, by seeing that all air brake work is properly performed and no material wasted. Work slighted or improperly done causes failure. Failures mean delays to traffic and even disaster.

Let the slogan of this convention be to improve the efficiency of the air brake man, thereby making his service to the railroad more valuable. We are not assembled here today as individual units each representing some particular railroad, but as each railroad represents a part of the whole, we are united under one head, organized for the purpose of winning this war.

Following Mr. Weaver's address, D. R. McBain, superintendent motive power of the New York Central Lines west of Buffalo, addressed the convention in behalf of better maintenance of piping, cylinders, pipe connections, etc., on freight car equipment. He called attention to the effect a concerted campaign on the part of all of the members of the association, scattered as they are, all over the continent, might have in improving the condition of freight car brake equipment, especially at the present time when no thought of competitive activity as between the various railroads should be given consideration.

A report on Slack Action in Long Passenger Trains was then presented, of which the following is an abstract:

Slack Action in Long Passenger Trains

Slack action in any train is produced only by a change in velocity between the various cars comprising such train, the degree or severity depending upon the rate at which the change in velocity takes place, and the weight and number of cars involved. Shocks may be produced by: (a) Shutting off the engine throttle quickly and applying the engine and train brakes somewhat heavily; (b) applying the engine brakes and then the train brakes; (c) trains with brake conditions that produce effective braking power on the engine and head cars in advance of the rear cars; (d) cars in a train having a lower percentage of braking power than the balance of cars, which may be due to their being loaded in one case and empty in another; (e) inability to produce a low-brake cylinder pressure in the beginning of a brake application.

Even though all these conditions exist with the exception of the last one, if the engineer so manipulates the brake that light brake cylinder pressure will be obtained when the brake application is first started, any slack action will, of course, occur slowly, and will not be noticeable in the form of shocks.

Inability to produce low brake cylinder pressures may be due to small brake cylinder volumes in proportion to auxiliary reservoir volumes, short piston travel, or the use of too large auxiliary reservoirs. If it is possible to provide and maintain a piston travel that will permit of low cylinder pressures being obtained, this would be the only change necessary in existing types of brake equipment.

Under pneumatic operation of the brakes, increasing the

percentage of braking power on the locomotive and also on the load carrying cars, which might be operated in the forward end of trains, might prevent the slack running out in the form of jerks, but at very low speeds it would increase the tendency for a collision between the head end and rear end of the train, unless provision was made to apply the brake so slowly that the slack action would not be noticeable.

A form of foundation brake gear can be employed which will permit of a longer piston travel being maintained than is common with the single shoe type so largely employed at the present time. This can be depended upon, if equipped with automatic slack adjusters, to maintain the piston travel at practically that for which the operating parts of the brake were designed; viz., eight inches, without greatly increasing the piston travel during brake applications when the train is running, thus insuring a low brake cylinder pressure in the beginning of brake applications, regardless of the train's speed.

With the single shoe type of foundation brake gear now in common use, considerable false piston travel exists. Under such conditions, if the piston travel cannot be maintained sufficiently long when the car is standing to provide necessary flexibility when the car is running and it is not desired to increase the brake shoe clearance, it is necessary to provide an increased brake cylinder volume in order to permit of a low brake cylinder pressure being obtained in the beginning of brake applications; or to reduce the auxiliary reservoir volume so that the proportion of the auxiliary reservoir and brake cylinder will be such that a low brake cylinder pressure will be possible.

If it is impossible to maintain the piston travel sufficiently long to provide for brake flexibility and brake shoe clearance, on account of the action of automatic slack adjusters or excessive false piston travel, it would be necessary in the former case to move the slack adjuster connection towards the nonpressure brake cylinder head to provide the desired increased travel. In the latter case it would be necessary to provide additional movement for the brake piston before striking the nonpressure cylinder head.

If existing types of brake operating equipment are to be maintained intact, the foundation brake gear must of necessity be modified, and any change in this direction should contemplate a brake gear that will provide the minimum of false piston travel and the maximum of effectiveness and convenience, and economy for maintenance.

It is necessary that we depart from the practice of heavy service brake applications, regardless of the train's speed, and that instead of applying the brakes to their maximum in one continuous reduction, the reduction should be made so that the brake application will be gradually produced. For pneumatic operation, the brake application should be timed automatically so that the engineer is able to build up the brake cylinder pressure at a certain rate to some predetermined point in the application, and that this rate be dependent upon the operating conditions obtaining for any particular railroad. Any modification of the service brake does not necessarily involve the emergency brake, so that its effectiveness need not be disturbed. Modifying the service brake by increasing the brake cylinder volume, or by reducing the reservoir volume, can be compensated for by increasing the brake pipe pressure so that the stopping distance would remain the same.

Where the single shoe type of foundation brake gear is in common use and it is the practice to run the piston travel short, necessary shoe clearance is not obtained, with the result that a great many brake shoes are rubbing the wheels very hard when the brakes are released. This increases the difficulty of starting the trains. Increasing the piston travel to provide more flexibility for the service brake, automatically increases the shoe clearance and reduces the diffi-

culty of starting, with a consequent reduction in slack action and also a reduction in the power necessary to start and propel the train. Increasing the piston travel to provide more flexibility for the service brake, also automatically reduces the difficulty of releasing brakes, because it necessitates slightly heavier applications to produce effective braking power.

What Is the Safe Life of an Air Brake Hose?

At the 1917 convention, your committee was instructed to continue their investigation. For the 1918 report we decided to turn our attention to the matter of porous hose, with a view to determining about the average term of service of hose that might be found porous.

The committee obtained records of 25,000 air hose in service. These were inspected in five different groups.

If we accept 25,000 hose as a sufficient number upon which to base a set of averages for the country at large, we may expect to find porous 18.1 per cent of all hose in service, as that is the average percentage of hose found porous from the number of hose inspected.

No data was collected this year covering burst hose, nor did we figure the average length of time in service of those non-porous which we inspected; but did find, as was found last year, that the average life of the air hose still in service was considerably less than those which were found burst or porous, this being due to the fact that hose inspected did not burst until they were in service an average of 28½ months, and might reasonably be expected to burst at any time after that length of service. We find, however, that comparing the average life of the porous hose as of this year with the average life of burst hose as inspected last year, there is only a difference of two tenths of a month in the average life.

Every member is well aware of the detrimental effect of brake pipe leakage, but it is possible that each of us may not give due weight to the effect that a few porous hose in a train may have. In order to determine that, one of the committee caused five trains to be tested for leakage, inspected for porous hose, and again tested for leakage, after the porous hose were removed. The train in each case consisted of 65 cars, and therefore, represented 132 hose, exclusive of those between the engine and tender. The results are shown in Table I.

TABLE I—EFFECT OF POROUS HOSE ON BRAKE PIPE LEAKAGE

Train No.	Leakage per min. before testing	No. hose found porous	Percent of hose porous	Leakage per min. after removing porous hose
1	15 lb.	6	4.55	7 lb.
2	18 lb.	5	3.79	8 lb.
3	20 lb.	8	6.06	6 lb.
4	12 lb.	6	4.55	6 lb.
5	14 lb.	7	5.30	7 lb.

It will be seen from the foregoing that a vast improvement is brought about by inspecting these trains for and removing porous hose, and yet the average number found porous in five trains was only 4.85 per cent. When we remember that of all hose inspected, the general average found porous was about 18 per cent, we may begin to realize the handicap under which our enginemen, as well as our inspectors, are working, and also the out-bound terminal delay due to inaudible brake pipe leakage in the porous hose.

The committee urgently recommends that the various railroads put into effect, when weather permits, a system of inspection and soap suds tests at least on repair tracks, for the purpose of detecting and removing from service all porous hose.

The benefit to be derived from this was quite noticeable on one of the railway lines on which data was collected, where the soap suds test system was inaugurated on repair tracks about the time we began collecting data. It was found that while the percentage of porous hose ran very high at the beginning, it gradually lessened until within two

months it was reduced to such a point that only two per cent of the hose tested were found porous. It was also noticed that out-bound terminal air brake delays decreased.

While the cost of removing hose at the expiration of 28 or 30 months means the expenditure of a large sum, we believe that the additional cost will be offset many times by the decreased out-bound terminal air brake delay and by the increased flexibility of train control, the greater train safety and less damage to the equipment due to air brake manipulation. In order to lengthen the life of air brake hose,

the railroads must do one of three things: either put into effect a rule which will cause the hose to be parted by hand, buy a guaranteed hose from the manufacturer, or take up the use of properly constructed braided hose.

Abstracts of the remainder of the papers and committee reports will be given in next week's issue.

A list of the companies having exhibits at the convention together with a brief statement as to the character of the exhibit, and the names of their representatives present will be found in the General News Section of this issue.

Welding Cast Iron With the Electric Arc

Work Done By New York Central Methods Indicates That No Break Is Too Complicated for Repair

REAL ECONOMIES are being effected in railroad repair shops because it is now possible successfully to repair iron castings damaged from various causes. Heretofore, expensive castings were scrapped because it was not possible to patch them up in a satisfactory manner. Probably the most important phase of this work as applied to steam locomotives is the welding of cylinders. These castings cost in the neighborhood of \$1,000 and in the past it was often necessary to hold an engine in the shop for months

filled up by the metal electrode process, and additional metal is laid over the top of the joint, covering the upper and lower row of studs. This additional metal is known as the "pad."

If the weld does not require strength, it is necessary only to "V" out the sections to be welded, and fill in with the metal electrode until the surfaces are flush. The tensile strength of a section in which steel is applied to a cast iron surface, is, however, only about 5,000 lb. per square in. Usually it is desirable to have the ultimate strength of the weld as much or more than that of the original casting. For this reason, the studs are used, as mentioned in the preceding paragraph.

The required size of these studs, and the manner of placing them, is a subject which has caused a large amount of discussion. Until the welder has become experienced, however, a good method to follow is the one shown in Fig. 1.

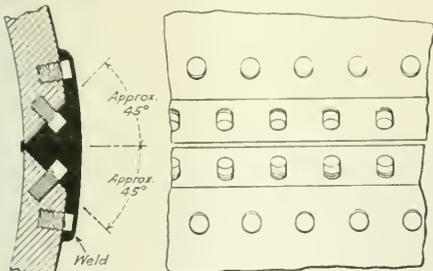


Fig. 1—Section to Be Welded Is "V'd" Out with an Air Chisel and Studs Are Placed in Staggered Rows

while the old casting was taken out and a new one obtained and substituted. Now a broken cylinder can be patched satisfactorily by the electric arc, the work costing from \$50 to \$100, and the locomotive can be released in a few days. Thousands of dollars are saved annually in large locomotive shops, as it is possible with the electric arc to repair castings in place.

The experience of shop men on the New York Central who are interested in welding, proves that it is possible to weld satisfactorily any cast iron material over 1/4 in. in thickness and that no break is too complicated for repair. There are, of course, breaks which are too complicated to weld economically, but there are few such breaks and it is possible to repair any of them. Furthermore, if the proper method be used and proper care be taken in the work, the strength of the weld will be greater than that of the original material.

Preparation of Material for Weld

The material adjoining the fracture is "V'd" out with an air chisel to an angle of about 45 deg. as shown in Fig. 1. Where strength is required, steel studs are placed in the material to be welded in staggered formation as shown in the same illustration. The space which is "V'd" out is then

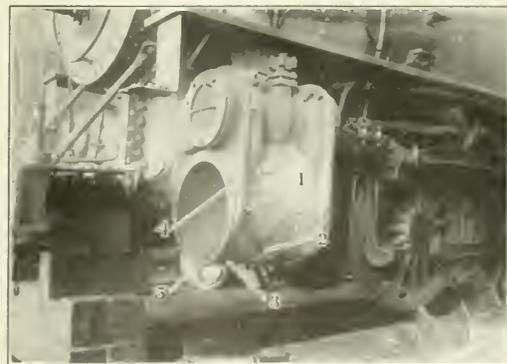


Fig. 2—Triangular Section Replaced in Cylinder by Metal Electrode Process

using studs of such a size and with such a spacing that the strength of the metal in the studs alone will be equal to, or greater than the ultimate tensile strength of the casting.

Best practice in studding, as used by the New York Central, is shown in Fig. 6. It will be noticed that the studs in the "V" are smaller than those outside. An example of the practice used is to place 1/2 in. studs in the "V" of a fracture with 1 in. thickness and 3/4 in. studs outside of the "V" in the pad of the weld.

A comparative simple cylinder repair is shown in Fig. 7.

In this illustration the section 4-2-5 was broken out of a cylinder. Most of the broken section was in small pieces, but the flange 4-5 was intact. The first part of the operation was to replace this flange, and weld it into position. This left a triangular hole, 1-2-3. A piece of wrought iron was cut and rolled to fit this triangle. The outer edges of the wrought iron were beveled, and the inner edges of the hole in the cylinder were beveled, and the inner edges of the hole in the cylinder were beveled and studded with mild steel studs. The wrought iron patch was then clamped in place temporarily, while the weld was "tacked" at several points. The clamps were removed, and the weld completed. The reasons for using wrought iron for the patch are that wrought

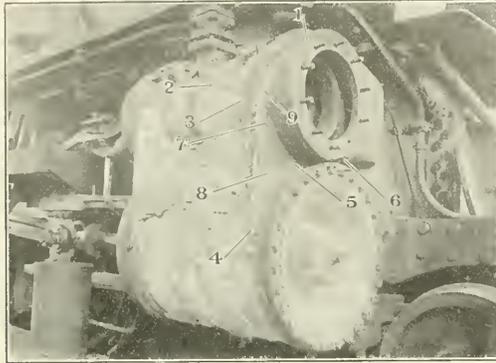


Fig. 3—A Badly Broken Casting Which Taxed the Ingenuity of the Welder

iron is easily cut and shaped to fit such a break, and that it is not necessary to place studs in the wrought iron in order to make a perfect weld. The thickness of metal in the wrought iron patch is equal to the thickness of the original casting. A much more complicated cylinder fracture is shown



Fig. 4—Hole Cut in Valve Chest with the Oxy-Acetylene Torch. Metal Surrounding the Hole Has Been Drilled and Tapped for Studs, and Metal Shown Under the Hole Has Been Repaired with the Electric Arc

in Fig. 3. The parts broken out were the section 1-2-3-4-5-6. The flange 1-6 was found intact, and was "V'd" out and welded into position. A straight piece 4-9 was made, and secured to the body of cylinder and valve casting with long studs. The section 1-2-3-4-9 was then built up by the metal electrode process. This left the triangular hole 5-7-8. A

piece of wrought iron was cut out to approximately fit this hole and welded into position, in exactly the same way as the wrought iron was welded into the first cylinder described.

A unique application of welding is shown in Figs. 4 and 5. Fractures developed in the valve ports at about mid



Fig. 5—The Hole Shown in Fig. 4 Has Been Closed With a Piece of Wrought Iron Welded in Place with the Electric Arc

position in the valve. It was impossible to reach the fracture through the head of the valve cylinder, so a circular piece was cut out of the side of the valve chamber with an oxy-acetylene torch as shown in Fig. 4. This made it a comparatively simple matter to get at the broken parts and repair them with the arc. A piece of wrought iron with beveled edges was cut to approximately fill the hole, the



Fig. 6—The Four Sides of This Cylinder Saddle Were Cut Out to Permit the Repair of the Exhaust Passage. One and One-Quarter-Inch Boiler Plate and the Electric Arc Made the Saddle as Good as New

sides of the hole were beveled and studded, and the wrought iron plate welded into position with the metal electrode as shown in Fig. 5.

One locomotive was brought into the shop with the exhaust passage broken inside the cylinder saddle. In order to repair the break, it was necessary to get at it from all four sides. Accordingly, a large opening was cut in each of the four sides of the saddle with an oxy-acetylene cutting torch. The crack in the exhaust passage was "V'd" out and studded, and the edges of the holes cut in the side of the cylinder saddle were beveled and studded, as shown in Fig.

6. The operator then welded the break in the passage by working through the holes cut in the saddle. After the break had been repaired, the holes in the saddle were closed and welded. Pieces of 1½ in. boiler plate were used to replace the metal taken out on the four sides of the saddle. This operation supplies conclusive evidence to show that the possibilities of electric arc welding, in connection with the welding of cast iron, are practically unlimited.

General Foreman McAllister, of the West Albany shops, has made a special study of cast iron welding, and his capability in this respect has been recognized, as he was one of the committee appointed by former Collector Malone to report on the method of handling repairs on the interned German ships. It is now a well-known fact that the use of the electric arc in repairing these ships greatly facilitated getting them into service quickly at a minimum cost. Work which ordinarily would have taken over a year was finished in two or three months. In connection with the work at West Albany, Mr. McAllister says that even though the cost of materials has increased over 100 per cent and labor has made an advance of from 50 to 100 per cent during the past two or three years, the cost per locomotive mile for repairs has remained approximately constant. This is due altogether to shop economies, the most important of which is the use of electric arc welding.

Safety-First and the Golden Rule

ON THE DETROIT DIVISION of the Pere Marquette, the Safety-First Committee consists of the trainmasters, the division engineer, the master mechanic, the road foreman of engines, the chief dispatcher, the general yardmasters, the agents at Detroit and Lansing and foremen, clerks and others to the number of 19 in all; and each one of these men is required to constitute himself chairman of another committee consisting, besides himself, as chairman, of employees who have broken some rule. Once on this committee, a member is required to explain how the violation of the rule happened to occur, and to consider what the consequences might have been. Membership in the committee lasts until such time as a new violation of the rules occurs, when the oldest member retires, making way for the new man. In this way, the committee becomes a sort of endless chain. This creates a rivalry among the men and has the effect of putting them on their guard against infractions of the rules, to the end that they may escape the duties and obligations of the committee work.

J. J. Corcoran, superintendent of this division, issues educational bulletins whenever a suitable occasion offers, not waiting until some bad accident occurs. Bulletin No. 39, dated December 31 and reprinted in the Pere Marquette Magazine for February, takes for its text the butting collision of passenger trains at North Vernon, Indiana, on December 29. It says, in part:

"It is indeed unfortunate that this bulletin is on the same subject as the preceding number, but it is fortunate that the affair is not credited to our railroad. The cause is said to be the east-bound train disregarding orders. Now, let us draw a parallel with our division, and then ask ourselves a few questions. . . . I am just wondering what respect was given the automatic signals. Were the train orders handled as they should have been? We have known of cases where the rules were not followed, in so far as properly reading the orders is prescribed. Was the intermediate preventive overlooked in this case; that is, the conductor with the air signal notifying the engineer that they had a meeting point at the next stop? How were the automatic signals respected? Perhaps if any one of the three points mentioned had been literally lived up to, this accident could have been avoided."

And the bulletin goes on to give, says the Pere Marquette Magazine, some "Golden Rule admonitions" to conductors, engineers and others to ponder lessons of this kind without waiting for a disaster to occur on their own division. The magazine gives quotations from other bulletins embodying the Christian doctrine of the golden rule. Some of these are—

No. 1, to trainmasters:

"It is exasperating to read the numerous reports which have been received covering damaged switch points, stands and connecting rods on account of switches being run through. We must take action to have this kind of work discontinued. Speedy investigations should be conducted. It is not necessary that they be long drawn out affairs, taking up a lot of your time. Hustle each one of the cases to a conclusion and mete out the discipline you think is warranted.

"Cold weather is now on and naturally the men are bundled up in heavy wearing apparel and engineers should understand that men handling switches cannot be as active as when free from burdensome clothing. . . .

No. 2:—"Of course, all of you gentlemen are familiar with the very bad accident which happened on a railroad other than the Pere Marquette, between a steam railway movement and a street car. Several months ago we had several cases where a number of street cars at crossings were not handled just as they should have been. Each of you will, of course, continue your vigilant observation and research into the conduct of all employees located there.

. . . The division engineer will please have his supervisor and section foreman report anything which in their judgment is irregular. The signal engineer, the trainmaster and road foremen will handle this with train and engineers and yardmasters. . . . I personally canvassed each point myself and find that they are being handled properly at the present time; eternal vigilance, without question, keeps us out of irregularities better than anything else."

No. 3:—"I understand that on some divisions where electric blocks are in operation it has been the practice where one train followed another closely instead of remaining back until the blocks cleared and permitted them to go, they put a flagman on the preceding train.

"I would like to know if anything like this could be happening on this division. We cannot be too severe on these fellows who willfully disregard such rules. Do not hesitate to take decisive and severe action with anyone you find violating these rules."

No. 4:—"I cannot resist from appealing to all that we should have uniform railroading. We seem to be satisfied with semi-annual house cleaning periods—spring and fall. During each of those two periods a thorough renovation is made and the untidy housekeeper just thinks there is nothing further to be done until the next regular house cleaning period, but it is in the interim that her troubles accumulate.

"It is so with railroads. The supervision gets lax and a lot of accidents occur and then everybody starts house-cleaning. They get on their toes and harp about compliance with the rules; and finally straighten out and go along as they should for a short time; but we gradually forget what has gone before and matters get back into the old rut and we let a lot of little troubles accumulate without any action being taken until finally we run into another epidemic of accidents and then comes another house-cleaning.

"But what I am hinting at is to keep cleaning all the time; and I don't mean vigilance and observance of the rules. Frankly, I think we are keeping our house pretty clean, but let us continue to do so.

"What is your answer to this?"

Further, says the editor of the magazine, Mr. Corcoran has successfully handled the training problems of the Detroit division with practically the same set of employees that surrounded his less successful predecessors.

General News Department

A free school for instruction in telegraphy has been opened by the Boston & Albany at Springfield, Mass.

The wheel and axle warehouse of the Louisville & Nashville, at Louisville, Ky., was destroyed by fire on May 2; estimated loss, \$125,000.

The freight house of the Baltimore & Ohio at Braddock, Pa., together with a storehouse containing unclaimed freight, was destroyed by fire on May 1; estimated loss on real estate, \$35,000, and on merchandise, \$75,000; total, \$110,000.

The Texas Short Line railroads have sent a deputation, accompanied by the chairman of the State Railroad Commission, to the railroad administration at Washington, asking special consideration of the Texas short line railroad situation.

On the dining cars of the Erie Railroad the prices of meals are now fixed, and a la carte rates have been discontinued. The price for a dinner is \$1 and for a breakfast or luncheon 75 cents. To members of the military and naval forces, in uniform, the rate is 75 cents uniformly, morning, noon and night.

The Ozark Valley Railway, a 35-mile line extending from Williamsville, Mo., northward to Cascade, has been sold for junk to the Bender Iron & Supply Company, Shreveport, La., subject to the confirmation of the United States district court, under which the road has been operated by G. A. Long, receiver.

The Atchison, Topeka & Santa Fe has applied to the Kansas Public Utilities Commission for authority to take up the track of its line between Wellington and Caldwell, a distance of about 20 miles. This line has not been used for several years, trains being run over the parallel line of the Chicago, Rock Island & Pacific.

The annual meeting of the Western Railway Club will be held at the Hotel Sherman, May 20, the informal banquet being held in the Italian room at 6:30 p. m. and meeting in the Louis XVI room at 8 p. m. The principal speaker of the evening will be professor H. G. Moulton, of the department of political economy, University of Chicago, who will speak on "The Business Side of the War." The Memorial Committee will present resolutions on the death of Joseph Taylor, the late secretary of the club. There will be the usual annual meeting and election of officers.

The Division of Valuation of the Interstate Commerce Commission wants senior electrical engineers, grade 2; junior civil engineers, grade 1; and junior engineers in the same grade for the electrical, mechanical, signal, structural, telegraph and telephone departments; also junior architects. Candidates for senior electrical engineer will have their applications considered on June 18, while those for the other offices named will be taken up at any time, regardless of date. The salaries for the first named office will range from \$1,800 to \$2,700; and for the other places, from \$1,320 to \$1,680.

The Chicago council committee on track elevation went to Washington this week to confer with the director general of railroads on the subject of railroad track elevation work in Chicago during the war. The committee wishes to determine whether the prosecution of the war demands the total or partial discontinuance of elevation work in the city. The committee carried with it statistics prepared by the coroner showing the number of persons killed and injured at grade crossings in the city in 1916 and 1917. Solon Gold, engineer of track elevation for the city, accompanied the committee to Washington.

The stationary storehouse of the New York, New Haven & Hartford, at New Haven, Conn., was destroyed by fire on May 9; estimated loss, including contents of building and freight and passenger cars, \$80,000. On the day before,

Wednesday, the passenger station of this road at New Haven was gutted by fire and practically ruined. This building was used mostly for offices, as some months previously a temporary wooden station was put in use preparatory to the construction of a new passenger station a short distance west of the present location. The burned station was of brick, three stories high, built in about 1871 and rebuilt in 1891 after the fire of that year.

M. C. B. and M. M. Associations

The Executive Committees of the Master Car Builders' and the Master Mechanics' Association, at a joint meeting held in Chicago on May 13, elected V. R. Hawthorne secretary of both associations, to fill temporarily the vacancy caused by the death of Joseph W. Taylor. Mr. Hawthorne was formerly in the service of the Pennsylvania Railroad, but for the past year has been engaged in work for the American Railway Association.

Vestibuled Cabs

The New York legislature has passed a law requiring all new locomotives which shall be put in service after this year (1918) and all taken into the shop after January 1, next, for general repairs, to be equipped with "vestibuled" cabs, so constructed as "to attach to the sides of and inclose all openings between the engine cab and the tender." The New York law requiring power-operated fire-box doors on locomotives goes into effect on the same date on all new locomotives placed in service after January 1, next, and locomotives now in service must be equipped with vestibules the next time they are withdrawn for "generally heavy repairs," after the act becomes effective next January.

Fuel Consumption by Railroads in 1917

The Geological Survey reports that the immense increase in railroad traffic has increased correspondingly the quantity of petroleum consumed as locomotive fuel in 1917, despite the mounting cost and growing scarcity. Statistics compiled from reports submitted by all railroad companies that operated oil-burning locomotives in the United States show that the quantity of fuel oil consumed by them in 1917 was 45,707,082 barrels, or 8.5 per cent over 1916 and a larger consumption than in any other year.

The total distance covered by oil-burning engines in 1917 was 146,997,144 miles, and the average distance covered per barrel of fuel consumed was 3.2 miles. Oil-burning locomotives were run on 32,431 miles of road in 21 States.

Western Roads Will Use Government

Employment Agencies

Railroads under the authority of the Western regional director have agreed to discontinue the use of employment agencies conducted for profit and to obtain their track labor exclusively through the United States employment service. The carriers' own free labor agencies are to be continued as branches of the United States free employment service. The employees of these agencies will be appointed examiners in the Federal service at one dollar a year, and will continue to receive their regular compensation from the railroads. Those agencies operating labor camps under contracts with railroads have similarly been taken over by the United States employment service. Although private labor agencies will no longer be used by the roads, the United States employment service is taking over many of the best operatives of these organizations. In Chicago alone 20 employees of labor agencies have joined the United States employment service and in Omaha four have been employed.

The plan for recruiting track labor under the new arrangement has been worked out by Dr. P. L. Prentis, superintendent of District 7 of the United States employment service, with head-

quarters at Chicago, and W. G. Bierd, chairman of the Chicago Railroad Presidents' Committee, who is the representative of R. H. Ashton, regional director. Several railroad officers with practical experience in employing laborers have assisted them in this work. Dr. Prentiss and the superintendents of the other districts of the United States employment service in the western railroad region will supervise the recruiting of track labor in their respective territories, in co-operation with the existing organizations maintained by the railroads. Each superintendent will aim to supply the labor demand in his own territory and in case he secures an excess will turn over the surplus to adjoining districts in need of men.

Railroad men with experience in handling laborers believe that this plan of distributing men is practicable only within certain limits. They point out that the hobo class of labor is of a roving disposition and accustomed to making long trips from points where they have wintered before they are willing to settle down and do any work. It is also pointed out that the maximum wage of \$2.75 for terminal points and \$2.50 a day for points on the line, recently established by the Railroad Administration for western lines, is not sufficient to attract men. The recent recommendations of the Railway Wage Commission are based upon conditions in December, 1915, when track laborers received from \$1.65 to \$1.75 a day, so that the 43 per cent increase recommended will only raise the track laborer's wage to from \$2.35 to \$2.50 a day, or less than the maximum wage recently established for railroads in western territory. While it is probable that wages will have to be increased above this maximum, it is pointed out that it is not necessary to raise the compensation for track labor to the standards obtaining in war industries, as there is an attraction about track work which induces men who have had experience on railroads to work at less pay than is offered in other industries, provided the pay is sufficient to supply them with the necessities and the pleasures which they are used to.

The Overman Bill

The Overman bill, authorizing the President to reorganize the executive departments of the government, was passed by the House of Representatives on Tuesday of this week, and has been sent to the President. The amendment to except the Interstate Commerce Commission from this law was rejected in the House by a vote of 213 to 7. In the debate on the bill, Chairman Webb, of the Judiciary Committee, said that President Wilson had told him that he had no intention of taking away the functions of the Interstate Commerce Commission, especially such functions as the power of the commission to review freight and passenger rates, as conferred by the railroad control bill; but the President said that he could make use of many employees and experts of the Interstate Commerce Commission in other departments of government work.

Inefficiency of the Post Office Department

The Merchants' Association of New York city, acting on a voluminous report made by a committee, after five months' investigation, has presented to Congress a memorial calling for the appointment of a joint committee to make a comprehensive investigation of the present methods of the Post Office Department. These methods have resulted in serious delays throughout the country. The investigating committee finds that about 44 per cent of the railroad lines formerly served by railway postal cars, have been wholly or partly deprived of the advantages of that service, and that economizing space in cars, to reduce the cost of transportation, is constantly causing unreasonable delays. The investigating committee finds that mails are not despatched with former frequency; that they are not fully worked in transit; and that train delays are not a principal cause of slowness in the mails.

Society for Testing Materials

The twenty-first annual meeting of the American Society for Testing Materials will be held at the Hotel Traymore, Atlantic City, N. J., on June 25, 26, 27 and 28. Wednesday afternoon, the 26th, will be devoted to topical discussions on Co-operation in Industrial Research, while the evening session on Thursday will be a joint meeting with the American Concrete Institute. The annual golf tournament will be held on Thursday afternoon.

Bugs Stop Train

A freight train on the Chicago Burlington & Quincy was stalled on May 7 near Stockholm, Wis., when it ran into an immense cloud of shad flies. The crushed bodies of the insects lubricated the tracks to such an extent that the driving wheels slipped. It was necessary to clean the rails before the locomotive could make headway.

Miss Phœbe's Finish?

Should McAdoo
Miss Snow Taboo
And veil her face from human view,
In Memory's light
She'd still shine bright
Along the Road of Autraucite

—J. B. G., in Verse of the Month

Wooden Passenger Cars Passing Out of Service

In order to ascertain the progress of the building of steel and steel underframe passenger train cars and to develop the cost of reconstruction in steel of the present wooden equipment of the country the Special Committee on Relations of Railroad Operation to Legislation sent certain requests to the carriers on January 2, 1918. Replies were received from 434 roads operating 246,224 miles in the United States and 64,816 passenger train vehicles, and with 966 under construction on January 1. Replies were also received from eight companies operating 33,269 miles in Canada, with 5,422 passenger train vehicles, and with 35 under construction on the same date. Estimates and percentages in the tables apply only to cars operated by roads in the United States.

It will be noted that there were but five wooden passenger train cars constructed in 1917 and that but 27 such wooden cars were under construction on January 1, 1918, indicating that the building of wooden passenger train cars has practically ceased.

ANNUAL ADDITIONS OF PASSENGER EQUIPMENT

Acquired in	Total number	PERCENTAGES		
		Steel	Steel underframe	Wood
1909.....	1,880	26.0	22.6	51.4
1910.....	3,638	55.4	14.8	29.8
1911.....	3,756	59.0	20.3	20.7
1912.....	2,660	68.7	26.9*	20.4
1913.....	3,350	63.0	30.4*	6.6
1914.....	4,495	74.6	39.7*	4.5
1915.....	1,696	73.7	20.1*	6.2
1916.....	1,445	93.5	72.8	2.7
1917.....	2,780	62.5	37.3*	—
January 1, 1918 (under construction).....	966	90.8	6.4	2.8

*This figure includes wooden cars reconstructed with steel underframe.

The rapid increase in steel and steel underframe cars is shown below:

Approximately in service	Steel	Steel underframe
January 1, 1909.....	62	673
January 1, 1910.....	1,117	1,088
January 1, 1911.....	3,111	769
January 1, 1912.....	5,347	309
January 1, 1913.....	7,221	1,266
January 1, 1914.....	9,456	4,698
January 1, 1915.....	12,966	5,274
January 1, 1916.....	14,286	6,061
January 1, 1917.....	15,784	6,139
January 1, 1918.....	12,601	8,319
Increase 1918 over 1909.....	16,927	7,646
Increase 1918 over 1909.....	2,698	1,178
Increase 1918 over 1917.....	1.7	25.6

The number of wooden cars in service on January 1, 1912, was 48,126. There are now in service approximately 38,876, indicating the retirement from service of 9,250 cars in six years.

APPROXIMATE COST OF REPLACEMENT WOODEN CAR WITH CAR OF STEEL

	Number	Average cost*	Amount
Postal.....	15	\$1,000	\$15,000
Mail and baggage.....	12	12,000	144,000
Mail baggage and passenger.....	78	17,500	1,365,000
Baggage and passenger.....	3,441	17,500	60,217,500
Passenger, air express.....	1,088	24,800	26,982,400
Passenger.....	4,057	19,000	77,083,000
Parlor, sleeping, dining.....	3,978	17,000	67,626,000
Business.....	72	6,000	432,000
Motor.....	276	15,000	4,140,000
Total.....	10,876		\$181,220,900
Annual interest charge at 5 per cent.....			\$4,110,445

*This cost figure is for a car to be used a year.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY, 1918

Name of road	Average mileage operated		Operating revenues		Maintenance of		Operating expenses		Total	Net railway income (or decr.)	Railway tax	Operating income (or decr.)
	Freight	Passenger	(Total)	(Total)	Way and equip.	Trans-traffic	General	Operating				
Atkins, Top, & Santa Fe.....	\$17,469.81	\$2,512,167	\$1,309,007	\$5,042,537	\$153,725	\$3,013,780	\$33,532	\$7,641,424	\$7,641,424	\$10,500	\$46,713	\$57,207
Baltimore & Ohio.....	6,988,407	1,550,430	1,347,707	2,793,224	1,755,034	5,150,215	-81,907	8,398,548	8,398,548	556,882	3,438,471	901,598
Carrollton & Santa Fe.....	215,943	29,738	207,284	40,815	5,576	13,140	10,521	90,837	90,837	11,346	11,346	39,697
Chicago & North Western.....	1,078,616	1,238,641	1,078,616	1,238,641	181,027	3,387,447	32,853	6,950,083	6,950,083	20,000	25,620	26,128
Chicago & Western.....	578,316	336,253	336,253	714,569	20,195	3,387,447	4,762	185,667	185,667	16,000	16,000	9,961
Chicago, Rock Island & Pacific.....	2,099,680	690,238	4,442,077	7,000,304	8,514	231,392	16,881	4,333,637	4,333,637	23,923	23,923	13,836
Central New England.....	1,004,959	344,886	3,321,418	2,438,400	24,348	1,039,349	7,204	403,410	403,410	164,556	333,719	164,556
Central of Ohio.....	3,338,746	1,338,746	1,074,486	1,532,623	85,768	189,490	8,511	1,358,814	1,358,814	395,762	397,903	363,877
Central of Pennsylvania.....	155,221	117,321	901,194	174,863	21,737	421,317	35,027	473,894	473,894	36,986	37,303	55,225
Chicago & Eastern Indiana.....	314,341	375,829	399,530	883,791	71,615	2,101,924	9,548	3,674,233	3,674,233	164,684	164,684	587,070
Chicago, Rock Island & Pacific.....	1,447,177	4,746	2,042,704	30,776	32,223	669,501	4,079	1,442,165	1,442,165	157,254	442,157	31,887
Chicago & Western.....	894,616	4,863,12	1,489,689	33,362	220,263	2,681,3	81,627	3,321,297	3,321,297	137,742	137,742	190,572
Chicago & North Western.....	3,264,612	4,949,291	54,989	4,949,291	4,301	65,926	1,627	3,312,426	3,312,426	17,432	10,434	-65,056
Chicago & Western.....	3,209,143	885,118	4,676,354	959,035	1,424,199	2,778,924	19,536	5,437,635	5,437,635	811,281	288,339	-1,096,666
Chicago & Western.....	3,209,143	885,118	4,676,354	959,035	1,424,199	2,778,924	19,536	5,437,635	5,437,635	811,281	288,339	-1,096,666
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Chicago & Western.....	3,209,143	885,118	4,676,354	959,035	1,424,199	2,778,924	19,536	5,437,635	5,437,635	811,281	288,339	-1,096,666
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Chicago &												

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH, 1918, CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance of way and equip.		Operating expenses		Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase comp. with last year.
		Freight.	Passenger.	(inc. misc.)	Total.	Trans- portation.	Traffic.	General.						
Denver & Salt Lake	255	\$139,992	\$22,967	\$162,959	\$43,594	\$83,973	\$3,444	\$106,591	122.45	\$36,444	\$9,000	\$44,044	\$4,788	
Denver & North Platte	280	24,254	4,224	30,478	7,551	13,923	1,634	22,575	107.50	8,903	1,400	10,303	5,161	
Detroit & Toledo Shore Line	80	175,974	178,794	354,768	18,400	13,317	32,717	84,514	47.38	94,890	11,400	106,290	3,666	
Det., Grand Haven & Milwaukee	400	17,000	37,460	54,460	35,060	68,666	3,943	155,696	271,866	70.7	1,444	1,180	43,669	
Det., Toledo & Ironton	141	147,190	10,886	158,076	28,425	59,660	2,616	106,579	135.07	67.9	1,444	62,843	60,971	
Duluth & Iron Range	284	87,670	20,822	108,492	74,939	75,054	771	117,727	135.00	13,479	7,277	21,476	1,478	
Duluth, Missoula & North	400	131,751	169,544	291,295	130,444	147,000	3,916	281,360	117.47	11,747	11,635	23,382	18,267	
Duluth, St. Paul & Northern Pacific	400	1,125,741	77,721	1,203,462	51,563	51,563	1,147	1,255,025	117.47	11,747	11,635	23,382	18,267	
Duluth, Winnipeg & Pacific	175	1,257,141	27,678	1,284,819	177,664	223,203	3,468	1,508,391	78.32	34,478	7,412	41,890	43,458	
E. Pass. & Northwestern Co.	1,028	82,803	209,134	291,937	115,516	163,227	1,227	278,743	134.08	54,083	50,875	105,958	51,033	
Elgin, Joliet & Eastern	804	1,214,194	16	1,214,210	136,446	278,300	6,715	344,751	134.00	87,044	50,772	137,816	1,340	
Empire State	1,890	4,937,779	786,412	6,314,191	804,841	1,813,978	12,210	2,618,826	100.70	43,376	236,927	280,303	67,914	
Florida	1,000	3,487,477	34,847	3,522,324	1,000,000	1,000,000	1,000	2,522,324	134.84	518,324	50,000	568,324	47,754	
Flt. Worth & Wrentham R. Co.	454	469,535	149,437	618,972	111,314	127,366	6,094	197,680	83.57	11,816	1,171	12,987	61	
Galveston, Harrisburgh & Ship Am.	1,350	1,213,433	419,139	1,732,572	240,332	265,034	34,534	294,866	79.41	37,440	51,570	88,910	6,478	
Galv. South & Ft. Worth	402	167,643	103,975	271,618	107,777	120,110	8,358	215,885	59.43	13,437	1,903	15,337	7,787	
Gen. Sout. & Fla.	1,137	1,073,511	103,975	1,177,486	34,792	54,626	6,291	115,418	79.0	58.9	14,341	14,399	13,627	
Grand Rapids & Ind.	560	400,000	123,956	523,956	73,346	124,513	9,450	183,305	83.85	64,648	7,679	72,327	7,344	
Grand Trunk Western	347	519,000	141,600	660,600	76,912	257,028	15,442	372,176	113.94	47,314	37,649	84,963	15,744	
Gulf & Ship Island	307	149,143	45,000	194,143	36,316	30,313	3,291	63,889	68.78	6,347	19,368	25,715	1,707	
Gulf, Mobile & Northern	1,027	1,533,484	30,886	1,564,370	193,341	257,407	5,656	454,804	57.80	56,958	76,278	133,236	1,641	
Houston, East & West Texas	190	1,043,25	37,798	1,081,048	41,370	79,277	12,323	130,647	78.89	35,537	6,100	41,637	34,84	
Houston & Texas Eastern	143	677,517	178,571	856,088	16,171	30,000	13,353	46,171	74.39	19,302	33,030	52,332	9,47	
Ill. Cent.	4,765	6,877,451	1,406,077	8,283,528	1,062,101	1,652,110	76,883	2,714,211	70.15	2,651,137	43,748	3,188,585	417,64	
Ind. Harbor	1,116	771,516	291,675	1,063,191	58,977	98,235	2,073	157,212	86.16	70,043	8,987	79,030	6,776	
International Great Northern	1,443	3,963,336	391,584	4,354,920	1,202,429	1,604,856	19,668	2,817,285	74.51	293,186	30,000	323,186	110,633	
Kansas City, Mex. & Orient	272	275,560	10,342	285,902	19,006	41,732	4,063	60,739	123.63	18,225	18,747	37,472	34,573	
Kansas City, Mexico & Orient of Tex.	465	895,056	10,137	905,193	16,292	25,276	4,366	32,404	103.90	10,914	5,660	16,574	3,57	
Kansas City Southern	774	697,056	170,647	867,703	199,257	209,557	20,957	461,407	439.89	83,277	23,278	106,545	5,168	
Lake Erie & West.	900	738,043	43,712	781,755	151,843	186,069	12,334	267,886	72.18	23,278	5,800	29,078	1,466	
Leland & Anderson Rivers	206	187,943	3,492	191,435	23,692	39,036	1,446	46,134	134.53	19,694	6,100	25,794	1,466	
Lehigh Valley	3,982	3,963,336	391,584	4,354,920	1,202,429	1,604,856	19,668	2,817,285	74.51	293,186	30,000	323,186	110,633	
Lehigh Valley	1,646	763,134	165,114	928,248	154,156	192,393	16,760	270,549	83.28	166,300	4,300	170,600	15,781	
Louisiana	1,116	774,064	305,115	1,079,179	190,655	224,124	10,456	415,779	88.63	69,408	1,700	71,108	8,171	
Louisiana & Arkansas	307	235,346	57,406	292,752	52,862	46,104	7,669	82,468	134.53	19,694	6,100	25,794	1,466	
Louisiana West.	509	506,250	1,606,242	2,112,492	1,202,429	1,604,856	19,668	2,817,285	69.55	51,924	6,814	58,738	6,944	
Marathon	1,116	774,064	305,115	1,079,179	190,655	224,124	10,456	415,779	88.63	69,408	1,700	71,108	8,171	
Marshall, Delaware & V. Ry. Co.	1,861	3,947,429	1,084,674	5,032,103	818,694	1,048,848	31,843	2,148,542	78.37	54,673	10,548	65,221	27,290	
Marquette	386	609,664	57,406	667,070	35,510	33,088	2,905	68,603	131.69	54,531	7,214	61,745	4,142	
Marquette Valley	1,646	763,134	165,114	928,248	154,156	192,393	16,760	270,549	83.28	166,300	4,300	170,600	15,781	
Memphis	1,116	774,064	305,115	1,079,179	190,655	224,124	10,456	415,779	88.63	69,408	1,700	71,108	8,171	
Memphis & Paducah	1,116	774,064	305,115	1,079,179	190,655	224,124	10,456	415,779	88.63	69,408	1,700	71,108	8,171	
Memphis, Paducah & S. L.	1,116	774,064	305,115	1,079,179	190,655	224,124	10,456	415,779	88.63	69,408	1,700	71,108	8,171	
Memphis, Paducah & S. L.	1,116	774,064	305,115	1,079,179	190,655	224,124	10,456	415,779	88.63	69,408	1,700	71,108	8,171	
Memphis, Paducah & S. L.	1,116	774,064	305,115	1,079,179	190,655	224,124	10,456	415,779	88.63	69,408	1,700	71,108	8,171	
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Program of Convention of Fuel Association

The tenth annual convention of the International Railway Fuel Association will be held at the Hotel Sherman, Chicago, on Thursday and Friday, May 23 and 24, under the auspices of the United States Railroad Administration and the United States Fuel Administration. The convention will open on the first day at 10 a. m. and on the second day at 9:30 a. m. The program is as follows:

Thursday

Introductory Address by E. W. Pratt, President, International Railway Fuel Association.

"The Railroads and Their Relation to the Fuel Problem," by C. R. Gray, Director, Division of Transportation, United States Railroad Administration.

"What Can Be Done for Our Northern Ally," by Sir George Bury, Chairman, Canadian Railway War Board.

"What the Men on the Locomotives Can Do," by W. S. Stone, Grand Chief, Brotherhood of Locomotive Engineers.

"The Motive Power Department and Fuel Economy," by R. Quayle, General Superintendent, Motive Power and Car Department Chicago & North Western.

"The Railroad Industrial Army," by W. S. Carter, Director, Division of Labor, U. S. Railroad Administration.

"Relation of Locomotive Maintenance to Fuel Economy," by Frank McManamy, Director, Division of Locomotive Maintenance, U. S. Railroad Administration.

"The Transportation Department and Fuel Economy," by E. H. De Groot, Jr., Assistant Manager, Car Service Section, Division of Transportation, U. S. Railroad Administration.

Friday

"The Fuel Problem and the War," by H. A. Garfield, U. S. Fuel Administrator.

"The Need for Fuel Conservation," by P. B. Noyes, Director, Conservation Division, U. S. Fuel Administration.

"The Supply and Distribution of Fuel," by J. D. A. Morrow, Director, Distribution Division, U. S. Fuel Administration.

"The Coal Operator and His Responsibilities," by Edwin Ludlow, Vice-President, Lehigh Coal & Navigation Company, Lansford, Pa.

"What the Coal Miner Can Do," by John P. White, Labor Advisor, U. S. Fuel Administration.

"What the Coal Operator Can Do," by H. N. Taylor, Vice-President, Central Coal & Coke Company, Kansas City.

"Individual Effort Toward Fuel Savings," by Eugene McLaughlin, Manager, Fuel Conservation Section, U. S. Railroad Administration.

Exhibitors at the Air Brake Convention

The companies exhibiting devices at the Air Brake Association Convention, which was held at the Hotel Winton, Cleveland, Ohio, May 7 to 10, together with a list of their representatives is given below:

Ashton Valve Company, Boston, Mass.—Gages, gage testers and safety valves. Represented by H. O. Fettinger.

Barco Manufacturing Company, Chicago, Ill.—Engine-tender air connections and air reservoir joint connections. Metallic car steam heat connections. Represented by F. N. Bard and C. L. Mellor.

Detroit Lubricator Company, Detroit, Mich.—Lubricators and flange oiler. Represented by A. G. Machesney.

Dielmere Valve Company, Tacoma, Washington.—Automatic drain and relief valve for single or compound air pumps, and Vincent grease plug for side rods on locomotives. Represented by W. P. McLaren.

Dixon Crucible Company, Joseph, Jersey City, N. J.—Graphite and graphite products for railroad service. Represented by L. H. Snyder, F. R. Brandon and William Ernst.

Garlock Packing Company, Palmyra, N. Y.—Air brake gaskets, air pump and spiral packing. Represented by C. F. Flood.

Goff Electro-Pneumatic Brake, Collingswood, N. J. Represented by Frank Goff.

Gould Coupler Company, New York.—Gould universal automatic brake slack adjuster. Represented by W. F. Richards, Geo. R. Berger, W. Garstang and W. H. Sauvage.

Johns-Manville Company, H. W., New York.—Airbrake throttle and brake cylinder packing, expansion rings and slack adjuster. Represented by F. E. Meek, C. E. Murphy, Fred Horne, L. C. Sprague and G. Christenson.

Leslie Company, The, Lyndhurst, N. J.—Steam heat regulators and removable injector coupling nuts. Represented by S. J. Leslie and J. J. Cizek.

New York Air Brake Company, New York.—Air pump strainer, Type J slide valve, feed valve. Represented by N. A. Campbell, L. W. Sawyer, B. Hyanes, Wm. Owens and B. Pratt.

New York and New Jersey Lubricant Company, New York.—Non-fluid-oil brake cylinder lubricant and N. F. O. triple valve lubricant. Represented by J. H. Bennis and W. W. Orvis.

New York Belting and Packing Company, New York.—Represented by L. F. Partell.

Perfection Adjustable Hand Reamer Company, Cleveland, Ohio.—Reamers for valve and governor bushings. Represented by C. Feagler.

Simmons-Boardman Publishing Co., New York.—Railway Age, Railway Mechanical Engineer and Railway Electrical Engineer. Represented by H. H. Marsh and A. F. Stuebing.

United States Rubber Company, New York.—Mechanical goods division, air brake hose, pneumatic tool hose, gaskets and packings. Represented by C. S. Frosser, W. B. Wise and T. P. Dunham.

Westinghouse Air Brake Company, Pittsburgh, Pa.—Slack adjuster, hose mounting and clamping devices. Represented by Walter V. Turner, A. W. Dudley, J. B. Wright, F. H. Parke, T. W. Newburn, A. L. Berghime, C. B. Pierce, C. M. Nellis, E. H. Dewson, H. H. Burns, J. C. Ruhnert, E. B. Johnson, F. H. Whitney, J. S. V. Fralich, L. Weaver, T. H. Thomas, B. F. Key, G. A. Stenson, A. L. Houston, R. E. Miller, L. J. Gwynne, E. Richards, W. M. Slect.

Traffic News

Waiving the customary thirty-day period after the publication of a tariff schedule, the State Public Utilities Commission of Illinois on May 8 permitted attorneys representing railroads in Illinois to file a petition for the reclassification of commodities. The commission will open a hearing on the matter at Springfield, Ill., on May 15 and after a week in that city it will continue the hearing at Chicago. A request by shipping interests for a thirty-day postponement of the hearing was not granted.

Freight, in carload lots, destined for Baltimore or Philadelphia, is now received by the trunk lines for shipment to either of those cities only on a special permit for each shipment; which permit must be procured from the local committee, which will issue it only after having been assured that the consignee of the freight will unload it promptly. The committee consists of Presidents Rhea, of the Pennsylvania, and Dice of the Reading, and Vice-President Thompson of the Baltimore & Ohio.

The Erie Canal was opened for business on May 15. The government manager, G. A. Tomlinson, announced in New York last week that the government had bought 30 tugs and had taken 165 of the barges heretofore in use on the canal, this in order to begin taking freight without waiting for the construction of new barges. Of the new and larger barges there will be 75, some of them steel and some concrete. None of these will be self-propelling; it was found that the construction of boats with engines would require a much longer time. The new barges will be 150 ft. long, 21 ft. beam, and 12 ft. moulded depth.

Shipments of anthracite in April, as reported by the Anthracite News office, amounted to 6,368,372 tons, an increase of about 14 per cent over those of the corresponding month of last year. It is anticipated that with the working energy now in force, this year's total output may reach 80,000,000 tons, a gain of 3,000,000 tons over 1917. A satisfactory supply of cars is available to move all anthracite as currently produced. The order prohibiting shipments to 19 states south and west, except on special permits, affects, relatively, a limited tonnage. New England shipments have been limited somewhat by embargoes which have been intermittent on the New Haven and quite steady on the Boston & Albany for two weeks past.

Coal Movement

During the month of April the railroads transported coal at a rate which, if continued throughout the year, will make up the amount which the Fuel Administration estimates will be required, according to statistics compiled by the Railroad Administration. During the four weeks ending April 27 the bituminous coal loaded into cars amounted to 895,318 carloads, an increase of 73,978 cars as compared with the corresponding period of 1917.

The Geological Survey reports that bituminous output declined slightly during the week ended May 4, after three successive weeks of rising production. The total production of soft coal (including lignite and coal made into coke) is estimated on the basis of railway shipments at 11,559,000 net tons as compared with 11,803,000 net tons during the preceding week, or a decrease of 2 per cent. Production per working day is estimated at 1,927,000 net tons, considerably in excess of 1,829,000 net tons, the average during the month of May, 1917.

Losses attributed to transportation conditions declined during the week ended April 27 from 16.2 per cent of potential capacity during the preceding week to 14.4 per cent; losses due to labor conditions from 4.8 per cent to 4.4 per cent; those due to mine disability from 3.3 per cent to 2.8 per cent and to market losses from 1.8 per cent to 1.2 per cent.

Anthracite shipments during the week ended May 4 rose to 40,570 cars, the largest since the week of March 30.

Commission and Court News

Interstate Commerce Commission

The commission has announced a series of hearings, before Commissioner Atchison, in various cities, for the purpose of giving all interested parties an opportunity to express their views as to the exact definition of the five zones of standard time, which the commission was authorized to establish in the "day-light saving" law.

The Interstate Commerce Commission has announced a hearing at Washington on May 27 for the consideration of a set of suggested amendments proposed by the Bureau for the Safe Transportation of Explosives and Other Dangerous Articles, after exhaustive conference with shippers and carriers, to the commission's regulations on this subject. By reason of new information and altered conditions certain modifications are desirable. Unless objections are presented and sustained, the proposed amendments will be adopted. Therefore, the commission says, attendance upon the hearings seems not to be important except for the purpose of presenting objections.

Private Car Line Report

The Interstate Commerce Commission has made public the tentative report of Attorney-Examiner G. N. Brown on the commission's investigation of private cars. An important part of the interstate commerce of the country is transported in privately owned cars and, says the report, it is to the interest of the owners, the carriers and the public that their operations should be continued under such rules and regulations as will insure their efficient handling without discrimination. Different phases in connection with the use of privately owned cars are considered in detail in the report and recommendations are made with respect to their use for the future. In conclusion, the report recommends: That shippers may continue to lease cars independently for the transportation of their shipments; that carriers require statements of car line charges made by car owners against shippers, for publication in their tariffs; that a charge in addition to freight rates should not be made for furnishing to shippers refrigerator, tank or other special types of cars unless the freight rates are predicated on transportation in another type of cars less expensive and less difficult to operate; that the basis for the compensation to be paid owners of private cars should not be on the cost of cars and shops, etc., depreciation, taxes, cost of operation and maintenance and interest on investment, but that payments should be made by the carriers on the basis of loaded and empty mileage; and that the mileage should be computed on the basis of distance tables without the elimination of mileage movements through the switching districts.

It is recommended that there be no increase in the present payment for the use of refrigerator cars and so-called meat cars east of El Paso, Albuquerque, Salt Lake City and Ogden, but that the present rate of three-quarters of a cent per mile on the loaded and empty movement of tank cars be increased to one cent and that an increased allowance should be paid on live poultry cars, palace stock, heater and other privately owned cars which are used, operated and controlled by shippers, where the payment is now less than one cent a mile. It is recommended that there should be no increase on stock, coke, coal, rack, flat, box or pocket cars, although privately owned. The examiner also recommends that the master carbuilders' rules be not filed as tariffs.

The report estimates that on January 1, 1918, there were in the United States 200,000 private cars. This includes 135,000 tank and refrigerator cars, and the remaining 65,000 is made up of stock cars, coal cars, palace stock cars, heater cars, etc. It is estimated that these 200,000 cars represent an investment of \$250,000,000, and in addition to this the owners of the cars have large investments in repair shops, etc.

Equipment and Supplies

The Mechanical and Purchasing Committees of the Railroad Administration have been holding joint meetings to consider the specialties for cars and locomotives ordered which have been recommended by the Mechanical Committee in the light of bids submitted by manufacturers. Various representatives of manufacturers have been called in to discuss the proposed orders for their devices, while some have been told tentatively that they will be given orders. No announcement of the specialties selected is expected for several days.

Freight Cars

- THE VIRGINIAN is inquiring for 15 caboose cars.
- THE BALTIMORE & OHIO is inquiring for 100 steel underframes for caboose cars.
- THE CUBAN AMERICAN SUGAR COMPANY is inquiring for five 6,500-gal. tank cars.
- THE TRUMBULL STEEL COMPANY, Warren, O., is inquiring for ten 50-ton steel gondola cars.
- THE PINE POOL GASOLINE COMPANY, Okmulgee, Okla., is inquiring for 40 8,000-gal. insulated tank cars.
- THE CABLE CHEMICAL COMPANY, Charleston, S. C., is inquiring for 25 50-ton, 7,000-gal. sulphuric acid tank cars.
- THE COLORADO & WYOMING has ordered ten 50-ton gondola cars from the Western Steel Car & Foundry Company.
- THE CHIMO COPPER COMPANY, Salt Lake, Utah, has ordered 24 underframes from the Pressed Steel Car Company.
- THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, is in the market for a number of ore cars, not over 25 ft. long.
- THE WITTAKER GLESSNER COMPANY, Portsmouth, Ohio, has ordered four 50-ton gondola and seven 50-ton hopper cars from the Pressed Steel Car Company.

Passenger Cars

- THE PACIFIC ELECTRIC is inquiring for 25 motor cars.
- THE BOSTON ELEVATED is inquiring for prices on 200 motor cars and 100 trailers.
- THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, is in the market for a number of passenger cars.

Miscellaneous

THE ST. LOUIS SOUTHWESTERN has ordered from the Roberts & Schaefer Company, Chicago, two automatic electric coaling plants, to be of reinforced concrete and of 200-ton capacity each. These will be duplicates of the plant that was recently built for the same road at Valley Junction, Ill. The new plants are to be built at Commerce, Tex., and Jonesboro, Ark.

BUILDING LOCOMOTIVES IN DENMARK—Commerce reports, under date of March 28, says that building of locomotives is progressing in Denmark. The firm of J. rische & Co., Aarhus, has recently booked an order from the Government for 20 new locomotives.

JAPAN BUYS LIGHT RAILWAY—The Government has decided to purchase the Ishinomaki Light Railway which runs from Kogota to Ishinomaki, in Miyagi prefecture. The decision was made in consequence of the recent completion of the Trans-Ou Railway, with Kogota as the eastern terminus. *The Far Eastern Review*.

Supply Trade News

The H. W. Johns-Manville Company announces that after July 1, 1918, its Houston office will be located at 424-426 Washington avenue, Houston, Tex.

John A. Diener, formerly assistant examiner of the United States Patent Office, and for the past four years associated with Brown, Hanson & Boettcher, Chicago, in the practice of patent and trademark law, has become a member of that firm.

H. D. Wright, manager of the San Francisco office of the Brown Hoisting Machinery Company, has been appointed Pacific coast representative succeeding the Colby Engineering Company in the northwest territory. Mr. Wright's offices are in the Monadnock building.

H. S. Patterson has been appointed manager of the railroad department of the Walworth Manufacturing Company, with headquarters in Boston. H. T. Goodwin has been appointed assistant manager of the railroad department, with headquarters in New York. Both Mr. Patterson and Mr. Goodwin obtained their training with the National Tube Company by taking the specialty course at the Kewanee works of the National Tube Company, now the Walworth Manufacturing Company.

C. Z. Moore, supervisor division No. 4 of the Philadelphia division of the Pennsylvania Railroad, with headquarters at Middletown, Pa., tendered his resignation, effective May 1, to associate himself with John Lundie, consulting engineer, 52 Broadway, New York, inventor and producer of the Lundie tie plate. Mr. Moore entered the service of the Pennsylvania Railroad, October 1, 1894 in the division engineers' office at Harrisburg, Pa. One year later he was transferred to the construction department where he assisted for several years in heavy construction work. Later he returned to the maintenance of way department and served as transitman, assistant supervisor and supervisor at various points



C. Z. Moore

on the system. For the past few years he has been most successful in work as a track engineer, having taken in competition the general manager's prize for five consecutive years, the awards being made for the greatest improvement and the best track on the system and superintendent's division. Mr. Moore will represent Dr. Lundie with office in the Finance building, Philadelphia, Pa.

The Austin Company, Cleveland, O., announces that G. E. Lemmerich has joined the engineering staff of that company, to devote his entire attention to the design of railway terminal buildings, having specialized in this work with the various railroads in the United States for a number of years. Mr. Lemmerich began his railway career in 1881 as axeman for the Pennsylvania, and has been doing railway layout work for over 20 years. In 1898 he was with the Central Railroad of New Jersey on engine terminals, freight terminals, and on special work in connection with the Elizabethport shops. In 1902 he was employed by the Delaware, Lackawanna & Western on the construction of freight car repair shops, at Scranton, and in 1903 at Jersey City on the proposed terminals for the Erie. In 1904 Mr. Lemmerich was employed with the Northern Pacific working on layouts for division

terminals. During the past eight years he has been associated with the design of freight terminals on the Illinois Central and the Chicago & Western Indiana, and with the design of engine terminals on the Western Maryland. The Austin Company, which has specialized in the construction of standard buildings erected in 30 to 90 days, is now designing engine terminal, shop and other railway buildings for similar rapid construction.

Edward Buker has been appointed western representative of Rome Iron Mills, Inc., with office in the McCormick building, Chicago. Mr. Buker was born in Chicago in 1885. He received his education in the public schools at that city and at the University of Illinois, from which institution he received the degree of Mechanical Engineer. While at college his summer vacations were spent in South Chicago rolling mills. Immediately upon graduation from college Mr. Buker entered the service of the Pullman Company as apprentice in that company's car shops in Chicago. After serving his time he went as special apprentice in the locomotive shops of the Illinois Central. Two years later he accepted a position as inspector on the Chicago, Rock Island & Pacific and was later appointed general foreman on the same road. Leaving the Rock Island he went with the Missouri, Kansas & Texas as master mechanic. During the past two years he has been with the Galena-Signal Oil Company as mechanical expert, which position he held up to the time of his recent appointment.



E. Buker

Trade Publications

SWITCH STANDS.—The Ramapo Iron Works, Hillburn, N. Y., has just issued its Pamphlet No. 17, descriptive of the Ramapo automatic safety switch stands. This is a 16-page book with illustrations and shows in detail the character of construction and the manner of operation of this type of switch stands.

MOTIVE POWER PROBLEM.—The Baldwin Locomotive Works in Record No. 90 has issued in booklet form the address of its president, Alba B. Johnson, before the annual convention of the Chamber of Commerce of the United States, at Chicago, April 11, entitled "The Problem of Motive Power Under the National Administration of Railroads." Mr. Johnson's paper was published in the *Railway Age* of April 12, page 965.

RAILWAY CONSTRUCTION IN DOMINICAN REPUBLIC.—There are two railroads in the Puerto Plata consular district, viz., the Dominican Central, owned by the Dominican Government, and the Samana & Santiago, owned by Scotch capitalists. The Dominican Central connects Puerto Plata with Santiago, a distance of 42 miles, with a further extension of 17 miles to Moca. Traffic on this road was suspended the first half of 1916, but operations were resumed in July of that year. The service has improved gradually, and the railroad has been reconstructed throughout, 700 tons of new 60-lb. rails and 50,000 new ties being laid. The telephone system has been placed in good condition, and new apparatus have been installed. All bridges, stations and other buildings have been painted and repaired. Work was commenced on a cut-off from Barrabas and La Sabana, which will reduce the grade from 9½ to 3 per cent and reduce the maximum curvature to 32 degrees. The Samana & Santiago made considerable progress with its seven-mile branch between Moca and Saucedo. When completed, this branch line will link the Samana & Santiago with the Dominican Central, thus connecting the ports of Sanchez and Puerto Plata by rail.—*Commerce Reports*.

Financial and Construction

Railway Financial News

DENVER & RIO GRANDE.—An agreement has been reached between the Denver & Rio Grande and Western Pacific interests and Government officials whereby the Denver & Rio Grande will secure funds to pay off its interest and other obligations up to and including June 1, with the exception of the judgment for approximately \$38,000,000 held by the Western Pacific against the Denver. This agreement plans for the wiping out of approximately \$4,500,000 indebtedness, which includes \$2,400,000 bond interest, unpaid or due June 1. The Railroad Administration will advance \$1,500,000, on account of the Denver rental, and the Equitable Trust Company will advance \$1,800,000 and will purchase certain Treasury securities, Liberty bonds, etc., while \$925,000 in cash in the Denver's treasury now under attachment will be released by order of the court. By agreement also \$900,000 on deposit with trustees for Denver bonds will be available.

DES MOINES & FORT DODGE.—See Minneapolis & St. Louis.

MINNEAPOLIS & ST. LOUIS.—Judge Charles M. Hough in the Federal Court at New York has dismissed the suit of William Mitchell and others as temporary administrators of the estate of Amos F. Eno against the Des Moines & Fort Dodge and the Minneapolis & St. Louis railroads. The plaintiffs sought to prevent the consolidation of the roads and to compel the payments of dividends on stock in their possession.

MISSOURI PACIFIC.—Bertram Cutler has been elected a director to succeed Carl Gray.

NEW YORK CENTRAL.—This company has obtained \$6,000,000 for six months at six per cent from the Central Trust Company of New York through the efforts of Director General McAdoo. See "Doings of the United States Railroad Administration" on another page of this issue.

ST. LOUIS-SAN FRANCISCO.—James N. Wallace has been elected a director to succeed E. D. Levy, resigned.

WASHINGTON, BRANDYWINE & POINT LOOKOUT.—See Washington, Potomac & Chesapeake.

WASHINGTON, POTOMAC & CHESAPEAKE.—A new corporation, the Washington, Brandywine & Point Lookout Railroad has been formed to operate this road which last December was sold for junk to Joseph Bros. & Co. for \$2,500. The purchasers had begun to dismantle the railroad when proceedings were begun by prominent citizens which stopped the dismantling. A new charter was procured and stock was subscribed for. After \$75,000 had been raised and the Government had loaned \$50,000 on first mortgage, a contract for the purchase of the road from Joseph Bros. & Co. for \$125,000 was signed on May 6 in the office of Judge John B. Payne, general counsel for the director general of railroads.

Railway Construction

ILLINOIS CENTRAL.—This company has completed plans for the construction of a 12-stall roundhouse, a turntable and a machine shop at Carbondale, Ill., to cost about \$200,000. It is also planning to enlarge its mechanical facilities at Champaign, Ill. The work, in the main, will consist of the construction of new roundhouse stalls and will cost about \$150,000. At Centralia, Ill., the company proposes to construct additional tracks in both its north and southbound yards at a cost of about \$150,000. At Paducah, Ky., it is planning mechanical facilities, including a new roundhouse containing 32 stalls, which will cost approximately \$200,000. Plans are also being prepared for a hospital building at Paducah, the construction of which the company expects to start in about six weeks. The road expects to complete plans for its fifty-third street (Hyde Park) station, Chicago, in about two months.

Railway Officers

Executive, Financial, Legal and Accounting

J. B. Myers has been appointed auditor of the Montana, Wyoming & Southern, with office at Bellry, Mont., succeeding **A. R. Clement**, resigned to enter other business.

W. J. Jackson, receiver of the Chicago & Eastern Illinois, with headquarters at Chicago, has resigned and has been placed in charge of the operation of the road with the title of president. **Thomas D. Heed**, of Chicago, succeeds Mr. Jackson as receiver.

A. E. Warmington has been appointed assistant to the president of the California Southern, with headquarters at Los Angeles, Cal. **J. C. Odell** has been elected treasurer, with headquarters at Los Angeles, Cal., succeeding **J. R. Grant**, who continues as secretary.

J. E. Conklin, assistant to the president of the Anthony & Northern, has been elected vice-president, with office at Hutchinson, Kans., and **T. A. Fry** has been elected secretary, with headquarters at Hutchinson, Kans., succeeding **E. M. Vetter**. Mr. Fry continues the duties of treasurer and purchasing agent.

Winfield S. Cooper, whose appointment as assistant to the vice-president in charge of operation of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, was announced in the *Railway*



W. S. Cooper

Age on May 3, was born at Polk, Ohio, on February 15, 1862. Mr. Cooper's railway work began in May, 1877, when he became a telegraph operator on the New York, Pennsylvania & Ohio, which has since become part of the Erie. Subsequently he was consecutively operator and train dispatcher on the Louisville & Nashville, train dispatcher on the New York, Pennsylvania & Ohio, train dispatcher on the Canadian Pacific, and from 1886 to 1895 train dispatcher and chief dispatcher of the Chicago, Milwaukee & St. Paul. In 1895 he was appointed trainmaster, and in February, 1903, he was promoted to superintendent. Three years later he was again promoted, this time to assistant general superintendent, with headquarters at Chicago. He continued in that position for six years, following which on February 1, 1912, he became general superintendent of the southern district, with the same headquarters, holding this position until his recent appointment as assistant to the vice-president, as mentioned above.

Operating

J. D. Feeny has been appointed acting superintendent of the Anthony & Northern, with office at Pratt, Kans., succeeding **C. F. Jeff**.

F. O. Bamforth, treasurer of the Cincinnati, Findlay & Ft. Wayne, which road is operated by the New York, Chicago & St. Louis, has also been appointed superintendent.

A. Ross, superintendent of the Lehigh Valley at Easton, Pa., has been appointed superintendent of New York division, vice **S. S. Stone**, resigned; **M. A. Mulligan**, superintendent at Hazleton, has been appointed superintendent of the New Jersey & Lehigh division, vice Mr. Ross, and **P. T. Reilly**, general yard inspector at Bethlehem, has been ap-

pointed superintendent of the Mahanoy & Hazleton division, vice Mr. Mulligan, transferred.

W. M. Bacon, assistant superintendent of the St. Louis Southwestern, with headquarters at Mt. Pleasant, Tex., has been appointed assistant superintendent of the Denver & Salt Lake, with headquarters at Denver, Colo., succeeding **G. W. Barr**. **A. R. Stith** has been appointed superintendent of car service, with headquarters at Denver, Colo., succeeding **W. T. Bruning**.

J. B. Blair, who has been appointed superintendent of the Canadian Pacific with headquarters at Farnham, Que., as has already been announced in these columns, was born on November 17, 1876, at Whitby, Ont., and was educated at Dufferin school, Toronto, and at the Toronto Normal school. He began railway work in May, 1894, with the New York, Ontario & Western, at Norwich, N. Y., and subsequently served consecutively on the New York, New Haven & Hartford, the Chicago & North Western, the Chicago, Milwaukee & St. Paul, and the Southern Railway, in various capacities in train service. From June, 1914, to January, 1916, he was general yardmaster of the Canadian Pacific at Windsor, Ont., and then to the following month was assistant superintendent at London. In February, 1916, he was appointed assistant superintendent of terminals at Montreal, Que., which position he held at the time of his recent appointment as superintendent of the same road as above noted.

A. J. Miller, whose appointment as superintendent of car service of the Delaware, Lackawanna & Western, with headquarters at Scranton, Pa., has already been announced in these columns, was born on October 3, 1877 at Dummore, Pa., and was educated in the high schools and at business college. He began railway work in March, 1902, with the Delaware, Lackawanna & Western as a clerk in the car service department. He subsequently held different positions in this department and in October, 1912, was promoted to traveling car agent, remaining in that position until July, 1916, when he left that road to become chief clerk to the superintendent of car service of the Central of New Jersey, at Jersey City, N. J. In November, 1916, he returned to the service of the Delaware, Lackawanna & Western, as general chief clerk to the superintendent of car service, which position he held at the time of his recent appointment as superintendent of car service of the same road, as above noted.

W. M. Weidenhamer, whose appointment as general superintendent of the southern district, of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, was announced in the *Railway Age* on May 3, was born in Schuyler County, Ill., on June 23, 1863. He entered the service of the Chicago, Burlington & Quincy on January 2, 1880, as a brakeman and was promoted to conductor on February 12, 1885. On May 4, 1904, he was assigned to special duties by the operating vice-president. On November 1, 1904, he was appointed trainmaster of the Galesburg division, with headquarters at Galesburg, Ill., and on October 15, 1905, he was transferred in the same capacity to the McCook division, with headquarters at McCook, Nebr. He was promoted to superintendent of the Sterling division on December 15, 1908, with headquarters at Sterling, Colo., and on December 1, 1909, was transferred to the Alliance division, with headquarters at Alliance, Nebr. He left the Burlington in December, 1917, to become inspector of transportation of the Chicago, Milwaukee & St. Paul, which position he held until his recent promotion to general superintendent of the southern district, as mentioned above.



A. J. Miller

Martin J. Larson, whose appointment as superintendent of the Southern Minnesota Division, of the Chicago, Milwaukee & St. Paul, with headquarters at La Crosse, Wis., was announced in the *Railway Age* on May 3, was born in Norway, on April 19, 1866. He began railway work as a messenger in the passenger department of the Chicago, Milwaukee & St. Paul, at Milwaukee, Wis., on September 15, 1882. The following year he was employed as a clerk in the purchasing department at Milwaukee; then in March, 1884, as a clerk in the general superintendent's office at Milwaukee. In June, 1889, he was appointed chief clerk to the division superintendent at Sioux City, Iowa. In July, 1903, he was transferred to the general manager's office at Chicago, and on May 1, 1907 he was promoted to trainmaster at Sioux City, Iowa. In July, 1912, he was appointed assistant to the assistant general manager at Chicago, where he remained until his recent appointment as superintendent of the Southern Minnesota division.

Hugh Wilson, assistant division superintendent of the Baltimore & Ohio at Grafton, W. Va., has been appointed superintendent of the Monongah division, with headquarters at Grafton, vice **J. W. Deneen**, promoted; **P. C. Allen** has been appointed superintendent of the Baltimore division, with headquarters at Baltimore, Md., vice **C. B. Gorsuch**, granted leave of absence; **B. Z. Holverstott**, trainmaster at Fairmont, W. Va., has been appointed assistant superintendent of the Monongah division with headquarters at Grafton, vice Mr. Wilson; **J. K. Flaherty**, road foreman of engines on the Monongah division, has been appointed assistant superintendent, with office at Cumberland. **J. N. Niland**, general yardmaster at Cumberland has been appointed trainmaster with office at Grafton, succeeding **J. McClung**, transferred to Clarksburg. **P. E. Marsh**, road foreman of engines, with office at Weston, has been appointed trainmaster with office at Clarksburg to succeed **E. Bartlett**, who has been transferred as trainmaster to Fairmont, succeeding Mr. Holverstott.

Traffic

F. J. Toner has been appointed acting general freight and passenger agent of the Denver & Salt Lake, with headquarters at Denver, Colo., succeeding **W. H. Paul**.

H. A. Fletcher, commercial agent of the Central of Georgia, with office at Chicago, has resigned to accept service with the Illinois Central, and the agency at Chicago has been closed.

G. A. Westcott, general freight and passenger agent of the Copper Range, has been appointed traffic manager, with office at Houghton, Mich. The office of general freight and passenger agent has been abolished.

F. G. Abbey, assistant general freight agent of the Missouri, Kansas & Texas, of Texas, with headquarters at Dallas, Tex., has resigned to become Washington representative of the Southern Products Company.

William M. Mortimer, general freight and passenger agent of the Coal & Coke, with office at Charleston, W. Va., having resigned to accept other service, the position of general freight and passenger agent has been abolished.

J. H. Webster, general agent of the passenger department of the Erie, has been appointed division passenger agent, with headquarters at Elmira, N. Y., and **F. Ralph** has been appointed division passenger agent, with office at New York.

William Owens, northern passenger agent of the Chicago & Alton, at Milwaukee, has been appointed passenger agent at the Union Station at Chicago, succeeding **H. E. Thomas**, who has resigned to enter the army. The position held by Mr. Owens at Milwaukee has been abolished.

C. McD. Davis, general freight agent of the Atlantic Coast Line, with office at Wilmington, N. C., has been temporarily detached from his duties with the Atlantic Coast Line for service with the Southern Freight Rate Committee at Atlanta, Ga. Until further advised, the duties of the general freight agent will be performed by **J. W. Perrin**, assistant freight traffic manager at Wilmington; **S. H. Dare**, general western freight agent at Chicago, has been appointed division freight agent, with office at Montgomery, Ala.

Engineering and Rolling Stock

S. W. Heckathorne has been appointed master mechanic of the Anthony & Northern, with headquarters at Pratt, Kan., succeeding **S. C. Reep**.

J. B. McClain, assistant bridge engineer of the Seaboard Air Line, with office at Norfolk, Va., has been appointed bridge engineer, vice **Guy Pinner**, resigned to accept service elsewhere, and **W. C. Binford** has been appointed assistant bridge engineer, vice Mr McClain.

C. Gribbin, master mechanic of the Canadian Pacific at North Bay, Ont., has been appointed master mechanic of the New Brunswick district, with office at St. John, N. B., succeeding **C. Kyle**, transferred; **T. Hambley** has been appointed master mechanic, with headquarters at North Bay, vice Mr Gribbin; and **J. S. Allen** has been appointed general foreman, locomotive erecting shop, at North Bay.

A. B. Enbody, assistant master mechanic of the Central of New Jersey, with office at Mauch Chunk, Pa., has been appointed master mechanic of the Lehigh & Susquehanna division in charge of locomotive and car departments, and assignment of power, with office at Ashley, and **C. W. Culver**, general foreman at Mauch Chunk, has been appointed assistant master mechanic of the Lehigh and Susquehanna division, with office at Mauch Chunk.

H. S. Wall, whose appointment as mechanical superintendent of the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., was announced

in the *Railway Age* on April 12, has been in the employ of the Atchison, Topeka & Santa Fe for a period of nearly 19 years. On October 5, 1899, Mr Wall entered the services of that company as a machinist at Albuquerque, N. M., and on April 1, 1900, he was appointed roundhouse foreman at Needles, Cal. On July 1 of the same year he was promoted to general foreman at the same place, and on August 15, 1900, he was promoted to division foreman at Barstow, Cal. He remained there until May 1, 1906, when he was



H. S. Wall

promoted to master mechanic at Winslow, Ariz., being transferred on October 21 of the same year to Needles, Cal. On July 1, 1909, he was promoted to shop superintendent at San Bernardino, Cal., which position he held until his recent appointment as mechanical superintendent of the coast lines as mentioned above.

Purchasing

The New York, New Haven & Hartford announces that on May 7, the purchasing department and stores department were consolidated, with headquarters at New Haven, Conn., and both departments are now known as the "supply department," under the supervision and management of **George G. Yeomans**, general purchasing agent, and **G. W. Hayden**, assistant purchasing agent. The supply agents, Lines East and West, will co-operate and rank with maintenance engineers and mechanical superintendents. The division supply agents will co-operate and rank with division master mechanics and division engineers.

Railway Officers in Government Service

F. R. Hanlin has been appointed export agent for the regional director of western railroads, with headquarters at Seattle, Wash.

W. W. Walker, vice-president and general manager of the Duluth, South Shore & Atlantic, has been appointed

chairman of the terminal committee in charge of railroad operations at Duluth effective May 7.

William Sproule, president of the Southern Pacific, has been appointed chairman of the western department of the western railroad region, with headquarters at San Francisco, Cal., and will assist the regional director of western lines in supervising the operation of the roads in California and adjacent states.

W. B. Scott, president of the Southern Pacific, Texas and Louisiana lines, has been appointed chairman of the southern department of the western railroad region, with headquarters at Houston, Tex., and will assist the regional director of western roads in directing the operation of the railways in that section of the western territory.

H. J. Bell, safety inspector of the Chicago & North Western has been appointed safety supervisor of the railroads under the jurisdiction of the western regional director. Mr Bell is in Washington at present, where he is familiarizing himself with his new work under the supervision of H. W. Belnap, manager of the Safety Section of the United States Railroad Administration. He expects to assume his new duties with headquarters at Chicago in about a month.

Joseph W. James, assistant to the general manager of the Buffalo, Rochester & Pittsburgh, has been appointed special representative under J. M. Herbert, chairman Inter-regional



J. W. James

committee, in charge of railway operation, at St. Louis and East St. Louis. Mr. James was born at Cooper's Plains, Steuben county, New York, on August 10, 1879. He began his railway work in 1894, with the Delaware, Lackawanna & Western as telegraph operator. Subsequently he held various positions, such as telegraph operator, agent, yardmaster, train dispatcher, general yardmaster, chief train dispatcher and trainmaster, on various roads including the Great Northern, the Union Pacific, the Southern Pacific, the

Louisville & Nashville, the Atlantic Coast Line, the Illinois Central, the Cleveland, Cincinnati, Chicago & St. Louis, the Pennsylvania, the Missouri, Kansas & Texas, and the St. Louis & San Francisco. Mr. James has made an exhaustive study of train despatching, handling train orders and train rules. He was recently instrumental in revising the operating rules of the Buffalo, Rochester & Pittsburgh, where he was also the founder and editor of the employees' magazine. He originated and superintended the installation of the so-called "sailing day" plan for movements of package freight on the Buffalo, Rochester & Pittsburgh. Among other matters assigned to Mr. James in connection with his duties as special representative is the inauguration of a plan similar to the "sailing day" plan for the southwestern railroads under the jurisdiction of the committee in charge of operation in that section.

Obituary

A. S. Weinsheimer, secretary of the Pullman Company at Chicago, died on May 11, at the age of 72 years. Mr. Weinsheimer was born at Allertown, Pa., on May 12, 1846, and entered railway service in 1860 with the Lehigh Valley, with which he was consecutively telegraph operator, train clerk and ticket agent. From 1864 until the termination of the Civil War he was connected with the U. S. Army Quartermaster's department at various points in the Indiana & Ohio. In 1865 he again entered the service of the Lehigh Valley in the coal department. He severed his connections

with that company in 1871 to go with the Pullman Palace Car Company, at Chicago, and served it and its successor, the Pullman Company, until his death. He was cashier from September 1, 1875, to September 13, 1878, and from the latter date until his demise was secretary.

William Mahl

William Mahl, formerly vice-president and controller of the Southern Pacific Company, at New York, which retired on April 7, 1913, under the pension rules of the company, after 53 years' continuous railroad service, 31 of which were in the service of the Southern Pacific Company, died at Atlantic City, N. J., on May 13. Mr. Mahl was born in Carlsruhe, Baden, on December 19, 1843, and came to America with his parents in 1852. In 1860 he was entered as an apprentice in the shops of the Louisville & Nashville. In four years he became successively a machinist, a draftsman and chief clerk in the mechanical department. From 1864 to 1872 he was auditor and purchasing agent of the Louisville, Cincinnati & Lexington, now a part of the Louisville & Nashville. For a few years he served under Colonel Thomas A. Scott, on the Texas & Pacific, as auditor, purchasing agent and financial agent. Soon after the panic of 1873 he returned to the Louisville, Cincinnati & Lexington, and was appointed general superintendent. In February, 1882, Collis P. Huntington called him to New York, where he served successively as general agent, controller and assistant to the president of the Chesapeake & Ohio and the Southern Pacific, and the various collateral railways, steamship lines and other large interests of Mr. Huntington. After Mr. Huntington's death, E. H. Harriman continued and extended Mr. Mahl's functions so as to cover the entire Union Pacific and Southern Pacific systems. Mr. Mahl was vice-president and controller of both systems from October, 1909, until the Union Pacific and the Southern Pacific were separated under the order of the Supreme Court; and on February 6, 1913, he resigned from the Union Pacific.

William Mahl belongs to the older generation of railroad men, of whom there are now only one or two still active in business life. He represented in a remarkable way the ideals of the great age of American railroad development; ideals of great achievement, of personal initiative, of arbitrary exercise of great powers, the ideals of a railroad system strictly under private ownership and private management.

When Mr. Mahl went to the Louisville & Nashville in 1864, Albert Fink was chief engineer, and shortly afterwards became general superintendent. Mahl's early training was, therefore, under one of the greatest of the older generation of railroad men, and one of the first students of scientific railroad operation.

In 1873, when William Mahl was auditor of the Texas & Pacific, Thomas A. Scott, later president of the Pennsylvania Railroad, was president; General Grenville M. Dodge, later chief engineer of the Union Pacific, and later chairman of the board of the Colorado & Southern, was chief engineer, and W. H. Newman, later president of the New York Central & Hudson River, and now chairman of the board, was general freight and passenger agent.

From 1882 on, Mr. Mahl was an assistant, with one title or another, to Collis P. Huntington. Whatever his title happened to be on the various roads which Mr. Huntington was interested in, his functions were actually those of watch-dog of the treasury. Collis P. Huntington was a man, generous to a degree, and the loyal co-operation and service of a man like Mr. Mahl, to whom waste was an abomination, was in-

valuable. The present generation of railroad men hardly realize how great a share C. P. Huntington had in the development of the railroads of the United States. In the early eighties he was president of the Chesapeake & Ohio, and was connected with the development of the roads now known as the Texas Lines of the Southern Pacific, and with numerous other railroad enterprises which were later linked up with the larger railroad systems of the country. Mr. Huntington's genius lay in the conception of the rapid development of great railroad projects. Mr. Mahl's contribution to the success of these projects was of very real importance. His was the analytical mind which permitted of the carrying out of the dreams of Mr. Huntington in an economical and scientific way.

Until the time of his death, Mr. Mahl was engaged in writing an autobiography of his long and remarkably interesting life. It is to be hoped that these memoirs were near enough completion so that they may be put in shape for publication by Mr. Mahl's heirs. Curiously enough, in a man whose life work dealt with a vast multiplicity of detailed figures, Mr. Mahl wrote not only clear, concise English, but could be, when interested in his subject, vividly interesting.

Mr. Mahl was not of the cost accounting school of the present day followers of the Interstate Commerce Commission's theories. In his work of preparing accounting figures and statistics for Mr. Huntington and his railroad officers, the fundamental principle was to so construct the accounts as to call the attention of the executive to a fluctuation in costs, and, where possible, to provide the figures for an explanation of this fluctuation. Starting in, as he did, as a machinist, Mr. Mahl was always particularly interested in the accounting of the mechanical department, and his contrast of his own desires and those of the Interstate Commerce Commission in maintenance of equipment expenses is illuminating as to his attitude toward railroad accounting in general. The Interstate Commerce Commission's chief desire is to allocate to each piece of work the cost of doing this piece of work. Mr. Mahl's fundamental principle was to make it apparent at a glance if a particular shop force were added to even to the extent of a single man.

Exactness from his subordinates the utmost precision, he, nevertheless, had a thorough contempt for bookkeeping as bookkeeping. No poet could have expressed more scorn than could Mr. Mahl in pronouncing the phrase "That is a mere matter of bookkeeping." As a matter of fact, Mr. Mahl was, in his use of figures in his annual reports, akin to a great artist in the use of colors, or a great author in the use of phrases and of the connotation of words to produce a particular effect. If one will study Mr. Mahl's reports of the Southern Pacific under Collis P. Huntington, this fact will be amply apparent. When a sale of bonds was impending, Mr. Mahl's annual report would be a picture of the assets of the Southern Pacific that was remarkably convincing. From the first set of tables to the last, touch after touch to this picture would be given until the facts which, under a man of less genius, would have been a compilation of figures and nothing more, stood out as vividly as a physical picture of the resources, the plowed in profits, and the equities behind the Southern Pacific stock and bonds.

Mr. Mahl's standard of honesty in accounting work, as in everything in his life, was absolutely uncompromising. It was 100 per cent.

When the late E. H. Harriman bought the Southern Pacific, he asked Mr. Mahl to become the controller of the Harriman lines and made him vice-president, promising authority similar to that which Mr. Mahl had had on the Southern Pacific under Collis P. Huntington. Probably this promise, made in perfect good faith, was impossible of accomplishment. Mr. Harriman himself had so intimate a grasp of detail that his own mind performed the functions which Mr. Mahl had supplied to Mr. Huntington's mind. But Mr. Harriman depended on Mr. Mahl as he did on few of his associates. When the Harriman lines were dissolved and the accounting problems, involved in the dissolution of the Southern Pacific and Union Pacific, had to be worked out with the restrictions on the one side of Mr. Harriman's dominating personality and inflexible purposes to carry out certain policies and, on the other, the restrictions of the decree of dissolution of the courts, Mr. Mahl felt that it was a task better fitted for younger men, and he retired from all active railroad work.



W. Mahl

EDITORIAL

Railway Age

EDITORIAL

The *Railway Age* showed in an editorial last week that the operating income of 114 railways was \$90,000,000, or 60

Railway

Earnings and Expenses

per cent, less in the first three months of the present year than it was in the first three months of last year. Returns from 191 roads which have now been made public by the Interstate Commerce Commission make a better showing, although not much better. In the three months these roads had an increase in operating revenues of \$57,400,000. The increase in their operating expenses was \$162,000,000 and the increase in their taxes and uncollectible revenues was about \$3,490,000. In consequence, their operating income declined from \$189,900,000 to \$81,600,000, making a loss in operating income compared with last year of \$108,000,000, or 57 per cent. The encouraging feature of the returns is that those for March are much better than those for the entire three months. The decline in the operating income of these roads in March was only from \$73,787,000 to \$67,352,000, or about 9 per cent. If the results for the three months should be taken as an indication of what the earnings and expenses will be during the entire year the outlook would have to be regarded as very bad. On the other hand, if results in March may be taken as an indication of those which will be gained during the rest of the year, the outlook is very much better. In any event, however, the indications are that the tendency of operating expenses would continue to be strongly upward and that of operating income strongly downward, even if a very large advance of wages was not impending. It seems highly desirable and necessary, therefore, that steps should be taken as rapidly as possible toward an increase in rates in order to save the government from suffering a large deficit from railway operations this year.

The director of the Division of Capital Expenditures of the Railroad Administration, Judge Robert S. Lovett, has

Large Capital Expenditures Authorized

authorized capital expenditures by 182 railways amounting to about \$938,000,000. As was to be expected from a department headed by a man of such great experience and executive ability and wisely as was practicable in the circumstances. The newspapers have called attention to the fact that the expenditures authorized are about three times as great as those made in any of the last three years. Measured merely in terms of money this is true. Measured in terms of what money will buy, it is far from true. In the fiscal year 1915 capital expenditures were \$310,500,000. The average railway wage this year will be at least 40 per cent higher than it was then, the prices of equipment will be at least 100 per cent higher and the prices of materials will average at least 50 per cent higher. The additions and betterments made and the equipment bought in 1915 for \$310,000,000 would have, on the basis of present wages and prices cost about \$550,000,000. Or to state the matter in another way, the facilities which can be provided now for \$938,000,000 would have cost on the basis of the prices and wages of 1915, about \$500,000,000. In the three years ending with 1915 the increase in investment in road

and equipment averaged \$457,500,000 annually and in the three years ending with 1912 it averaged \$755,000,000. Making allowances for differences in wages and prices, the authorizations for this year do not provide for as great increases in facilities as those made on the average annually from 1909 to 1915, inclusive. On the other hand, they probably provide for all and more than all the increases in facilities which it will be possible to get labor, money and materials to make.

A more careful analysis of the report of the Railroad Wage Commission discloses

The Wage Increase and the Shop Mechanics

where the railway shop craftsmen and foremen will not participate in the increases recommended. During the past two years the railroads have been forced by dire necessity to periodically increase the rates of pay to this class of men in order to keep the shops fully manned. The demand for mechanics has been so great in the manufacture of war materials and ship building and the wages paid so high that many of the men have been drawn away from the railroads. Since the government has taken control of the roads, however, the immigration of the mechanics has been checked somewhat by the more or less tacit understanding that the men in the shops would be taken care of properly in the readjustment of wages. It is not to be wondered at, therefore, that expressions of dissatisfaction are heard from that quarter. The commission said: "It (the proposed scale) has its foundation in principle and not in the compelling force of any unusual competitive conditions." This, of course, is not practical, when there is such a large discrepancy between the awards made by the commission and what is being paid by industrial concerns. The ship building industry pays anywhere from 65 to 85 cents per hour for its mechanics and common laborers receive 40 cents. Munition plants pay 70 cents for machinists. Even the locomotive builders pay the craftsmen as high as 65 and 75 cents per hour. This compared with wages in the neighborhood of 50 cents an hour for mechanics and 25 cents for labor on the railroad indicates the difficulties that will be encountered as the demand of the war industries grow, unless a modification is made in the present schedule. Without doubt, the director general has observed this deficiency in the commission's report and will correct it. The fact, however, that the original report has received such wide publicity requires that prompt action be taken.

The terminal problem has been receiving considerable attention of late because it is well known that a large part

Pooling Introduced

with Success in the West

of the war time consumption in railway yards and that operations of congestion can generally be traced to inadequate terminal and interchange facilities. Under the stress of necessity the regional director of Western railroads recently introduced a plan for handling certain commodities in solid train lots, described elsewhere in this issue, which has the advantage of eliminating terminal switching and avoiding the delays incident thereto. The plan which was first applied to export

grain, has reduced by one-half the transit time on that traffic between the Western primary markets and the Atlantic seaboard. The innovation constitutes a pooling of traffic among initial lines and the assignment to each of all shipments on certain designated days. This method of dividing business enables a railway to assemble sufficient cars of the same commodity consigned to the same destination to handle them in solid trains. These are operated through to the point of final delivery, according to routings arranged for by the Railroad Administration in such a manner that connections alternate in participating in the movement. The plan prevents the duplication of switching by initial lines, eliminates delays in switching at junction delivery points and gives all lines involved a fair share of the business handled. Up to date the scheme has been applied to the movement of both export and domestic foodstuffs, oil originating in the "Mid-Continental field," packinghouse products, north Pacific coast lumber consigned to the government, California perishables and coast-to-coast shipments of hemp, wool and sugar. While the western regional director and his staff are to be commended for the success of the train-lot plan, this method of handling traffic is nothing more or less than pooling which was prohibited by law under the private operation of railroads. It would, therefore, be decidedly unfair to seize upon this development under federal control as an argument for government ownership. It is rather an added proof of the short-sightedness of repressive regulation, and an indication of the need for an altered policy by federal and state governments when the railways are returned to their owners.

Increasing Track Capacity on Lines Already Signaled

CONGESTION FREQUENTLY OCCURS on certain more or less limited sections of track on a division already signaled owing to a number of trains endeavoring to move over such sections at approximately the same time. It may be inadvisable or impossible to rearrange train schedules to relieve such a situation. When one or more tracks are badly congested with traffic moving in the one direction at a time when the other track or tracks used for traffic in the opposing direction are idle, or nearly so, a decided loss in capacity results and the most efficient use is not being made of all the facilities at hand.

This condition can be and is oftentimes relieved by running some trains on other tracks against the current of traffic by the issuance of train orders. Instead of lightening the burden of the train dispatcher such practices add to his work, which is heavy enough under the most favorable circumstances. A study of the train sheets will indicate the time as well as the points on a division (if not already known) where the greatest congestion occurs.

The possibilities of using all tracks to capacity was early recognized by some roads. The Chicago, Burlington & Quincy has for a number of years made very good use of existing facilities by operating trains in the same direction on two tracks during certain periods when the conditions warranted, as outlined above. This practice was followed when the lines were operated under the telegraph block system. With the installation of automatic block signals, the tracks, where necessary, have been so signaled as to provide for operation in either direction on each track. Such a method not only provides for the most efficient use of existing facilities but more nearly approaches the ideal operating conditions, as trains may be run on any available track without the use of train orders or the throwing of additional work on the dispatcher. Such a method of operation is recognized by the American Railway Association and is fully provided for in the standard code.

It would appear advisable for operating officers to make a careful study of their lines and where conditions exist such as outlined above their tracks might well be signaled for operation in both directions. Considering the advantages to be derived, the changing of the present signal installations for such operation would appear to offer a solution of some of the difficulties experienced at the present time. When it is considered that the first cost and the cost of maintenance of such an installation are small compared with the cost of other means of obtaining the same results the plan is deserving of careful consideration, as any increase in the capacity of existing lines means ability to move additional traffic, which is so vital at the present time.

A Large Construction Program

THE NOTE OF PESSIMISM which has pervaded most discussions of railway betterment programs for the current year should be completely dissipated by the recent announcement of capital expenditures authorized by the Railway Administration, which aggregate \$937,961,318, of which \$440,071,013, or nearly one-half, will be spent for additions and betterments. It has been known for some time that the division of capital expenditures had recommended extensive improvements and that some of the roads have had very large budgets approved, but it was not until now that the real magnitude of the total sum has been apparent.

The actual size of the expenditures approved on the different roads vary widely, beginning with the New York Central with a maximum appropriation of \$70,000,000. There is also a wide variation in the relation of the sum authorized to the total amount of the budget submitted by the railroads, from the cases where the budget was accepted in full to the instances where nearly all of the items were eliminated. However, the same rule has been applied in all cases—the bearing of the items in question on the effectiveness of the railways as a war machine. Roundhouse and shop facilities have received primary consideration. Next in importance are increases in facilities for the movement of traffic, such as additional main tracks and yard improvements. The latter are primarily in the nature of extensions from which benefits will be secured in the shortest time. Nevertheless, the authorizations include projects for yards of unusual proportion, such as the Markham yard of the Illinois Central near Chicago. Other work has been approved where direct connection with the "winning of the war" has not been so obvious, although fundamentally just as pertinent. Among these may be mentioned the completion of grade separation projects in which the present stage of the work constitutes an obstacle to traffic. It is not surprising that extensions have been limited to \$18,203,000, divided among 38 out of the total of 182 roads that are included in the budget figures quoted above.

The time required to pass upon this heavy expenditure to ascertain whether the proposed work complied with the spirit of the policy adopted by the Railway Administration has, of course, been considerable, and is one of the causes for delay in undertaking work. Another obstacle has been a lack of funds on the part of the railroads. The large decrease in net revenues has effected some reduction in the amount of cash on hand; the government has been slow in making payments on its transportation bills and only limited disbursements have been made as yet on the income guarantees under government control. However, any misapprehension on this score should be allayed by Circular No. 14, issued by Director General McAdoo with regard to the progress being made on addition and betterment work. This order indicates that the interest of the Railway Administration in these projects does not cease with an examination and

authorization of the expenditure, but that the government, in placing its stamp of approval not only sanctions the work, but definitely directs its active prosecution. Of particular importance is the director general's inquiry as to delays to work through a lack of necessary funds, with instructions for immediate reports on any financial needs for an expeditious prosecution of such work. The Railway Administration, having passed on these improvement programs, is in the possession of valuable information regarding the needs of the various roads, and the advantages to accrue in improved transportation facilities through their completion. It is to be expected, therefore, that the government will not rest with mere authorization but will give the roads ample co-operation in the supply of both men and materials necessary for successful completion.

Amalgamation of Railway Associations

THE PROGRESS IN EFFICIENCY of the railways of the United States along technical and operating lines has been very largely due to work which has been done by their associations. The most prominent among these have been the American Railway Association, the Master Mechanics' Association, the American Railway Engineering Association, the Master Car Builders' Association, the Railway Signal Association, and the Association of Railway Accounting Officers.

They have furthered progress in two general ways. First, they have handled investigations and negotiations which have had to be made in order to enable any of the railways to make progress in certain directions. Second, they have had meetings and discussions, furnished information regarding the work being done on individual railways, and adopted recommendations as to standard practice, which have enabled all the railways to benefit by all the improvements made by any of them in operating methods or physical plant.

It has been truly said of the railway associations:

"It is a point often overlooked in discussions of Government ownership that economies of the kind attributed to consolidation under Government ownership in Prussia are made in the United States under private ownership by co-operation between the various railways. This co-operation is carried on largely through numerous national associations, composed of the railways themselves or of their officers. Some of the most important associations are international, including Canadian and other roads. The way their members, although competitors, place the results of their investigations and experience at one another's disposal without reserve and without price affords perhaps the best example of commercial co-operation in the world. By the investigations and reports of their committees, the free and full discussions at their meetings, the recommended practice which they adopt, and their very substantial success in getting the railways to follow the practice recommended, these organizations exert a potent influence for efficiency."

There has been, however, for some years an opinion among many railway officers that the various associations did not accomplish as much as they would if, first, they were co-ordinated under the hegemony of the American Railway Association, and second, their recommendations regarding standard practice were given some kind of backing which would cause them to be more generally carried out.

Some strong objections have been urged against either subjecting the control of other associations to the American Railway Association or attempting to force individual lines to comply with the recommendations of either this or other associations. It has been objected to the plan of putting other associations under the control of the American Railway Association that the latter has been less progressive and aggressive than some of the less pretentious organizations, that it is composed chiefly of executive officers, most of whom are not technical men, and that subjection to it would be likely to hamper rather than to further the work of the technical associations. Furthermore, there has been no power directly connected with railroad management which could exercise any coercion over the individual lines. Gov-

ernment control has given to one central authority, the director general of railroads, the power of forcing the individual lines to adopt standards recommended by the associations; and the movement for subjecting the other associations to the control of the American Railway Association has been renewed. It is even proposed to amalgamate all the more important associations.

The *Railway Age* believes there should be more co-ordination between the activities of the various associations. It also believes that there has been too much diversity in the practice of the railways of the United States, and that when recommendations for standardizing practice which it is desirable should be uniform, have been adopted by a large preponderance of the membership of important railway associations, there is no good reason why the various lines should not be required to adopt these practices. At the same time, however, this paper strongly questions the desirability of actually amalgamating all the large associations; and it seems clear that there might be more harm done by enforcing too much standardization of practice, than has been done in the past by failure voluntarily to adopt enough of it.

The constant development of better and better practice requires much experimenting and experience; and before any practice is adopted as standard for all the railways all the different varieties of practice should be carefully studied and fully discussed. In the mechanical field this investigation and discussion can best be done by an organization of mechanical officers; in the engineering field, by an organization of engineering officers; in the signal field, by an organization of signal officers. But the organizations in the several fields cannot do their work intelligently and thoroughly unless they are allowed a large measure of autonomy. They might be able to do it well if they were changed into divisions of the American Railway Association, which met and deliberated separately, and they reported the results of their deliberations to the American Railway Association; but if they were reduced to the status of mere committees of the American Railway Association, the number of technical officers who were given an opportunity to participate in their work would be greatly curtailed, and the amount of intelligence and the breadth of experience brought to bear on the various problems to be solved would be almost proportionately reduced.

If it were desirable that practice in regard to all operating and engineering matters on all railways should be the same, the case for having all such matters handled by a single association whose recommendations would be enforced by governmental authority would be stronger. And there are numerous matters regarding which practical uniformity is desirable. It is desirable regarding such matters as train rules, safety appliances on cars, and signaling indications. Train employees constantly are shifting from one railway to another, and diversity regarding such matters as those mentioned are elements of danger. There are many kinds of practice, however, diversity in which is desirable, not as a thing good in itself, perhaps, but as a means to an end which is good, this end being progress. Manifestly, it would be desirable to have the government require all roads to conform to the best practice in everything, provided we were sure, first, what was the best practice, and second, that the government's enforced standardization of a certain kind of practice would not prevent the introduction of still better practice. If, however, it were left to a single association to adopt recommended practice along all lines for all the railways of the United States, and if the government were to require the adoption by all railways of the exact practice recommended, there would be great danger that progress in the technical development of the railways, and in their operation would be hindered rather than promoted.

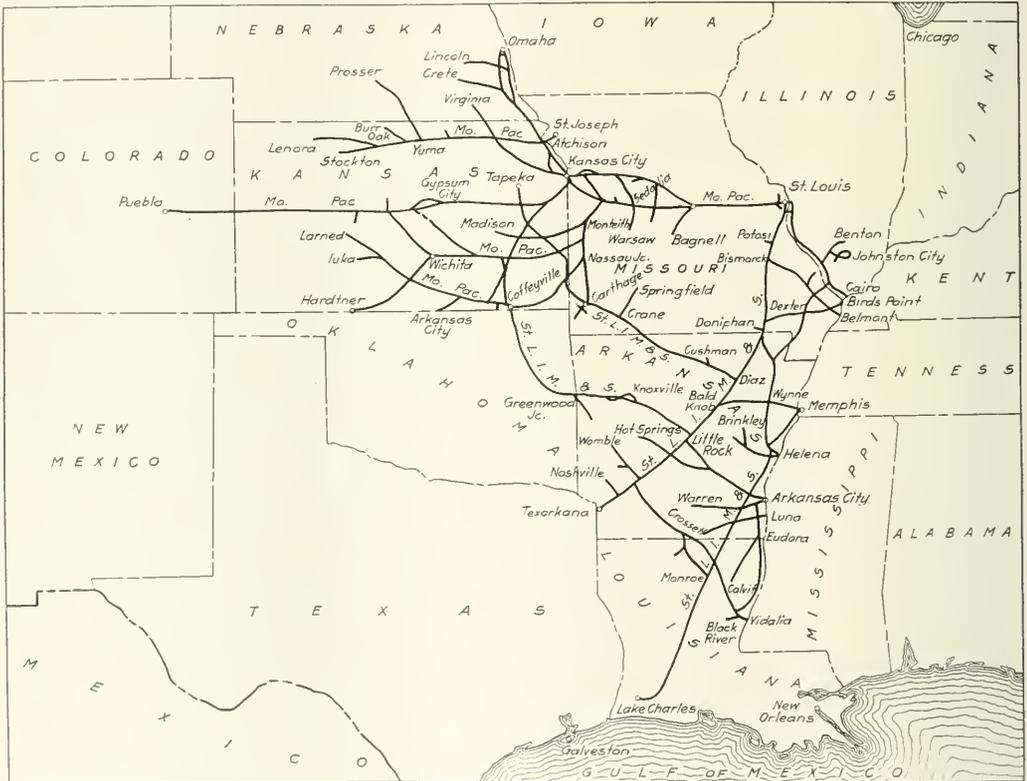
While it probably is desirable for closer co-ordination

of the associations to be brought about, it is very doubtful if the revolutionary step of actually amalgamating them should be taken. It would seem that the adoption of some such plan as the following would be sufficient at present: First, make the various technical associations divisions of the American Railway Association, but let them continue to meet separately and have such discussions and adopt such recommendations as to privilege in their respective fields as they consider wise; second, give the American Railway Association authority to co-ordinate the work of the various associations so that harmony in their recommendations will be brought about where they touch upon the same general subject; as, for example, on the relation of wheel loads and strength of track, and refer back to the subsidiary organizations for further consideration recommendations of which it does not approve; and third, vest in the American Railway Association the authority and duty of making to the

Missouri Pacific

THE RESULTS OF OPERATION on the Missouri Pacific in the calendar year 1917 were in striking contrast to the financial results obtained on most of the eastern trunk line roads. With an increase of less than 12 per cent in traffic, there was an increase of over 31 per cent in gross income available for interest charges and dividends. In 1917 gross income amounted to \$22,300,000, and if the reorganization plan which was actually put into operation in June had been in operation during the entire year, the Missouri Pacific would have had \$10,218,000 surplus over its fixed charges, or equivalent to the full five per cent on the outstanding \$71,800,100 preferred stock and to over eight per cent on the \$82,839,500 common stock.

The reorganization plan which was approved of in March and put in operation in June, 1917, was generally considered



The Missouri Pacific

director general recommendations regarding the practice which it may be deemed desirable to have enforced upon all railways.

On each individual railway it is the function of the technical officers to make recommendations regarding the practice to be followed in their respective departments, and that of the executive officers to reject, or to adopt, and put into effect these recommendations. Why should not a similar general relationship exist between the organization of the various technical associations and the American Railway Association itself, which is an executive officers' organization?

a sound plan, with the possible exception of what appeared to be a rather inadequate provision of working capital. The balance sheet of June 1 showed only \$1,470,000 cash on hand, with total current liabilities of \$13,866,000. During the last seven months in 1917 the company strengthened its cash position to a remarkable extent. Cash on hand at the end of December amounted to \$4,153,000, current liabilities having been reduced by over \$400,000. This \$4,153,000 would appear to be ample cash for a company doing the amount of business that the Missouri Pacific does. The need for building up a cash reserve did not apparently interfere, however, with the expenditures for additions and better-

ments. A total of \$5,819,000 was spent for betterments, of which \$1,327,000 was for improvement and additions to roadway and \$2,315,000 for additions (net) to equipment.

While it is probable that when all of the annual reports for western and southwestern roads have been published it will be found that roads in that part of the country did not suffer as severely in 1917 as the trunk lines and New England roads, nevertheless, the Missouri Pacific is in a rather unique position. While the road was still being operated under B. F. Bush as receiver, a very large force of employees was built up because of the need of taking up a great deal of delayed maintenance work and, in general, of feeding up the patient which had been, prior to the receivership, pretty badly starved. When, therefore, Mr. Bush was made president of the new company the management had a well rounded out organization with which to work. Traffic was on the increase, but under the receivership adequate facilities had been provided to meet an increase in traffic, so that while the Missouri Pacific, like all the other roads, had to pay greatly increased wage rates, the management had adequate forces both for train operation, maintenance of equipment and maintenance of way at their disposal.

Total operating revenues amounted to \$78,320,000 for 1917, an increase compared with 1916 of 11.93 per cent. Total operating expenses amounted to \$53,248,000, an increase of 3.71 per cent. Transportation expenses amounted to \$26,326,000, an increase of 21.18 per cent, which in the face of the rise in the rate of wages and the larger traffic handled, is a good showing. Maintenance of way cost \$10,946,000, a decrease of 10.81 per cent, and maintenance of equipment \$12,449,000, a decrease of 11.15 per cent. The explanation is, of course, that under the receivership in 1916, maintenance included very large expenditures for deferred maintenance. The Missouri Pacific management would probably say that notwithstanding the acute labor shortage it was in a position to do and actually did all of the maintenance work in 1917 that was necessary to keep the property up to the new and much higher standard which has been set for it.

The following table shows the ratio of each class of expenses to total operating revenues:

	1917	1916
Maintenance of way and structures.....	13.98	17.53
Maintenance of equipment	15.90	20.02
Traffic	2.15	2.48
Transportation	33.61	31.05
General	2.18	2.26
Other	0.16	0.03
Total	67.99	73.37

In 1915 8.64 per cent of the main line tracks of the Missouri Pacific was unballasted and 46.90 per cent of branch line tracks was unballasted. At the end of 1917 4.27 per cent only of main line tracks and 35.26 per cent of branch line tracks were unballasted. These figures, however, by no means give an adequate picture of the amount of rehabilitation work which has been done. Just what part of the track which was carried on the books as ballasted in 1915 had had so little renewal of ballast applied to it as to make it ballasted in theory rather than practice, it is hard to say, but there was a very considerable mileage of this kind of track. Renewal of ballast is a charge to maintenance of way expenses and a part of the very heavy maintenance expenses in 1916 was on account of work that, while technically renewal, actually cost almost as much as if there had been no ballast under the track before.

A great part of the increase in traffic which was handled by the Missouri Pacific in 1917 resulted from a much larger tonnage of bituminous coal and a larger tonnage of manufactures. The tonnage of bituminous coal carried in 1917 was 6,824,000, or 15.38 per cent more than in 1916. The tonnage of all manufactures totaled 5,352,000 tons in 1917, an increase of 20.55 per cent over the previous year. The average haul per ton in 1917 was 252 miles, in 1916 243.

There was a notable gain in train loading, the average train load in 1917 being 550 tons as against 463 tons in 1916. The average loading per loaded car was 21.55 tons in 1917, as against 19.35 tons in 1916.

The number of passengers carried one mile totaled 648,000,000 in 1917, an increase of 20.58 per cent. The mileage made by passenger trains, however, actually showed a decrease, totaling (including mixed train-miles) 12,370,000, or 1.74 per cent less than in 1916.

The table shows the figures for operation in 1917 and 1916:

	1917	1916
Average mileage operated	7,325	7,437
Freight revenue	\$57,504,651	\$5,601,444
Passenger revenue	14,912,673	12,031,982
Total operating revenues	78,320,313	69,972,813
Maint. of way and structures	10,945,534	12,711,479
Maintenance of equipment	12,448,601	14,010,096
Traffic	1,691,349	1,734,745
Transportation	26,326,377	11,715,162
General	1,708,652	1,578,953
Total operating expenses	53,248,038	51,342,197
Taxes	4,220,700	3,068,800
Operating income	20,848,963	15,526,653
Gross income	23,299,877	16,970,525
Net income	8,965,104*	959,008†

*Deductions from gross income include interest on funded debt of the old company for the five months ended May 31, 1917.

†Deductions from gross income include the interest on the entire funded debt of the old company, although part of this interest was not paid, but was defaulted.

New Books

Proceedings of the American Railway Bridge & Building Association. 300 pages. Illustrated. 6 in. by 9 in. Bound in paper and cloth. Published by the Association. C. A. Lichty, Secretary, 319 North Waller avenue, Chicago. Price, \$1.

This volume contains the proceedings of the twenty-seventh annual convention which was held in Chicago on October 16-18, 1917. The reports and papers which were presented at this meeting were prepared with particular reference to present day problems in the bridge and building department and with the discussions will be found to be of more than usual value to railway men confronted with the problems incident to the maintenance of bridges and other structures. Committee reports were presented on the following subjects: The Erection of Plate Girder Spans with the Least Interruption of Traffic; Repairing and Strengthening Old Masonry; Paint and Its Application to Railway Structures; The Economical Delivery of Water to Locomotives, and Fire-proofing Roofs of Wooden Buildings. Individual papers were also presented on the following subjects: Concrete Casing for the Protection of Steel Structures, by E. E. R. Tratman, western editor, *Engineering News-Record*, Chicago; The Organization and Operation of Bridge and Building Material Yards, by H. C. Pearce, general purchasing agent, Seaboard Air Line; The Organization and Operation of a Bridge and Building Supply Yard, by Geo. T. Richards, superintendent bridge and building shop, Chicago, Milwaukee & St. Paul, Tomah, Wis.; Shipping Company Material Economically, by J. R. Pickering, superintendent of car service, Chicago, Rock Island & Pacific, Chicago; Housing and Feeding Bridge and Building Maintenance of Way Crews, by F. E. Weise, chief clerk, engineering department, Chicago, Milwaukee & St. Paul, Chicago; Snowsheds, by Geo. W. Rear, general bridge inspector, Southern Pacific, San Francisco, Cal.; Uniform Versus Differential Rates for Bridge and Building Department Employees, by E. T. Howson, western editor, *Railway Age*, Chicago; How to Secure and Hold Bridge and Building Men, by J. P. Wood, supervisor of bridges and buildings, Pere Marquette, Saginaw, Mich.; The Material Problem, by Albert Reichman, division engineer, American Bridge Company, Chicago; and Intelligent Reclamation of Material, by C. A. Lichty, Chicago & North Western Chicago.

Letters to the Editor

The Report of the Railroad Wage Commission

NEW YORK.

TO THE EDITOR:

This document, dated April 30, 1918, and released to the press May 9, 1918, is an able one, and the investigation was made with a view to its comprehensiveness and appears to have been thorough. It has, however, the defects of its origin. It is a political document and is carefully built within the four walls of political expediency.

The trouble with the politician is that he always looks at the problem of industrial organization from the "one man, one vote" standpoint. He never visualizes the industrial organization in its functioning—an activity in which one man as a manager may easily equal in potency one thousand men as workers, in which \$1,000 of capital in dynamic plant energy may easily equal in potency many times that value in human dynamic energy. In passing upon the rewards of these three contributing efforts, the views expressed are not especially illuminating.

The entire argument rests on the cost of living. The commission takes cognizance of two things:

(1) That the cost of living has increased disproportionately among those of small incomes, and

(2) That there is a point up to which it is essential that the full increased cost shall be allowed as a wage increase, while from this point on the increase may be gradually diminished . . . because the opportunity for substitution and other methods of thrift decline almost to the vanishing point.

In view of the emphasis placed upon this point, the findings of the investigators, Hathaway and Bowen, are interesting; that is, they find the increase in the cost of living as applied to men receiving incomes up to \$600 per year has been 43 per cent, to men receiving up to \$2,000 40 per cent; in other words, that the compressibility of the expenses of the \$2,000 man as compared with that of the \$600 man shows an advantage of only 3 per cent. This can hardly be the common experience.

No changes are recommended in wages above \$250 per month and no hint is given of the real decrease in wages and salaries above that amount through the incidents of the income tax, the sur-tax, the excess profits tax, etc.

The commission criticizes the slowness of the railroads in yielding to increase in wages, but it does not call attention to the reason therefor, which was the strangulation to which the roads were subjected through their rates being held inflexible by the commissions. Attention is called to the fact that such advances as were made were not in any way uniform, but the report does not dwell particularly upon the activities of the brotherhoods and not at all upon the activities of the President and the Congress in the passage of the Adamson law.

One noticeable feature of the report is that it applies to all employees and goes back for its foundation to the conditions existing on December 31, 1915. Thus, at one stroke, the government wipes out everything for which the unions fought: that is, their separatist advantages. This as to the future does not seek wholly to rectify the inequalities of the past, not even going so far as to suggest that having laid down the rule that the wage goes with the place and having fixed a wage for the place, that if the present incumbent was receiving a wage in excess of the standard and if, in

indulgence, he were allowed to continue in his position, his successor in taking the place should do so at the standard wage.

Such compensations, these commissioners suggest, "have been attained by the most compact and complete organizations, handled with a full appreciation of all strategic values." Had their statisticians reviewed the history of wages in the last forty years they would have seen how valueless have been these organized efforts as against the law of supply and demand. The fact is that unorganized common labor has fared equally well if the wages of today are compared with those of, say, 1880.

"Reductions in hours are not to be regarded as increases in pay." So much in apology for the history of the past! The basic eight-hour day, with its increase of 37½ per cent in wages (where the hours worked are maintained, but the basic day and its overtime are applied) has attractions that are well understood by all that are in direct contact with the situation.

The political aspects of the matter are further accentuated by the entire failure to report or condemn uneconomic practices—the maintenance of parasitic labor, as in the full crew requirements, too many men in freight and passenger pools, the limitation of output, as in the prohibition of operating double-headed trains in territory west of the Mississippi river, limitations in the number of apprentices, and many other similar examples of the false philosophy of labor unionism.

It is not unexpected that in contrast with this silence they should markedly call attention to the salaries of officials, some of which they say "may well be abolished altogether, others greatly reduced."

"Our system of railroads (they say) and our method of railroading are regarded as the model for the world, excelling all other public or private systems elsewhere. For our needs and for our pride this standard of superiority must be maintained." But no words of recognition of the great names of the past nor of the ability and the devotion of the names now on the official roster are found in this report. Here the report descends to demagoguery.

A FRIEND OF THE YOUNGER RAILROAD OFFICER.

"Curses and Courtesy"

CHICAGO.

TO THE EDITOR:

I have noted in your issue of January 18 the article signed "Nemesis."

I wondered what the idea was. Is any individual who happens to be able to write, to be allowed to accuse railway men of customarily transacting their business by cursing? There does not seem to be, on analysis, anything but imagination in what is said in the article, but it is run as a statement of facts.

F. H. RUTHERFORD,
Superintendent Terminals, Chicago & Eastern Illinois.

[The letter entitled "Curses and Courtesy," which appeared in our issue for January 18 and to which Mr. Rutherford refers, was published because it was written by a railway officer who perhaps meant to describe only how business is conducted in his immediate environment. If his letter was meant as a description of the way in which railway operation generally is conducted it was, according to our observation, inaccurate and unjust. There is a great deal of profanity spilled in the operation of the railways of the United States, but it is no greater in proportion than the amount spilled in running any other line of business. It would be entirely unjust to imply that railway men, as a class, are peculiarly addicted to profanity.—EDITOR.]

A Billion Dollars for Capital Improvements

Railroad Administration Announces Railroad Budgets That Have Been Tentatively Approved

WASHINGTON, D. C.

BUDGETS made up by the railroads for improvements and extensions during 1918 aggregating a capital expenditure of \$937,961,318 have been approved by the Railroad Administration, through the division of Capital Expenditures. The total includes \$440,071,013 for additions and betterments, \$479,686,531 for equipment, and \$18,203,774 for extensions. Proposed expenditures aggregating \$349,247,828 were eliminated in the revision of the budgets by the regional directors and the division of Capital Expenditures.

A list of the expenditures approved by roads divided between additions and betterments, equipment and extensions, together with the amounts eliminated, is given in the accompanying table given out on May 18. The list was accompanied by an explanatory statement as follows:

"The attached budgets were made up by the carriers in response to a letter of instructions issued by Director General McAdoo, which contained the following:

"In determining what additions and betterments, including equipment, and what road extensions, should be treated as necessary, and what work already entered upon should be suspended, please be guided by the following general principles:

"From the financial standpoint it is highly important to avoid the necessity for raising any new capital which is not absolutely necessary for the protection and development of the required transportation facilities to meet the present and prospective needs of the country's business under war conditions. From the standpoint of the available supply of labor and material, it is likewise highly important that this supply shall not be absorbed except for the necessary purpose mentioned in the preceding sentence.

"Please also bear in mind that it may frequently happen that projects which might be regarded as highly meritorious and necessary when viewed from the separate standpoint of a particular company, may not be equally meritorious or necessary under existing conditions when the government has possession and control of railroads generally and therefore when facilities heretofore subject to the exclusive control of the separate companies are now available for common use whenever such common use will promote the movement of traffic."

"If these instructions were followed, the estimates should be conservative. Nevertheless they were carefully revised and further reduced, as shown by this statement.

"The approval of these budgets is necessarily tentative. It was necessary to ascertain as speedily as possible what improvements were required and the probable cost, and grant authority to proceed with those most urgent, so that the work could be done promptly and before next winter. The subject is still under careful study, with a view to postponing or canceling any work which can reasonably be deferred; and the financial condition of the carriers and their ability to repay the money borrowed will require curtailment in many cases. On the other hand, it is certain that there will be considerable additions from time to time to the amounts required for particular improvements, which were not foreseen when the budgets were prepared. But on the whole, the figures given in the statement are as definite and accurate as it is possible for any estimates for such vast and varied work to be."

The total of \$479,000,000 for equipment includes the estimates of the various companies as to their requirements

for the year, as revised including equipment contracted for but not yet delivered or paid for. If the roads are supplied from the cars and locomotives ordered by the government the cost will be charged against the authorized expenditure, so the total for equipment is not to be added to the expenditure of the government for equipment. As new cars and locomotives are charged to capital account while the cost of cars or locomotives which may be retired are written off the accounts, the figure \$479,000,000 represents the estimated expenditure for new equipment, regardless of any amount that may be written off for retirement. In the case of additions and betterments in the case of a facility that is retired, the figures given in the table represent the increase in the cost of the new facility over the cost or estimated value of the facility retired. In a circular addressed to the roads giving instructions as to the preparations of their reports it was stated that the information desired was as to the new money required in connection with the improvement rather than the manner in which the transactions are dealt with on the carriers' books.

Because the authorizations are more or less tentative, a further subdivision showing the detailed expenditures to be made is not yet available.

The asterisks in the table opposite the names of certain roads indicates that these budgets are still subject to revision, but the figures in general indicate an intention on the part of the Railroad Administration to allow the roads to make capital expenditures approximately three times as great as the average of the amounts so expended in the last three years, although the figures cannot be exactly compared with the increases in property investment as reported by the Interstate Commerce Commission.

The figures also indicate that the Railroad Administration is not encouraging many extensions of lines except for the completion of projects already under construction. The total for extensions, over \$18,000,000, is apportioned among 38 roads and in only eleven cases has more than \$800,000 for any road been approved. Of the total nearly \$7,000,000 is for the Pennsylvania System. The greater part of the additions and betterments approved are on the eastern lines where the heaviest traffic is being concentrated.

The cases in which the greatest eliminations were made were those of the Chicago Union Station Company, whose estimate was reduced by \$19,043,480 to \$1,655,293; the Norfolk & Western, whose figures were reduced by \$20,755,200; the Pennsylvania Western Lines, reduced \$22,356,128, and the Southern Railway, reduced \$46,916,950.

Rules to be observed with respect to all railroad work involving charges to capital account were prescribed in General Order No. 12 issued by Director General McAdoo on March 21, which authorized the director of the Division of Capital Expenditures, R. S. Lovett, to issue such regulations and instructions and to prescribe such forms and require such reports as might be necessary to carry out the order. The reports which Judge Lovett's department asked were sent to the regional directors for their recommendations and to Judge Lovett's office for final approval. After most of the budgets had been passed upon Circular No. 25 was addressed to the roads directing them to report at once to the regional directors and to the Division of Capital Expenditures as to whether they were proceeding with all practicable expedition to construct and put into operation all additions and betterments approved, with the reasons why

in case the work was not being vigorously prosecuted. In case the carrier did not have on hand or had not arranged for the necessary funds, and if it anticipated that this condition was likely to delay any of the work, the carrier was directed to make a report at once to the director of the Division of Finance, stating its financial needs to complete all approved work expeditiously. Wherever possible, it is expected that railroads will finance their own work but if necessary the government may purchase the securities issued therefor. It may also make advances to the roads from its revolving fund, which consists of an appropriation

of \$500,000,000 and any surplus earnings of the carriers, or advances may be made through banks or directly by the War Finance Corporation.

The New York Central's Budget

The New York Central's total of \$70,672,087 allowed for capital expenditures, is the largest for any road and the total for the entire New York Central system, approximately \$163,000,000, exceeds the total for any other system. From its budget as submitted to the Railroad Administration, the New York Central proper had only \$41,000 eliminated and

BUDGETS FOR 1918.
Total capital expenditures approved

Name of railroads	Additions and betterments	Equipment	Extensions	Total	Eliminations
Akron & Barberton Belt.....	\$29,870	.....	.....	\$29,870	.....
Akron Union Passenger Depot Co.....	210,768	.....	.....	650,293	.....
Alabama & Vicksburg.....	1,062,092	.....	.....	1,062,092	685,787
Alabama Great Southern.....	195,684	.....	.....	2,150,969	147,852
Ann Arbor*.....	67,500	.....	.....	59,250	.....
Arkansas & Memphis Ry. Br. & Tr. Co.....	59,250	.....	.....	59,250	25,000
Arizona & New Mexico.....	17,757,647	23,007,137	\$701,000	41,465,784	9,684,037
Arhison Topoka & Santa Fe.....	318,326	189,944	.....	508,270	100,000
Atlanta & West Point.....	354,396	1,010,500	.....	1,364,896	24,190
Atlanta, Birmingham & Atlantic*.....	74,000	.....	.....	.....	.....
Atlanta Terminal Co.....	2,833,959	7,328,177	143,656	10,295,792	4,871,428
Atlantic Coast Line.....	.....	.....	.....	.....	.....
Baltimore & Ohio.....	16,022,171	27,336,132	450,000	43,808,303	2,454,302
Baltimore & Ohio Chicago Terminal.....	274,775	8,850	.....	283,625	573,101
Baltimore, Chesapeake & Atlantic*.....	14,500	24,700	.....	28,500	.....
Bangor & Aroostook.....	207,778	889,315	.....	1,097,093	109,461
Bessemer & Lake Erie.....	850,074	138,654	121,525	1,110,253	1,557,364
Boston & Albany.....	2,199,400	1,587,579	.....	3,786,979	.....
Boston & Maine*.....	8,948,648	13,359,761	.....	22,308,409	4,645,163
Buffalo Rochester & Pittsburgh.....	1,738,047	2,418,612	.....	4,156,659	.....
Carolina, Clinchfield & Ohio.....	398,475	4,492,750	.....	4,891,225	4,378,500
Central of Georgia.....	1,514,678	1,636,200	.....	3,150,878	471,370
Central New England.....	864,305	24,000	.....	888,305	45,000
Central of New Jersey.....	7,457,647	8,763,800	.....	16,226,447	5,173,334
Central Vermont.....	474,382	268,473	.....	742,855	5,032,500
Charleston & Western Carolina.....	275,000	.....	.....	275,000	199,982
Chesapeake & Ohio.....	7,028,094	10,877,996	500,631	18,406,721	3,059,381
Chicago & Alton.....	1,060,542	578,793	.....	1,639,335	9,219,600
Chicago & Eastern Illinois*.....	2,185,488	2,123,009	.....	4,308,497	168,000
Chicago & North Western.....	7,570,832	3,640,520	.....	11,211,352	154,000
Chicago & Western Ind. & Belt Ry. of Chicago.....	621,600	390,688	.....	1,011,688	4,959,000
Chicago, Burlington & Quincy.....	6,246,638	6,599,200	.....	12,845,838	6,749,345
Chicago Great Western.....	755,571	330,710	.....	1,086,281	4,817,500
Chicago Junction.....	60,000	31,815	.....	91,815	560,000
Chicago, Milwaukee & St. Paul.....	12,636,650	9,848,003	642,000	23,126,653	4,060,705
Chicago, Peoria & St. Louis.....	37,314	11,595	.....	48,909	404,000
Chicago, Rock Island & Pacific*.....	8,248,065	3,950,431	.....	14,199,036	16,832,225
Chicago Union Station Co.....	986,324	1,310,333	.....	2,296,657	.....
Chicago Union Station Co.....	1,655,293	.....	.....	1,655,293	19,043,430
Cincinnati, Indianapolis & Western.....	333,881	330,525	40,165	704,571	22,958
Cincinnati, New Orleans & Texas Pacific.....	5,415,994	619,800	.....	6,035,744	838,775
Cincinnati Northern.....	319,809	69,545	.....	389,345	.....
Cleveland, Cincinnati, Chicago & St. Louis.....	10,117,796	12,044,211	.....	22,162,007	3,115,288
Colorado & Southern.....	256,370	1,614,648	.....	1,871,018	.....
Colorado & Wyoming.....	167,000	200,000	.....	367,000	.....
Cumberland Valley.....	1,280,961	670,272	.....	1,953,233	24,279
Davenport, Rock Island & Northern.....	3,300	.....	.....	3,300	84,000
Dayton Union.....	3,000	.....	.....	3,000	.....
Delaware & Hudson.....	1,196,659	1,961,954	.....	3,158,613	1,492,161
Delaware, Lackawanna & Western.....	1,835,118	1,597,692	.....	3,432,810	139,765
Denver & Rio Grande.....	2,422,668	363,694	62,179	2,848,541	8,041,617
Denver Union Terminal.....	6,602	.....	.....	6,602	.....
Detroit & Toledo Shore Line.....	70,206	2,008,500	.....	2,078,706	.....
Detroit Terminal.....	216,332	140,000	.....	356,332	.....
Duluth & Iron Range.....	437,090	789,316	6,734	1,233,140	.....
Duluth, Missabe & Northern.....	2,130,218	917,855	.....	3,038,073	.....
Duluth, South Shore & Atlantic.....	74,885	.....	.....	74,885	.....
East St. Louis Connecting.....	225,377	4,625	.....	229,362	.....
Elgin, Joliet & Eastern.....	696,960	1,053,052	.....	1,750,012	.....
El Paso & Southwestern System.....	860,816	2,445,856	23,259	3,329,931	714,318
Erie.....	9,799,262	14,794,178	.....	24,593,440	22,000
Florida East Coast.....	999,307	742,500	.....	1,741,897	.....
Fort Worth & Denver City.....	260,138	444,415	.....	704,553	1,428
Georgia R. R. Lessee Corporation.....	168,017	898,750	.....	1,066,767	.....
Georgia Southern & Florida.....	45,505	117,500	.....	163,005	120,000
Grand Rapids & Indiana.....	130,912	1,331,160	.....	1,462,072	69,346
Great Northern.....	9,510,600	4,622,388	450,000	14,582,988	.....
Gulf & Ship Island.....	106,600	389,820	154,406	650,226	152,498
Gulf & Coast Lines.....	194,308	35,200	27,800	257,308	761,619
Gulf, Colorado & Santa Fe.....	2,349,406	6,865	.....	2,476,263	326,310
Gulf, Mobile & Northern.....	957,374	40,000	911,024	1,908,398	410,000
Hocking Valley.....	3,622,043	2,046,998	.....	5,669,041	4,759,000
Hudson River Connecting.....	2,000,000	.....	.....	2,000,000	.....
Illinois Central.....	10,660,251	15,770,397	325,000	26,705,648	7,152,462
Indiana Harbor Belt.....	513,300	1,150,547	.....	2,063,847	.....
Indianapolis Union.....	1,198,179	160,000	.....	1,358,179	3,088,038
International & Great Northern.....	507,520	489,947	.....	997,467	1,410,000
Kansas City Southern.....	1,304,279	1,026,899	.....	2,331,178	902,898
Kansas City Terminal.....	1,669,130	4,300	.....	1,673,430	1,562,600
Kentucky & Indiana Terminal.....	655,900	325,060	.....	980,960	.....

Total Passenger Equipment

Notes on Items	Additions and betterments	Equipment	Extensions	Total	Equipment
Lake Erie & Western	1,133,600	77,150		1,210,750	1,011,000
Lehigh & New England	73,270	6,671	4,400	84,341	...
Lehigh & Hudson River	59,300	202,640		261,940	...
High Valley	5,773,247	4,136,611	5,000	9,914,858	17,099,950
Louis Island	1,193,990	1,076,773		2,270,763	3,025,918
Louisiana & Arkansas	785,758	1,084,996		1,870,754	619,492
Louisville & Nashville Br. & R. R.	4,498	3,400		7,898	...
Louisville & Nashville	95,000	60,000		155,000	2,600
Louisville, Henderson & St. Louis	5,944,013	5,740,008		11,684,021	6,363,4
	128,913	259,690		388,603	23,600
Mahoning Coal	1,301,275			1,301,275	...
Maine Central	460,132	2,011,900		2,472,032	1,600,000
Maine & Union Station	8,000			8,000	...
Michigan Central	4,426,225	15,601,332		20,027,557	598,508
Midland Valley	150,000	70,000		220,000	355,000
Minneapolis & St. Louis	412,645	378,638		791,283	2,779,975
Minneapolis, St. Paul & Sault Ste. Marie	1,141,166	137,084		1,278,250	2,000,000
Missouri & North Arkansas	73,114	9,733		82,847	144,810
Missouri, Kansas & Texas*	1,453,327	2,539,498		3,992,825	1,597,894
Missouri, Kansas & Texas*	895,378	48,875		944,253	2,745,518
Missouri, Oklahoma & Gulf*	61,443			61,443	2,056,032
Missouri Pacific	2,394,599	7,517,050	15,000	9,926,649	326,049
Mobile & Ohio	352,914	400,000		752,914	2,778,650
Nashville, Chattanooga & St. Louis	1,273,338	1,441,067	559,141	3,273,546	...
Natchez & Southern	9,842			9,842	...
New Orleans & Northern	515,223	487,530		1,002,753	1,990,000
New Orleans Great Northern	116,645	5,192		121,837	...
New York Central	32,428,693	38,168,394	75,000	70,672,087	41,000
New York, Chicago & St. Louis	1,362,538	2,601,120	628,200	4,591,858	1,355,551
New York Connecting	1,217,767			1,217,767	...
New York, New Haven & Hartford	14,713,919	9,602,010		24,315,929	4,248,052
New York, Ontario & Western	140,448	72,931		213,379	18,800
Norfolk & Portsmouth Belt Line	292,500	212,282		504,782	684,782
Norfolk & Western	8,888,167	14,639,057	135,000	23,662,224	20,755,700
Norfolk Southern	690,100	569,334	77,000	1,336,434	977,000
Northern Pacific	5,146,123	8,678,757	235,000	14,059,880	6,068,278
Northern Pacific Terminal Company	501			501	...
Northwestern Pacific	416,320	583,095		999,415	...
Northville & Santa Fe	501,135			501,135	19,015
Pennsylvania (Lines East)	37,658,917	21,198,116	5,531,710	64,388,743	14,258,469
Pennsylvania (Lines West)	27,966,754	19,057,655	1,243,500	48,267,909	22,356,128
Pennsylvania Terminal	150,000			150,000	...
Pere Marquette	3,977,759	4,441,782		8,419,541	134,170
Philadelphia & Reading	11,886,387	11,532,376		23,418,763	9,670,741
Pittsburgh & Lake Erie	4,587,700	4,120,497		8,708,197	...
Pittsburgh & Shawmut	430,989	116,914		547,903	337,162
Portland Terminal Company	207,544	78,140		285,684	...
Richmond, Fredericksburg & Potomac	782,292	1,163,920		1,946,212	161,000
Railroad	499,250	439,168		938,418	55,000
St. Joseph & Grand Island	318,341	17,163		335,504	29,746
St. Louis, San Francisco	5,709,397	1,661,533		7,370,930	126,400
St. Louis Southwestern	630,105	1,401,325		2,031,430	408,431
St. Louis Southwestern of Texas	644,472			644,472	584,360
St. Paul Union Depot	1,400,000			1,400,000	...
San Antonio & Aransas Pass	79,900	8,852		88,752	3,978,048
Seaboard Air Line	2,961,101	5,596,622	153,000	8,710,723	4,694,000
Sioux City Terminal	174,082			174,082	...
Spokane & Int'l. Empire	64,115			64,115	...
Spokane International	77,050	3,511		80,561	...
Spokane, Portland & Seattle	386,543	107,299		493,842	26,840
Staten Island Rapid Transit	651,632			651,632	...
Southern Pacific System—					
Arizona Eastern	258,070	281,370		539,440	28,480
Galveston, Harrisburg & San Antonio	1,698,608	1,969,760	426,798	4,095,166	...
Houston & Texas Central	311,766	714,779		1,026,541	502,400
Houston, East & West Texas	11,622	1,255		12,877	...
Houston & Shreveport	155,477	5,669		161,147	...
Louisiana Western	240,839	209,977		450,816	...
Morgan's Louisiana & Texas	10,811			10,811	...
Southern Pacific Company—Pacific System	14,477,718	287,667		14,765,385	2,893,978
Texas & New Orleans	392,222	7,991		400,213	73,400
Southern of Mississippi	11,636,684	17,476,827		29,113,511	46,916,950
Tennessee	29,631			29,631	...
Tennessee Central	80,770			80,770	240,000
Terminal R. R. Association of St. Louis	47,490	1,886,847		1,934,337	...
Texas & Pacific	3,117,559	3,037,852		6,155,411	569,653
Toledo & Central	1,308,141	4,480,111	737,775	6,526,027	933,633
Toledo, Peoria & Western	15,000			15,000	...
Toledo, St. Louis & Western	714,134	3,767,500		4,481,634	...
Toledo Terminal	57,564	116,400		173,964	...
Trans-Mississippi Terminal*	206,934			206,934	...
Utter & Delaware	52,073			52,073	...
Union Pacific System—					
Oregon Short Line	940,700		361,283	1,301,983	918,856
Oregon-Washington Railroad & Navigation Co.	1,347,162	507,774	378,468	2,233,404	450,108
Union Pacific & R. R.	13,320,690	12,040,949	77,408	25,439,047	3,058,527
Utah	18,000	275,000		293,000	...
Vicksburg, Shreveport & Pacific	154,988	284,500		439,488	...
Virginia	4,886,150	4,977,774	237,444	10,101,368	13,100,000
Washington Southern	39,232	370,650		409,882	1,000
Western Pacific	977,024	4,149,133		5,126,157	1,297,675
Western Railway of Alabama	55,000	257,870		312,870	177,816
Wheeling & Lake Erie	634,872	8,595,546		9,230,418	126,000
Wichita Valley	31,155	1,172		32,327	29,400
Yazoo & Mississippi Valley	3,166,484	16,513		3,182,997	...
Puffalo & Susquehanna	18,218			18,218	...
Buffalo Creek	34,836			34,836	...
Charleston Union Station	25,000			25,000	...
Chattanooga Station	30,000			30,000	...
Dallas Terminal & Union Depot	2,323			2,323	...
Fort Worth Belt	24,000			24,000	...
St. Louis Transfer	17,080	1,750		18,830	...
Union Terminal	17,080			17,080	...
Wichita Falls & Northwestern*					39,218
Wilkes-Barre Connecting	13,367			13,367	91,281

Total (1*2) \$440,071,013 \$479,686,531 \$18,367,774 \$917,965,318 \$149,477,838

* Subject to change.

the total eliminations for the entire system figure up only to less than \$5,000,000, of which \$3,115,288 was taken off the total for the Cleveland, Cincinnati, Chicago & St. Louis.

In view of these facts it is interesting to see how the total for the New York Central Railroad proper was divided:

	Chargeable to investment account	Chargeable to operating expenses	Total
I. Equipment:			
Locomotives—			
Contracted for	\$8,731,800	.....	\$8,731,800
Not authorized but necessary in 1918	9,340,400	.....	9,340,400
Freight cars—			
Contracted for	265,634	.....	265,634
Not authorized but necessary in 1918	8,600,000	.....	8,600,000
Passenger cars—			
Contracted for	3,112,808	.....	3,112,808
Not authorized but necessary in 1918	2,274,000	.....	2,274,000
Betterments to equipment—			
Locomotives	521,239	\$273,290	794,529
Freight cars	1,844,734	3,223,007	5,069,741
Passenger cars	228,579	142,388	370,967
Total equipment	\$38,168,394	\$3,640,685	\$41,809,079
II-1. Additions and betterments necessary for efficiency:			
(1) Contracted for	\$1,243,046	\$104,254	\$1,347,300
(2) Authorized but not contracted for	703,185	1,445,734	2,148,919
(3) Not authorized but necessary in 1918	13,950,650	2,508,757	16,459,407
II-2. Additions and betterments necessary, but not primarily for efficiency, etc.:			
(1) Contracted for .....	.....	.....	.....
(2) Authorized but not contracted for	821	29	850
(3) Not authorized but necessary	99,500	14,000	113,500
II-3. Necessary road extensions:			
.....	\$15,997,202	\$4,072,774	\$20,069,976
III-a. Additions and betterments (exclusive of equipment) inaugurated prior to December 28, 1917, which has not been completed, and which are necessary to increase carriers' efficiency economy or capacity:			
.....	\$14,247,871	\$5,902,135	\$20,150,006
III-b. Same—which are not primarily calculated to increase efficiency, etc.			
.....	2,224,620	265,030	2,489,650
III-c. Road extensions and new branches and lines inaugurated prior to December 28, 1917:			
.....	75,000	.....	75,000
.....	\$70,713,087	\$13,880,624	\$84,593,711
Less part that can and will be suspended	41,000	.....	41,000
.....	\$29,702,087	\$13,880,624	\$43,582,711

Of the total of \$70,702,087 which may be charged to investment account \$61,015,887 is for the lines east of Buffalo. All of the equipment is charged to the lines east, no separate return for the equipment for the lines west having been included.

Equipment.—In the budget of over \$38,000,000 for equipment it is noted that the road now has on order 226 locomotives costing \$8,731,800, delivery on which is expected at various times throughout the year, even as late as December. Additional locomotives to the number of 171 costing \$9,340,000 are required this year.

The road has only 263 freight cars costing \$265,634 on order, but the budget as approved allows it to place additional orders for 1,000 box and 2,000 coal cars costing \$3,000,000 and \$5,600,000, respectively.

The passenger cars on order total 173, costing \$3,112,808. The budget allows the placing of additional orders for 50 coaches, 50 baggage and 10 milk cars, a total of 120, at a cost of \$2,274,000.

Other equipment now on order totals only 4 units, costing but \$22,200. The budget approves the placing of orders for 626 additional units costing \$3,227,000, including among other things 300 coal and ballast cars costing \$1,500,000; a ferryboat costing \$450,000; three tugs worth \$450,000, and 20 covered barges worth \$360,000, etc.

Among the additions and betterments for the lines east of Buffalo classified under II as necessary for efficiency, are

the following, the items quoted here being chosen from a list of several hundred as being among the more important.

Syracuse.—A 30-stall engine house, costing \$900,000, including \$540,000 chargeable to investment account and \$360,000 to operating expenses.

East Buffalo.—Shop improvements, \$550,000.

Depew.—Gardenville branch connection, \$500,000.

Watertown.—A 30-stall engine house, coal trestle, etc., \$900,000.

Avis.—Boilers for generating plant, shop extensions, etc., \$855,000.

Under the head of track work at various points on the road appears the sum of \$638,150, all but \$67,000 of which is to be charged to investment account.

Buildings will call for an expenditure of \$512,500.

An item of \$216,000 appears for coaling plants.

Signals will call for a total expenditure of \$1,337,400, of which \$997,900 will be chargeable to investment account and \$340,500 to operating expenses. The several items are as follows:

Automatic signals, Little Falls to Fonda, \$321,000, and Buffalo Belt Line, \$72,000.

Interlocking, Syracuse Junction, \$282,000; two towers at Rochester, one \$222,000, the other \$127,500.

Miscellaneous automatic signal and interlocking work, \$312,900.

Under the head of III-a—projects already under way, the completion of which is necessary for the carrier's efficiency, etc.—appear the following important items chosen also from a list of several hundred.

Belle Isle Engine Terminal.—Now 40 per cent completed; \$600,000 required for 1918.

Gardenville Engine Terminal.—Also 40 per cent completed; \$1,400,000 required.

Tonawanda, realignment, etc., made necessary by Barge Canal construction.—20 per cent completed. Required in 1918, \$1,437,000.

Rail.—The 1918 program calls for 62,190 tons costing \$2,576,600, nearly all chargeable to operating expenses.

Grand Central Terminal.—For this project there are a large number of comparatively small items which it is desired to carry out in 1918, some in the way of improvements which will increase the rentals of stores, etc. at the terminal, some required for the convenience of the public, some by city requirements, etc. For these purposes \$695,750 is permitted under III-a (necessary for the carrier's efficiency, economy and capacity) and \$1,262,750 under III-b (not primarily necessary for efficiency).

The only amount for new extensions either asked for or allowed in the entire budget is under III-c—projects inaugurated prior to December 28, 1917, and is for only \$75,000. It covers the expenses for 1918 for the Beach Creek Extension Railroad which the New York Central is planning to build along the south side of the Susquehanna River from Keating, Pa., to Browns, a line which will eventually be 47 miles long, will cost from \$6,000,000 to \$8,000,000 and will be an important link in the road's soft coal traffic. Between the points in question the New York Central is now using the Pennsylvania Railroad under trackage rights.

Lines West of Buffalo.—Several important projects are called for on the lines west at Buffalo.

Under II-1.—Improvements at Collinwood, \$615,000.

At Cleveland, \$267,000.

A new yard at Minerva, \$500,000.

Extension of yards at Elkhart, \$279,000.

Machine tools for various shops, \$480,000.

Under III-a.—New yard at Dock Junction to handle increased traffic at Erie. Now 30 per cent completed, \$432,000 required in 1918.

Improvements in freight facilities at Cleveland now 80 per cent completed. \$2,000,000 required.

Under the head of track materials for the lines west appears the total of \$2,644,000, of which \$1,713,000 is chargeable to operating expenses. The lines west ordered 30,000 tons of rails in 1917 but obtained only 24,000. The 6,000 tons is added to the 1918 program, making 36,000.

In reference to ballast the budget for the lines west states:

"Our program for 1918 is considerably below normal and represents the minimum amount necessary to keep our main tracks in safe operating condition."

Railroads To Be Operated By Federal Managers

This Step Taken by Director General McAdoo in Belief That
No Man Can Serve Two Masters

DIRECTOR GENERAL McADOO has announced a plan for placing the operation of each railroad in the hands of a federal manager to be appointed by and to be directly responsible to the Railroad Administration, reporting to the regional directors and displacing so far as authority for operation is concerned the presidents of the roads except as some of them may be appointed federal managers. The appointments of federal managers, except in one instance, have not yet been made. They will be chosen as far as practicable from operating officers of the particular properties involved and in most instances will probably be operating vice-presidents. The presidents who are displaced will thus be left free to represent the corporations with responsibility to stockholders and directors and their compensation will be charged to corporate funds, rather than to operating expenses. The plan as announced also includes further subdivision of the eastern region into districts and the creation of two additional regions, and a similar plan is expected to be adopted in other parts of the country.

Announcement of the plan which has been under contemplation for some time was made by the director general in a statement issued Tuesday night as follows:

"In view of the direct responsibility for the operation of the railroads of the country placed upon Director General McAdoo by the act of Congress and by the proclamations of the President, he has been unable to escape the conclusion that it will be advisable to place in direct charge of each property for operating purposes a representative, to be known as the Federal Manager, who will report to the Regional Director. As far as practicable, this Federal Manager will be chosen from the operating officers of the particular property, who are therefore entirely familiar with its employees and with its conditions.

"Except so far as may be necessary to meet the emergency conditions which compel the government to take control of the railroads, the Federal Manager of each railroad will endeavor to avail himself to the fullest extent of the advantages incident to the operation of the particular railroad as a unit and the preservation of its identity. This is believed to be of essential importance, not only to secure the best results during the period of government control, but also to give the greatest degree of re-assurance to the officers and employees that the railroad careers upon which they have entered will not be narrowed, but, if anything, will be broadened, and to give the greatest possible re-assurance to the stockholders that their just interests in the properties will be respected and that nothing will be needlessly done to have even the appearance of impairing their just rights.

"While in this way the responsibility for the operation of the property will be directly to the Regional Directors, and not to the boards of directors, it is the purpose of the Director General to accord to the boards of directors and their representatives the fullest opportunity to keep advised as to the operation and improvement of the properties and to maintain with the Director General and the Regional Directors the

fullest interchange of views as to what is in the best interest of the government and of the stockholders.

"In the development of this policy the Regional Directors, and also the Federal Managers, will be required to sever their official relations with the particular companies and to become exclusive representatives of the United States Railroad Administration.

"The first moves in the inauguration of this policy will be through the creation of two new regions, to be known as the 'Allegheny region' and the 'Pocahontas region.'

"The Allegheny region will consist, broadly, of the Pennsylvania lines east of and including Pittsburgh and Erie; Baltimore & Ohio, east of Pittsburgh and the Ohio river, including Pittsburgh terminals, Bessemer & Lake Erie Railroad, Cumberland Valley Railroad, Central Railroad of New Jersey, Coal & Coke Railroad, Philadelphia & Reading Railway, Western Maryland Railway, Cumberland & Pennsylvania, and Pittsburgh & Lake Erie. This region will be placed in charge of C. H. Markham as Regional Director (who has resigned his connections with the Illinois Central and other companies), who will have offices in Philadelphia.

"The Pocahontas region will consist of the Chesapeake & Ohio Railway east of Columbus, Cincinnati, and Louisville; the Norfolk & Western Railway, and the Virginian Railway, including the terminals of all lines at Hampton Roads. With the exception of the Allegheny and the Pocahontas regions, the Eastern region will remain as originally defined, with A. H. Smith as Regional Director, and district directors under Regional Director Smith will be appointed for New England and for that portion of the Eastern region west of Pittsburgh and the Ohio river and south of the Erie main line. The selection of the Regional Directors for the Pocahontas region and for the Southern region, succeeding Mr. Markham, as well as of the two new district directors under Regional Director Smith, will be announced later.

"The same policy will be applied from time to time, as rapidly as may be convenient, in other parts of the country, always with the greatest possible regard for all the interests affected and with a view to preserving intact, as far as reasonably practicable, the operating organizations of the companies."

Railroad President Displaced

The announcement followed the making public of the fact that C. W. Huntington, president of the Virginian Railway, was retired as the chief operating officer of the company and that Joseph H. Young, president of the Norfolk Southern, was appointed federal manager of the road in charge of its operations by telegraphic orders from Mr. McAdoo on Monday, effective at 12:01 a. m. on Tuesday. The Railroad Administration had ordered some improvements on the Virginian Railway in accordance with its policy of developing the coal-carrying roads to handle a greater tonnage of coal to the Hampton Roads district and it is stated that Mr. Huntington did not act with sufficient

promptness in carrying out the orders but delayed work pending a discussion of such matters as the amount of interest to be paid on the necessary capital.

Mr. Huntington has issued the following statement:

"President Huntington, when seen at the office of the Virginian Railway Company, said that he had been 'retired as the chief operating officer' of the Virginian Railway Company by a telegram sent from Washington at 9.55 p. m. Saturday, May 18, and received by his secretary Sunday morning, which read as follows:

C. W. Huntington, president. Virginian R. R. Co., 60 Wall street, New York.

It is hereby ordered, effective at 12.01 A. M., Tuesday, May 21, 1918, that C. W. Huntington, president of the Virginian Railway Company, be retired as the chief operating officer of the railroad of that company, and that thereafter his compensation be paid by the corporation so long as the corporation desires to utilize his services, and that Joseph H. Young be and he is hereby appointed federal manager of the Virginian Railway and placed in charge of operations thereof, with office at the Norfolk Terminal Station building, Norfolk, Va., with full power to do and perform any and all acts which may be necessary or appropriate in the efficient operation of said railroad, and in the making of all improvements and betterments which may be necessary or appropriate to enable said railroad adequately to serve the public needs.

All officials, agents, and employees of said road are required to obey orders issued by or under the authority of said federal manager.

W. G. McADOO.

Director General of Railroads.

"Mr. Huntington said that no reason had been assigned for the action of the director general and that he had no information on the subject except a news report that his retirement as chief operating officer of the Virginian Railway was because of his failure to obey an order of the Director General to make certain improvements on the railway. He added that the statement about failure to make ordered improvements was false, as no such order had ever been issued."

Published statements as to amount of the salaries to be paid to federal managers and members of the staff of the Railroad Administration are not confirmed, but no effort is made at the Washington office to deny the impression that officers' salaries to be paid by government will be limited to less than amounts paid under private management. The regional directors are expected to come to Washington shortly to discuss the appointments of the federal managers.

Eastern Liberty Loan Details

F. D. UNDERWOOD, chairman of the Third Liberty Loan committee, Eastern Railroads, has issued a statement giving complete details of the subscriptions by 691,521, employees of the Eastern Railroads for \$45,829,500 Third Liberty bonds.

The total number of men employed by the 95 railroads and subsidiaries in the Eastern district is 876,886, showing that 78.9 per cent of the employees subscribed to the loan.

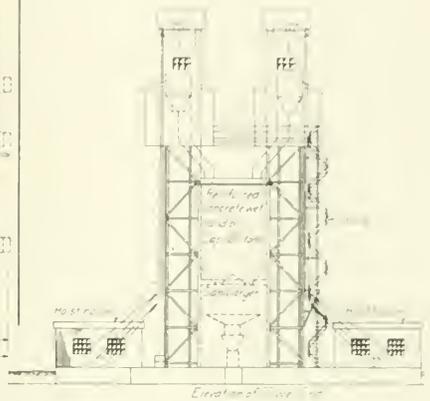
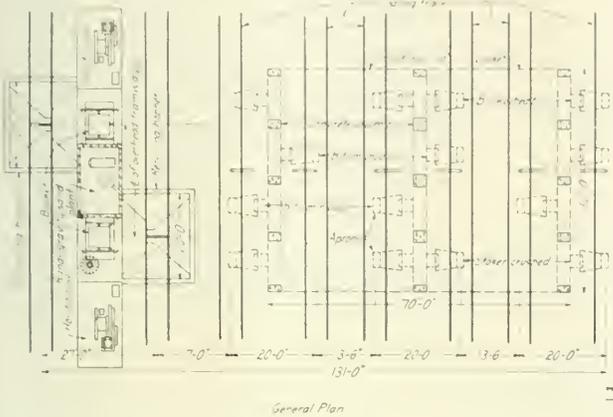
RAILROADS	FIRST LOAN		SECOND LOAN		THIRD LOAN			
	Subscribers	Subscriptions	Subscribers	Subscriptions	Total employees	Subscribers	Per cent	Subscriptions
Ann Arbor					1,468	1,267	86.0	\$59,450
Baltimore & Ohio	4,940	\$397,300	6,496	\$501,800	65,679	56,273	85.5	4,013,350
Bangor & Aroostook	455	40,550		15,600	1,692	829	48.0	61,850
Bessemer & Lake Erie	6,252	122,275		4,786	4,786	1,761	36.5	125,500
Boston & Maine	99	49,150	3,424	320,000	29,169	22,510	77.2	1,610,350
Buffalo & Susquehanna	3,390	275,650	1,738	128,250	6,487	5,545	85.5	355,250
Buffalo, Rochester & Pittsburgh					Included in N. Y., N. H. & H. figures			
Central of New England	1,950	87,900	2,180	138,050	14,211	11,181	78.0	759,150
Central R. R. of New Jersey	725	45,050		2,615	1,727	66.0	117,350	
Central Vermont	3,500	350,000	3,525	293,000	22,840	10,950	48.0	714,250
Chesapeake & Ohio	163	21,500	323	35,250	4,110	2,823	68.7	160,500
Chicago, Indianapolis & Louisville			103	15,050	1,583	1,303	82.3	131,800
Chicago, Terre Haute & Eastern			223	22,850	1,736	1,135	65.3	100,600
Cincinnati, Indianapolis & Western				5,050	918	603	65.6	37,400
Coal & Coke		9,300			119	55	46.1	4,900
Dayton, Toledo & Chicago	7,367	\$10,300	18,250	14,750	14,715	12,312	83.8	791,950
Delaware, Lackawanna & Western	16,886	1,091,350	17,671	1,071,500	22,544	21,208	94.0	1,302,850
Detroit & Mackinac					Employees bought locally.	No report.		
Detroit & Toledo Shore Line					445	274	61.0	19,600
Detroit, Toledo & Ironont					Employees bought locally.	No report.		
Erie	14,103	1,008,850	15,610	1,097,000	46,926	38,774	82.6	2,355,350
Grand Rapids & Indiana			1,772	127,250	Included in Pennsylvania system totals.			
Grand Trunk					9,600	7,141	74.3	391,350
Hocking Valley	150	30,000	1,669	138,300	5,200	1,788	34.4	131,300
Hudson & Manhattan					1,825	1,514	83.0	118,300
Huntington & Broad Top					524	392	74.8	27,350
Lehigh & Hudson					254	27,300	74.5	100,500
Lehigh & New England					348	24,000	1,290	94,850
Lehigh Valley	9,768	701,050	2,293	220,050	9,913	625,650	23,821	1,545,100
Long Island			62	4,250	7,226	3,563	49.0	237,350
Maine Central	108	27,750			746	646	86.0	40,300
Monongahela								
New York Central System—								
Lines East					{	{	{	{
Lines West	19,312	1,345,150	20,894	1,343,050	{ 64,248	{ 53,918	{ 83.9	{ 4,114,800
Boston & Albany	860	66,300	471	32,200	{ 34,045	{ 29,199	{ 85.7	{ 2,037,950
Cincinnati Northern	137	14,800	71	5,600	{ 8,800	{ 6,051	{ 68.7	{ 374,550
C. C. & St. Louis	2,448	19,700	5,668	389,400	{ 881	{ 645	{ 73.1	{ 30,600
Indiana Harbor Belt	327	29,100	498	30,400	{ 23,042	{ 21,240	{ 92.1	{ 1,549,150
Kanawha & Michigan	86	10,550	287	21,500	{ 2,021	{ 2,156	{ 73.8	{ 138,150
Lake Erie & Western	706	21,300	273	21,500	Included in T. & O. C.			
Michigan Central	4,449	335,850	3,621	264,850	{ 3,415	{ 3,096	{ 90.6	{ 226,550
Pittsburgh & Lake Erie	433	28,600	660	74,200	{ 12,090	{ 78.6	{ 835,850	
Rutland	563	43,300	660	74,200	{ 11,013	{ 8,937	{ 81.1	{ 599,650
Toledo & Ohio Central	269	22,850	998	70,450	{ 2,300	{ 1,898	{ 82.5	{ 140,900
Total, New York Central System	39,591	\$2,140,100	33,944	\$2,284,250	{ 5,400	{ 4,412	{ 80.2	{ 330,250
New York & Long Branch					581	160	27.0	12,200
New York, Chicago & St. Louis	1,825	115,900	1,678	117,350	7,500	5,253	70.1	345,550
New York, New Haven & Hartford	207	21,250	1,548	120,000	42,000	32,938	78.4	1,991,800
New York, Ontario & Western	2,074	251,800	3,575	364,000	4,624	3,330	50.4	159,200
Norfolk & Western	2,074	251,800	3,575	364,000	26,569	14,279	53.7	1,177,650
Pennsylvania	52,510	3,378,350	124,789	9,243,500	249,795	205,883	82.0	12,378,200
Pennsylvania, Lines West	6,220	597,900			Included in Pennsylvania totals.			
Pere Marquette	974	97,400	1,785	117,000	9,348	9,982	64.0	363,350
Philadelphia & Reading	5,588	398,450	8,393	566,800	31,658	21,655	68.0	1,313,100
Pittsburgh & Shawmut	39	5,600	1,893	30,000	558	477	86.0	48,400
Pittsburgh & West Virginia					166	133	80.0	7,800
Pittsburgh, Shawmut & Northern			110	205,400	Employees bought locally.	No report.		
Toledo, St. Louis & Western			191	115,550	3,050	1,350	44.2	100,000
Ulster & Delaware	146	12,100	205	16,800	608	344	56.6	28,350
Virginian	128	8,500			4,439	1,977	44.5	230,650
Walsh	670	67,000	265	28,450	16,822	15,025	89.3	985,050
Western Maryland	1,108	69,500	315	22,750	6,835	5,262	76.1	335,850
Whedding & Lake Erie		20,000	411	28,450	4,351	3,666	84.0	243,400

An Example of Modern Coaling Station Construction

The Lehigh Valley Has Completed a Large New Plant
Which Embodies Some Original Features

A NEW REINFORCED concrete coaling station has recently been completed on the Lehigh Valley at Manchester, N. Y., which is notable not only because of the volume of storage space and capacity of the

structure while one passes along each end. The elevating towers are separated from the bin structure by a distance of 39 ft., the coal being transferred from the tower to the bin by means of two bridges spanning the intervening distance



General Plan Showing Track Arrangement and an Elevation of the Towers

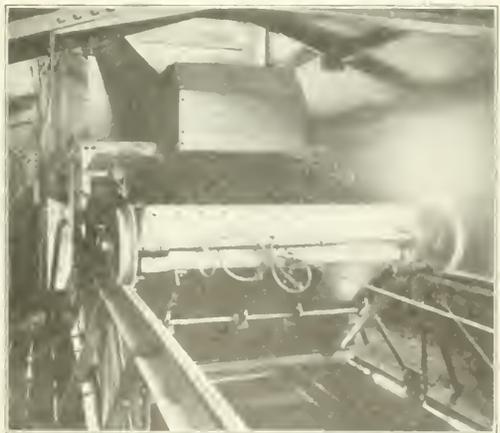
receiving and discharge facilities, but also because of a number of innovations incorporated in its construction. Duplicate receiving and hoisting facilities, an arrangement

and forming a part of the superstructure covering the top of the bin.

This coaling station was designed and built by Roberts & Schaefer Company, Chicago, Ill., and the coal handling equipment is similar to that furnished in other plants built by that company, except as it has been modified to suit the particular requirements at this point. The elevating equip-



Arrangement of Chutes Over the Coal Pockets



One of the Coal Trams Receiving Coal

for mixing the various kinds of coal as received, and an unusual compactness and convenience in the installation are among the special features that deserve notice.

The reinforced concrete storage bin is 70 ft. by 52 ft., and is elevated on concrete columns so as to serve locomotives standing on six tracks, four of which pass under the

ment is in duplicate. Each elevating tower receives coal from a separate track hopper 20 ft. long from which it is fed automatically into the elevating bucket by means of a

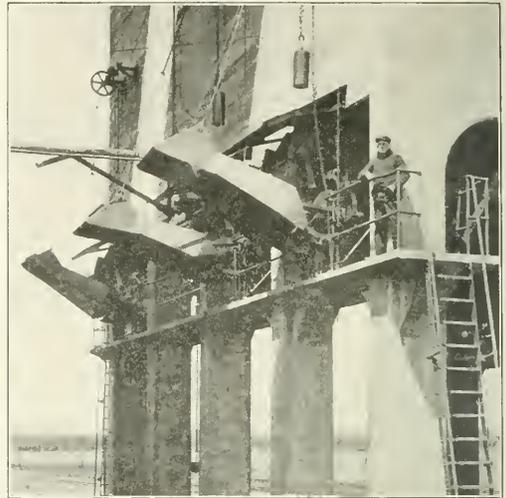
Schraeder measuring coal feeder of $2\frac{1}{2}$ tons capacity, this feeder being actuated by the ascent and descent of the elevating bucket. The bucket in turn is raised and lowered by an independent electric hoist, having a capacity of 75 tons per hour. Since there are two elevators, 150 tons of coal can be received from cars and distributed in the bins each hour. One of the prime advantages of this duplicate equipment is that the plant may be served by either of the hoists alone in case the other is out of service.

At the top of each tower the elevating bucket dumps coal into a "RandS" horizontal tram car, which is shown in one of the photographs, the tram car for each elevator traveling back and forth on its own track across the bridge and over the top of the bin. Each tram car is timed to make its excursion over the coal pocket horizontally, as the bucket makes its excursion vertically.

The operation of both the hoisting and distributing equipment is automatic, being under the control of a Cutler-Hammer automatic controller, so that the operation is continuous without the attention of the operator. However, the operation may be stopped or started at will by means of electric push buttons at two locations, one in the hoist on the ground level and one over the bin.

The 1,200-ton bin is divided into a number of pockets, equipped at the top with chutes for receiving coal at various points in the travel of the tram cars across the top of the bin. It will be seen from one of the photographs showing a view over the top of the bin that the two interior rows of pockets can receive coal from either or both of the tram cars. This arrangement has been made useful in a unique way. At the present time this plant is delivering to engines either buckwheat or run of mine, bituminous coal or a mixture of 30 per cent buckwheat with 70 per cent crushed stoker coal; or a mixture of 50 per cent of buckwheat with 50 per cent of lump run of mine bituminous coal. One kind of coal in any proportion can be elevated in one elevating

bucket, and another kind of coal in any proportion can be elevated in the other elevating bucket, discharging into the two tram cars at the same time and through the concrete



The Pockets Are Equipped with Measuring Coal Loaders

chutes so as to bring this coal together at the delivery point into the storage pocket. Thus the coal in the pockets may be mixed in any desired proportions.

The coal bin is equipped with 14 electrically operated



The Station Will Coal Six Locomotives at One Time

"Rands" measuring coal loaders, for issuing and recording the amount of coal placed on locomotives at the rate of five tons per minute. The bin is arranged with steel walkways and pipe hand railings under the structure, and an operator is kept continuously on these walkways to issue all coal to locomotives, the loaders being operated by two horse-power electric motors with hand control.

In addition to the handling of coal, this plant is equipped with a reinforced concrete "Rands" gravity sand plant located between the bucket towers. The green sand is dumped in the track hoppers in the same manner as the coal, elevated in the elevating buckets, and discharged into a 120-ton capacity concrete wet sand pocket. Located directly under this are two Beamer steam sand dryers, which receive the sand through a rack and pinion gate. All of the dry sand passing through the dryers, which run continuously night and day without the attention of the operator, falls on a large steel hopper, over which the dry sand is screened, while the pebbles and foreign matter pass to the outside of the structure. The dry sand passing through

the screen falls into an automatic Tyrone sand drum, and by the use of two air valves, the dry sand is blown by compressed air to the 20 ton capacity dry sand tank located over the bin. The bin is equipped with six moisture proof undercut sand valves and telescoping spouts for supplying sand by gravity to locomotives on the six tracks. By the use of the "Rands" gravity sand plant, the sand is not touched with hand or shovel from the time it is dumped in the track hopper until it is placed in the domes of the locomotives.

The force required to tend this plant during operation includes one operator in charge of the mechanical equipment for elevating and distributing, one operator to coal the locomotives by the use of the measuring loaders and three laborers who dump the coal over the track hoppers. The installation of the plant has been under the direction of E. B. Ashby, formerly chief engineer, now consulting engineer of the Lehigh Valley, and G. T. Hand, now chief engineer. All work in connection with this structure was executed by the forces of Roberts & Schaefer Company.

Train-Lot Plan of Moving Freight in West

Regional Director Achieves Marked Operating Economies by New Method of Handling Traffic

ON FEBRUARY 25 there were approximately 12,000,000 bu. of grain in the primary markets west of Chicago waiting for movement to seaboard for export. Despite the urgent need for food-stuffs abroad, the acute operating difficulties of the railroads resulting from exceptionally severe weather had slowed up transportation so considerably that export grain was reaching the Atlantic ports irregularly and often too late for transfer to the vessels in which shipping space was reserved. Likewise, some ports became congested with this freight because of the absence of a well-worked out plan for the distribution of export traffic among the various coast terminals.

This condition demanded a prompt and effective remedy. Accordingly, R. H. Aishton, regional director of western railroads, and M. J. Gormley, his operating assistant, put into practice the train-lot system of handling freight. That the scheme is a success is evident from the record for the first two-and-one-half months' experience. Between March 1 and May 15, 7,348 cars of foodstuffs were handled in train-lot movements, most of which contained grain and flour for export. Under the new plan a continuous stream of export freight is moving uninterruptedly from interior markets to Atlantic and Gulf ports where bottoms, arranged for in advance, are waiting.

To illustrate the speed with which this traffic is now being handled, a trainload of oats recently made the trip from St. Paul to Baltimore in seven days. This instance is not an exception but merely indicative of what can be done when the time consumed in crowded yards switching cars from one line to another is eliminated. It is not exaggeration to say that the time of moving cars from western markets to seaboard has been cut in half by the new arrangement. Cars leaving St. Paul, for example, did well under former conditions if they reached Baltimore in 12 or 14 days.

How Train-Lot Plan Is Operated

Under the train-lot plan the regional director of western railroads receives daily reports from the Food Administration and the British Ministry of Shipping through which he is advised of all purchases of grain, flour and other food-

stuffs at various primary markets. The regional director in turn telegraphs a "train-movement notice" to his terminal chairmen at the market centers, which contains all necessary directions concerning the furnishing of cars, time of departure and routing. Copies of these notices are also forwarded to all parties interested in any way in the handling of this traffic from the loading point to the destination of the freight.

It is incumbent upon the terminal chairmen to secure cars for the freight to be moved and to assemble these into trains. As soon as a train has been despatched over the designated road the chairman is required to telegraph the first connecting line and the regional director giving notice of departure indicating therein the probable time of arrival at the terminal or junction delivery point. The other lines involved in the movement likewise give telegraphic advice to their connections of the probable time of delivery, thus keeping all concerned fully informed and insuring continuous movement with minimum terminal delay. The road making final delivery at destination also advises the regional director's office by wire of the time of arrival. The following forms are used in telegraphing advice of the progress and arrival of a train-lot movement.

PROGRESS REPORT

To Connecting Line and Regional Director:
 Train movement Notice No. _____ Train No. _____ left _____ at (time) _____ (date) _____ with _____ (weight) _____ gross tons. Will arrive (delivery point) at (time) _____

ARRIVAL REPORT

To Regional Director:
 T. M. N. No. _____ Train No. _____ arrived at _____ at (time) _____ with _____ cars of _____

The train movement notices are exceedingly simple, thereby facilitating prompt action on their receipt. Train Movement Notice No. 18, which is reproduced in part below, is typical:

MARCH 13, 1918

To: F. I. G. _____ of 500 W. 10th St. of wheat for export is ordered from Kansas City to New Orleans via routes and in dates named. These

trains are to be handled intact and given continuous movement. All cars in any one train to be destined to one port:

Train No.	Date	Initial line	From	To	Routing
1	March 14	Mo. Pac.	Kansas City	New Orleans	Mo. Pac. (through) destination.
2	March 15	K. C. S.	Kansas City	New Orleans	K. C. S.-Shreveport-T. & P.-destination.
3	March 16	St. L.-S. F.	Kansas City	New Orleans	St. L.-S. F.-Memphis-Ill. Cent.-destination.

O. T. Hill, chairman, car service committee, will arrange details with D. F. Piazek, zone agent, United States Food Administrator, and car pooling necessary. Kansas City lines are to make delivery of empty equipment as directed by Mr. Hill for this movement, and this to be done regardless of their other necessities.

Oil Movements Accelerated 100 Per Cent

The train-lot plan proved so successful in connection with the movement of export grain and flour that its application has been rapidly extended to other commodities. The second commodity to be handled according to the train-lot plan was oil in the so-called "mid-continental" field. This was necessitated by a reduction in the number of tank steamers available for oil movements from southern ports to the Atlantic seaboard, the increased demands for oil for governmental and industrial use and the impossibility of making any immediate additions to the available tank car equipment.

Following a conference of the Fuel Administration, the Railroad Administration and the oil industry, arrangements were made for the handling of oil traffic in train-lots. In order to facilitate the execution of the plan, the Oil section of the Fuel Administration appointed H. M. Conley, the oil interests appointed W. E. MacEwen and the Railroad Administration designated B. L. Swearingen as members of a committee on oil traffic, with headquarters at Kansas City. The plan provides for the consolidation of oil traffic from various refineries in train-lots at specified concentration points. When a train is made up the originating line designates it by a number and gives advance information to its connections of the point and time of delivery, together with the consist of the train. Similar information is passed on by each intermediate line, thereby insuring continuous and prompt service through to destination. The return movements of empty cars are effected by assembling cars at important terminals or concentration points and despatching them to points of origin as soon as trains are made up. Empty cars arriving at concentration or terminal points after one train has started are held for similar train-lot service on the following day, thus insuring a uniform and uninterrupted movement of empties and providing for an available supply of tank cars in refineries for loading.

In the first month of operation under the plan 6,562 cars were handled according to the train-lot method. The success of the scheme is indicated by the fact that the car mileage per day of oil equipment has been raised from 57 to 117 miles per day. A recent train consigned to one company in Pittsburgh made the trip from Tulsa, Okla., and return in 11 days. The new plan has not only insured an adequate supply of cars and eliminated delays in switching at terminals but has relieved the oil shippers of the necessity of employing a large corps of car tracers to locate delayed shipments. In fact, one of the most important advantages of the plan is that it dispenses with the services of those who demoralized yard forces through their efforts to secure special attention to the movement of oil shipments.

Plan Expedites Movement of Government Lumber

The application of the train-lot plan to the movement of government lumber from North Pacific coast points has been an unqualified success. Previously the government employed soldiers as train riders in order to secure the prompt and uninterrupted movement of shipments required for shipbuilding and aeroplane construction. Because of the un-

satisfactory results under this plan, the regional director of western roads introduced train-lot service to take care of the traffic.

Under the practice inaugurated, shipments from various mills are consolidated at designated originating train movement terminals, from which trains are despatched as soon as 15 or more cars have been assembled. The regional director, the government, connecting lines and all others concerned are provided with telegraphic reports of the consist of the train, the time of departure, the probable time of delivery at junction points and passing times at division terminals. The plan enables the government and the regional directors to follow the train from point of origin to destination and, if so desired, to divert certain cars to different plants at designated diversion points. Inasmuch as reconsignment is limited to a few terminals it is possible in most instances for the terminal chairmen at those points to hold the diverted cars until they can be consolidated with other cars for the same destination, thereby making a new train-lot movement possible.

For example, at Billings, Mont., shipments originating over the Great Northern and Northern Pacific are consolidated into one train over the Chicago, Burlington & Quincy which takes a new train-lot identity and is handled in the same manner as previously, to destination. At Minnesota Transfer shipments arriving over the Northern Pacific or Great Northern are consolidated into one train and given to one specific line for movement beyond. Likewise, they are given a train identity, whereas formerly cars originating at that point were scattered over all the Twin City-Chicago roads. Operating economy is further effected by the provision in the plan permitting the filling out of lumber trains with other commodities to full freight tonnage rating. Experience under the train-lot plan of handling shipments shows a saving in time between coasts of from four to ten days.

The Plan as Applied to Packing House Products

Under the old system of operation all of the roads serving the packinghouse centers of South Omaha, Sioux City, South St. Paul and Kansas City sent switching crews to the packing houses daily to assemble cars routed over their lines. Each line likewise attempted to maintain schedules averaging from 28 to 30 hours between those points and Chicago. They were, however, rarely able to reach destination on time with the result that the cars generally required re-icing before arrival. The absence of any definite provision for re-icing under the old plan of operation resulted in considerable losses through the deterioration of meat.

Under the plan introduced by the regional director, the schedules have been lengthened and re-icing has been specifically provided for at the expiration of each 24 hours of the run. The plan further definitely assigns all shipments from each of these terminals to certain roads on certain days, thereby insuring sufficient tonnage for train-lot service by the handling line and eliminating the duplication of switching service with the unavoidable interference of one line with another in the yards of the packing plants. A marked advantage of the new practice is that each line knows definitely what traffic it will be called upon to handle and is in a position to perfect arrangements for its movement in advance.

California Perishable Traffic Pooled

The train-lot plan has also been applied to the California fruit and vegetable traffic. Under former conditions each line participated in this business and attempted to operate under schedules which they were rarely able to maintain. Under the new plan the traffic has been divided up among the different roads in a manner similar to that under which the meat traffic is handled and trains are moved only

when a minimum of 25 cars has been accumulated, whereas formerly the roads started trains containing as few as ten cars of perishable freight. In addition, the schedules have been lengthened to provide for arrival in Chicago in time for morning team track placements, including delivery to auction houses and to eastern connections. Under the old system the schedules also provided for morning delivery but trains frequently arrived late. Inasmuch as there was no advantage in delivery unless it could be made early in the morning, the Railroad Administration decided to add a day to the schedule in order to insure arrival at destination on time. Thirty hours, for instance, has been added to the schedule between Roseville, Cal., and Chicago, but this addition in time makes delivery in Chicago sure on the morning of the ninth day from point of shipment.

Another merit of the new practice is that each train has a specific routing from the loading point to destination. Under the former plan of operation a separate routing would be specified for each car with the result that trains would be divided among connecting lines at junction points. At Omaha, for instance, a receiving road might or might not, secure sufficient cars to make up a fruit train for Chicago. It is obvious, therefore, that the old method of handling perishable traffic was not conducive to economy.

Summary of Merits of Train-Lot Plan

The train lot plan which has proved so successful in the movement of the commodities mentioned, is being rapidly extended to govern the transportation of other supplies including wool, sugar and hemp which have been moved in solid trains from the Pacific coast to the Atlantic seaboard.

The merits of the train-lot scheme may be summarized as follows:

(1) Through the pooling of equipment by all lines at loading points an adequate supply of cars is insured.

(2) Continuous movement of traffic is effected through the advance information furnished connecting lines concerning each train.

(3) Economy of operation is made possible by the elimination of switching at terminals.

(4) Fast schedules are not essential under the new plan, because continuous movement and minimum terminal delays enable trains to reach destination on time.

(5) The designation of certain roads to handle specific commodities on certain days insures maximum tonnage to the handling lines in contrast with the former method of dividing traffic and running several trains on different lines operating under the same schedules.

Doings of the United States Railroad Administration

Railroads Will Carry Own Insurance—Merger of Express Companies—Wage Increases Not Satisfactory

THE railroads of the United States now having been unified into a single system, the combined system is considered big enough to carry its own insurance, thereby saving that part of the amount of the insurance premiums which goes to make up the profits of the insurance companies.

On April 30 a telegram was sent to carriers, instructing them not to renew any expiring fire insurance policies on property in federal control, and not to take out any new fire insurance policies upon such property. It was provided that carriers might call attention to cases calling for exceptional treatment. A letter was sent to the carriers confirming this telegram, and the letter suggested care for fire prevention in terms similar to the last paragraph of this order.

The Director General has now issued General Order No. 24, in which he says:

"It is desired to extend the instructions to other insurance than fire insurance, excepting only bonds or policies insuring fidelity of employees in handling funds.

"Carriers, therefore, are now instructed not to renew any expiring insurance of any character, covering property in federal control, or any liability in connection with the operation or use of any such property, or liability for property transported or stored by carriers under federal control, and not to take out any new policies, or place any additional or new risks under existing policies, of such insurance, except that this order shall not relate to bonds or policies insuring the fidelity of employees in handling funds. Such fidelity bonds or policies shall be continued, and proper provision made for any necessary changes, as heretofore. Carriers may present to the director general any special circumstances which they believe call for exceptional treatment."

If the termination of insurance in accordance with this order results, as to any particular property, in the discontinuance by the insurance company of inspection or other measures for prevention of loss, it will be desirable to adopt proper substitute therefor, and the carrier must make rea-

sonable and proper temporary provision for such inspection or other preventive measures, reporting its action to the director general.

The idea, of course, is that, the railroads being under a single control, a loss on one road can be made up by the saving in premium payments on other roads.

Many railroads now carry their own insurance and have accumulated considerable funds for the purpose. One of the points in controversy in connection with the negotiations with the government on the compensation contract involves the question as to whether such funds, accumulated by charges to operating expenses, belong to the companies or whether they have been transferred to the government.

C. A. Prouty, director of the Division of Public Service and Accounting, is taking steps to bring about uniformity in accounting for additions and betterments. In circular No. 3 he says:

"From advices received, there appears to be a lack of uniformity among accounting officers of steam railroad carriers in accounting for expenditures for additions and betterments incurred in connection with property (excluding land and equipment) retired and replaced.

"Uniformity in accounting for expenditures for additions and betterments must be attained, and to that end accounting officers of steam railroad carriers are hereby instructed to take such steps as will result in accounting for these expenditures in accordance with the accounting rules of the Interstate Commerce Commission.

"The attention of all concerned is directed to the general instructions of the commission's classification of investment in road and equipment, and particularly Sections 7 and 12 thereof.

"A copy of all inquiries addressed to the Interstate Commerce Commission requesting an interpretation of the rules referred to, should be forwarded to A. H. Plant, chairman of the Accounting Committee."

Freight Control Committees

Two additional committees for the control of freight traffic have been organized as subsidiaries of the North Atlantic Ports Freight Traffic Committee, which reports to the regional director for the eastern district. The two committees are located at Baltimore and at Philadelphia and are to control the movement of domestic freight into those ports. The Philadelphia domestic division consists of R. R. Blydenburgh, chairman, W. D. Corfield and W. F. Richardson. The Baltimore domestic division consists of E. S. King, chairman, S. T. Stackpole and W. A. Shropshire.

Railroad Offices in New York

No operating office in New York City of a railroad which does not reach New York City will be allowed to be charged to operating expenses under government control. This is a decision reached by Director General McAdoo after the entire subject of the expenses of corporate and operating offices of the railroads in New York City has been under consideration for some time. The director general has decided that he will not allow to be charged to operating expenses any of the expenses incident to the corporate existence of the corporations, which means that New York financial and corporate offices, if maintained, will have to be charged to the compensation which railroads receive from the government; and that of the New York offices, only those actually used for the operation of railroads reaching New York may be charged to operating expenses.

Proposed Merger of Express Companies

The contract between the Railroad Administration and the proposed Federal Express Company, which provides for a merger of the principal express companies of the United States into one company on the basis of an exchange of capital stock for physical assets, and for a contract with the Railroad Administration for the carriage of express traffic, has been practically completed and is now before Director General McAdoo for his approval. The contract provides for a division of the earnings of express traffic on the basis of slightly over 50 per cent to the government, this figure having been reached by taking the average of the amounts paid by express companies to railroads during the last ten years. The proposed combination thus far does not include three express companies owned by railroads, the Great Northern Express, subsidiary of the Great Northern Railway, the Northern Express, subsidiary of the Northern Pacific, and the Western Express, subsidiary of the Denver & Rio Grande and Western Pacific. These companies did not wish to be included because the railroads take the position that their earnings from express should be included in the compensation to be guaranteed them by the government, while the government has taken the position that it will make a contract with but one express company. The railroad-owned express companies, therefore, have been told that the government will not make a contract with them individually, but that they will be given an opportunity to join the proposed combination of the express companies on such terms as they can make, and the disposition of the matter is still unsettled.

Drop Letters Instead of Postcards

A. H. Smith, regional director for the eastern railroads, has sent a circular to the roads in his territory suggesting that drop letters at first-class postage rates be used instead of postal cards for communication with consignees regarding their freight shipments because under the new postal rates drop letters for delivery in the same community may be sent for two cents, the same price as a postal card, and they may be used to give more complete information. It is also understood that the drop letters sometimes receive better postal service than cards.

Consolidated Ticket Office in Chicago

Director General McAdoo has approved the selection of the ground floor of the Insurance Exchange building, located on Jackson Boulevard, with a frontage running from Sherman to Wells streets for the consolidated ticket office in Chicago. There will be two large rooms, the eastern half being occupied by the Eastern and Southern lines and the western half by the Western lines. There are at present 37 railroad ticket offices in Chicago which will be supplanted by the two consolidated offices. The annual saving in rental will be \$198,725. The work of equipping the new offices will proceed as rapidly as possible.

It is estimated that the aggregate business transacted in the consolidated offices will exceed \$16,000,000 a year.

Walker D. Hines

In Circular No. 26 the director general announces that Walker D. Hines, heretofore assistant to the director general, has been appointed assistant director general of railroads.

Compensation Contract

Negotiations between the representatives of the Railroad Administration and the committee representing the railways headed by Alfred P. Thom, regarding the form of contract for the compensation to be paid the railroads by the government are rather far from a conclusion and conferences are still being held. It is understood that the railroad committee and the government had approached an agreement when at the conference held on May 16 a committee representing the National Association of Owners of Railroad Securities, with Samuel Untermeyer as counsel, appeared and interjected some new points of controversy into the discussions which may serve to prolong the negotiations.

Proposed Wage Increase Not Entirely Satisfactory

It is becoming apparent that if the director general expects to keep railroad employees satisfied with their wages sufficiently to prevent them from leaving the railroad service for other employment it will become necessary for him to revise upward some of the recommendations of the Railroad Wage Commission, which would increase the railroad payroll by approximately \$300,000,000 a year. Mr. McAdoo still has the report under advisement but meanwhile large numbers of railway employees are protesting that the recommended increases in wages as compared with those of December 31, 1915, will give them little or no increase at this time, because they have already received increases from the railroad companies which equal or in some cases even exceed the advances recommended, but which they do not consider sufficient. This condition applies with greater force on some roads than on others. The shop employees particularly have received increases by various settlements and arbitration proceedings of such an amount that the figures proposed by the commission would not benefit them greatly. The brotherhoods, although the increases in their earnings which resulted in many instances from the Adamson law are not counted against them, are also understood to have asked for more.

SINGLE-PHASE 1,200 H. P. FREIGHT LOCOMOTIVES.—On the Magdeburg-Halle-Leipzig railway, one of the busiest lines of Central Germany, three 1,200-h.p. locomotives were recently introduced for dealing with the freight traffic. Since then 27 new locomotives have been ordered. The engines are built by the Allgemeine Elektrizitäts-Gesellschaft and are worked by single-phase currents of 13,500 volts and 16⅔ periods per second. Each engine carries two motors; the speed is 50 km., about 30 miles, per hour.—*Engineering, London.*



An Italian Military Supply Train

Italian Railways Under Government Management

The Value of Unified Direction Exemplified as a War Measure During Three Years of War

By Our Special European Correspondent

(Continued from page 1119, May 3.)

THE railway history of Italy is not pleasant reading, certainly. There have never been the huge financial rewards for railroad builders as in a richer country, and as a general rule the government has been called upon to throw good money after bad in order to meet the national necessity of obtaining railroads. There has always been in Italy a good deal of railroad graft, ranging from the knocking down of fares to high finance, but for all that the building has gone along steadily, and the results are felt to have justified the expenditures.

Why Italy Took to Government Control

Government control because of military necessity hardly seems to have entered the minds of anybody in Italy during the long and heated controversies beginning in 1903 and ending in 1905 with the government taking over and running its railroads. In the light of present events, no stranger fact can be found in this connection than the failure of all the bright minds of Italy, in and out of the Senate and the Chamber of Deputies to see the inevitable necessity of taking over the railroads because of their military importance. In war time one might as well think of having the army and the navy run by a group of business men as of having the railroads run on the same basis as in peace times. I have read many of the public documents of those years regarding government ownership in Italy and hardly anywhere has this phase of railroad management been discussed.

The underlying reason was simply that socialism in those days was taking its first great stranglehold on Italy, including other countries of the world, and one of the truisms of socialistic doctrine is government ownership and the elimination as much as possible of private ownership or management of so-called public utilities and public service concerns.

A royal commission appointed by parliament to study the matter reported against government ownership, and the private railroad owners were against it, as were the majority of the commercial bodies of the country. The railroad em-

ployees and workmen in general and the political parties representing them were in favor and carried the measure.

The facts in the case were reviewed among others by Deputy Rubini before parliament June 30, 1904. Italy's railroads had always been controlled in some fashion by the government. Previous to 1885 it had let out certain lines and had then been under the necessity of taking them back or of putting up money to pay their losses; but in 1885 and thence until 1905 it had leased its lines to three large companies for a term of 20 years with the possible privilege of renewal for two other periods of 20 years each, the government guaranteeing interest to be paid on the company capital. For the two years preceding 1905 a popular campaign was begun to prevent the renewal of the leases for the second period of 20 years.

Having tried both systems of ownership Italy ought to furnish one of the best models of any country for studying both sides of the question. But from a money point of view there doesn't ever seem to have been much made out of the Italian roads. The private companies did show dividends of 4 to 6 per cent in the prosperous years of Europe around 1900, and those who remember their service claim it was much better than that which the state has ever been able to give since.

Those favoring state control, however, claimed the private companies had been able to show dividends because of the help given by the state. Deputy Rubini, who made the fairest, most exact and comprehensive review of the railroad situation that perhaps has ever been made here, stated that in the fiscal year 1904-5 the only correct interpretation of railroad accounts showed receipts to be 165,000,000 lire (one lira—19.3 cents) with expenditures 307,000,000 lire, with a virtual loss therefore of 144,000,000 lire. This loss he claimed had to come out of the pockets of the nation that had guaranteed the operation of the roads, so after all it didn't matter whether the roads were under private or state control; the loss existed and had to be paid even by those who stayed at home and benefited only indirectly by railroads. He pointed out that in 1885 the state had leased

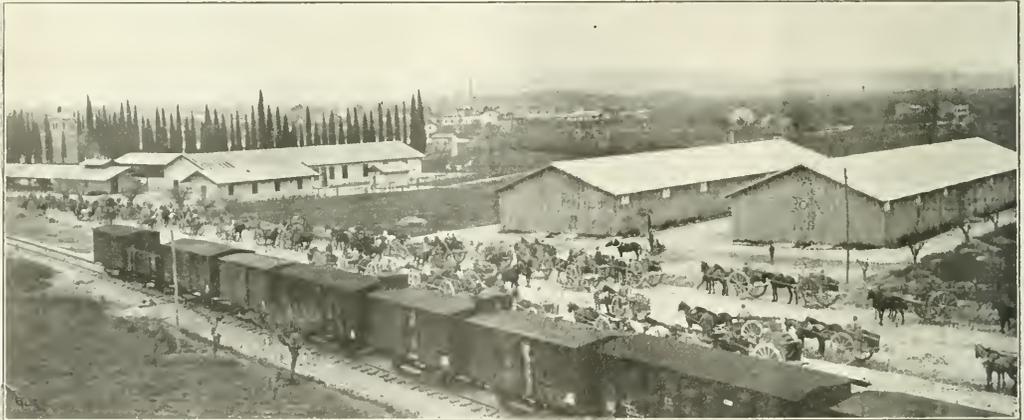
its roads together with rolling stock and that after 20 years, with 9,000 kilometers of railway in operation representing a valuation of 5 billion lire, the state would owe July 1, 1905, about half a billion lire.

Rubini made careful comparisons of Italy's railroads with those of other European countries and gave some of the reasons why it was difficult to operate railroads in Italy and make them pay over a large territory.

Most of these reasons, I think, exist in 1918 as they did in 1900 or earlier. If one will take a map and look at the whole of Italy it will be seen that the country is traversed by the straggling chain of mountains the whole of which is called the Apennines. The only really level and rich country is that in the north, the city centers of which are Turin, Milan, Bologna and Venice. The next richest soil in fairly level country is that in central Italy, between the cities of Florence and Perugia, with a third bit of rich soil in the wheat country to the south of Foggia near the Adriatic straits.

The railroading problem in the north of Italy save for the grades reaching upward to the Alps and over the frontiers, has always been comparatively easy, with a level country and a rich agricultural soil and a large manufacturing population to draw from. But elsewhere, with a not very

length, and expensive shorter tunnels counted by the hundred. Grades are another railroad curse to Italy. Trains are always going up or down mountains. The climb from Genoa to the French frontier at Modane, over a distance of 165 miles, is 3,120 feet. The central cities of Rome, Florence and Bologna are practically the same distance above the sea level, about 100 feet, but to get from Rome to Florence, a distance of 188 miles, there is a gradual climb of 600 feet over two-thirds of the distance. From Florence to Bologna, a distance of 80 miles, there is a midway climb of 1,800 feet. To cross Italy, in the south, from the flat wheat lands of Foggia to Naples, a distance of 118 miles, with Foggia 192 feet above sea level and Naples 36 feet, elevations of 1,652 feet must be overcome. To cross from the Adriatic Sea to Rome, on the opposite side of Italy, on the Castellamare-Adriatic-Rome branch of railway, a distance of 144 miles, beginning at an elevation of 15 feet and ending at one of 174 feet, a series of grades must be overcome the worst of which reached 2,700 feet above sea level. The prosperity of the country along this line is indicated by the statement that midway of the line is located the earthquake section where in 1915, near Avezzano, many thousands of people were killed or made homeless. One of the branches of this line, from Sulmona to



An Italian Military Supply Station

rich soil and with mountains to climb, mountains bare on their faces and with no stores of mineral wealth underneath, the problem has always been a staggering one. South of Bologna a central line runs to Florence, thence to Rome, and Naples, with two parallel lines following each coast of the peninsula. These three lines are not fed by many cross lines because of the mountains and also because of the lack of industrial centers. The two seashore lines are in level but poor country.

Consider the line that runs down from Genoa to Pisa and thence to Rome. In 1905, in the short distance of 55 miles south from Genoa to the port of Spezia, there were no less than 81 tunnels, with the rest of the line to Rome going, after passing the port of Leghorn, through a dreary, swampy waste of land, with no profitable traffic except the little freight that could be picked up at the iron mines of the Isle of Elba. Even under the Romans, with thousands of slave workmen at their disposal, this region, kept open by the Aurelian road, constituted a problem. Only in the past dozen years, thanks to quinine and drainage, have its fevers been controlled and its land tilled.

There are about 50 miles of long tunnels in various sections of the railways, including 20, averaging $1\frac{1}{2}$ miles in

Cainello, a distance of 104 miles, enjoys a grade of 3,345 feet, possibly the highest south of the Alps country.

These are a few samples of grades which indicate railroading conditions in Italy and might explain why, on the whole, the lines do not pay. Rubini pointed out that despite a large population (35,000,000), the ratio of travelers to 100 kilometers of line was but 396,560, as compared with 1,153,000 in France and as compared with 3,016,086 in Belgium.

Political Conception that Railroads Need Not Earn Money

But whether Italy's railroads had or had not earned money under private management, I believe they would have gone under government control just the same, given the political trend of thought in the country. We must remember that the Government of the United States was founded for the very purpose of obtaining relief from the petty vexations and restraints of Europe, this old Europe which for so many centuries has been nurtured on the idea that the government is all-powerful. When we in our happy slang say, "Let George do it," we express Europe from the ground up. Loving private initiative, born to individually and personally

do for ourselves, we cannot learn to lean on a government as they do here in Europe, and when I say Europe I mean continental Europe, for England, too, is one of the homes of personal endeavor. We have always had privately owned railroads for much the same generic reason that Europe has had the other kind.

It must be remembered that here in Italy is the 2,000-year-old example of a centralized government. The great



Italy Has Hundreds of Such Tunnels

United States is but a child among nations, as compared to the thousand years of greatness enjoyed by the Romans. This old example of central authority is ever before these people, influences them today, and always will influence them. It is the secret dream of modern Italy, to establish once more a great world-encompassing government. Then, too, there is the more recent example of Napoleon who for a brief 15 years or so established a centralized government

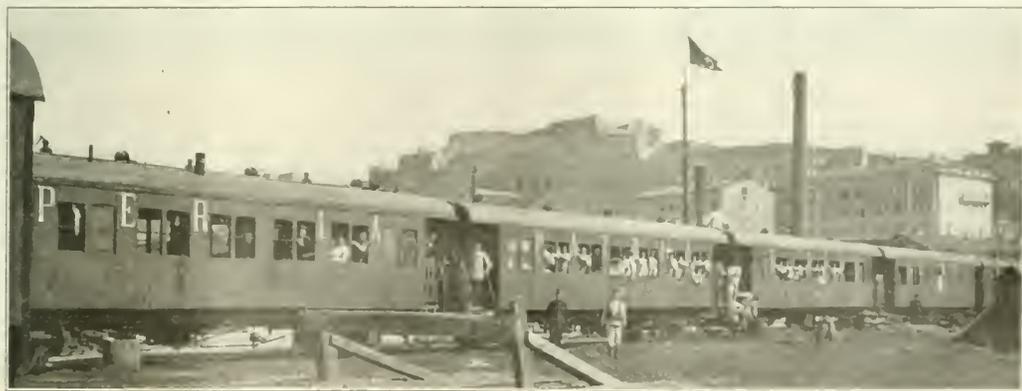
of which a that the state should control every large-scale activity.

For instance, Germany, like Italy, has not been given by nature a rich soil like that of France or of Russia but by government organization and help she has increased her agricultural wealth until she imported, in the year just before the war, but 5 per cent of her foodstuffs to feed her population. "Let us do the same with Italy," argued Luzatti, one of Italy's statesmen who helped pull up her finances. "Let us have rich farming districts and then our railroads will have more freight to carry. Why should Italy's railroads have to depend on passenger traffic for one-third to one-half of their revenues? But in order to enrich our farming districts we must build better railroads. Private companies cannot afford to spend the money to reach out into districts where at present there is no freight. Therefore the government must do this."

So gradually the view regarding railroads in Italy has come to be that they should not be expected to make money, primarily. If some time in the distant future they do earn money, it will be only as incidental to national prosperity.

The same arguments that have been only very recently brought up in the United States are very old in Italy, namely, that by state ownership the evils of private competition are eliminated, as in the case of running empty trains to the same points by different lines, the making of unfair tariffs to obtain long distance hauls; also, the employment of personnel for life instead of for a few months or years and thereby running the risk of losing efficient men and of at the same time injuring individuals by too frequent discharges; further, the danger of harming one section of a country by building up another section through unequal transportation favors. Government ownership, too, in a great measure has destroyed the speculation in railroad stocks, often to the injury of the public, since railroad shares are guaranteed by the government.

There are certain evils inherent in either private or public



For Country and King

with a machinery more perfect, if possible than that of the Romans. It is commonly stated that thanks to his system France has been held together ever since. There, authority more than law is the dominant force. Italy is modeled on the French lines, with the Napoleonic code as the basis of its government. The men governing Italy some 15 years ago had, too, been educated in the centralization organization of Germany. Many of them had attended German universities as students; and right here in Italy, too, there were a large number of German traders, bankers, salesmen, all of whom brought their educational ideas, the basis

ownership, and in a future article I shall discuss these in relation to Italy's experiences so that American statesmanship may perhaps apply this experience to obtaining the best of both for ourselves.

PAPER CLOTHING FOR HUNGARIAN RAILWAY EMPLOYEES.—It is announced in the Bohemian press that experiments made with "paper cloth" have been so successful that the Hungarian State railways are to furnish their employees with summer clothing of this fabric.—*Commerce Reports*

An Example of Kinked Rails

AN INTERESTING INSTANCE of rails being damaged as a result of the incorrect counter-balancing of locomotives was observed on the St. Louis-San Francisco last year, shortly after the receipt of some new Santa Fe type engines from the builders. Shortly after the engines were placed in service it was discovered that the rails were being kinked down and in towards the center of the track and tests made to determine the conditions under which this damage occurred showed that the damage commenced when a speed of 50 miles per hour was reached and that it became marked when the speed rose slightly above this figure. In fact many of the rails damaged at the higher speeds had to be removed from the track.



Longitudinal View of the Kinks

As shown in the photographs the damage consisted of an appreciable bend in the rail both horizontally and vertically. Sometimes the kinks were spaced at intervals equal to practically the exact circumference of the driving wheels, while in other cases they would be further apart. In one instance measurements extending over 10 rail lengths indicated that the kinks were 7 in. further apart than the circumference of the wheels. Sawing and calipering of the rails indicated that the rail section had not been distorted but that the entire rail was bent. There was no indication that the head had been bent on the web or that the web had been bent on the base.

This condition was called to the attention of Prof. A. N.

in the rail under the main driver with the counterweight up was eight times as great as that which occurred when the counter weight was down, while under the other drivers the stress had its maximum value with the counterweight at its low point. These results were found at a relatively high speed for the type of locomotive used. Mean stresses in the base of the rail were found as high as 52,000 lb. per sq. in., which is equivalent to 57,000 lb. per sq. in. in the head of the rail for that particular rail section. In some of the test runs, both vertical and lateral kinks were created at points removed from the instrument and measurements from the kinks to the instruments indicated that the counterweight of the main driver was at the high point over the kinks. It is stated that the main drivers on the locomotives giving rise to the trouble were not counterbalanced by more than 900 lb., while the other drivers were over counterbalanced.

Report of Freight Operations for February

THE BUREAU OF RAILWAY ECONOMICS has issued the monthly report of freight operations of steam railways for the month of February, 1918, and the combined two months, January to February, inclusive, compiled for the American Railway Association. The returns, which cover roads operating 226,340 miles of operated line, are given in the accompanying table and, while they show some recovery from the conditions which prevailed in January, they represent comparatively little improvement as compared with February, 1917. The revenue ton miles increased 2.9 per cent for the month, tonnage per train increased 5.1 per cent and the tonnage per loaded car increased 8.8 per cent. The



One of the Rails After Removal from Track

Talbot, chairman of the Committee on Stresses in Track of the American Railway Engineering Association, and the Committee has undertaken to study this problem. While the committee is still working on it certain tentative conclusions have been drawn. It has been found that the stress

average miles per locomotive per day decreased 10 per cent, and the average miles per car per day decreased 7.9 per cent.

The results for the combined two months are considerably affected by the unusually difficult operating conditions experienced in January. For the two months the revenue ton

MONTHLY REPORT OF FREIGHT OPERATIONS OF STEAM RAILWAYS, FEBRUARY, 1918

Item	UNITED STATES*				EASTERN DISTRICT			
	1918	1917	Increase or decrease		1918	1917	Increase or decrease	
			Amount	Per cent			Amount	Per cent
Freight train-miles	47,207,216	48,327,371	d 1,120,155	d 2.3	17,867,743	19,843,775	d 1,976,032	d 10.0
Loaded freight car-miles	1,028,372,774	1,089,322,750	d 60,949,928	d 5.6	403,715,034	471,480,374	d 67,765,340	d 14.4
Empty freight car-miles	421,493,003	433,143,150	d 11,650,147	d 2.7	186,564,156	203,099,615	d 16,535,459	d 8.1
Total freight car-miles—loaded and empty	1,449,865,777	1,522,465,900	d 72,600,073	d 4.8	590,279,190	674,579,989	d 84,300,799	d 12.5
Freight locomotive-miles	55,250,998	60,233,631	d 4,982,633	d 8.3	22,343,542	24,299,259	d 1,955,987	d 8.0
Revenue ton-miles	26,591,083,830	25,836,735,285	734,348,545	2.9	11,584,801,489	12,189,187,250	d 604,385,761	d 5.0
Non-revenue ton-miles	2,626,467,989	2,549,615,620	76,852,369	3.0	832,850,097	783,612,154	49,237,943	6.3
Average number of freight locomotives in service	30,737	30,181	556	1.8	13,210	12,843	367	2.9
Average number of freight locomotives in shop or awaiting shop	4,743	4,574	169	3.7	2,191	1,975	216	10.9
Average number of freight cars in service	2,355,206	2,278,155	77,051	3.4	1,224,843	1,203,939	20,904	1.7
Average number of freight cars in shop or awaiting shop	122,368	125,226	d 2,858	d 2.3	71,301	69,997	1,304	1.9
Home	81,119	94,426	d 13,307	d 14.1	46,122	52,411	d 6,289	d 12.0
Foreign	41,249	30,800	10,449	33.9	25,179	17,586	7,593	43.2
Tons per train	619	587	32	5.1	695	654	41	6.3
Tons per loaded car	28.4	26.1	2.3	8.8	30.8	27.5	3.3	12.0
Average miles per locomotive per day	64.2	71.3	d 7.1	d 10.0	60.4	67.6	d 7.2	d 10.7
Average miles per car per day	22.0	23.9	d 1.9	d 7.9	17.2	19.4	d 2.2	d 14.0
Per cent of empty car-miles	29.1	28.5	0.6	2.2	31.6	30.1	1.5	5.0
Per cent of freight locomotives in shop or awaiting shop	15.4	15.2	0.2	1.8	16.6	15.4	1.2	7.9
Per cent of freight cars in shop or awaiting shop	5.2	5.5	d 0.3	d 5.5	5.8	5.8	...	d 0.1
Revenue ton-miles								
Per freight locomotive	865,116	856,060	9,056	1.1	876,972	949,092	d 72,120	d 7.6
Per freight car	11,341	11,290	51	d 0.4	4,958	5,044	d 86	d 6.6
Average miles operated—single track	224,763.27	224,729.41	33.86	a	58,384.98	58,679.97	d 294.99	d 0.5

miles show a decrease of 7.9 per cent, but the tonnage per train shows a decrease of 7.7 per cent, and the tonnage per loaded car increased 10.3 per cent. Both the average miles

per locomotive per day and the average miles per car per day show large decreases. The table gives the figures in detail and by districts.

Item	SOUTHERN DISTRICT				WESTERN DISTRICT			
	1918		1917		1918		1917	
	Amount	Per cent	Amount	Per cent	Amount	Per cent	Amount	Per cent
Freight train-miles	181,738,789	8.30	187,787,874	8.30	1,366,134	6.7	1,411,373	6.4
Loaded freight car-miles	84,630,836	2.92	79,668,159	2.82	1,018,881	4.4	1,144,199	4.9
Empty freight car-miles	209,699,775	9.61	206,440,744	9.38	3,167,253	14.8	2,267,174	10.4
Total freight car-miles—loaded and empty	991,438,615	45.53	994,128,603	45.68	4,486,034	20.2	3,411,373	15.6
Freight locomotive-miles	9,916,119	0.45	11,116,157	0.50	111,373	0.5	128,894	0.6
Revenue ton-miles	4,097,420.4	18.6	4,658,472,066	211.8	446,948,888	20.6	4,907,671,966	224.1
Non-revenue ton-miles	441,840,311	20.0	444,119,005	20.1	1,181,797,471	55.6	1,084,441	0.5
Average number of freight locomotives in service	4,822	110	4,811	110	110	5.1	110	5.1
Average number of freight locomotives in shop or awaiting shop	612	15	606	15	1,940	9.1	1,993	9.1
Average number of freight cars in service	745,317	27.0	83,977	3.0	281,046	12.6	270,219	12.4
Average number of freight cars in shop or awaiting shop	13,077	4.7	13,399	4.8	38,745	1.7	47,839	2.1
Home	8,341	2.9	9,001	3.2	6,345	2.8	6,411	2.9
Foreign	4,736	1.7	4,398	1.6	11,899	0.5	10,415	0.5
Tons per train	6.8	0.11	6.11	0.1	3.4	0.15	3.4	0.15
Tons per loaded car	27.9	0.2	27.7	0.2	7.9	0.3	7.8	0.3
Average miles per locomotive per day	7.0	0.3	6.9	0.3	6.1	0.3	6.1	0.3
Average miles per car per day	27.9	1.0	27.9	1.0	26.8	1.2	26.5	1.2
Per cent of empty car-miles	31.4	1.3	29.4	1.1	26.8	1.2	26.5	1.2
Per cent of freight locomotives in shop or awaiting shop	12.4	0.3	12.6	0.3	13.4	0.6	13.4	0.6
Per cent of freight cars in shop or awaiting shop	3.8	0.1	4.4	0.1	4.8	0.2	5.4	0.2
Revenue ton-miles	1,035,640	48.0	966,432	44.0	786,106	36.0	718,272	32.0
Per freight locomotive	214,762	9.5	16,372	0.7	12,622	0.6	11,386	0.5
Per freight car	37,333.17	1.6	37,199.33	1.6	129,045.12	5.8	128,940.09	5.8

COMBINED TWO MONTHS, JANUARY TO FEBRUARY, INCLUSIVE

Item	UNITED STATES*				EASTERN DISTRICT			
	1918		1917		1918		1917	
	Amount	Per cent	Amount	Per cent	Amount	Per cent	Amount	Per cent
Freight train-miles	95,661,849	4.4	104,060,361	4.8	36,000,489	1.6	42,662,719	1.9
Loaded freight car-miles	1,969,985,405	88.5	2,348,968,003	106.4	760,026,758	34.3	1,018,899,737	45.9
Empty freight car-miles	835,804,352	37.8	971,797,600	43.6	300,302,447	13.7	358,061,420	16.0
Total freight car-miles—loaded and empty	2,795,185,657	126.3	3,320,765,603	150.0	1,060,329,205	48.0	1,376,951,157	61.9
Freight locomotive-miles	111,959,163	5.0	135,105,159	6.0	45,027,177	2.0	58,399,477	2.6
Revenue ton-miles	5,163,747,581	234.0	56,077,522,197	2522.0	22,597,307,686	1022.0	26,511,836,426	1192.0
Non-revenue ton-miles	5,317,971,911	240.0	5,479,616,119	246.0	1,664,344,208	75.0	1,639,533,087	74.0
Average number of freight locomotives in service	50,834	115	50,476	115	13,113	59	12,671	57
Average number of freight locomotives in shop or awaiting shop	4,796	11	4,558	11	2,109	9	1,983	9
Average number of freight cars in service	2,363,861	85.0	2,357,117	85.0	1,285,455	58.0	1,296,334	58.0
Average number of freight cars in shop or awaiting shop	121,130	4.4	127,392	4.6	68,660	3.0	71,230	3.2
Home	8,586	0.3	9,619	0.4	45,853	2.0	53,308	2.4
Foreign	38,544	1.4	31,973	1.2	7,571	0.3	17,832	0.8
Tons per train	5.9	0.1	5.9	0.1	4.7	0.2	4.7	0.2
Tons per loaded car	28.9	0.1	26.2	0.1	8.5	0.4	8.4	0.4
Average miles per locomotive per day	6.1	0.3	6.6	0.3	5.8	0.3	6.8	0.3
Average miles per car per day	28.9	1.0	26.2	1.0	18.5	0.8	18.4	0.8
Per cent of empty car-miles	29.5	1.1	29.3	1.1	32.2	1.5	31.0	1.4
Per cent of freight locomotives in shop or awaiting shop	15.6	0.6	15.0	0.6	16.1	0.7	15.4	0.7
Per cent of freight cars in shop or awaiting shop	5.1	0.2	5.6	0.2	5.6	0.3	5.9	0.3
Revenue ton-miles	1,675,253	75.0	1,840,635	84.0	1,677,411	75.0	2,059,811	92.0
Per freight locomotive	21,852	1.0	24,519	1.1	18,164	0.8	21,977	1.0
Per freight car	226,340.56	8.1	226,387.66	8.1	58,377.35	2.6	58,678.89	2.6

Item	SOUTHERN DISTRICT				WESTERN DISTRICT			
	1918		1917		1918		1917	
	Amount	Per cent	Amount	Per cent	Amount	Per cent	Amount	Per cent
Freight train-miles	18,457,640	0.8	18,457,641	0.8	41,493,711	1.9	43,020,558	1.9
Loaded freight car-miles	356,137,932	16.1	408,321,125	18.3	853,980,715	38.6	921,737,138	41.2
Empty freight car-miles	171,054,432	7.8	176,764,101	8.0	296,843,353	13.6	336,997,078	15.2
Total freight car-miles—loaded and empty	527,192,364	23.9	585,085,226	26.3	1,150,824,068	52.2	1,258,734,216	56.4
Freight locomotive-miles	5,717,426	0.3	6,010,048	0.3	46,961,669	2.1	52,195,684	2.3
Revenue ton-miles	2,609,912,205	118.0	10,224,430,696	463.0	1,674,518,760	76.0	19,341,585,765	870.0
Non-revenue ton-miles	958,686,035	43.0	996,270,153	44.0	2,012,044,717	92.0	2,048,812,379	92.0
Average number of freight locomotives in service	5,191	115	5,112	115	12,580	57	12,483	57
Average number of freight locomotives in shop or awaiting shop	674	15	631	15	1,913	9	1,944	9
Average number of freight cars in service	355,107	12.6	406,494	18.1	783,397	35.0	784,190	35.0
Average number of freight cars in shop or awaiting shop	14,146	5.0	13,933	6.2	38,224	1.7	42,177	1.9
Home	9,698	0.4	11,008	0.5	7,905	0.4	8,784	0.4
Foreign	4,448	0.2	2,925	0.1	10,489	0.5	10,164	0.5
Tons per train	6.8	0.1	6.7	0.1	9.4	0.4	9.4	0.4
Tons per loaded car	27.9	0.1	27.8	0.1	8.4	0.4	8.4	0.4
Average miles per locomotive per day	6.8	0.3	6.8	0.3	6.1	0.3	6.1	0.3
Average miles per car per day	28.4	1.0	28.4	1.0	24.8	1.1	24.8	1.1
Per cent of empty car-miles	32.4	1.2	33.4	1.2	34.8	1.6	34.8	1.6
Per cent of freight locomotives in shop or awaiting shop	13.0	0.5	12.3	0.5	16.1	0.7	15.6	0.7
Per cent of freight cars in shop or awaiting shop	4.0	0.1	4.7	0.2	4.9	0.2	5.4	0.2
Revenue ton-miles	1,895,727	85.0	1,996,179	90.0	1,577,122	70.0	1,543,498	70.0
Per freight locomotive	37,268	1.7	33,494	1.5	126,116	5.7	126,116	5.7
Per freight car	39,158.62	1.4	38,975.98	1.4	128,804.6	5.8	128,804.6	5.8

* The returns included in the monthly statement represent about 97 per cent of the total tonnage and about 99 per cent of freight traffic. Decrease.
 † Less than one-tenth of one per cent.
 Compiled for the Association by Bureau of Railway Economics, Washington, D. C., May 23, 1918.

Railroad Men's Mountain Home Association

THE PROJECT FOR A Railroad Men's Mountain Home in Colorado, mentioned in the *Railway Age* of March 22, has aroused much interest among the railroad men, who are now lending their support to such an extent that a sufficient sum of money has already been guaranteed to enable the board of directors to start work on their plans to provide a recuperation camp for returning soldiers who enlisted from the ranks of the railroad and express service. It is believed that within the next 30 days two buildings will be ready for occupancy and will accommodate approximately 25 men. As funds are received through the generous assistance of various railroads the accommodation will be rapidly enlarged, and eventually the complete plan will be in successful operation, so that railroad men in need of such assistance, regardless of whether they have been actively engaged in military service, will be afforded the opportunity to regain health and strength under ideal conditions.

The plan has the approval of a number of important railroads. The Chicago & Alton, St. Louis Southwestern, Oregon Short Line, Denver & Rio Grande, Colorado & Southern and Oregon-Washington Railroad & Navigation Company, as well as several smaller lines, have brought the matter to the attention of their officers, agents and employees with request that contributions be sent to the treasurer of the company, who, in turn, will remit to the First National Bank, Denver, Colo., which is acting as treasurer for the Mountain Home Association. The Rock Island, Baltimore & Ohio, Southern Pacific, Oregon-Washington Railroad & Navigation Company, and several others have made appeals to their men through their employees' magazines with gratifying results.

Railroad men are also being solicited by letter, to send 25 cents or a thrift stamp or two to the bank in Denver for the support of the home, as the stamps can be very easily remitted. The Association of Transportation and Car Accounting Officers has officially endorsed the plan and is circularizing its officers and others, bringing to their attention the "Thrift Card" plan for raising funds. Employees of the Southern Pacific shops at San Jose, Cal., have collected and remitted to the treasurer of the association a total of \$127.50 for the purpose of equipping a San Jose section in the home.

Apparently an erroneous impression prevails in some quarters, that the plan has been established in connection with the government plans for the rehabilitation of wounded and disabled soldiers. The association will not undertake any work of this kind, but its activities will be almost wholly confined to affording the opportunity for convalescent and weary railroad men to recuperate under ideal conditions. No attempt will be made to conduct a hospital or take care of surgical cases.

A circular letter addressed to railroad men explains the plan in part as follows:

"The *Railway Age* of January 4 says the American railroad fraternity was represented in the army on that date by about 70,000 men. You probably have, or will have, relatives and friends facing the bullets in France; and, in the natural course of events many of them will return disabled or afflicted. Therefore, it is essential that means be provided to care for them on their return.

"Seven railroad men and citizens of Denver have incorporated, under the non-profit sharing statute of Colorado, and have accepted 40 acres of mountain ranch, donated by a railroad man, 30 miles southwest of that place on the side of a mountain, ideally located, where accommodations will

be provided so our railroad soldiers may find rest among the pine trees and pure mountain air.

"A fund is being provided for carrying out this undertaking, buying additional property if necessary, building cottages, making improvements, etc. Your assistance is requested. The board of trustees is giving its time toward the furtherance of this laudable enterprise. They will pass on the eligibility of applicants desiring to go to the home, and furnish all information regarding the plan, as it will be maintained at as low a cost as possible on the co-operative principle. No compensation of any kind is to be received by any one other than the actual employees. It is hoped to have a few cottages ready for early summer; and, by the



Location of the Railroad Man's Mountain Home

end of the year, to increase the capacity to accommodate at least 1,000.

"If you are in sympathy with this movement kindly send 25 cents or more, or a government thrift stamp or two, to the cashier of the First National Bank, Denver, and write at least five copies of this letter to other railroad or express company men and women. The writer of this has the assurance of a friend from whom it was received that it is a very worthy cause. This assurance can be handed down the line to the railroad people of the United States, who can verify it by inquiring of any railroad man in Denver, as the newspapers have given it publicity."

TWO HUNDRED AND SIXTY-FIVE TRAINS OF HUN WOUNDED.—Two hundred and sixty-five trains full of wounded soldiers returning to Germany from the battle fronts of Picardy and Flanders, says the newspaper *Les Nouvelles de The Hague*, were counted in the daytime on April 9, April 11 and April 12, on the Namur-Liege Railway. The transports were so crowded that the Germans were even using open coal cars to carry the wounded.

Durability of Untreated Piling Above Mean Low Tide

Report of an Investigation of the Protection Afforded by Saturation Above the Water Level.

By C. H. Teasdale and Mabel E. Thorne
Forest Products Laboratory, Madison, Wis.

IT HAS LONG been recognized that wood constantly immersed in water is not subject to decay. Instances are on record of wood being preserved in this way for centuries. Timber structures in fresh water or in water free from the various forms of marine wood-borers remain sound indefinitely, unless affected by some destructive agent other than decay.

In tidal water, where marine borers are not active, portions of piles that are completely immersed at each high tide may be exposed at other times without danger of decay, for though completely immersed only part of the time, they may be practically saturated all the time. The extent of this saturation, and therefore permanent preservation against decay, is an item of considerable interest and importance in designing pile construction. The difficulties of cutting off piling at low water, as well as the extra cost and weight of the superstructure when joints are made at low tide level, may well be avoided wherever immunity from decay exists for any distance above this level.

Because there is so little available data as to the extent of this immunity zone, the Forest Products Laboratory has recently been conducting a study of the subject by the questionnaire method. Replies to the questionnaire are given in this report. They show careful thought, and several of them contain records of actual investigations made after the questionnaire was received.

Effect of Setting in Earth

A few of the replies make note of the fact that piles set in an earth wharf are free from decay to a greater distance above mean low tide than those set alone. For example, Edwin Lord, harbor master at Bangor, Me., writes that "where the wharfing and piling have been covered with earth and saturated at high water the timber remains sound. I have seen the wharfing uncovered and the logs apparently in perfect condition where they have lain for nearly 70 years."

Raymond F. Bennett, president, Bennett Contracting Corporation, Portland, Me., states that "for piles driven in a solid earth wharf, the height of no decay would be higher than for piles standing alone, and this height would also increase with the distance of the pile from the edge of the fill. A Boston engineer who designed a structure to be built on a solid fill wharf in this harbor, stipulated that the piles near the edge of the fill should be cut off 5 ft. above mean low tide; and that piles say, 20 ft. and further from the edge of the fill, should be cut off at 7 ft. I think probably this is good practice."

The United States Engineer Office, Galveston, Texas, writes as follows: "A pile and brush dike was built about 1902 on the north side of Galveston channel, the piles being green with the bark on and their tops being about 4½ ft. above mean low tide. This dike was partially covered by material excavated from the channel, but some of the material has since washed away, so that the piles which remain now stand on ground which is possibly one foot above mean low tide. In other words, they stand in water part of the time. Those of the piles which have not been touched by the teredo are still sound although the bark is gone." (Mean tide level is 0.3 ft. above mean low tide in Galveston harbor.)

The Commission on Waterways and Public Lands of Massachusetts reports: "A great deal of solid clay filling has been done in Boston, and piles driven into it have been found solid up to 13 ft. above low water 30 years after they were driven. Above that level they were practically all decayed, the filling above the clay being gravel." (Mean tide level here is 4.5 ft. above mean low tide.)

One particularly interesting case was reported from Galveston. Under the direction of the U. S. Engineer Office, an examination was made of piles set in a salt marsh or meadow, so enclosed that they were protected from teredo and yet were subject to frequent immersion in salt water. The nominal range of tide at Galveston is less than a foot but the harbor is subject to storms which force the water up onto the shores of the bay to much greater depths. The following is quoted from the letter describing the results observed:

"The piles in an old trestle built about 1892 across a salt marsh on the east end of Galveston island were examined. The piles are pine. In order to make an examination the dirt was removed from around them to a depth of about 18 in. The results of the examination are tabulated thus, all elevations being referred to mean low tide

Pile No.	Diam. at top inches	Elev. of top of pile plus 4.8	Elev. of ground surface plus 4.4	(Condition and remarks)
No. 1	14	plus 4.8	plus 4.4	The full exposed part of the pile except the heart is decayed.
No. 2	12	plus 5.6	plus 4.1	Decayed, except heart.
No. 3	18	plus 4.9	plus 3.3	Sound.
No. 4	12	plus 4.0	plus 3.0	Sound.
No. 5	16	plus 4.8	plus 3.7	Sound.
No. 6	12	plus 4.9	plus 2.6	Sound.
No. 7	12	plus 4.7	minus 0.6	Sound. Contains a few small teredo holes, but no live teredo was found.

"Remarks: Piles 1 and 2 are on level ground covered with marsh grass. Pile 3 is located at the head of a small swale or depression leading to tide-water, and the remainder of the piles follow down this depression consecutively, as numbered. Piles 3 to 7 were saturated with water so that driving a hatchet into them brought water to the surface. The wood was bright and clean as if newly cut from the forest."

H. E. Manvel, vice-president, Rhodes & Manvel, Inc., states that: "We have also found that on foundation piles driven in salt meadow which is permanently wet to high water line, that capillary action saturates the piling for a distance of 12 to 18 in. above the high water mark, and it is very seldom that the piling will rot below that point, so we can broadly state from our experience that timber and piles will be saturated on an average from 1 to 2½ ft. above the permanent water level."

The extent above mean low tide to which these piles remain sound may be explained by the fact that salt has certain preservative properties.

Protection from Weather

Protection from the action of the weather is also an important factor in the durability of piles. The following replies mention this point:

T. A. Scott, harbor master, New London, Conn.: "Piles or timber extending above mean low water (New England coast), which are saturated every high water will stand preserved for at least 50 years and longer if that part of the timber exposed to the atmosphere all the time is under some protection from the weather."

S. R. Alexander, acting harbor engineer, Baltimore, Md.:

"I also noted that timbers buried in earth filling behind bulkheads were in much better condition than those exposed to the air even though the latter were in many cases lower than the former."

Richard A. Monks, vice-president, John Monks & Sons, New York, N. Y.: "As foundation piles are not exposed to any drying factors, such as sun-light, etc., they should retain their life indefinitely, if cut about half tide or below this level."

Commission on Waterways and Public Lands, Massachusetts: "Many piles have been observed in old wharves where the outer portion of the timber is sound up to about the high water mark, while the center portion has been decayed—the decay extending to half tide or below. Piles cut off just below mean high water and having their tops protected from rain water will undoubtedly last indefinitely, excepting for the action of worms and ice, and especially so when they are not exposed to the sun."

Relation of Durability to Mean Tide Level

Replies received from 25 different sources were summarized and divided into two classes, those which state that for permanent foundation work piles can be safely cut off at mean tide level or above and those which state that the zone of safety does not extend to mean tide level. It was noticeable that the grouping of these replies according to their character is a geographical grouping as well. The climate of the northern states is more favorable to the long life of piling than that of the southern states. From the data at hand, it would seem that the line of demarcation between the harbors in which it is safe to cut off piling at mean tide level or above and the harbors in which it is not safe lies somewhere between New York and Baltimore.

The rate at which a pile dries is largely dependent on temperature and relative humidity. The relative humidity varies only slightly from Maine to Florida, while the temperature variation is considerable. This means that, a few hours after high tide, piles in southern waters will have a much lower percentage of moisture than those in northern waters, which, combined with the encouragement to the growth of fungi furnished by the higher temperatures, probably accounts for the variation in the extent of the zone of safety.

Orders of Western Regional Director

DURING the past week R. H. Aishton, regional director of western railroads, has issued the following circulars:

Purchases

In supplement No. 1 to R. P. C. Circular No. 7, dated May 15, the western regional purchasing committee says:

The central advisory purchasing committee at Washington has now decided as follows: The proposed plan for turning over to the purchasing agents of producing lines for handling, inspecting and shipping from one road to another unfilled contracts or orders placed prior to government action on March 13, 1918, as outlined in R. P. C. Circulars 1 and 7, cannot be made effective in time to avoid delay in delivery for this season's requirements. Therefore the following will be observed:

1. All contracts or orders for cross-ties placed prior to government action March 13, 1918, must be handled on their merits. Roads having such contracts or orders unfilled should immediately take up with the contractors the questions of completing shipment if possible by June 15.

2. There may be old contracts made at low prices that should be revised. In such cases the committee will consider such recommendations as roads submit. In the event of any question as to adjustment of price, the matter should

be taken up direct with the contractor and if an increase is warranted, the recommendation of the road interested should be submitted for approval to the regional purchasing committee with full explanation.

3. The receiving roads will continue to take up and inspect the ties same as heretofore. It is hoped that all such contracts or orders as are not completed by June 15, should be given special consideration at that time as to the best means of handling and completing them.

4. All embargoes on ties to be shipped from one road to another should be lifted and the ties moved as soon as possible.

5. The road on which ties are produced will give every assistance possible to secure prompt completion of such orders and contracts.

6. If there is any shortage of cars for moving ties, the matter should be brought to attention of regional director.

Track Labor—Season 1918

Supplement No. 3 to Circular No. 63 issued by the western regional director reads as follows: In order to avoid any misunderstanding, and the possibility of laborers transferring from one line to another, please discontinue at once the payment of time and a half for Sunday work to section and extra gang track laborers, regardless of whether the practice was in effect prior to the issuance of Circular No. 63 or not.

Cars for Grain Loading

In a communication to grain-carrying roads, dated May 17, the western regional director gives the following instructions:

Special efforts must be made, in anticipation of heavy grain movement, to have all available box cars fit for grain loading in proper repair. It must be realized that with the large percentage of foreign cars on the various roads this year special attention will have to be given to these cars that they may be made fit for this service. Specialize on repairs to box cars and pay particular attention to those repairs relating to the subject of this circular.

Engines Available

In Circular No. 105, dated May 16, the western regional director asks western lines to send him a report of all engines now tied up *awaiting service* giving information as called for below:

Engine Nos.	Where Located	Type of Loco.	Kind of fuel used	Tractive Power	Size Drivers	Size Cyls.	When will they be required for service	Remarks
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He also asks for additional reports whenever the engines referred to are put in service or additional engines are tied up awaiting service. This refers to passenger engines of 25,000 tractive power or over and other engines of 33,000 tractive power or over.

Equipment—Wagon Coal Mines

Supplement No. 1 to Circular 51, issued by the western regional director on May 16, reads as follows: The object of restricting wagon coal mines to the use of box cars is to conserve the open-car supply for mines loading coal from tipples. In order that the situation may be taken care of as fairly as possible it is further provided:

1. When open-car equipment available is sufficient to provide full car supply to mines loading coal from tipples, open cars may, when requested, be furnished to wagon coal mines.

2. Where wagon coal mines dump coal into cars from elevated platforms under physical conditions such as to make the loading of box cars impracticable, open cars may be distributed on the same basis as to tipple mines.

3. Any special condition in connection with wagon mines on your line that seems to warrant further deviation from the letter of this rule may be reported for consideration.

Annual Convention of Railway Fuel Association

Under Auspices of United States Railroad Administration and
United States Fuel Administration

“**S**AVE COAL, OR LACK IT,” was the keynote of the opening session of the tenth annual convention of the International Railway Fuel Association. This convention, which is being held with the co-operation of the United States Fuel Administration and the United States Railroad Administration, opened on Thursday, May 23, at Chicago. The first meeting was held in Cohan's Grand Opera House.

Several changes were made in the list of speakers for the first day's session as originally announced. C. R. Gray, director of the Division of Transportation, United States Railroad Administration, was unable to be present, and R. H. Ashton, director Western Regional District, United States Railroad Administration, addressing the meeting in his stead. Sir George Bury, chairman of the Canadian Railway War Board, was also unable to attend but was represented by Thomas Britt, general fuel agent of the Canadian Pacific Railway.

Practically every railroad company in the country designated representatives to attend the convention and there were also present a large number of coal operators and other representatives of the mining industry.

The convention was opened with an introductory address by the president of the association, E. W. Pratt, assistant superintendent motive power and machinery, Chicago & Northwestern. Mr. Pratt spoke in part as follows:

President's Address

E. W. Pratt, president of the association, spoke in part as follows: “Subsequent to our last convention the executive committee of the association made offer of itself, our individual membership and the entire machinery of the organization to the United States Railroad Administration and to the United States Fuel Administration. The offers were accepted and representatives from each department were assigned to co-operate with us. We want you to leave this convention so imbued with the patriotic spirit that when you go home you will carry on the movement for more and better coal and its economical use. As individuals we take a back seat for no one when it comes to patriotism, but it has been my experience and observation that we know not always wherein our individual duty lies nor can we sense its importance in the big game. We are wont to say, ‘What's the use of the extra exertion to save a shovelful of coal when another can save a ton?’ ‘What's the use of unloading a car of coal a day earlier when we see trains of coal remaining unmoved daily?’ ‘What's the use of firing a locomotive with care when the train dispatcher holds us an hour on a siding?’—a delay which seems to you avoidable, ‘Why repair a car today by extra effort when there will be “just as many” tomorrow?’

“Some of us can do more than others, but all of us have it in our power to a greater or less degree to help win the war by doing our best. It is not expected that the miner will do as much as the operator, but both can do wonders in the improvement of the quality of fuel coal if their heart be in it. The stationary fireman can do less toward fuel economy than the manager of the plant who can provide efficient devices. Neither can the locomotive fireman save as much coal on his one engine as can the train dispatcher with dozens of trains on a single track road, but each can do and must do his part.

“There is no time for any of us to count his performance with respect to what the other fellow is doing. If the other man fails that is no reason for letting up on our own efforts.

“The largest single item of railroad expenditure, other than labor, is for fuel, and yet we know that much fuel is wasted on every railroad. The railroads of the United States use over one-quarter of all the coal mined, and being such extensive users of this commodity, valuable in time of war far beyond dollars and cents, it devolves upon those of us who are laboring for the railroads to exert ourselves to secure the utmost economy. Ask the average locomotive fireman if he can, by close attention to his work, save a shovelful of coal a mile and he will say, ‘Sure I can.’ Suppose he were firing a locomotive over in France on the United States military railroad with coal costing anywhere up to \$150 per ton, and he would surely tell you he could save still more.

“It is stated that in the year 1917 fifty millions tons more coal was mined in this country than in the year before we entered the war. That sounds good, but let us consider the facts: Experts calculate that there was enough slate, bone and dirt in 650 million tons of coal mined in 1917 to nearly offset the apparent increase of 50 million tons. It means that it took one million more coal cars to haul this 50 million tons of slate and rock from the mines to the users, a tremendous loss in economical firing due to ashes and clinkers, and another million cars (or its equivalent in wagons, barges, etc.) to haul them away. The miner might say that it would give him less earnings during the year to pick the coal well, and the operator might say it would give him less sales for the year, but I contend that this is not true. The output of both miners and the mines will without doubt this year be limited by the car supply at the mines, as has been the case for the last few years, and it should be borne in mind that the railroads are not responsible for this condition, but the public policy toward them for the past decade.

“There are three items in this tremendous fuel problem—production, transportation and consumption—and the railroads of this country are largely responsible for all three of them. For production in so far as concerns the delivery of machinery and supplies to the mines and a car supply for the coal produced; but the miners and operators both can do much in this particular. How often have the mines dropped empty cars by the shaft for some trivial reason? If there be refuse in the cars, a hole in the floor or sides, a brake chain broken, how little effort on their part would avoid this loss of use of one or more cars for a whole day? I venture to say that this trivial item amounts to several thousand of coal cars each day.

“The next item is transportation, largely by rail, some by water. Railroad men are a hardy and earnest lot and not easily discouraged, working every day in the year including Sundays and holidays, that their task may be accomplished with credit to themselves, their employers and to their country. But when last winter, after weeks of continued and unprecedented snow and cold, their locomotives were compelled to operate with added disadvantages of poor and dirty coal it was perhaps the greatest obstacle of all and many a locomotive died and its train was abandoned for this reason. I have yet to see a miner or operator who would defer to the railroad man in the matter of patriotism or loyalty to country, and I believe if the proposition is put squarely up to the men that there will be no Sundays or holidays in either

the mine, on the railroad or in the coal yard when it concerns the output and distribution of coal, any more than there is Sunday or holiday in the trenches with the Hun facing our boys and the Kaiser menacing our free institutions.

"Were the railroad problem purely one of handling coal, it would indeed be simple and easy, but with vast quantities of foods and materials to move it is greatly complicated.

"The zoning system inaugurated by the United States Fuel Administration will save thousands of coal cars per month. This must needs be, yet it will be only a drop in the bucket compared with what we can accomplish by all pulling together. It is calculated that the average car in coal trade only makes a round trip from the mines to the coal shed once a month. Reduce this time at the mines, on the repair tracks, on the road and at the coal sheds; this we must do to help solve the problem.

"The 27 per cent of the coal produced which is used by the railroads is so large that we hope by care and close attention to details not only as to firing but in better repair of locomotives, more care in despatching and moving trains,

through the shop should be continued as far as possible, considering the scarcity of materials and skilled labor to apply them. The locomotive feed-water heater also offers an attractive field for economy and efficiency and well warrants careful and continued experimentation.

"There is every indication of a greater shortage of coal next winter than we had last unless production is increased and great conservation is practiced and let it not be possible for anyone to point the finger at you or me and say with any degree of justice—there is a slacker."

The Railroad Industrial Army

By W. S. Carter,

Director, Division of Labor, U. S. Railroad Administration

Mr. Carter was unable to attend and the address prepared by him was read by Eugene McAuliffe, manager of the Fuel Conservation Section, United States Fuel Administration. Mr. Carter's address was in part as follows:



E. W. Pratt, President, Railway Fuel Association



Frank McManamy
Director, Division of Locomotive Maintenance, U. S. Railroad Administration



Robert Quayle
General Superintendent, Motive Power and Car Department, C. & N. W.



E. N. De Groot, Jr.
Assistant Manager, Car Service Section, Division of Transportation, U. S. Railroad Administration



W. S. Carter
Director, Division of Labor, U. S. Railroad Administration

and better operation on the part of the engineer, to save millions of tons of coal and millions of gallons of fuel oil. Superheating has been proven practicable and each locomotive so equipped saves hundreds of tons of fuel per year besides rendering faster and better service; hence, the present practice of superheating the larger locomotives passing

We are told by those who know that it requires four tons of shipping to maintain one American soldier in France. We are told by those who are determined to win the war that by the spring campaign of 1919 we will have more than two millions of our boys "over there," and as the war progresses more and more ships will be required to trans-

port across the sea food and munitions with which to maintain our fighting force. Not only the winning of the war depends upon this ceaseless flow from our farms and our factories to the battle front but without it the men we send to France in freedom's cause will be sacrificed.

When we talk of this stupendous movement of war supplies we seem to think only of ships but little thought is given to the fact that upon our railroads these ships must depend for cargoes and bunker coal. The reason that we have not more fully recognized this fact is because heretofore the capacity of our railroads has exceeded that of our ships. We read from day to day of the splendid developments of the ship building industry, and the day is not distant when our ports will be crowded with ships in readiness to perform their part in this great transportation problem. When that day comes we railroad men will have a rude awakening. No longer may we conduct our business affairs and maintain our conditions of labor as in the days of peace.

Without yielding their laudable purpose to limit a day's work to eight hours when this war is over the American working people must now work as long each day as the war's necessities demand, compatible with their physical well being. So long as brothers and sons of American working people are dying in France for our liberty none of us will hesitate short of our greatest effort. Business men must no longer profit out of our country's misfortunes. Great wealth accumulated during this war will not be the product of patriotism. With millions of men now under arms in France, with thousands of ships ready for cargoes and bunker coal, railroad men will soon realize that truly they are a component part of the American expeditionary forces. In fact they are now a great industrial army. Their failure to maintain an efficient line of transportation will cause ships to lie idle in our harbors and deprive our battle line of munitions and food.

A breakdown in the efficiency of our railroads here when the crisis comes will be no less disastrous than a rout of one of our armies in the great battles that must be fought before the war is won. I shall not attempt to tell each railroad man what he should do to avert the possible collapse of our transportation system when it is put to a crucial test. Each and every railroad man's conscience will tell him that.

I know that the railroad employees of this country will not be lacking in the performance of their duty to the nation and to those who go across the sea to win or die. My confidence in and my knowledge of railroad men assures me they will do their part. If the railroads fail when they should be most efficient I cannot believe that the fault will lie with those men whose uniforms are overalls. When our children's children read the stories of the part played by America in the great war for liberty they must find there also recorded that the railroad men of America realizing that upon them had fallen the burden of transporting troops, munitions and food far beyond their normal capacity worked as no men had ever worked before and thereby maintained an uninterrupted medium of transportation without which the war could not have been won.

Relation of Locomotive Maintenance to Fuel Economy

By Frank McManamy,

Manager Locomotive Section, United States Railroad Administration.

Fuel economy and locomotive maintenance in practically everything that relates to efficient locomotive performance, are synonymous terms. Within recent years the increasing cost and scarcity of fuel have made fuel economy a question

of major importance to the designer of locomotives as well as to the officials in charge of locomotive maintenance. The inventor has also turned his talents in that direction, with the result that the superheater, the brick arch combustion chamber firebox, and other fuel saving devices, are today parts of the equipment of every modern locomotive. The influence of these devices in effecting real fuel economy is tremendous, and their application to many existing locomotives will result in a marked reduction in fuel consumption.

The largest possible measure of performance can be obtained from a locomotive only by giving constant and careful attention to locomotive maintenance. Locomotive maintenance is not only related to fuel economy, it is fuel economy. What is meant by a locomotive in good condition? It means a boiler which generates steam economically but freely, proper steam distribution to the cylinders and efficient mechanism for transmitting the power developed in the cylinders to the only place where the power of the locomotive can be measured—the drawbar at the rear of the tender.

The boiler, to promote economy of fuel, must be properly designed, with ample grate and heating surface. It must be clean, the grates level and easily shaken and in good condition, the ash pan and grates must have ample air openings to aid combustion, the firedoor should operate easily, and the fire tools should be in good condition. The flues must be clean, the flues and firebox free from leaks, smokebox must be air tight, the smoke stack and nozzle in line, and the draft appliances in good condition and properly adjusted.

Too much stress can not be laid on the necessity for keeping boilers clean, because in addition to effecting a material saving in fuel, it increases the efficiency of the locomotive and materially prolongs the life of the flues and firebox sheets. Frequent and thorough boiler washing is the foundation of proper boiler maintenance. Authorities differ somewhat as to the exact loss due to scale on boiler sheets but a comparison of tests made indicate pretty conclusively that 1/16 in. of scale will increase the fuel cost approximately 15 per cent and that 1/4 in. of scale will increase the fuel cost approximately 60 per cent.

It is not an exaggeration to say that on an average 40 per cent of the locomotive boilers in service have scale 1/16 in. thick or to say it differently, that due to poor boiler washing all of them have 1/16 in. scale 40 per cent of the time, and that many have scale from 1/8 in. to 1/4 in. in thickness. In fact in some districts it is not unusual to find 1/2 in. of scale on boiler sheets. Let us see what this means in actual figures. In 1918 it is estimated that the railroads will require 160,000,000 tons of coal at an average cost of \$8.50 per ton, which will be a total of \$581,000,000. If we add to this 48,000,000 barrels of fuel oil it will make the total fuel cost over \$650,000,000. We will pay, therefore, during the year of 1918 more than \$50,000,000 for fuel on account of the scale in locomotive boilers that many men do not consider of sufficient importance to warrant its removal.

But even a boiler that is clean and in the best of condition can do no more than generate steam; proper steam distribution to and from the cylinders must be had and the steam made to do effective work. If the valves are out of square or blowing or the valve gear badly worn; if valve chambers or cylinders are badly worn or out of round; if the cylinder packing is worn or leaking; if leaking piston rod packing or leaks about the steam chests or cylinders, less than the steam that should be used is made to do work. We can expect no improvement in our fuel performance.

Assuming, however, that the boiler is in good condition, that the steam boiler mechanism is good, and that there is no waste of steam through steam leaks, it remains to deliver this power at the firebox, and this can not be efficiently or economically done through the medium of narrow firebricks. Rods in

bad condition, boxes loose on journals, wedges which require adjusting, and tires badly worn which will cause excessive slipping, are poor mediums through which to transmit energy.

Some of the repairs which will do the most towards reducing the fuel consumption and improving locomotive performance arranged in what is believed to be the relative order of their importance, are, setting the valves properly and maintaining the valve motion, washing the boilers, keeping the flues clean, eliminating steam leaks about cylinders and steam chests and maintaining the driving boxes and rods.

Each locomotive represents a certain definite investment on which a return must be made. This can be done only by maintaining it in a condition to accomplish maximum results in the way of locomotive performance. If it were possible to calculate the aggregate loss in operating efficiency for the total number of locomotives that due to lack of maintenance are operating at less than their maximum efficiency, the result would be staggering, and when we add to this enormous loss of operating efficiency, from 10 to 20 per cent of the railroad fuel bill which for the past year was \$329,000,000, and for the current year is estimated to be \$581,000,000 for bituminous coal alone, we begin to realize the price we have been paying for the privilege of operating defective locomotives and delaying traffic thereby. This being true, the question that must inevitably follow is, what is being done by the U. S. Railroad Administration to remedy the conditions which have been described.

The first step before taking action to bring about an improvement in the condition of locomotives was to make a survey of the field. The next step was to speed up locomotive repairs to provide motive power to meet the immediate needs and this was done by increasing the shop hours about 16 per cent for over 200,000 men, and by nationalizing locomotive repairs so that a locomotive in need of repairs would be sent to the nearest available repair shop, thus utilizing to the fullest extent the total shop capacity of all railroads. The result of this soon became apparent in the increased number of locomotives turned out of the various shops which for the four months ended April 30, increased 6,849 over the corresponding period for last year. This not only means more locomotives but it means better locomotives, which both increases operating efficiency and decreases fuel consumption.

For the future the work that has been started will be continued and a higher standard of condition of locomotives required. A regular schedule for the application of superheaters and other fuel saving appliances to locomotives not new equipped, is being prepared and will be adopted subject only to labor and material being available.

Next to wages the fuel bill of American railroads constitutes their largest single item of expense. Locomotive maintenance is the only method of conserving fuel that will of itself show a net profit, in addition to the fuel saved. Every item of maintenance that makes for fuel economy also promotes operating efficiency and increases the life of the locomotive. Therefore, the good effects of maintaining locomotives are cumulative, and the bad effects of failing to maintain them, increase in the same ratio.

Today, with the increased demands for fuel by reason of the war and the necessity for furnishing fuel to our allies; with the increased use of fuel in industries whose output is essential to the successful conduct of the war, the saving of fuel by better locomotive maintenance and the increased operating efficiency which will result therefrom, means more than can be expressed in terms of tons, gallons, or dollars. It means the saving of America, the saving of Democracy, the winning of the war.

In the conservation of fuel by better locomotive maintenance, as in all other matters relating to transportation, the United States Railroad Administration, and the railroad men

of the country who are solidly behind it, can rightfully adopt as their motto, "We will deliver the goods."

The Motive Power Department and Fuel Economy

By Robert Quayle,

General Superintendent Motive Power and Car Department,
Chicago & North Western

In 1917 the railroads of this country consumed approximately 175,000,000 tons of coal. This, at an average price of \$2.50 a ton, would give us a cost of \$437,500,000. Now, I maintain that if every individual in the operating end of the railway organization of this country were to work together as one man, each helping the other to the one end of saving fuel, we could easily save 10 per cent, which would be 17,500,000 tons equivalent to \$43,750,000.

I want, first, to call attention to the master mechanic's part in this game of saving fuel. It is your duty to know what is going on on the division or the divisions that you represent. You should be in touch with your division superintendent and train dispatchers in such a way as to make them feel and really know that you are interested in them personally, that you are interested in their welfare. Men can always do their best work when they do it cheerfully. It is the master mechanic's duty to be so in touch with his shop man and engineers and firemen that they will have confidence in him, and he should have the happy faculty of having the men constantly feel kindly toward him. This would enable him at once to get the best from the men that can be had. Kindly treatment always begets bigger and better results than the opposite sort of treatment.

You should fix the machines that the men are going to handle, so that the men will have the least amount of discouragement in their work, and there will be the least amount of effort on their part necessary to get the best results. To this end you should have your men trained to make proper reports of necessary work to be done. You will find that occasional meetings with your roundhouse foremen, particularly calling attention to these things, and insisting upon their having the work done that is reported, will bring about good results, and your engineers encouraged by that method will take much more interest in making the detailed reports than they would if their reports were not given proper attention. Give every encouragement you can to all your men. By so doing you make them grow bigger and better, and the results increase as the men grow.

My next thought is the traveling engineer. His real importance on a big job, such as his is, is not often placed in the class wherein it belongs. What are his duties? To make inspection of locomotives; see that they are in proper condition to do the best work. He should know the condition of every engine in his charge. He should know what they are capable of doing. He should see to it, at the roundhouse end, that the engines leave fully capable of making the trip successfully and economically. He should always have it in mind that his job is one of helpfulness and instruction, rather than one of fault finding and improper criticism. The result will be that every man then will measure up to what is properly required of him, and will do his part to the very best of his ability.

The roundhouse foreman, as a rule, is the most abused man on a railway. He is up against all kinds of conditions, all kinds of cares and troubles, all kinds of problems to work out, in order that everything may move smoothly, keep every man one at peace with the other, and get every locomotive repaired and put in condition for its trip. His duties are multitudinous, not only in so far as the mechanical end of it is concerned, but in so far as the personal end of

it is concerned. We require a good deal of the roundhouse foreman, and to be a successful roundhouse foreman, to get the very best out of his job, he should be gracious; he must needs be a philosopher, he must be a student of human nature and he must smile even when everything goes "dead wrong."

Locomotive engineers and firemen, what a magnificent opportunity you men have to show your patriotism by your work! Study every day "What can I do to help Uncle Sam out in this crisis?" Coal is scarce. I need not tell you what people had to do last winter to get coal to keep themselves warm. Industries were restricted in the amount of fuel that they had formerly used, because of conditions generally existing in this country at that time. On the basis of your loyalty and faithfulness I am asking you to redouble your efforts; increase your intelligence not only for yourselves, but strongly urge every other fellow not only to do his bit, but to do his all, that fuel will be conserved and utilized, not wastefully, but with the highest economy and efficiency, that our nation and our allies might not suffer for the want of fuel. Fuel is now playing and will play a most important part in our warfare.

Work your engine most economically, consistent with the work that you have to do. Keep your eye on the coal pile in your tank. Watch your firemen. Do not flood your engine one time and have your crown sheet almost bare another time. Do not climb your hills 100 miles an hour and put your brakes on going down the other side. I know, of course, that very few men do these things in the extreme, but it is the careless, indifferent man that must be brought up to the standard of the best men.

The firemen can do much on their job to save fuel, and they will do much, if we put it to them right. When a piece of coal is in the gangway, instead of kicking it off, if you would do like our best men do, put it where it belongs. Don't keep the fire door open, and shovel ten or fifteen scoops of coal in at a time, without closing the door and then get up on your seat and let the black smoke roll out, and think you are doing fine. You all know that the fellow on that engine is a slacker and not a good soldier. When you find a man like that, do your bit and call his attention to it and tell him we are at war, and if he does not know it tell him coal is scarce and the demand is greater than the supply. Knowing that, I believe that he, too, will join the ranks for economy; that he, too, will go out and talk and work, and, if need be, fight, that every pound of coal will be saved.

You will observe that what I have said can be summed up in a word, co-operation, and I am sure when we of the motive power department will have done our part that the men at the other end of the operating department will say to us, "You have done well." Then we are in a position not only to solicit, but practically to command, their co-operation, and they, too, will help us get better results, because human nature is the same the world over. We all respond to success, and when one department has shown a great improvement the other fellows will not only follow in the wake, but they will try to beat them out in the end if they can.

Co-operation means, on a railway, every man of us in every department helping every other man in his own, as well as in every other department, to the end that they as a railway might be bigger and better, more useful and more serviceable to the country in which we live than any other railway.

My appeal in closing this address is that every railroad man here will take another hitch in his belt, roll up his sleeves a little higher, think more deeply, more earnestly, work a little harder, fight a little better for the conservation of fuel and for the Government by which we are employed, and for Old Glory, which stands for bigger and better things than any other flag in the universe.

The Transportation Department and Fuel Economy

By E. H. DeGroot, Jr.,

Chief, Bureau of Car Service, Interstate Commerce Commission, and Assistant Manager, Car Service Section, United States Railroad Administration

Fuel is absolutely necessary to the production of raw materials. It is essential to the manufacture of those materials into products and without it there would be no transportation as we now understand the term. Coal and more coal, then, must be our slogan.

That Nation which lags in its coal supply must lag in its fighting! We must win the war! What will it profit us, though we send our boys to the battle fields by the million, if we at home waste the coal needed to support them adequately with supplies and munitions or upon which our gallant allies are dependent to enable them to hold out?

And what can we of the transportation department do to help in this? What ladder iron can we grab that we may get a foot in the sill-step and climb to the deck of opportunity in this crisis? Well, the locomotive is in the hands of the transportation department from the time it leaves the turntable at the initial point until it is turned in over the tender pit at the terminal, and during this period it offers splendid opportunities for patriotic railroad men to co-operate to the end that the work which it performs may be done with a minimum of coal consumed.

Steam saved is coal conserved. The air compressor on the modern locomotive is a powerful engine. It performs wonders which are little enough appreciated by most of us but it has a frightful appetite for steam—and steam means coal. Its cylinders are large, necessarily so because of the exacting nature of its work, and as its load increases directly with the progress of the piston, the steam cannot be used expansively but must be admitted to the very end of the stroke, there to be exhausted and a fresh draft made upon the boiler. Under these circumstances, air leaks constitute a direct drain upon the boiler and so reach their greedy fingers back through the firebox into the precious coal pile. There is no way in which the trainman can contribute so much toward the good cause of saving coal as by stopping the train-line leaks before starting on the trip. With porous hose, worn gaskets, pipe and other leaks, what the pumps less to overcome needs no description among practical men.

Leaks are crimes when coal is a military necessity! To stop leaks then is of the greatest importance and this should be done carefully and conscientiously. Surely, any man who does less than he can, does less than he ought in this. The practice of carrying a hose gasket or two in the pocket as some trainmen do for this purpose is an excellent one. Rainy weather offers an opportunity to locate hose which are porous to a serious extent and by changing them when opportunity offers much fuel may be saved which would otherwise be wasted.

But all of the leaks are not discoverable while the train is at rest, particularly in cold weather, and new ones develop during the trip. These should all receive first-aid treatment as soon as found. Then, too, the leaks may result in sticking brakes and this condition is like compounding a felony. It not only takes much coal to pump against the leaks but much more coal at the same time to pull against the brakes.

Nothing has been said about the share which the engineer and fireman may have in this good work for the reason that other speakers will cover these points, but in passing it should be noted that the opportunities for co-operation between engineers and trainmen are many and that advantage should be taken of all of them. One way to co-operate to good advantage is by being ready to leave the house promptly at

the hour for which called, thus affording maximum time in which to pump up the train, look for and repair leaks and properly test the brakes.

So much for trainmen. Now how about the superintendent? Well, with him individual interest is indispensable! If he does not take an active interest in fuel conservation it follows as the night the day that the value of the transportation department as a factor in saving coal on *that* division will be very small. On the other hand, when the superintendent manifests keen sympathy with the movement, the men for whom he is responsible will contribute no small share toward the success of the movement. In short, the other transportation officers and the employees on the division will form their estimate of the importance of the movement very largely from his point of view. Fuel costs form the largest single item of transportation expense, and fuel economy should interest every superintendent as a fundamental of successful operation, but I want to place it on a higher plane than this, meritorious though it be,—the plane of patriotism!

Our boys are laying their lives on the altar—making the supreme sacrifice cheerfully and unafraid, as Americans have always done in the testing time. It is no longer a question whether the sons of a decadent age are worthy of their sires, but a burning question whether we fathers of America are worthy of our noble sons! And these sons will judge us—those who come back. How shall we meet them if we have betrayed them in the matter of the fullest support—or like Peter, followed afar off?

Experience on different roads has demonstrated that one of the very best ways to develop interest in fuel economy is through the agency of employees' meetings held at convenient times and places and attended by the superintendent, the road foreman and, as may be practicable, by the trainmaster, dispatchers, stationmen and any others interested—as well as by engineers, yardmen and trainmen. Attendance upon these meetings should be purely voluntary and the discussion of all subjects, including that of saving coal, frank and friendly.

Where the attendance is general, that is, not restricted to any particular class or classes of employees, there is insured a wide-spread appreciation of the importance of the subject and its place in the great war program of the nation, which is very helpful indeed. Some roads report that at meetings of this description they regularly have a hundred men or more in attendance.

The trainmaster has a fine chance to make a substantial contribution to the cause as he goes about the division, through his contact with the men and the resultant opportunities for educating and enthusing them, as well as by his ability to correct conditions which result in waste of fuel, or to have them corrected. With the yardmasters he is in position to have trains so made up at terminals as to minimize switching en route, remembering that to keep trains moving kills two birds with one stone; reduces overtime and *saves fuel*. In short, his active co-operation is of great value in this important work of fuel saving and his responsibility correspondingly great. By ordering trains for a time by which they can be made up by yard crews and at which they can get out without being delayed by other road movements as well as with a view to expediting their passage over busy stretches of track where other trains might interfere if the call is made without sufficient forethought, chief train dispatchers and yardmasters can render no little assistance.

Long delays to freight trains on sidings often result in bad fires and leaky flues, both of which increase the amount of coal which must be burned in order to overcome the handicaps which they present. Train dispatchers and trainmen by close co-operation can avoid many of these detentions and with a knowledge of how vital to the nation the

conservation of coal is at this time, should do their best to avoid such detentions.

Telegraph operators also can help by keeping dispatchers advised as to conditions affecting the movement of trains and their location so that orders may be issued advantageously and the despatching done in such a manner as to involve a minimum of delay.

In fact, fuel economy is like a Liberty Loan, everybody on the division from superintendent to call-boy should glory in having a share therein.

What has gone before pertains to the saving of coal after it has been mined and distributed. Now just a word about a big opportunity which comes to transportation men actually to make possible an increased production of coal by the miner. I refer to the chance to get cars to the mines and place them in time to save a day in their loading. Every man who in any way expedites the movement of a coal car, loaded or empty, helps in this and should realize that he is making a contribution of service which is of great importance even though he may not see the result. Men composing mine crews, however, have a fine chance not only to play the game but also to see the result by making every possible effort to place the cars for loading by the time and in the numbers that they are required under agreements between mine operators and miners, co-operating heartily with both in an endeavor to make possible the loading of a maximum number of cars each day. They can further hit the Huns by pulling the loads promptly and switching them for movement as early as possible, thus expediting the movement outbound.

Careful handling of coal loading equipment both in mining territory and elsewhere is another way in which an increased supply of cars for the movement of fuel may be secured, while careless handling, on the other hand, resulting in damage as it frequently does, means the withdrawal of instrumentalities from service which can ill be spared at this time.

The addresses of R. H. Aishton, Thomas Britt, W. S. Stone and the addresses given at the closing session on May 24 will be published in next week's issue.

INCREASED RAILWAY RATES IN EGYPT.—An Exchange telegram from Cairo states that the fares on the state railways of Egypt have been increased 50 per cent, being 100 per cent increase on the pre-war rates. Freight rates have also been increased from 50 to 150 per cent.—*Railway Gazette, London.*

RAILWAY BETWEEN THE MALAY STATES AND SIAM.—Advices received by the Malay States Information Agency are to the effect that the railway connecting British Malaya with Siam was nearing completion, and that it was expected that through passenger traffic between Singapore, Kuala Lumpur, Penang and Bangkok would begin on April 1. As a matter of fact, trains conveying officials of both countries had already been run over the line between Kuala Lumpur and Bangkok, and it was only the difficulty of obtaining certain ironwork that has prevented an earlier opening of the line to general traffic. One big bridge on the Siamese side had not been completed. The substructure had been built, however, and efforts were being made to get the metal work fixed up as soon as possible. The completion of the through railway is expected to have an appreciable effect on the Federated Malay States food problems, as the Siamese authorities are anxious to send through as much rice and other foodstuffs as possible when once the railway is open. Owing to circumstances due to the war, the through service will at first be of a modified nature, and it is not likely that there will be more than one passenger train daily each way till the war is over.

The Air Brake Association Convention

THE PROCEEDINGS OF THE FIRST DAY'S SESSION of the Air Brake Association convention appeared in last week's issue on page 1245. A brief abstract of the later proceedings follows:

Preparing Air Brakes at Terminals

Installation.—The brake cylinder and auxiliary reservoir should be bolted to the most rigid portion of the underframe and all points of fastening should be equally rigid to avoid twisting or cramping under stresses of brake applications. All air brake piping should be securely clamped to prevent shifting when cars are subjected to shocks. This will avoid many broken or distorted cross-over pipes, loose pipe joints and other causes that produce excessive leakage.

Maintenance.—If the man in charge is to be successful in supervising air brake work, his knowledge should cover the following points: He should know when a triple valve is applied to a car that has been properly repaired, cleaned and tested and is suitable for service. A brake that is tested by making a service application, the reduction of brake pipe pressure being made at the proper rate, will often fail to apply or remain applied, while if it was tested by making the reduction at an excessive rate, which may still be less than required to produce an emergency application, the brake will apply and remain applied. Hence, the importance of testing brakes with a service reduction at the proper rate, this to insure the condition of the brake being such that it will apply and remain applied when placed in the train.

The application of levers of improper dimensions and proportions causes brake-rigging failures, slid flat wheels, improper and unequal braking power and a detrimental influence on train handling. Changing brake shoes without readjusting to between seven and eight inches standing piston travel is often the direct cause of slid flat wheels, break-in-twos and train shocks. Permitting cars to leave shop or repair tracks without hammering and blowing out the brake pipe is not treating the triple valve on the car or other cars in the train in a manner conducive to good operation. Applying triple valves to cars without first seeing that branch pipe strainers are inserted and in good condition and failure to clean out dirt collectors at proper intervals, deprives the triple valves of the protection they are entitled to and causes numerous triple valve troubles.

Inspection Tests.—In making initial inspection tests and retaining valve and brake cylinder tests the committee emphasized the need of giving especial attention to the condition of all piping at points where wear or corrosion is apt to take place. It should be determined that all pipe clamps and nuts on bolts holding cylinders and reservoirs are securely in place. A 90-deg. bent nipple with each leg approximately six inches long, instead of an elbow, should be installed at the triple valve end of the retaining pipe and the pipe should be clamped not closer than six feet from the triple valve to provide flexibility and should be clamped about every six feet from this point to the retaining valve. But one union should be used in the retaining pipe, located at the end of a 90-deg. bent nipple 12 or 14 in. from the triple valve.

Triple valves that do not apply with a service reduction; that apply quick action with a service reduction, and those that have leaks at the exhaust ports should be removed and replaced with others which have been cleaned and tested in accordance with M. C. B. practice. Brake cylinders that have leaky packing rings, and the brakes that have not been cleaned for eight months on system cars or 12 months on foreign cars should be cleaned, repaired, tested and stenciled in accordance with M. C. B. standard practice.

No train should be permitted to leave a terminal without a terminal test. In testing incoming freight trains at terminals the air brake and the general inspection must not be combined. On both leaving and arriving trains inspectors should rapidly examine the train for piston travel, brakes that fail to apply, brakes that have leaked off and brake pipe leaks. To insure inspectors ascertaining the condition of the brakes on arriving trains, switchmen, carmen and others must not discharge any air from the auxiliary reservoirs or brake pipes of cars that have not been inspected.

Brake Pipe Leakage.—Excessive brake pipe leakage is one of the most liberal contributors to train shocks and break-in-twos. It wastes air, takes away from the engineer the ability to control the amount of brake applications, contributes to brakes sticking, causes overheating of the air compressor and even prevents the maintenance of standard brake pipe pressure. The maximum leakage should not exceed seven pounds per minute, as determined by standard test. This test consists of making a reduction of ten pounds from standard pressure, lapping the brake valve and then noting the leakage during the following minute after the service exhaust ends. By observing the caboose gage during brake applications train men can often note the existence of excessive leakage.

The most common cause for brake pipe leakage is poorly clamped piping that will permit shifting in switch movements, or shocks that occur along the road. Allowing train and yard men to pull hose apart instead of separating them by hand, produces spread couplings jaws, destroys gaskets and creates porous hose.

Brake pipe is not the only leakage to be considered in our effort to eliminate shocks and break-in-twos. Brake cylinder and auxiliary leakage are just as productive of damage to trains as is brake pipe leakage. If a triple valve performs its duty and permits the desired pressure to pass from the auxiliary reservoir to the brake cylinder when the reduction is made and then, due to a bad leather in the cylinder or a defective gasket under the pressure head, the pressure is permitted to leak to the atmosphere, the effectiveness of that brake is either partially or wholly lost. On the other hand, if the brake cylinder and brake pipe are comparatively tight and we have a leaky auxiliary, either from a carelessly applied drain plug, a poorly fitting exhaust valve or a slide valve leaking, then after the application is made the auxiliary pressure leaks down two or three pounds below the brake pipe pressure, the brake will release and its efficiency is lost. Other factors that assist in producing leakage are brake pipes applied out of proper height and distance from the face of the coupler; nipple ends broken off and new threads cut on old nipples, shortening the brake pipe; angle cocks applied and not given the proper angle toward the center of the track.

Defective Triple Valves.—Any number of cases have come under the observation of the writer, when with the brake pipe and auxiliary fully charged the trainman in separating the train would close only the angle cock on the portion of train to be moved, leaving the other one open, and then pull the hose apart, setting all the brakes in emergency on the standing portion of the train, regardless of its length. Repeatedly applying brakes in emergency in this manner is frequently the cause of bent emergency piston stems.

Undesired Quick Action.—Undesired quick action can be caused by permitting triple valves to become dirty and gummy to the extent that the piston sticks to the bushing so that a high differential must be brought about to cause it to move. It may also be caused, especially with long trains, by a very light brake application or a very slow reduction, produced by lapping the brake valve and allow-

ing brakes to leak on, where it would be avoided by braking according to proper methods.

How Train Shocks May Be Eliminated.—To prevent, as far as possible, damaging shocks in long trains due to brake applications, it is necessary that the percentage of braking power be as near uniform as possible on all cars, and that loaded and empty cars be so distributed that the greater part of each will not be at the head end or rear end of long trains. This provides a means of distributing the braking power so that reasonably good handling of the train can be expected.

Long piston travel is preferable to short piston travel. A seven-inch standing travel will provide much better handling trains than a five-inch standing travel with the same brake pipe reduction, because in the former case the cylinder pressure will be built up more slowly and consequently any movement of slack in the train will take place proportionately slower, with a reduction in the velocity difference between cars and the stresses thereby set up. While there will be a considerable difference in the cylinder pressure between a five-inch and seven-inch travel at the beginning of a brake application, the pressures will be nearly equal when the brake is fully applied. If the piston travel is short, say five inches, it is possible to develop a high brake cylinder pressure at the head end with a 10-lb. reduction before the beginning of brake application at the rear. This causes the slack to run in from the rear, sometimes with very damaging results if the speed is low. If the piston travel is long, say eight or nine inches standing travel, it is possible to make the same reduction and produce only 20 to 25 lb. cylinder pressure, less than one-half the pressure produced with the short piston travel. This reduces the rate of retardation set up on the head end of the train, and consequently the severity of any slack action due to a run-in of the slack. Lighter brake pipe reduction still further reduces the cylinder pressure developed, until the train can be controlled without any noticeable slack action.

Excessive Draw Bar Slack.—Another liberal contributor to train shocks and break-in-twos is excessive drawbar slack. The inspector should be instructed to watch this closely and make every effort to have cars with undue draw bar slack sent to the repair tracks for correction. With no slack and good draft rigging, trains could not be broken in two. The same can be said with slack either all in or all out and held so. The damage arises from its sudden change. How heavy the shock will be depends mainly on the difference in speed that must instantly be made uniform and on the weight that must suddenly be altered in speed. Weight is important, but change in speed is more so, as a sudden change of three

miles an hour will cause nine times the shock caused by a similar quick change of one mile an hour.

DISCUSSION

The members discussed measures that might be taken to keep the air brakes on freight cars in condition to render effective service. The necessity of setting brakes on incoming trains and stretching trains before starting from terminals was emphasized, and the practice of inspecting and cleaning brake cylinders and triple valves on team and house tracks, which is now followed by some roads, was endorsed as a means of saving much time to outbound trains and keeping cars in the train to destination. Higher standards of maintenance were urged by a speaker who told that inspection on one road showed that of cars off the tracks of the owning line 25.3 per cent were found to have ineffective brakes. It was moved to recommend to the M. C. B. Association that Rule 6 be supplemented by a provision permitting all roads to clean brake cylinders and triple valves on foreign cars sent to the repair tracks for other defects nine months after the previous cleaning.

Other Business

Reports were also submitted on the maintenance of $8\frac{1}{2}$ in. cross compound compressors, on the maintenance and operation of the feed valve, on M. C. B. freight brake stenciling and on proposed changes in the recommended practice of the association. The conservation of material and supplies was discussed at Wednesday's session and the topic was assigned as the subject of a report to be presented at the next convention.

In addition to addresses by C. H. Weaver and D. R. McBain, short addresses were given at the opening session by W. O. Thompson of the New York Central Lines, Martin Beman, director of public welfare of the city of Cleveland and W. S. Stone of the Brotherhood of Locomotive Engineers. On Wednesday evening Walter V. Turner gave a lecture on freak inventions.

The treasurer reported the largest balance that the Association has ever had in its treasury, and the executive committee voted to invest \$1,000 in war saving certificates. The secretary advised that the association's membership was now over 1,000.

The officers elected were as follows: president, F. J. Barry, New York, Ontario & Western; first vice-president, T. F. Lyons, New York Central; second vice-president, L. P. Streeter, Illinois Central; secretary, F. M. Nellis, Westinghouse Air Brake Company; treasurer, Otto Best, Nathan Manufacturing Company.



Photos from Underwood & Underwood, N. Y.

Scottish Troops Arriving in Italy



In Palestine

Relation Between Train Handling and the Caution Signal

By F. H. Nicholson,

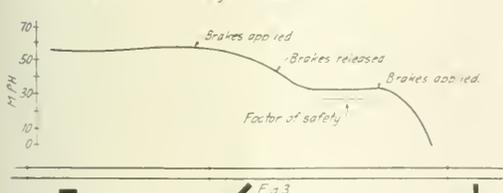
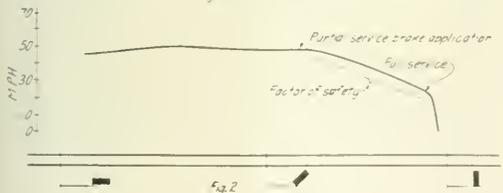
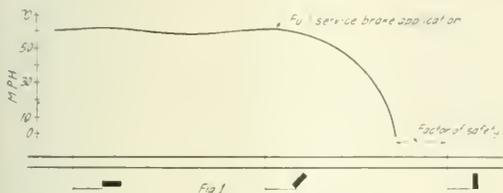
Assistant Engineer, Signal Department, N. Y., N. H. & H. R. R., New Haven, Conn.

IT IS NATURAL ENOUGH to assume, in considering a signal stop, that the train is run at high speed to the caution signal, or to some point beyond it, where the engineman makes a carefully measured brake application and brings his train to rest just under the line at the stop signal. Not many signal stops are made in this apparently simple manner.

In the first place, to make such a stop with the necessary assurance requires a quality of judgment in speed, distance and braking power that is rarely if ever possessed by the most experienced engineman. No engineman can so closely estimate speed, distance, grade and braking qualities of his train that he can run at high speed to a certain point, make a full service brake application, and know that his train will stop at a definite and predetermined point in advance. If an engineman, basing his estimate of speed, distance and braking qualities upon normal conditions, runs at high speed to a certain point, makes a full service reduction, and stops

and the engineman's intention is not to stop his train anywhere within the caution block, but quite close to the stop signal. It is only by stopping quite close to this signal that the most efficient use is made of the signal system; therefore, the first stop, in which the train is stopped a considerable distance from the desired point, and in which the factor of safety appears as an inaccuracy, is plainly not good practice.

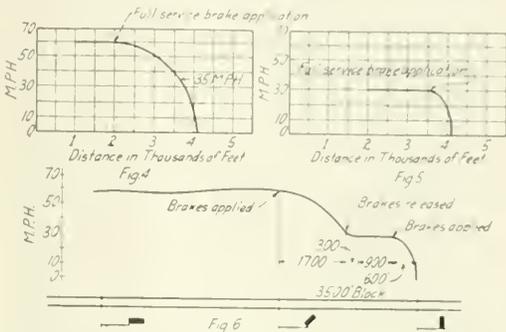
If the factor of safety appears as a lighter brake application, there may be no factor of safety available when most needed. Through misjudgment of distance or speed the engineman may so encroach upon minimum braking dis-



Factor of Safety Appears As Inaccurate Stop, Fig. 1; As a Partial Service Brake Application, Fig. 2; As a Free Running Period Between Two Braking Periods, Fig. 3

his train with the pilot of his engine just opposite the stop signal, he has realized his expectations, but he has nothing left for an error in judgment. The factor of safety is nil. To obtain a factor of safety, braking must be begun earlier, that is, at a greater distance from the stop signal. With the average train the factor of safety would then appear as a stop short of the signal; as a lighter brake application with probably more accurate handling of the train; as a combination of short stop and lighter brake application, or as a free running period in a two-application stop, which is probably the most accurate stop of all.

Accuracy, of course, is a valuable quality in train handling,



Full Service Stop from 60 M. P. H. with 12-Car Passenger Train, Fig. 4; From 30 Miles Per Hour, Fig. 5; Two Application Stop from 60 M. P. H., Fig. 6

tance, that to avoid overrunning the stop signal he may finally find it necessary to put to work all the braking power available, and make what he would call a "parachute" stop; or he may even overrun the signal through inability to produce sufficient braking power when needed. The stop in which the factor of safety appears wholly as a lighter brake application is liable then to be an unsafe stop, and it is therefore not good practice.

If the train is stopped by the two application method of braking, the factor of safety appears as a free running period between two braking periods. The first brake application is made at a point and of a degree such that if maintained the train will be stopped a considerable distance from the desired point. The intention of the engineman is to stop at the signal, and since the first application if held will stop the train short of the desired point, the brakes are released after the train has been brought to an intermediate, or so-called controlled speed, and the train is allowed to drift for a certain distance. The engineman "proceeds with caution," and a well judged second application brings the train to rest with smoothness and accuracy at the stop signal.

The following records of train handling illustrate the three methods of braking, and the three forms in which the factor of safety may appear. Fig. 1 shows a stop in which the factor of safety appears as the distance between the signal and the point at which the train stops, in other words, the factor of safety appears as an inaccurate stop. Fig. 2 illustrates a stop in which the factor of safety is consumed in a lighter brake application, and this curve shows also that all the braking power available had to be used to avoid overrunning the stop signal. Fig. 3 is an example of a two-application stop, in which the factor of safety appears as a free running period between two braking periods. This record shows the smoothest and most accurate handling of the train, and represents best practice in train handling.

Since the two-application stop is made up of two braking periods and an intermediate free running period, the distance

required may be determined by constructing the complete speed distance curve to represent the handling of the train. The first section of the complete curve would show the deceleration following the first brake application, and it would be obtained from the 60 m. p. h. full service braking curve. This braking curve, representing a stop from 60 m.p.h. with a twelve-car train, is shown by Fig. 4. This and the following assumed braking curves are for level and tangent track only.

Records of train handling show that the first application is usually held until the speed has been brought to approximately 35 m.p.h. In other words, most engineers consider 35 m.p.h. a convenient speed at which to release and recharge the brake system. After a release of the brakes the speed may taper off to about 30 m.p.h. in a distance of from 200 to 300 feet. Then follows a free running period. The second brake application made from 30 m.p.h., brings the train to a stop according to the braking curve shown by Fig. 5. The complete speed distance curve may now be constructed.

If this speed distance curve, shown by Fig. 6, be applied to a 3,500-ft. block, and we assume that the braking is begun as the train passes the caution signal, and that the train is brought to rest as the pilot appears opposite the stop signal, the factor of safety in the handling of the train is represented by the distance of 900 feet. The nominal per cent factor

of safety is $\frac{900}{1700 + 300 + 600}$, or 34.6 per cent, which

seems to be a large enough factor of safety to care for the variable braking conditions found in passenger train service. With average conditions in train braking, a margin would also be left for a braking effort somewhat less than full service. It may be noted that the true factor of safety is greater than 34.6 per cent, since the shortest possible stop is a one-application full service stop, as shown by Fig. 4, in

with best practice in making the signal stop. The interpretation, "approach next signal prepared to stop," leaves to the engineman the fixing of the point at which braking shall begin, and there is a temptation to run for a distance into the block at high speed, and to delay braking until the stop cannot be made without overrunning the signal, except by a heavy single brake application and a "parachute" stop. The factor of safety may be completely consumed in the distance covered at high speed, and if through some unknown defect there is less than normal braking power available, it may be impossible to stop without overrunning the signal.

Several of the curves are records of actual signal stops made in accordance with the first interpretation of the caution indication. They are typical of the results to be obtained where the caution signal means "reduce speed at once and proceed with caution." It is apparent that where signals are spaced with due regard to braking distance, the interpretation of the caution signal, "reduce speed at once and proceed with caution," brings into real agreement the language of the caution signal and the normal action of the engineman in making a safe and accurate stop, and insures that the designated factor of safety for each block will become an actual factor of safety in the handling of the train.

RESTRICT LONDON TRAVEL.—Sir Albert Stanley, President of the British Board of Trade, announced in the House of Commons on May 8 the decision of the government to place great restrictions on travel in London and vicinity, which will be extended later throughout the country. Passenger train service, he said, would be reduced by 40 per cent, and it will be necessary for every one to show that his proposed trip has an adequate reason.

FRENCH LOCOMOTIVES AND ROLLING-STOCK.—In an article given in its issue for March, *La Technique Moderne*

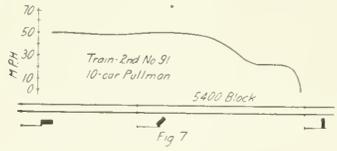


Fig. 7—Signal Stop from 50 M. P. H.
Fig. 10—Signal Stops from 40 M. P. H.

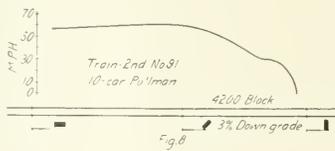


Fig. 8—Signal Stop from 60 M. P. H.
Fig. 11—Signal Stops from 55 M. P. H.

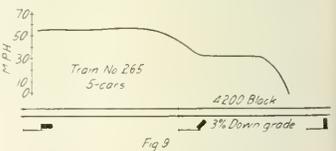
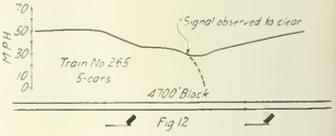
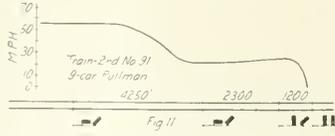
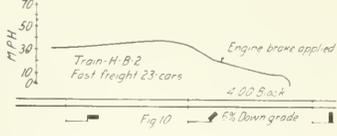


Fig. 9—Signal Stops from 56 M. P. H.
Fig. 12—Signal Slow Down



which the stop is made in 2,150 feet, the true factor of safety is $\frac{1350}{2150}$, or 62.8 per cent. This is the factor of safety

for a one-application stop, but, as pointed out above, it is a factor of safety unavailable in its entirety unless the braking is begun at the caution signal, and if made available by early braking, the result with the average train is an inaccurate stop and an inefficient use made of the signal system.

The two-application stop, therefore, really makes available the nominal factor of safety in block length, and as a manner of braking it is the most accurate method of making the signal stop. It is evident, therefore, that where signals are spaced 3,500 feet to 5,000 feet—or even more, the spacing depending upon grade and curvature—and the speed is properly limited, the interpretation of the caution signal, "reduce speed at once and proceed with caution," conforms exactly

reviews the duty required of the steam locomotive, the effect of superheat and compounding and the working of the locomotive boiler, and states that the reorganizing and development of railway transport in France are among the most urgent problems to be solved not only after the war, but even at the present time. It will be necessary shortly to renew the country's rolling-stock, which has been overworked during the last four years. A considerable increase in railway freight traffic is also to be faced. These conditions imply the construction of powerful traction units capable of hauling as heavy loads as possible at a speed closely approximating to the speed of passenger trains. Further, owing to the high cost of fuel, particular importance will attach to arrangements destined to reduce fuel consumption, by improving the utilization of the steam in the cylinders, or by improving the steam-raising power of the boiler.

General News Department

President Wilson, on May 20, signed the Overman bill, authorizing him to reorganize executive departments and agencies, under which he is expected to transfer some of the forces of the Inter-state Commerce Commission to the Railroad Administration or other agencies.

Employees of the Pennsylvania Railroad System in the military and naval service on April 1, last numbered 12,548; and 8,415 of the names of these men are printed in a statement, filling 42 pages, of the Mutual Magazine, published by the employees of the Pennsylvania Railroad. This number of the magazine (May) has for its frontispiece a full length portrait of Brigadier-General W. W. Atterbury.

The committee on track elevation of the Chicago city council, which conferred with the Railroad Administration at Washington last week to determine the latter's attitude towards a continuation of the track elevation program in Chicago, was referred to the regional director. If Mr. Aishon finds that any or all of the improvements which have been projected are vitally necessary, and so recommends to the director general, the completion of the work may be permitted.

Carrying workmen to industrial plants now requires, on the Pennsylvania Railroad, 370 passenger cars above normal passenger requirements on that road, these cars are mostly used between cities and nearby shipyards, munition factories, and other industries which have been established on account of the war; and the daily movement in each direction is from 31,000 to 32,500 passengers. Most of these industries are situated between New York and Baltimore. Every Saturday the Pennsylvania carries about 10,000 soldiers on furlough from Camp Dix, and Camp Meade to their homes, and carries them back to the camps on Sunday.

New union ticket offices are being established in many places. Locations in New York City, at 66 Broadway and at 280 Broadway, have already been announced. That for the "mid-town" district will be at 31 West Thirty-second street. A lease for this property has been taken for six years. The new union office at Louisville, Ky., has been opened in the Todd building, Fourth and Market streets. The agent is Frank L. Alexander, heretofore ticket agent of the Louisville & Nashville at the Tenth street station. The saving in rents at Louisville is estimated at \$22,000. Nine roads participate in the use of this office. Arrangements for an office in Chicago are noted in another column.

H. P. Salter, freight agent of the Louisville & Nashville at Nashville, Tenn., has relieved the congestion in his freight houses on numerous occasions, recently, by employing squads of young men from the colleges. A group of 20 young men from George Peabody college for teachers, helped out recently by working Saturday afternoon and on Sunday, and similar assistance has been rendered by students from Vanderbilt University. The work of these helpers is reported as highly satisfactory. Thirty students of the University of Chicago have signed contracts to work as track laborers for the Chicago, Burlington & Quincy in Wyoming during the coming summer.

The Pennsylvania bridge over the Ohio at Louisville, Ky., the entrance of the Southwest System to the city of Louisville, was seriously damaged by fire on May 6. The bridge is undergoing reconstruction and the fire occurred in the timber falsework and the counterweight forms in the south tower of the vertical lift span, which is over the Government canal on the Kentucky side of the river. Owing to the location of the initial blaze high up on the tower, difficulty was experienced in fighting the fire, which was not extinguished for several hours and did serious damage to the steel work of the tower. The amount of damage and the extent of the delay in completing the structure will not be known until a careful survey is made. The cause of the fire is not definitely

known but is assumed to be a spark from a passing locomotive.

Great oaks from little acorns grow, and great losses from little causes flow, and the general manager of the Coast Lines of the Atchison, Topeka & Santa Fe uses a picture of an oak tree, issued in the shape of a circular printed in red, white and blue, to impress on the employees of the road, the causes which have led up to the payment by the company of \$1,234,965 for losses of and damages to freight during the year 1917. The largest single item in the list of losses appears to be that for live stock, \$138,359; and the next is lumber, \$113,143. Among the big limbs of the tree lettered to show important causes of losses, are wrecks; improper refrigeration and ventilation; delays, dirty and defective cars, and concealed losses.

Labor difficulties in connection with the construction of the new Pennsylvania freight terminal at Chicago, were summarily terminated this week by the federal government. Several weeks ago, when the Quartermaster's Department of the Army reserved space in the new building it was found that the electricians who were putting in the wiring for the elevators were on a strike and that some other unions had gone out in sympathy. Despite the efforts of the government to induce the men to return to work the electricians remained obdurate. Finally, on Monday last, the government hired electricians belonging to an opposition union. United States troops have been placed on guard and it is expected that the wiring will now be completed in about six weeks.

The lines of pneumatic tubes in New York city, used for conveying letters underground between the central and the branch post offices aggregate in length about 27 miles, and the number of carriers transmitted through them daily is about 80,000. Each carrier has a capacity for about 450 ordinary letters, or 250 large letters. Each tube line consists of two tubes, each 8 in. in diameter. In the busy hours carriers are despatched every ten or fifteen seconds. These and other facts have been brought out in connection with the strenuous contest which has been made before committees of Congress in support of the clause in the annual appropriation bill providing for the maintenance of the tubes for the ensuing fiscal year. The postmaster general has persistently urged Congress to discontinue the use of the tubes and to have all letters carried by automobile trucks in the cities now using tubes—Boston, New York, Philadelphia, Chicago and St. Louis.

More State Railroading

The Massachusetts legislature has passed a bill providing for state control of the Boston Elevated Railway, which operates elevated, subway and surface lines in Boston and its suburbs. This law puts the management of the property, for a period of ten years, in the hands of five trustees to be named by the governor, provides for a guaranteed dividend of 6 per cent, and leaves the question of fares to be determined by the condition of the reserve fund.

Commercial Bribery

The Federal Trade Commission on May 16 sent to both branches of Congress a communication urging the enactment of a sufficient law striking at the unjustifiable and vicious practices of commercial bribery. The report says that the commission has found commercial bribery to be general throughout many branches of industry, and scores of complaints have been issued by it on that account. Fourteen states have laws prohibiting such practices, but they fail to reach the root of the evil. The commission can only deal with commercial bribery as an unfair method of competition, having no criminal jurisdiction.

Western Railway Club

At the annual meeting of the Western Railway Club held at the Hotel Sherman, Chicago, on May 20, the following officers were elected: President, A. LaMar, master mechanic, Pennsylvania Lines; first vice-presidents, G. S. Goodwin, mechanical engineer, Chicago, Rock Island & Pacific; second vice-president, W. Alexander, superintendent of motive power, Chicago, Milwaukee & St. Paul; treasurer, C. H. Bilty, mechanical engineer, Chicago, Milwaukee & St. Paul.

Manganese Track Society Elects Officers

The Manganese Track Society met at the Hotel Blackstone, Chicago, on May 16, and elected officers for the coming year. Knox Taylor, president of the Taylor-Wharton Iron & Steel Company, Easton, Pa., was elected chairman, succeeding A. H. Mulliken, president of the Pettibone-Mulliken Company, Chicago. O. de G. Vanderbilt, president of the Weir Frog Company, Cincinnati, Ohio, was elected vice-chairman in place of R. W. Gillespie, of the Bethlehem Steel Company, South Bethlehem, Pa., and Henry Elliot, president of the Elliot Frog and Switch Company, East St. Louis, Ill., becomes treasurer in place of R. J. Davidson, treasurer of the Ramapo Iron Works, Hillburn, N. Y. B. M. Fosgate, Chicago, continues as secretary.

Convention of American Association of Engineers

At the national convention of the American Association of Engineers at Chicago on May 14, the following officers were elected for the coming year: President, W. H. Finley, chief engineer, Chicago & North Western, Chicago; first vice-president, W. H. Clausen, assistant city engineer of Chicago; second vice-president, L. K. Sherman, president of the L. K. Sherman Engineering Company, Chicago; national directors to serve two years; Harold Almert, consulting engineer, Chicago; F. K. Bennett, principal assistant engineer, Minneapolis & St. Louis, Minneapolis, Minn.; T. M. Chapman, civil engineer, Central of Georgia, Atlanta, Ga.; J. N. Hatch, consulting engineer, Chicago; Alexander Potter, consulting engineer, New York; J. H. Prior, consulting engineer, Chicago.

The Airplane Mail Service

The airplanes of the Post Office Department, carrying letters between New York and Washington, have finished their first week with a checkered record. On the first day, Wednesday, May 15, the northbound flyer broke down at a point in Maryland about 25 miles from Washington, and his letters, at first reported as having been transferred to railroad cars, were brought to New York by airplane on the next day. The southbound trip on Wednesday, with 350 lb. of mail, was made substantially according to the schedule.

On Thursday the northbound trip was made successfully, leaving Washington at 11.30 A. M., and reaching the landing ground at New York at 2.58 P. M. On this trip the amount of mail was 118 lb., only 5 lb. of which was mailed at Philadelphia. The southbound aviator on Thursday lost his way and landed at Bridgett, N. J. He reached Philadelphia by automobile at 5.15 P. M. The Philadelphia-Washington machine then started for Washington, but went only 25 miles before something failed. A new start was made, however, and the mail finally reached Washington at 8.45 P. M.

On Friday a start was made from Washington at 11 A. M., but it was necessary to make stops for repairs, and Philadelphia was not reached until 7.25 P. M. The mail was taken to New York by train. The flyer who was waiting at Philadelphia, seems to have started for New York on time and arrived at 3.48 with 4½ lb. of mail. The southbound trip on Friday was made on time.

On Saturday, the fourth day, both northbound and southbound trips were successful, the time from Philadelphia to New York being 67 minutes, and from New York to Philadelphia 65 minutes. On Monday, the fifth day, the records appear to have been all right in both directions, the amount of mail leaving New York being 125 lb., and that arriving in New York 35 lb. From Philadelphia to Washington the trip of 135 miles was made in 89 minutes, favorable winds having helped the motor. On Tuesday, the sixth day, an electrical storm appears to have prevented the flyer from starting from Philadelphia for New

York. Southbound on Tuesday the flyer left New York on time, but soon encountered an electrical storm and returned; and the mail was sent by railroad. From Philadelphia to Washington the flyer also encountered an electrical storm—at a height of about two miles—but he kept on, and reached Washington in 154 minutes from Philadelphia.

The Government Railroad in Alaska

William C. Edes, chairman of the Alaskan Engineering Commission, says that this line will not be finished before 1921, or considerably later than the date calculated when the work of building the road was begun. The line is now 65 per cent completed, but more time may be required to build the unfinished third than was required for the completed two-thirds. About 6,000 men were employed in the field last year, but the chairman expects that not more than 3,000 men can be obtained this year. The Commission will direct its chief efforts to completing the main line between Seward and Anchorage and to laying steel toward Fairbanks. It is hoped to open the line from Mile 215 to Mile 265. For the transportation of supplies from the States to Seward and Anchorage, dependence must be placed, this season, on the commercial steamship lines. The amount of these supplies for this season is estimated at 5,000 tons, which will tax the capacities of the vessels. The government has spent thus far on this railroad an aggregate of \$23,670,000. The original estimate of the cost of the road was \$35,000,000, but, on account of the increased cost of labor and materials, the present estimate is \$40,000,000.

In the Anchorage district last year a large crop of potatoes was raised, and the coal fields yielded 54,000 tons of coal.

Accident Bulletin No. 63

The Interstate Commerce Commission has issued Accident Bulletin No. 63, giving statistics of railroad accidents occurring in the United States during the three months ending with March, 1917. This bulletin appears to have been made up in November, 1917, about seven months after the close of the period for which it gives returns; but it reached this office on May 17, 1918, or about 13 months late. (The last bulletin, No. 62, was reported in the *Railway Age* of September 14, 1917, page 462.)

The present bulletin is printed on sheets 9 in. x 11 in., and its form and style are changed throughout; and it contains much less detail than has been given heretofore. At the end of the year, however, it is proposed to give more detail, rather than less; this quarterly bulletin is being issued in abbreviated form so as to present "certain accident figures of immediate interest and usefulness." The electric railway statistics are left out; casualties to trespassers are given for each state in the Union separately; train accidents are shown in a table (giving the statement for each month by itself), in which the number of accidents is compared with the number of millions of locomotive miles; and the number of casualties to shopmen and other workmen is shown compared with the number of hours worked by the men, in each class, during the months reported. An appendix of 19 pages gives the circumstances and causes of train accidents which were investigated by the Bureau of Safety, of the commission, during the three months under review.

The total number of persons killed and injured on the railroads of the United States during the quarter here reviewed was 51,426; that is to say, 2,346 killed, and 49,080 injured. The condensed totals of the tables of casualties are as follows:

Casualties on Steam Railroads, Three Months Ending with March, 1917

	Passengers		Employees		Other persons	
	Killed	Injured	Killed	Injured	Killed	Injured
In train accidents.....	38	840	114	1,187	47	181
In train service accidents	43	866	614	12,563	1,357	1,888
In industrial accidents..	..	..	114	30,992	19	561
Totals	81	1,706	842	44,744	1,423	2,630

The number of "other persons" killed in train accidents (47) is swelled by including, under the head of train accidents, cases where a train strikes an automobile, or other vehicle at a public highway crossing. There were 38 accidents of this kind, in which 25 non-trespassers were killed, and 143 injured. The damage to railway property in these 38 accidents is given as \$16,790

The number of collisions per million locomotive miles in three months was 3.48, and of derailments 5.05. The total damage to railway property in all train accidents was \$3,078,370. The man-hours of shopmen reported by all the roads in class 1, were, for the quarter, 317,760,570, and the number of casualties per million man-hours, in and around shops, was 50.68. In this statement of ratio the killed, 34, and the injured, 17,714, are lumped in a single item. Similar statements of ratios are given for station men, trackmen, bridge and building men, and "other employees." The total number of casualties under the head of industrial accidents, as shown in the table above, was 31,686.

In our table the column headed "Other Persons," includes both trespassers and non-trespassers; and included in the trespassers are 39 employees killed and 63 employees injured. Besides these items there are included under the head of "Employees," 35 killed and 137 injured, who were not on duty.

Serious Delays to Trains by Heavy Mails

The report which has been sent to Congress and the President by the Merchants' Association of New York City concerning inefficient mail service, which report was briefly noticed last week, cites a great number and variety of statements showing how the movement of important postal trains has been seriously delayed by the conditions imposed by the Post Office Department as to the loading and unloading of mail at important stations. In the case of one of the heaviest mail routes the average train delay due to mails, during a period of thirty days, was 50.36 per cent of the total train delays. For 462 trains operating on 26 lines during the same period the general average of delay due to mails was 13.89 per cent. The Post Office Department explained the delays as due to the congestion of the railroad system, quoting the record of November, 1917, when there were 86,712 failures of mail trains to make their scheduled connections. The Merchants' Association calls attention to the omission of essential facts which, when shown, destroy the implication that delayed train movement is the sole, or even the principal factor in causing mail delays. By far the larger part of the mail trains operated in the month of November were substantially on time. Of all those not on time, a material part of the delay was caused by the conditions under which the railroads were required by the department to handle the mails. The number of train failures, 86,712, as stated by the department, is equivalent to only 18 per cent of the number of mail trains running. As each delayed train represents several missed connections, the number of such misses is obviously greater than the number of delayed trains causing them. The obligation rests with the Post Office Department to explain the major cause for the serious delays to the mails which, in number and duration of time, far exceed any possible delays that can result from railroad operation. Delays of one to four days were found to be not only common, but usual, in the case of mails moving not over 150 miles, by direct routes requiring no change to other lines, and upon lines having frequent train service. It is impossible convincingly to explain such delays by attributing them to delayed trains.

Trains Nos. 45 and 11, operating between New York and Pittsburgh, are among the main channels for the movement of west and eastbound mails. The record of delays to these trains caused by mails is as follows:

No. 45, October, 37.81 per cent November, 42.80 per cent
No. 11, October, 45.48 per cent November, 38.78 per cent
An examination of the daily records of these trains makes clear the fact that the delays due to the mails are in many cases sufficient to cause the train to miss its connections, and thereby prevent prompt despatch over connecting lines.

On the New York Central train No. 35, leaving New York at 8:40 p. m., is a solid mail train, carrying mails to make close connection with the Burlington at Chicago for far western points. A mail train from Boston connects with train No. 35 at Albany. The Boston train carries storage cars usually filled to capacity with mails. Under former practice these storage cars were switched into Train 35 at Albany and no delay in train movement was caused. Under the prevailing space system the cars coming from Boston end their run at Albany, and the mail contained in them is handled across the platform and loaded into Train 35. This process usually consumes considerable time. In one instance it required twenty-eight minutes in excess of the scheduled stop at Albany to transfer these Boston mails. Similar delays occur at other points, particularly at Cleveland, where heavy mails from Pennsylvania require to be transferred. Atretary J. H. Leonard New York

Toledo a large amount of mail for Detroit must be unloaded.

The Boston mail taken up at Albany is not concentrated in a particular car upon Train 35. Every car upon that train is frequently so filled with mail originating at New York that there is not sufficient space in any one car to take the Boston mails, consequently the latter are distributed at Albany throughout several cars, and it is impracticable for the clerks upon the train to so assemble that mail as to permit its being properly worked before arrival at Chicago. Moreover, the postal crews, immediately after leaving Albany, are compelled to devote a large part of their time to re-adjusting the contents of the several cars, upon which a load of Boston mail has been dumped, in such manner as to enable them to get at the various mails which must be worked for points beyond Albany. This delay consumes the time of the crew, at least as far as Utica, so that much mail destined for intermediate points is carried by, because it has been made inaccessible by the overloading of the cars with the Boston mail.

Joint Meeting of Master Car Builders' and Master Mechanics' Association at Chicago, June 19-20

The Master Car Builders' Association and the American Railway Master Mechanics' Association have issued a joint circular postponing the annual conventions of the associations another year, and calling a meeting to dispose of the accumulated work of committees and to pass on other matters requiring action. All representative members, the chairmen of all committees, the executive committees of both associations, and the arbitration committee of the Master Car Builders' Association are invited to attend the meeting, which will be held in the Florentine Room of the Congress Hotel, Chicago, on June 19 and 20, 1918.

The Master Car Builders' Association will receive reports from the committees on the following subjects: Arbitration; standards and recommended practice; brake shoe and brake beam equipment; couplers; loading rules; car wheels; specifications and tests for materials; train lighting and equipment; tank cars, and welding truck side frames, bolsters and archbars.

Committees of the Master Mechanics' Association will present reports on the following subjects: Standards and recommended practice; mechanical stokers; fuel economy and smoke prevention; specifications and tests for materials; train resistance and tonnage rating; springs (shop manufacture and repair).

The reports of the committees will not be sent out to the members in advance of the meeting but copies will be distributed to those attending. Members will be free to discuss the papers as was customary at the annual conventions. The associations will maintain headquarters during the meeting at the Congress Hotel. There will be no exhibit of appliances in connection with the meeting.

A Smoke Kit for Every Rock Island Soldier

The Rock Island Lines plan to send a "smoke kit" to each of the 2,074 Rock Island men now in army and navy service. Ever since last summer money has been coming in for Company B, of the Thirteenth Engineers (Railways), which has been in France since early last fall. So far about \$2,200 worth of "smokes" and other articles of comfort have been sent to the men in this company and, in addition, \$2,275 has been cabled to the company as a mess fund. It is now proposed to send a kit containing tobacco, candy and other comforts to all other Rock Island men now with the colors. The May shipment to Company B cost \$461 and consisted of 12,000 Fatima cigarettes, 720 packages of Tuxedo tobacco, 864 packages of Prince Albert, 100 books of cigarette paper, 1,440 pieces of chewing tobacco, 10 dozen packages of pipe cleaners, 3,132 cigars, 180 lb. candy, 6,000 envelopes and 18,000 sheets of letter paper.

Terminal Engineers

The Society of Terminal Engineers at its annual meeting held in New York on May 21 elected as president for the ensuing year Gen. William H. Paxon, U. S. A., St. Louis, Mo. There were also elected five vice-presidents: Francis Lee Stuart, New York; P. E. Cresson, Jr., New York; John Meigs, Philadelphia, Pa.; Calvin Tomkins, New York, and Charles Whiting Baker, New York. The treasurer is W. Joshua Barney and the secretary J. H. Leonard, New York.

Traffic News

The safe transportation of eggs is the subject of a report, entitled "Bulletin No. 664," which has been issued by the Department of Agriculture, giving the results of an investigation of the conditions surrounding the transportation of 147 shipments of eggs, all of them full carloads, and also less complete examinations of many other shipments. The report fills 31 pages, and goes into extreme detail, millions of eggs having been inspected individually. The average haul was over 1,200 miles, and the observers visited 32 packing houses, the stations of 32 railroads, and the establishments of 33 consignees. The conclusions are summarized in the statement that when eggs are shipped in carload lots, packed in good, well-made, standard cases, with new medium or heavier fillers and flats, with properly placed and suitable cushions at top and bottom, with cases tightly stowed and efficiently braced in the car, and the car handled in accordance with good railroad practice, especially when switching, the total damage referable to transit was less than 2 per cent. When loads are buffed properly with straw at the ends of the car, the eggs are damaged near the center of the car more than at the ends. The load of eggs must be a solid unit in the car, fitting without play. Straw buffing at the ends too near the bottom, or the use of too much buffing, will waste half the refrigeration.

Coal Production

The continuation of favorable operating conditions, both of transportation and mining, during the week of May 11, are reflected in the production of coal, which gained 2.2 per cent over the week of May 4, and exceeded slightly the record week of April 27, according to the weekly report of the Geological Survey. The total production for the week is estimated at 11,806,000 net tons, an average per day of 1,968,000 tons, compared with 1,926,000 tons the first week of May and 1,829,000 tons in May, 1917. Anthracite shipments declined from 49,570 carloads during the week ended May 4 to 38,314 carloads during the week of May 11. The percentage of full time output lost during the week ended May 4 on account of car shortage was 13.1.

Centralized Ticket Offices at Chicago

A central ticket office for all railroads entering Chicago will be established in the Insurance Exchange building, on Jackson Boulevard, between Sherman and Wells streets. The entire first floor of the building, embracing 20,000 sq. ft., has been leased for this purpose by the regional director of railroads, according to P. S. Eustis, chairman of the passenger traffic committee of western railroads. This consolidation will mean a saving to the Railroad Administration of approximately \$200,000 a year in rents and salaries. Comparatively few men will be thrown out of employment as most roads are now operating with restricted clerical staffs. The space will be divided into two sections, one on the east side of the building for the 14 eastern and southern roads and the other on the west side for the eight western lines. The arrangement of the booths to be occupied by the individual lines within the two sections has not yet been determined. The present tenants have been notified to vacate at once. Extensive alterations are to be made and the new ticket office will not be opened for several weeks. The quarters now occupied by railroad ticket offices will be sub-leased by E. A. Howard, vice-president of the Chicago, Burlington & Quincy.

PENNSYLVANIA OFFERS FRANCE TREES.—The Pennsylvania Department of Forestry, through Governor Brumbaugh, has offered to the French Government a gift of 4,000,000 forest tree seedlings from the State forest nurseries to be used in reforesting the shell-torn woods in the battlegrounds of eastern France. The tender will be made by Colonel Henry S. Graves, who organized the work of the forest regiments in France.

Commission and Court News

Interstate Commerce Commission

Collection of Undercharges

The commission has issued a revised interpretation of conference ruling 314. The commission held it to be the duty of common carriers to exhaust their legal remedies to collect undercharges; but carriers are advised that this ruling does not require the filing of a suit where the party liable for the undercharge cannot be located, or service cannot be made, or where upon investigation by the carrier in good faith it is found that legal process would be futile and ineffectual.

Court News

Railroad's Agreement with Customs Broker

The Michigan Supreme Court holds that an agreement between a railroad and its chief clerk, at a point on the Canadian line, that the clerk should remit to the railroad whatever fees he received as customs broker for the United States, was not *ultra vires* of the railroad.—Duluth S. S. & A. (Mich.), 167 N. W., 55. Decided March 27, 1918.

Removal of Station

In a hearing before the Oklahoma Corporation Commission, involving the removal of a station from one location to another, which it was alleged would be more convenient for the inhabitants of a nearby village, the probable cost to the company of removing the station and the facilities connected therewith came into question. Qualified witnesses on behalf of the railroad testified that the removal would cost in the neighborhood of \$24,000. Without any witnesses testifying to the contrary, the commission found that, "from viewing the grounds and general knowledge of the right of way and structure," the estimate of the railroad was about twice the actual cost. The Oklahoma Supreme Court holds that this finding was not supported by the evidence. The order directing the removal was held unreasonable and unjust and was set aside. The present location of the station is about half a mile from the principal street of Red Rock, a town of about 600 inhabitants, and the petitioners wished it moved nearer the town.—Atchison, T. & S. F. v. Wolverton (Okla.), 171 Pac., 722. Decided March 12, 1918.

War Exigencies Must Be Proved

In the case of the Norfolk & Western against the Public Service Commission of West Virginia, in which the railroad appealed from an order of the commission requiring shipping facilities to be furnished for the Trace Coal Company, the Supreme Court of that state holds:

1. The Act of Congress conferring upon the Interstate Commerce Commission authority to require railroads to provide shipping facilities for shippers tendering interstate shipments sufficient to justify the construction and maintenance of the same, does not deprive the Public Service Commission of jurisdiction to require such a railroad to provide such facilities to a shipper offering intrastate commerce, even though the facilities, when provided, may be used in the shipment of interstate as well as intrastate commerce.

2. Findings of fact by the Public Service Commission based upon evidence to support them will not be reviewed by this court.

3. A common carrier will not be excused from its duty of furnishing shipping facilities to one offering commerce to it, upon the ground that all of its energies are required to meet government needs, brought about by the present state of war, where it does not appear that the granting of such facilities would divert any of the carrier's energies, or require of it service which would make it less able to perform its public duty.

Equipment and Supplies

Supply Trade News

The Government Locomotive and Car Orders

The mechanical committee and the purchasing committee of the Railroad Administration completed their joint meetings to discuss the question of specialties for the government cars and locomotives last Thursday. Since then long lines of representatives of specialty manufacturers have waited outside the doors of the purchasing committee and they have been called in for conferences from time to time. It is understood that most of the locomotive specialties have been determined, and some of the car specialties, but no announcements have yet been made.

Locomotives

THE BUSHAM & GARFIELD has ordered one 0-8-8-0 Mallet type locomotive.

THE FRENCH STATE RAILWAYS, and the Paris-Orleans Railway, it is reported, are inquiring in this country for locomotives.

THE CHINESE GOVERNMENT RAILWAYS, and the Yunnan Railway of China, it is reported, are inquiring in this country for locomotives.

Freight Cars

THE GUANTANAMO & WESTERN is inquiring for 25 box cars.

GIOVANNI ANSALDO & Co., Genoa, Italy, is inquiring for 10 40-ton general service cars.

THE UNITED STATES GOVERNMENT, ORDNANCE DEPARTMENT, has ordered 150 ammunition cars from the American Car & Foundry Company.

Passenger Cars

THE GUANTANAMO & WESTERN is inquiring for 3 to 5 passenger cars.

THE RAILWAY EXECUTIVE COMMITTEE OF ENGLAND recently issued a notice ordering that all cars containing coal consigned to stations and sidings adjoining docks and canals must be unloaded at the place to which they are consigned, and that they must not be re-labelled and consigned elsewhere—*The Engineer, London*.

AERIAL SERVICE IN NORWAY.—The Tidens Tegn of Christiania states that a large number of prominent business men from all parts of Norway have decided to issue a prospectus relative to the organization and promotion of a company to be known as A. S. Norsk Luftfartrederi. The purpose of the new company is to be that of maintaining regular aerial routes, partly between points in Norway, and partly between Norwegian and foreign points. The organizers held a meeting at Christiania on March 1, 1918, and the prospectus probably will be ready for distribution within a short time.—*Commerce Reports*.

GERMANY SELLS LOCOMOTIVES.—Despite the alleged deficiencies of the German railways in respect to rolling stock, Germany still finds it possible to manufacture locomotives for export according to an Associated Press Correspondent at Stockholm in a report dated March 25, and quoted in the New York Times. Two of an order of twenty for the Swedish State railways were received the first week in March, and the other eighteen were promised before April 1. The scarcity of brass and copper in Germany is evidenced by the fact that nearly all locomotive parts usually made of these metals are made of iron or steel in the locomotives already received. The Swedish State railways have also closed a contract with the German steel trust for 80,000 tons of rails, with plates and bolts. One-third of the order is to be delivered this year, a third in 1919, and the rest in 1920.

The Burden Sales Company, Inc., New York announces the removal of its office from 30 Church street to the Forty-second street building, 30 East 42nd street.

Patrick T. Kilgarraff, chief clerk to T. C. Powell, vice-president of the Southern Railway system, Cincinnati, Ohio, has been elected vice-president of the Certes Supply Company, St. Louis, Mo.

Thomas Finigan was elected a vice-president of the American Brake Shoe & Foundry Company, with headquarters at Chicago, at a meeting of the board of directors of that company on May 20.

William F. Cutler has been elected president of the Southern Wheel Company, with headquarters at St. Louis, succeeding W. G. Pearce who now becomes chairman of the board of directors, and Frank C. Turner was elected vice-president in charge of sales with office at St. Louis.

Holmes Forsyth, second vice president, secretary and general manager of the Curtain Supply Company, Chicago, was elected president at a meeting of the directors on April 30.

Mr. Forsyth has been actively connected with the Curtain Supply Company since its organization in 1899, having at that time been elected second vice-president and secretary of the company, which offices he continued to hold until his recent election as president, succeeding Edward T. Burrowes, who died on March 19, at his home in Portland, Me.

Mr. Burrowes had been the president of the company since its organization on May 19, 1899, at which time the F. T. Burrowes Company, the Adams &

Westlake Company, and the Forsyth Bros. Company, sold out their curtain departments to the new concern which was designated the Curtain Supply Company. Mr. Burrowes was therefore connected with the car curtain industry from its very beginning, being president of the first company that ever put on the market an American car window curtain.

The Q & C Company announces that it has taken over the manufacture and sale of packing and lubricating under the Thomas Smith patents, formerly controlled by B. M. Jones & Co., of Boston. These devices will be hereafter known as the Q & C packing and Q & C lubricating.

R. G. Stutsman, for a number of years superintendent of the frog and switch shop of the Chicago, Milwaukee & St. Paul at Tomah, Wis., and more recently a master mechanic of the Four Lakes Ordnance Company, Madison, Wis., has been appointed sales representative of Manning, Maxwell & Moore at Milwaukee, Wis.

Randolph S. Reynolds, assistant to the general manager, was elected secretary at a meeting of the directors, succeeding Holmes Forsyth. Mr. Reynolds has been with the Curtain Supply Company since 1912. Prior to that date he was with the Western Steel Car & Foundry Company, at Alliston, Ala., and with the Pressed Steel Car Company of Pittsburgh, Pa., having been connected with their purchasing department from 1905 to 1912, at which time he resigned to go with the Curtain Supply Company.



H. Forsyth

The Driver-Harris Company, Harrison, N. J., announces the election of the following officers: Frank L. Driver, president; Arlington Bensel, first vice president; Leon O. Hart, second vice president; Frank L. Driver, Jr., third vice president; Percival E. Reeves, treasurer; Stanley M. Tracy, assistant treasurer, and M. C. Harris, secretary. Wilbur B. Driver, formerly vice president has retired from active participation in the business.

The Curtain Supply Company, owing to the growth of business and the need of increased space, has leased almost the entire building at 350-356 West Ontario St., Chicago, and will be located there after June 1. The new quarters of the company will be about 50 per cent larger than the old. The building is new and in addition to being equipped with greater and more efficient manufacturing facilities, will have a private track for shipping and receiving freight. For about 19 years this company has been located at 320 West Ohio street, Chicago.

Lieut. Colonel W. R. Roberts

Lieut. Colonel W. R. Roberts, the announcement of whose promotion from Major to Lieut. Colonel in the Construction Division of the United States Army has been previously made, is president of Roberts & Schaefer Company, Chicago. Colonel Roberts has been in engineering construction work for 30 years, and about 20 years ago organized the Roberts & Schaefer Company, which specializes in coal mining plants, coal washeries, coal docks, etc. He is still president of this company, although he has been giving all of his service to the government since last October. The Construction Division of the Army, with which Colonel Roberts is connected, is the outgrowth of the old Cantonment Division which was organized for the purpose of building the 16 National Army camps and the 16 National Guard camps. The variety and character of the work of the Construction Division are much greater than were those of the old Cantonment Division. While the Construction Division is still building some cantonments for the Signal Corps and the Engineer Corps and making extensive additions to all the original cantonments, its most important work at present is the building of large ordnance plants, powder manufacturing plants, Quartermaster Corps terminals, Quartermaster interior depots, many large hospitals, etc. Indeed, this division does all the construction work for the United States and its possessions, for all divisions or bureaus of the Army, and it now has a construction program on hand which amounts to about \$650,000,000. It is divided into six branches, engineering, construction, materials and transportation, contract and administration. Colonel Roberts is executive officer in charge of the construction branch, which is the largest and most important branch and which now employs about 200,000 men. Colonel Roberts was a graduate of the University of Illinois. His success in his business, as well as in his new work, has been due not only to his skill as an engineer, but to his ability as a business organizer.



Col. W. R. Roberts

Trade Publications

Tools.—The Warren Tool & Forge Company, Warren, O., has issued a 32-page catalog illustrating and indexing the special line of hand tools manufactured by that company. These consist of picks, crow bars, lining bars, various heavy hammers, axes, rail and tie tongs, wrenches, chisels, etc. Many different forms of each tool are illustrated.

Financial and Construction

Railway Financial News

ATLANTIC COAST LINE.—Frank K. Borden has been elected a director to succeed his father, E. B. Borden, deceased.

CHICAGO, MILWAUKEE & ST. PAUL.—Edward S. Harkness has been elected a member of the executive committee to succeed John D. Ryan, resigned.

KANSAS CITY SOUTHERN.—John F. Harris has been elected a director to succeed Herman Siecklen, deceased.

LEAVENWORTH & TOPEKA.—This 47-mile line, operating between Leavenworth, Kan., and Topeka, which was recently ordered sold for junk by the Federal Court, was purchased at a receivers' sale at Leavenworth, Kan., on May 10, by residents along the road. The sale price was \$80,000, of which \$25,000 was paid down, the balance to be paid at the confirmation of the sale by the Federal Court.

MISSOURI PACIFIC.—See editorial comments elsewhere in this issue.

NEW YORK CENTRAL.—See improvement budget in another column.

PENNSYLVANIA RAILROAD.—Clement B. Newbold has been elected a director to succeed William H. Barnes, deceased.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company has been authorized by the Railroad Administration to resume the construction of the Osage & Santa Fe from Caney, Okla., to Pawhuska. The director general had previously ordered the Santa Fe to discontinue this work.

CHICAGO, BURLINGTON & QUINCY.—This company has awarded a contract to E. Otto of Downers Grove, Ill., for the construction of a 10-stall brick roundhouse at Bridgeport, Neb.

CHICAGO & NORTH WESTERN.—This company has completed plans for the north approach of the Orleans Street bridge over the Chicago river, Chicago. The bridge will be built by the city, but the north approach which crosses the North Western tracks will be constructed by the railroad. The North Western has also awarded contracts to the Widell Company, Mankato, Minn.; Gaffin & Gehri, Fond du Lac, Wis., and Adolph Green, Green Bay, Wis., for concrete work in connection with the construction of 35 bridges on various divisions of the road.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—This company has been granted a permit to build a two-story brick extension to the office building in Nashville, Tenn. The estimated cost of the work is \$16,500.

QUEBEC & SAGUENAY.—A contract has been given to O'Brien & Doheny, Quebec, Que., to build a line through St. Francois Xavier, Que., Baie St. Paul, Eboulements, St. Irenee and Murray Bay. The work will be difficult and calls for building a number of temporary trestles, to be later replaced with steel bridges. Track has already been laid on 26 miles.

ENGLISH RAILWAY INVITES SUGGESTIONS.—The London & North-Western Railway has issued a notice in its Crewe works that the company will welcome suggestions for the improvement in methods of manufacture or carrying out work which occur to any of its staff, and in the event of any such suggestion being made use of by the company, and found beneficial, a suitable acknowledgement will be made, and, if desirable, assistance will be rendered towards the patenting of the same, under the usual conditions appertaining to patents taken out by employees of the London & North-Western. In conformity with the notice the directors have recently granted a reward of £5 (\$25) to a man in Crewe works for suggesting an improvement to the machine on which he was engaged.—*The Engineer, London.*

ANNUAL REPORT

First Annual Report of Missouri Pacific Railroad Company, Year Ended December 31, 1917

St. Louis, Mo., April 15, 1918.

TO THE STOCKHOLDERS

The Board of Directors herewith submits report of the operations and affairs of the Missouri Pacific Railroad Company, to December 31, 1917.

A summary of results from operations for the year divided between the periods prior and subsequent to June 1, 1917, compared with the year 1916, is as follows:

The following new equipment has been acquired and taken into the accounts since June 1, 1917, at a cost of \$1,873,617.29:

- 5 Combination Steel Coach and Mail Cars
- 6 Dining Cars
- 26 Stock Cars
- 1500 Coal Cars
- 13 Work Cars.

ROAD AND EQUIPMENT

	January to May, 1917.	June to December, 1917.	Year 1917	Year 1916.	Increase or Decrease	Per Cent
Railway Operating Revenues	\$31,126,903.51	\$47,193,409.95	\$78,320,313.46	\$69,972,812.50	\$8,347,500.96	11.9%
Railway Operating Expenses	21,536,977.47	31,711,060.67	53,248,038.14	51,342,397.05	1,905,641.09	3.71
Net Revenue Railway Operations	\$ 9,589,926.04	\$15,482,349.28	\$25,072,275.32	\$18,630,415.45	\$6,441,859.87	34.58
Railway Taxes and Uncollectible Railway Revenue	1,471,243.76	2,772,068.46	4,243,312.22	3,103,762.38	1,139,549.84	36.72
Total Operating Income	\$ 8,118,682.28	\$12,710,280.82	\$20,828,963.10	\$15,526,653.07	\$5,302,310.03	34.15
Non Operating Income	568,672.97	902,241.34	1,470,914.31	1,443,872.04	27,042.27	1.87
Gross Income	\$ 8,687,355.25	\$13,612,522.16	\$22,299,877.41	\$16,970,525.11	\$5,329,352.30	31.40
Deductions from Gross Income	6,349,133.08	6,994,140.57	\$13,334,773.65	\$16,011,517.31	\$2,676,743.66	*16.72
Net Income	\$ 2,338,222.17	\$ 6,618,381.59	\$ 8,965,103.76	\$ 959,007.80	\$8,006,095.96	...

* Decrease

† Included in the interest on funded debt for five months ended May 31, 1917, and for the calendar year 1916, is the interest on bonds in default, amounting to \$1,736,601.51 and \$4,917,930.00 respectively.

Applying the interest for twelve months of 1917 to the reduced debt basis under the reorganization plan, the net income would have been \$10,218,336.94.

Missouri Pacific Railroad Company was incorporated under the laws of the State of Missouri, March 5, 1917, and, with its subsidiary companies, has acquired substantially all of the lines of railroad, franchises and property formerly of The Missouri Pacific Railway Company and the St. Louis, Iron Mountain & Southern Railway Company, which latter Companies were in receivership continuously from August 19, 1915, until June 1, 1917. Missouri Pacific Railroad Company took over the properties for operation June 1, 1917, at which time there were issued the following securities:

Common Stock	\$82,839,500.00	
Preferred Stock (5% Cumulative after July 1, 1918)	71,800,100.00	
Total Stock	\$154,639,600.00	
First and Refunding Mortgage, 5% Bonds	\$46,923,000.00	
General Mortgage, 4% Bonds	51,350,000.00	
Total Bonds	\$98,273,000.00	
Total	\$252,912,600.00	

These securities were in addition to \$125,461,620.00 outstanding underlying bonds and \$3,683,000.00 equipment obligations.

CAPITAL STOCK.

No change has been made in the outstanding Capital Stock since June 1, 1917.

FUNDED DEBT.

Equipment Obligations to the amount of \$351,000,000 have been retired since June 1, 1917, and in addition, \$12,000,000 General Consolidated Railway and Land Grant Bonds have been retired with land grant funds, resulting in a reduction of \$363,000,000 in the Funded Debt. Statement on page 17 shows the detail of these reductions. Funded Debt outstanding is shown on pages 18 and 19, and brief descriptions of the various mortgages are given on pages 23 to 29, inclusive.

NEW LINES

A new line from Dalhousie, Ark., to Camp Pike, Ark., a distance of 4.05 miles was constructed for the purpose of transporting material for the construction of the National Army Cantonment at that point and to afford facilities for the movement of troops and supplies. Minor changes, due to reassignments and reclassification, increased the mileage 0.94 miles.

The details of charges to Road and Equipment as shown on page 22, summarize as follows:

For Construction of New Lines	\$ 176,865.41
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For Improvements and Additions to Roadway	1,326,923.71
For Improvements and Additions to Equipment	\$2,569,156.48
Less Credits account of Equipment Retired	254,140.60
Total Charge to Investment in Road and Equipment	\$3,818,895.94

OPERATIONS.

Total Operating Revenues for the year were \$78,320,313.46, an increase of \$8,347,500.96, or 11.9%. Applied to the average mileage operated, the revenues amounted to \$106,691.58 per mile of road, against \$9,408.41 the previous year. Freight revenue increased \$4,882,206.85, largely due to an increase of 13.11% in the tonnage from Products of Mines, 6.55% in the tonnage of Manufactures, 6.08% increase in the tonnage of Merchandise (less carload freight), and 21.72% in the tonnage of Miscellaneous Commodities. The total tonnage handled increased 9.72% (details of which are shown on page 43).

The average haul per ton of revenue freight was 252.42 miles, as compared with 243.26 miles last year. The traffic statistics on page 41 show material increases in loading per train and per car mile. Passenger revenue increased \$2,880,600.26, or 23.94%; the total amounted to \$14,912,672.69, or 19.04% of all Operating Revenues and without any material increase in the average rate per passenger mile. The number of passengers carried increased 13.77%, while the number of passenger miles increased 20.58%.

The total Operating Expenses shown in detail on pages 34 and 35 were \$53,248,038.14, an increase of 3.71% notwithstanding large increases in employees' wages and in cost of material. Maintenance of Way expenses equalled nearly \$1,000.00 per mile of operated road, and combined with Maintenance of Equipment expenses, absorbed 29.88% of total operating revenues.

Transportation Expenses show an increase of \$4,601,114.37, or 21.18% with an increase in gross revenue of \$8,347,500.96, or 11.93%.

PENSIONS.

To provide for employees who, after long years of faithful service, have reached an age when they are unable to further perform the duties of their office, a pension system was made effective July 1, 1917. At the close of the year there had been placed in the pension rolls the names of forty-four beneficiaries.

The productive capacity of the property, now fully improved as a transportation plant, is amply evidenced in the average operating revenues for the last three calendar years which exceeded the record of the previous three-year period by \$10,000,000.00.

H. F. BUSH
President.

Under a proclamation by the President of the United States the priorities were taken over for operation by the Government on December 31, 1917.

GENERAL BALANCE SHEET

DECEMBER 31, 1917, COMPARED WITH JUNE 1, 1917

	ASSETS		INCREASE OR DECREASE.	STOCK:	LIABILITIES		INCREASE OR DECREASE
	December 31, 1917.	June 1, 1917.			December 31, 1917.	June 1, 1917.	
INVESTMENTS							
Investment in Real and Equipment	\$349,970,117.58	\$43,486,781.87	\$1,494,135.71	Capital Stock	\$ 82,839,500.00	\$118,891,900.00	
Improvements on Leased Railway Property	3,882.40	3,582.90		Common	71,800,100.00	71,800,100.00	
Sinking Funds	8,337.75	694.21	8,241.54	Preferred	154,639,600.00	154,639,600.00	
				Total	\$154,639,600.00	\$14,639,600.00	

General Balance Sheet continued on next page

GENERAL BALANCE SHEET—continued.

ASSETS.				LIABILITIES.					
	December 31, 1917.	June 30, 1917.	INCREASE OR DECREASE.		December 31, 1917.	June 30, 1917.	INCREASE OR DECREASE.		
INVESTMENTS				STOCK:					
Deposits in Lieu of Mortgaged Property Sold....	152,029.86	69,688.67	84,941.19	LONG TERM DEBT:					
Miscellaneous Physical Property	2,554,552.51	2,544,455.31	10,097.20	FUNDED DEBT UNMATURED: \$227,054,620.00					
Investments in Affiliated Companies—Pledged	5,304,125.65	5,303,592.00	133.65	\$227,417,620.00					
Investments in Affiliated Companies—Unpledged ..	6,181,232.75	3,846,690.53	2,334,542.22	\$ —363,000.00					
Other Investments—Pledged	15,492,104.47	15,439,664.74	52,439.73	TOTAL CAPITAL LIABILITIES					
Other Investments—Unpledged	3,500,237.99	3,040,237.99	460,000.00	\$381,694,220.00					
TOTAL	\$383,167,719.46	\$378,733,188.22	\$4,434,531.24	\$382,057,220.00					
CURRENT ASSETS:				CURRENT LIABILITIES:					
Cash	\$4,152,978.64	\$1,470,394.76	\$2,682,583.88	Loans and Bills Payable..\$	70,000.90	\$	620,000.00		
Special Deposits.....	504,043.19	57,740.80	446,302.39	Traffic and Car Service Balances Payable	1,980,857.34	2,012,725.23	—31,867.89		
Loans and Bills Receivable	10,346.84	5,932.47	4,414.37	Audited Accounts and Wages Payable	5,822,681.93	6,797,510.00	—974,828.07		
Traffic and Car Service Balances Receivable	775,626.62	511,951.53	263,645.09	Miscellaneous Accounts Payable	407,403.92	478,223.34	—70,819.42		
Net Balance Receivable from Agents and Conductors	2,710,183.98	2,651,356.19	58,827.79	Interest Matured Unpaid..	1,133,423.49	309,520.00	823,903.49		
Miscellaneous Accounts Receivable	4,454,413.83	4,229,648.44	224,765.39	Unmatured Interest Accrued	2,543,795.60	1,275,238.76	1,268,556.84		
Material and Supplies....	7,551,261.26	6,059,126.74	1,492,134.52	Unmatured Rents Accrued	238,796.98	262,659.25	—23,862.27		
Interest and Dividends Receivable	49,869.18	35,350.32	14,518.86	Other Current Liabilities..	1,252,979.66	2,109,754.68	—856,775.02		
Rents Receivable	26,703.20	.....	26,703.20	TOTAL	\$13,449,938.92	\$13,865,631.26	\$ —415,692.34	
Other Current Assets.....	878,451.75	232,092.28	646,459.47	DEFERRED LIABILITIES:					
TOTAL	\$21,113,878.49	\$15,254,523.53	\$5,859,354.96	Other Deferred Liabilities..\$	568,289.64	\$	124,690.45		
DEFERRED ASSETS:				UNADJUSTED CREDITS:					
Working Fund Advances..\$	58,767.23	\$	60,475.66	\$	—1,708.43	Tax Liability			
Other Deferred Assets....	10.28	788.26	—777.98	Insurance and Casualty Reserves		\$			
TOTAL	\$58,777.51	\$61,263.92	\$—2,486.41	Accrued Depreciation—		Equipment			
UNADJUSTED DEBITS:				Other Unadjusted Credits.		853,301.66			
Rents and Insurance Premiums Paid in Advance..\$	95,619.33	\$	44,323.47	TOTAL		\$2,244,554.29			
Other Unadjusted Debits..	210,509.83	2,370,401.79	—2,159,891.96	CORPORATE SURPLUS:					
TOTAL	\$306,129.16	\$2,414,725.26	\$—2,108,596.10	Additions to Property through Income and Surplus					
TOTAL				Profit and Loss					
\$404,646,504.62				\$396,463,700.93				\$	
\$8,182,803.69				\$6,689,501.77				\$	
\$404,646,504.62				\$396,463,700.93				\$8,182,803.69	

NOTE.—The following Securities not included in Balance Sheet Accounts:
 Securities Issued or Assumed—Pledged

NOTE.—The following Capital Liabilities not included in Balance Sheet Accounts:
 Funded Debt Pledged.....\$ 35,000.00 \$ 35,000.00
 The capital liabilities shown above include the securities issued under the Reorganization Plan for bonds of various issues dealt with by the Plan, including \$7,781,500.00 principal amount, not acquired on December 31, 1917, which are accordingly not shown as liabilities.

[Nov.]



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Belgian Civilians Working on Belgian Railroad Under German Guard

Railway Officers

Executive, Financial, Legal and Accounting

William J. Moody, chief clerk in the treasurer's office of the Erie, at New York, has been appointed an assistant treasurer.

Hale Holden, president of the Chicago, Burlington & Quincy, has also been elected president of the Ft. Worth & Denver City and the Wichita Valley, with headquarters at Chicago.

T. B. Coppage, vice president and general manager of the Fort Worth & Rio Grande has been appointed terminal chairman at Fort Worth, Texas, under the regional director.

Operating

W. Tansley has been appointed car service agent of the Canadian Pacific at St. John, N. B., succeeding **W. B. Brown**, transferred.

J. F. Blattenburg has been appointed division examiner of the Colorado division of the Union Pacific, with headquarters at Denver, Colo., vice **P. Groome**, promoted.

F. N. Melius, hitherto acting superintendent, has been appointed superintendent of the Hudson division of the New York Central, with headquarters at Grand Central Terminal, New York.

J. J. Donnelly, trainmaster on the Gulf, Colorado & Santa Fe, with headquarters at Temple, Tex., has been transferred to Galveston, Tex., succeeding **E. W. Nettleton**, who goes to Brownwood, Tex., succeeding **W. M. Knowl**, who has been transferred to Temple, Tex., succeeding Mr. Donnelly.

J. T. Slattery, superintendent of the Denver & Rio Grande, Colorado lines, second district, with headquarters at Salida, Colo., has been transferred to the Salt Lake division of the Utah lines, with headquarters at Salt Lake City, Utah, succeeding **E. W. Deuel**, transferred to the Colorado lines.

C. W. Huntington, president of the Virginian Railway, by order of Director General McVoo, has been retired as chief operating officer of the road, and **Joseph H. Young**, president of the Norfolk Southern, has been appointed federal manager in charge of the operation of the Virginian, effective on May 21, with office at Norfolk, Va.

G. J. Ross, superintendent of car service of the New York Central, lines east of Buffalo, with office at New York, has been appointed superintendent of freight transportation, with headquarters at New York, vice **G. H. Alexander**, and **D. A. Day** has been appointed superintendent of car service, with headquarters at New York, vice Mr. Ross.

M. M. McLearn, chief dispatcher of the Canadian Government Railways at Truro, N. S., who was recently appointed assistant superintendent of District No. 2, Eastern Lines, with headquarters at Fredericton, has decided to return to his former position; and **R. Z. Walker**, station agent at Fredericton, has been appointed assistant superintendent, vice Mr. McLearn.

H. R. Saunders, superintendent of the Kansas City terminal division of the Chicago, Rock Island & Pacific has been transferred to Amarillo, Tex., succeeding **J. G. Bloom**, appointed division engineer at Herington, Kan. **G. W. Rourke**, formerly assistant general manager of the Chicago, Rock Island & Pacific, second district, with headquarters at El Reno, Okla., has been appointed division superintendent of the Kansas City terminal division, succeeding **H. R. Saunders**.

A. H. Moll, has been appointed assistant superintendent of the Chickasha subdivision of the Fort Worth & Rio Grande, with office at Oklahoma City, succeeding **J. A. Johnston** transferred to the Oklahoma subdivision with the same headquarters, succeeding **F. C. Glow**. Mr. Glow has been appointed trainmaster of terminals, with headquarters at Tulsa, Okla., in place of **J. C. McGlothlin**, resigned. **George E. Dornblaser** has been appointed assistant super-

intendent of the Cherokee subdivision of the same road. **D. P. Edmundson**, transferred.

W. L. Jarvis has been appointed assistant terminal trainmaster of the Long Island Railroad. **H. A. Golder** has been appointed assistant passenger trainmaster, general supervision of train service, etc., of the Lar Rock division and Beckaway Beach division, and **W. B. Hautsch**, general trainmaster at Bay Ridge, has been appointed assistant freight trainmaster, all with office at Jamaica, N. Y.

F. E. Williamson has been appointed general superintendent of the New York Terminal District of the New York Central, with headquarters at the Grand Central Terminal, New York. The New York Terminal District will comprise that portion of the Hudson division from Saenger Quay, (New York city) southward to St. Louis Park, including freight stations in Manhattan and at Wallabout Basin, Brooklyn, also that portion of the River West State Division from Little Ferry drawbridge, southward to the junction of the Pennsylvania Railroad south of Weehawken. Mr. Williamson was formerly superintendent of the Hudson division, but for the past year has been acting as general agent at New York city, for the American Railway Association.

James H. Brennan, assistant superintendent of telegraph, of the St. Louis-San Francisco, has been promoted superintendent of telegraph, succeeding **H. D. Teed**, whose death was announced in the *Railway Age* on Mar. 19. Mr. Brennan was born at Marysville, Kan., on September 1, 1873. He began his railway career on October 1, 1887, in the telegraph department of the St. Joseph & Grand Island at Marysville, Kan., and subsequently entered the service of the Western Union Telegraph Company as telegraph operator at Lincoln, Neb., later going to Kansas City as telegraph operator for the Western Union Telegraph Company and the Postal Telegraph-Cable Company. He afterwards became manager for the Western Union at Las Vegas, N. Mex., and then wire chief at Santa Fe, N. M., Cleburne, Tex., and La Junta, Colo. On December 1, 1906 he was appointed assistant superintendent of telegraph of the St. Louis-San Francisco, which position he held until his recent promotion as mentioned above.

Traffic

G. O. Herbert is appointed demurrage manager of the Missouri Pacific, with headquarters at St. Louis, Mo., effective June 1.

Samuel E. Aliender has been appointed chief special agent of the St. Louis-San Francisco, with headquarters at St. Louis, succeeding **James H. Smith**, resigned.

F. B. Townsend, vice-president of the Minneapolis & St. Louis has been appointed to the staff of **J. G. Woodworth**, traffic assistant to the regional director at Chicago.

W. B. Cornell, district passenger agent of the Chicago & Alton, at Cincinnati, Ohio, has been appointed passenger agent at Springfield, Ill. His former position has been abolished.

Rodney MacDonough has been appointed division passenger agent of the Pennsylvania Railroad and the West Jersey & Sea Shore, with office at Philadelphia, Pa., succeeding **F. B. Barnitz**, who has been granted a furlough.

S. B. Wade, connected with the traffic department of the Chicago & Alton, at Little Rock, Ark., has been appointed traffic agent of the Jacksonville division, with headquarters at Bloomington, Ill. The position he held at Little Rock has been abolished.

E. B. Robb, acting division freight agent of the Canadian Government Railways, with office at Cochrane, Ont., has been appointed division freight and district passenger agent for the Transcontinental Division—O'Brien, Que. to Graham, Ont., inclusive, with office at Cochrane.

Gordon M. Craig, assistant general passenger agent of the Erie with office at New York in addition to his present duties, will in future have the direction of the suburban passenger traffic, vice **Ralph H. Wallace**, general passenger agent who has been furloughed for service on the passenger train committed to the Railroad Administration for eastern routes.

Charles M. Burt, general passenger agent of the Boston & Maine and subsidiary companies, with office at Boston, Mass., having been assigned by the regional director, eastern territory, of the United States Railroad Administration, to duty on the passenger traffic committee, **Frederick T. Grant** has been appointed acting general passenger agent, of the Boston & Maine and subsidiary companies, with office at Boston.

J. L. Hayes, commercial freight agent of the Baltimore & Ohio, with office at Baltimore, Md., has been appointed division freight agent, with office at Cumberland, and authority over the Cumberland division, Martinsburg to Grafton, both exclusive, including branches. **P. H. Lantz** has been appointed commercial freight agent, with office at Baltimore, vice Mr. Hayes, and **W. F. Geisert**, traveling passenger and freight agent at Denver, Colo., has been appointed general agent, with office at Camp Sherman, Ohio.

H. P. Cornick, whose appointment as general freight agent of the Louisville & Nashville, with headquarters at Evansville, Ind., has already been announced in these columns, graduated from the high school at Evansville, and began railway work on October 13, 1884 with the Louisville & Nashville as stenographer to the general freight agent of the St. Louis & Henderson divisions. In November, 1892, he was promoted to chief clerk in the same office. On December 1, 1892, he was appointed assistant general freight agent of the St. Louis and Henderson divisions and branches, which position he held at the time of his recent appointment as general freight agent of the same road as above noted.

On May 1, the Atchison, Topeka & Santa Fe, in compliance with orders of the Railroad Administration, closed its off-line freight and passenger soliciting offices. The order caused considerable rearrangement of official positions and in some cases the men affected sought employment elsewhere. **E. F. Lalk**, general freight agent at Pittsburgh, Pa., was appointed assistant manager of the division of transportation of the United States Shipping Board, at Pittsburgh. **S. W. Manning**, general New England agent, at Boston, Mass., received a similar appointment from the Shipping Board at Boston. **R. C. Smith**, general freight agent at Philadelphia has been assigned to government work at Washington. **E. W. Demarest**, general freight agent at Buffalo, has gone to San Francisco, Cal., to engage in the automobile and tire business. **E. C. Kitching**, general freight agent, at Joplin, Mo., is now engaged in the automobile business in that city. **Sam Larimer**, general agent for the passenger department at Des Moines, Ia., has been appointed passenger agent at Wichita, Kas. **W. J. Curtis**, general freight and passenger agent at Salt Lake City, Utah, is now a passenger agent in the general office at Topeka, Kas. **W. S. Farnsworth**, general freight agent at Mexico City, has become identified with the United States Food Administration, in Cuba, in connection with the handling of sugar. **E. H. Dallas**, general passenger agent at Atlanta, Ga., is now located in the traffic manager's office at Chicago.

Engineering and Rolling Stock

G. H. Berry has been appointed assistant master mechanic of South Louisville (Ky.) shops of the Louisville & Nashville, vice **B. E. Dupont**, transferred.

W. Wells, district master mechanic of the Canadian Pacific, with office at Schreiber, Ont., has been transferred in the same capacity to the Farnham division of the Quebec district.

L. G. Curtis, district engineer of the Baltimore & Ohio, with office at Chicago, has been appointed assistant chief engineer in charge of construction, with headquarters at Baltimore, Md.

J. G. Bloom, superintendent of the Chicago, Rock Island & Pacific, with headquarters at Amarillo, Tex., has been appointed division engineer, with headquarters at Herington, Kan., succeeding **S. L. McClanahan**, who has resigned to enter the army, having received a commission as first lieutenant with the 25th Engineers (Railways.)

W. S. Jackson, master mechanic of the Erie at Marion, Ohio, has been appointed mechanical superintendent, with headquarters at New York, to succeed **F. S. Fitzsimmons**, resigned, **R. V. Blocker**, general foreman at Huntington, Ind., has been appointed master mechanic with office at Marion, to succeed Mr. Jackson.

C. E. Smith, consulting engineer at St. Louis and formerly bridge engineer of the Missouri Pacific, has received a commission as major in the engineering branch of the quartermaster's corps. He is now stationed at Washington, D. C.

The Chicago, Rock Island & Pacific mechanical department, in a rearrangement of territories assigned to supervisors of fuel economy, has made the following changes and additional appointments, effective May 15: **J. Benzies**, supervisor of fuel economy of the Chicago terminal, Illinois and Missouri divisions, with headquarters at Rock Island, Ill., will now have charge of the Chicago terminal and the Illinois divisions, with the same headquarters. **P. Smith**, supervisor of fuel economy of the Cedar Rapids, Minnesota, Dakota and Des Moines divisions, with headquarters at Cedar Rapids, Iowa, will now have charge of the Dakota and Des Moines Valley divisions, with headquarters at Valley Junction, Iowa. **F. Meredith**, supervisor of fuel economy of the Iowa, Nebraska and Colorado divisions, with headquarters at Fairbury, Neb., will now have charge of the West Iowa, Nebraska and Colorado divisions, with the same headquarters. **F. Connolly**, supervisor of fuel economy of the St. Louis, Kansas City terminal, Kansas and El Paso divisions, with headquarters at Herington, Kan., will now have charge of the Kansas and El Paso divisions, with the same headquarters. **B. J. Bonner**, road foreman of equipment, with headquarters at Herington, Kan., has been appointed supervisor of fuel economy of the East Iowa, Cedar Rapids and Minnesota divisions, with headquarters at Cedar Rapids, Iowa. **C. W. Reed**, road foreman of equipment has been appointed supervisor of fuel economy of the Missouri, Kansas City terminal and St. Louis divisions, with headquarters at Trenton, Mo.

V. R. Hawthorne, whose election as acting secretary of the Master Car Builders' Association and the Master Mechanics' Association, was announced in the *Railway Age* of May 17, has been serving as temporary secretary of the associations since the death of J. W. Taylor. Mr. Hawthorne was born at Oleona, Pa., on November 27, 1886. He entered the service of the Pennsylvania Railroad as a car repairman at the Elmira, N. Y. shops in June, 1905. He was transferred to the shops at Baltimore, Md., in November of the same year, at which place he was employed during the summer months repairing passenger cars and during the winter as a clerk. Here he gained his

first experience in M. C. B. billing. In June, 1910, he was transferred to Williamsport, Pa., as M. C. B. clerk in the office of J. T. Wallis, remaining there until June, 1914, at which time he was transferred to Altoona, Pa., as a gang leader in the M. C. B. clearing house. While there he was appointed on the M. C. B. special committee making time studies. Early in 1917 he was appointed special master car building inspector, reporting to J. T. Wallis, general superintendent of motive power of the Pennsylvania Railroad. He was assigned on special M. C. B. committee work of the American Railway Association in April, 1917.

Purchasing

C. C. Keeble, recently storekeeper of the Gulf, Colorado & Santa Fe, at Galveston, Tex., has received a commission as first lieutenant in the quartermaster's corps, at Washington.

Railway Officers in Government Service

H. S. Ray, assistant general passenger agent of the Chicago, Rock Island & Pacific at Des Moines, Iowa, has been commissioned a major in the army and assigned to duty as assistant director of inland transportation, war department.



V. R. Hawthorne

EDITORIAL

Railway Age

EDITORIAL

Announcement is made elsewhere in this issue of the appointment of W. J. Cunningham, the James J. Hill professor of transportation of Harvard University, to take charge of statistics for the government Railroad Administration. Professor Cunningham has worked for a number of years on just the kind of problem that he will have to solve under the Railroad Administration. His practical work, of course, has not been on as large a scale as it will be now, but his study of operating statistics has been comprehensive for the entire country. Some years ago he devoted a considerable part of his time to working out a system of statistics to be used by the Union Pacific, and the Union Pacific's operating statistics are today among the simplest and most useful of any system in use in the United States. For the last few years, Professor Cunningham has been acting in an advisory capacity to James H. Hustis in his operation of the Boston & Maine. The system of statistics for the Boston & Maine had to be built pretty well from the ground up and the practical experience which Professor Cunningham had on the Boston & Maine should stand him in good stead now. At the same time that he was having this practical experience he was making a study of the system of statistics in use on all the roads of the country. He possesses that rare combination of the student and the practical man, which is so vitally needed if the operating statistics of all of the railroads which are under the jurisdiction of the director general are to be harmonized and yet kept in such shape as to meet the particular needs of each property and each organization. It is essential that a new manner of reporting statistics, no matter how good it is theoretically, shall not be adopted on any road before it is so well understood by the organization that the figures of the old system in use could be interpreted and carried on by the new system. Professor Cunningham's work on the Boston & Maine is of special value in this connection.

Much uncertainty has attended all construction during the past two years. While this has been due primarily to the unsettled labor situation still the difficulty of securing the necessary materials for carrying on the work has been of hardly less importance. Before that time conditions were such that engineers when making plans for improvements could estimate closely the cost of work and the time necessary for doing it, basing their estimates on past experience. Contractors if invited to present bids on the projects also based their figures on past experience. Under the present conditions past performances have lost much of their value as measures of what may be expected in future operations. This is particularly true in building construction where materials of varied character are required. Such work calls for large quantities of cement, brick, steel and specialties. With the exception of cement and possibly brick, the demand for building materials exceeds the supply, and even if the materials can be purchased shipments are subject to embargoes, and consequently deliveries are uncertain. All this renders labor inefficient through the time lost in waiting for

Building Construction and Second Hand Material

deliveries, and the constant changes necessary in the organization to take advantage of available supplies at the expense of a predetermined plan of operation. In the construction of the new car repair shops at Port Huron, Mich., described elsewhere in this issue, the Grand Trunk minimized the delays due to the material situation by utilizing large quantities of second hand materials of varied character salvaged from buildings wrecked in connection with the preparation of the site. This resulted in a considerable saving in expenditure which was, however, secondary in importance to the saving in time effected. While it is true that the conditions surrounding this project were more or less favorable the results obtained would suggest the importance of close studies of conditions when attempting building construction in order that the most may be made of already existing conditions.

One of the most interesting of the kaleidoscopic developments of the regime of federal railroad control is the announcement of the plan for the appointment of federal managers to take charge of the operation of the railroads reporting exclusively to the Railroad Administration and with no connections with the owners of the properties. It is entirely natural, perhaps, that Mr. McAdoo should desire to have an organization responsible to him alone rather than one consisting of men with a dual allegiance and many close observers of the trend of recent events in the railroad world have foreseen the necessity of drawing a sharp line of distinction between the officers of the government and the officers of the corporations. This necessity first became evident in the case of members of the director general's staff at Washington who were required to sever their corporate relations and the issues drawn between the railroad owners and the administration in connection with the negotiation of the compensation contract have demonstrated some strong reasons why there should be a similar separation in the case of operating officers. Comment on certain phases of the policy should perhaps be withheld until more is known of the administration selections for the positions of federal managers. The newspapers have been allowed to give forth the impression that the railroad presidents already have been summarily ousted, whereas the only definite statement on the subject has been an announcement that the men to be placed in charge of each property must be exclusive representatives of the Railroad Administration. It would be exceedingly unfortunate if the director general should find it necessary or advisable to dispense with the services of any large proportion of the best brains in the railroad business and it is understood that many presidents will be appointed federal managers, leaving the chairman or other officer as the representative of the corporation, while in case the president is a man who has been more closely identified with the financial and corporate policies of the company than with its operation he will be allowed to remain with the corporation and an operating officer will be appointed federal manager, in most cases the operating vice-president. This is on the theory that many of the functions formerly performed

Federal Managers for the Railroads

delivered, and the constant changes necessary in the organization to take advantage of available supplies at the expense of a predetermined plan of operation. In the construction of the new car repair shops at Port Huron, Mich., described elsewhere in this issue, the Grand Trunk minimized the delays due to the material situation by utilizing large quantities of second hand materials of varied character salvaged from buildings wrecked in connection with the preparation of the site. This resulted in a considerable saving in expenditure which was, however, secondary in importance to the saving in time effected. While it is true that the conditions surrounding this project were more or less favorable the results obtained would suggest the importance of close studies of conditions when attempting building construction in order that the most may be made of already existing conditions.

by the chief executive officer of a railroad have now been taken over by the Railroad Administration.

The Advance in Rates

THE *Railway Age* has probably printed more material on the reasons why railroad freight and passenger rates should be advanced than any other publication. Some of its editors, as well as scores of its contributors, by long practice have acquired a facility and a fluency in dealing with the subject which some of our good natured critics have occasionally characterized as the manifestations of a deep-seated habit.

But before the latest opportunity to indulge in a discussion of this familiar topic we find ourselves strangely at a loss. An increase in rates amounting to something like a billion dollars a year seems an appropriate subject for discussion, but we approach it with something like awe. Not at the magnitude of the sum, although a billion dollars is still big in the railroad business, because we have been accustomed to observing the operating expense accounts and are becoming inured to large figures. But we confess ourselves somewhat embarrassed by the magnitude of the proposition. We can hardly be expected to object to an increase in rates. Our views on that subject are well known. But we have been used to discussing reasons why rates should be advanced, proposals to advance rates, and occasionally a qualified permission to advance rates. An order to advance rates is rather novel.

Moreover, Mr. McAdoo's General Order No. 28 contains so many points of interest that we hardly know where to begin and the time allowed for discussion before it takes effect is so short. We have usually been allowed at least a year or two to develop the reasons why freight rates in a part of the United States should be advanced 5 per cent, 10 per cent or 15 per cent, and have then been allowed additional years in which to complain because only a part of the increase was allowed. Here we have a 25 per cent increase in freight rates, an increase of passenger fares to 3 cents a mile, an additional passage charge for parlor and sleeping car passengers, state rates supplanted by interstate rates and then raised, and the elimination of special reduced rates induced by competition, all rolled into one order, to become effective in less than three weeks in the case of passenger fares and in a month in the case of freight rates. We have not time even to warm up by urging the Interstate Commerce Commission not to suspend the tariffs. Before we could get a good start the thing will have been accomplished.

There is a finality about the order that is rather appalling to those who have kept in touch with rate advance proceedings in the past. Mr. McAdoo returns to his office after an absence of two months, including two or three weeks when he was confined to his home by illness, signs an order which is telegraphed to all parts of the United States on the same day, and turns to another large problem, or a problem which formerly would have been considered large, with every assurance that his order will take effect on the date set. Even the element of controversy which has enlivened the history of rate cases is to a large extent lacking. Undoubtedly there will be opposition and protests but their apparent futility creates some lack of interest. While protests are being made before the Interstate Commerce Commission the rates will be in effect, in the states even as in the nation.

It is all so easy that Mr. McAdoo does not hesitate to advance wages for the morning papers and rates for afternoon release and to precede them both by an order that soldiers and sailors may ride for one cent a mile. He knows in advance where the money is coming from. In this he

has a great advantage over railroad executives who are sometimes accused of being lacking in vision. Many of them have known long in advance what ought to be done but they have not been able to pass so readily from the state of volition to that of action. One of the reasons why capital is timid is that capital usually has to pay the bill.

It seems unnecessary for the *Railway Age* to express its opinions of the director general's order. In the first place, what's the use? In the second place, we are already on record. For 10 or 12 years we have been pointing out the need for higher freight rates, why the passenger business should be placed on a self-sustaining basis and why the conflicts between state and interstate rate-making should be removed. It is coming about in a manner somewhat different from that which we had anticipated but we may at least congratulate Mr. McAdoo on his determination to place the railroads on a self-sustaining basis rather than yield to the suggestions that have been made from some quarters that any operating deficit be met indirectly by taxation.

Is the Amalgamation of Railway Associations Advisable?

THERE IS A LARGE NUMBER of railway associations. There are without question some which should be combined for the good of all concerned. However, with these exceptions, each of the organizations now existing fills a definite need, providing the channel through which the men in the particular department can exchange ideas and work together to improve methods and materials used in the service in which they are employed. In nearly all cases these societies are supported by railway men in their individual capacities, who join on their own initiative, pay their own dues and work in the associations largely on their own time. While some roads pay the annual dues of their men in these organizations and a large number pay their expenses to attend conventions, in the aggregate the money so spent by the roads is small in proportion to the benefits derived.

Before changing the present methods of organization of these societies, it is well to consider what they have accomplished under present methods in order to determine the effect which any change in these methods will have on the amount and character of the work done. In order to be specific, reference will be made to the American Railway Engineering Association for purpose of illustration as it is typical of the stronger and more efficient railway associations. This society was organized 20 years ago and now enrolls about 1,400 members, nearly all of whom are directly in railway service in the United States and Canada. No distinction is made between residents of the two countries, the president of the Association last year being J. G. Sullivan, chief engineer of the Western Lines of the Canadian Pacific and a resident of Winnipeg, Man. Membership is individual and voluntary without official designation from the roads. Work is done through committees which meet at frequent intervals and whose recommendations are subject to review and spirited discussion on the floor of the annual convention before acceptance by the Association. The reports and discussions are published in the annual proceedings which have become the standard book of reference in the libraries of railway officers concerned with engineering and maintenance of way problems. The recommended practices and standards of the association are also published in a manual, which is revised annually, to keep pace with the developments in practice and is in use throughout the English-speaking world. The Railroad Administration has already indicated its appreciation of the value of

the work done by this association by ordering a large number of copies of this manual. It is difficult to pick out specific work of any association for special mention. However, one of the most valuable lines of work has been with reference to the rail problem. As a result of the work of this committee changes have been made in specifications and mill practice which have played no small part in the improvement in the quality of the rails during the last few years. The committee on Stresses in Track is now engaged in an extensive study which bids fair to be of even greater value to the roads in determining the relations which exist between wheel loads and the different units of the track structure.

Work such as this can be done to best advantage only when men are working voluntarily because of their professional interest in the subject. The fundamental reason for the high grade of work done in most of these voluntary associations is the opportunity offered for individual initiative. It is for this reason that any amalgamation of these associations whereby they will lose their individual identities will do irreparable harm. When an organization becomes official in character, individual initiative in speech and action is checked while the incentive and loyalty to the individual organizations are removed.

The logical outcome of the consolidation of these associations will be that the members, particularly in the technical departments, will transfer their activities to other societies such as the American Society of Mechanical Engineers, the American Society of Civil Engineers, and the Western Society of Engineers, over which neither the railways or the director general have any control. This will be a return to the condition existing years ago before the formation of the railway organizations.

It has been stated that the director general has proposed the amalgamation of these associations in order that (1) he may have one central body to which he can turn to secure advice from the best talent in the railway industry, (2) he may limit participation in the preparation of principles and standards of recommended practice to those actually in the employ of the roads of the United States and (3) by giving this association an official character, he may have the means of making its recommendations binding on the roads. Referring to the first objective, it is not necessary to destroy the individual organizations to secure concerted action, for this can be accomplished by the co-ordination of activities through some central committee or board composed of representatives of these societies. The elimination of Canadian railway men and those in consulting practice, university professors, etc., would only deprive the societies of the benefits of the service and advice of these members with no positive gain. Likewise while the standards of design and practice prepared by the different organizations have been adopted wholly or in part by many but not all roads, and while the deviation from these standards on other roads has increased manufacturing costs, we do not believe that the enforced universal adoption of these standards is advisable, for it will tend to arrest, if not entirely stop, future development. The rapidity with which this development is occurring, largely as a result of united co-operative association work, is indicated by the fact that the American Railway Engineering Association revises its manual of standard practice yearly to keep it up to date.

The railway associations are willing and desirous of doing everything in their power to assist in the winning of the war. They have offered their services to the government in whatever way our country can use them. The railways are essential to our military activities. The railway associations have had much to do with the development of efficient practices. They should, therefore, be able to assist the government in the solution of the transporta-

tion problems now confronting it. We believe that this can be done best by co-ordinating the work of the associations in such way that there may be a minimum overlapping of work while at the same time providing for the freest play of initiative and individual incentive. The loss of interest and restriction of action which will necessarily follow the amalgamation of the organizations will far outweigh the disadvantages which now exist and most, if not all, of which can be eliminated by intelligent co-ordination.

New Books

The Elements of Railroad Engineering, by William G. Raymond, dean of the College of Applied Science State University of Iowa, 512 in. bound in cloth, 453 pages, illustrated. Published by John Wiley & Sons, Inc., New York. Price, \$4.

This is a revised third edition of the original volume published in 1908. The order and arrangement is the same as in the previous edition, the book being divided as before into three parts: "Permanent Way" which may be said to partake of the nature of a critical description of the roadway, track, structures, signals, etc.; "The Locomotive and Its Work" covering the principles of economic railway operation and its influence on railway location; and "Railroad Location, Construction and Betterment Surveys," which is an account of the methods of conducting the work rather than a mathematical treatment. The appendix on the location of the Knoxville, La Follette & Jellicoe Railroad by W. D. Taylor, covering 70 pages appears as in the original edition. The section on the locomotive has been largely revised and Chapter 10 on "Signaling" has been entirely rewritten. Chapter 23 on "Valuation," covering 22 pages, is an addition which has no counterpart in the original work, and which presents a review of the various problems involved and a statement of the opposing views presented in their solution.

A Bibliography of Municipal Utility Regulation and Municipal Ownership, By Don Lorenzo Stevens; 410 pages, cloth, 9 in. bound in cloth. Published by Harvard University Press, Cambridge, Mass. Price, \$4.

Although this book does not cover strictly railroad regulation, the student of railway matters will find it of considerable value, for there are many things in public utility regulation that follow along the same lines as railroad regulation. The book has been compiled primarily for the business man with a view, of course, to its use by the student or general reader, and is arranged with that in mind. Each publication noticed has been read by the author of the book and his very brief notations concerning the character of the articles should prove of considerable assistance in the selection of material. The names quoted are taken primarily from articles in public utility, technical and other periodicals and the bibliography is completed to January 1, 1917. "It is believed," says the author in his preface, "that little of value on the subjects treated has been overlooked."

The bibliography covers works on gas, electric water and traction utilities, but works in languages other than English are not included. Among the references are a number of articles which have appeared in the *Railway Age*. The bibliography is classified under the following heads: General Works; History of Utilities and of Regulation; Franchises; Public Service Commissions; Valuation; Rates; Taxation; Holding Companies and Municipal Ownership. A 50-page index also helps in locating articles. Like all the publications of the Harvard University Press, the book is attractively gotten up, printed in a clean type and well arranged typographically.

Letters to the Editor

The Trespassing Evil

CHICAGO.

TO THE EDITOR:

Allow me to add a word to your interesting discussions in recent issues dealing with the trespassing evil. The appeal to legislators is pat and timely. Whether the patient efforts of railroad officers, in this direction, will bear much good, remains to be seen; but if teaching by example will do any good the railroads certainly ought to begin before long to penetrate the hides of the indifferent.

You speak of one prominent road on which the trespassing record was reduced by 19 per cent, and you refer to the lethargy and ignorance of local magistrates. It occurred to me to call your attention to the Chicago & North Western, which also has made a new record. It is on the North Western, you know, that the "father" of safety-first on the railroads, R. C. Richards, has carried out safety ideas with a vigorous hand for a number of years past. The record of the

judges who are an exception to the general statement which you have made. In a circular printed in four languages, all in large type and arranged with good taste, he appeals to heads of families to "STOP, LOOK AND LISTEN"! This circular, distributed broadcast among the householders of Milwaukee, is reproduced below, reduced about one-half in width and height:

Mr. Richards, to whom I have referred, is, as your readers know, one of the leaders in the National Safety Council, and he is to be credited with many of the good ideas which are spread throughout the country in the bulletins issued by the



LOOK AND LISTEN

TO THE HEAD OF THE FAMILY:—

Read this — Then read it to your family — Then read it again.

Make sure YOU remember it. — Make sure THEY remember it.

IGNORANCE OF THE LAW EXCUSES NO MAN.

Did you know that? You know it now, anyway. Every time you trespass, or any member of your family trespasses, upon a railroad track you break the Law.

Every time that anyone — Man, Woman or Child — walks upon a railroad track that person is taking a dangerous risk. A risk of imprisonment; a risk of being maimed for life; a risk of being killed! The plea that you didn't know you were breaking the law will not keep you out of prison if you are arrested for trespass; it will not ease your pain if you get hurt; it will not mend a broken leg; it will not comfort your family if you get killed!

Don't let your children go on to the track to look for coal or kindling. Besides the danger to life and limb it paves the way to crime — to stealing from depots and waiting rooms; to breaking into freight cars and storage sheds.

If they go to prison for it YOU are to blame!

If they go to a hospital with a smashed limb YOU are the cause of it.

If you are sent for to identify the poor, maimed little body at the morgue YOU are responsible. Keep them away from the tracks!

REMEMBER! — If you or any of your family is, after this, brought before a judge for trespassing upon the tracks it will not help you any to say you "Didn't know."

You DO know — See that you keep it in mind.

During the twenty-seven years ending June 30th, 1916, there were:

123,591 Persons killed,

135,168 Persons injured, trespassing on the railroad tracks in this country.

In Milwaukee, in 1916,

84 Boys and Girls were killed and injured trespassing on railroad tracks.

During the same year

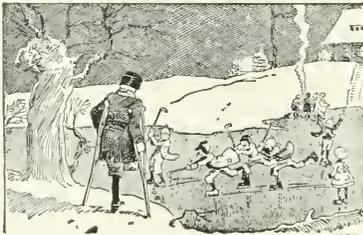
632 Boys and Girls were brought into Juvenile Court for misdemeanors on railroad tracks and thefts from freight cars.

John C. Karel
Judge of Juvenile Court.



Bulletins Are Read by 4,500,000 Workmen Each Week
NATIONAL SAFETY COUNCIL, CHICAGO, ILL.

JUST AS LONELY AS HE LOOKS



The Boy Who Flipped Trains

This picture tells its own story. The crippled boy is just as lonely as he looks. He is not getting that exercise which might make him a strong, robust man, and next summer when the boys are playing ball he will be standing over on the sidewalk, just as lonely as you see him in this picture. What happened to him, or something worse, has happened to THIRTY-SEVEN THOUSAND SEVEN HUNDRED AND FOURTEEN other boys and girls under eighteen years of age who were walking on the tracks or flipping on the trains in this country during the last twenty-eight years — SO, KEEP OFF THE TRACKS!

Remember! It Is Better to Be Safe Than Crippled!

number of trespassers killed on the North Western in the year 1917 was 89 killed and 120 injured, as compared with 146 killed and 223 injured in the same length of time four years previously (1913).

This statement concerning the North Western only tends, of course, to strengthen what you have said about the good work done in the east. The other point that I wish to make is, in a way, a contradiction of what you say about the inefficiency of local magistrates; but a contradiction which everybody will be glad to hear of. Hon. John C. Karel, judge of the Juvenile Court in Milwaukee, Wis., is one of those

secretary of the Council. One of the latest bulletins issued in this campaign is devoted to the "boy who flipped trains." A copy of this circular is shown herewith; it tells a vivid story. The original is on a sheet 8 1/2 in. by 11 in., and the three lines which are shown in the largest type are printed in red ink. This bulletin is issued by the Steam Railroad Section of the Council, headquarters, 208 So. La Salle Street, Chicago, and copies are furnished at cost price.

CHINORWEST.

VICTORIAN RAILWAYS DIAMOND JUBILEE.—The railways of Victoria are now in their diamond jubilee year; the first rule book was dated January 1, 1858, and the official opening of the first railway was on January 7, 1859.

PHILIPPINES HAVE 755 MILES OF RAILROAD.—According to the annual report of the Philippine public utility commissioner, the islands now have 755 miles of railroad under operation. Of this mileage, the Manila Railroad has 623.8 miles in operation and 5.3 miles under construction. A line 93.2 miles long is being projected from Calauag on the main line south to Baoo, the terminal of the Legaspi-Naga line. The Philippine Railway company has 131.7 miles of main line under operation.

Distribution of Additions and Betterments

An Analysis of Expenditures to Be Made on Improvements for Forty-nine Principal Lines

IN ORDER that a comprehensive idea might be obtained of the nature of the improvement work approved by the Railroad Administration, a compilation has been made from the budgets of 49 roads, having an aggregate mileage of 150,810 miles, showing the approved expenditures for several important items. These are shown by roads in the tables and the amounts are the sums of the expenditures chargeable to both capital and operating accounts.

A study of the distribution of the expenditures shows that the Railroad Administration has been particularly liberal in approving requests for items that will make possible an increase in the capacity of the railways. Of particular interest is the \$81,385,935 which will be spent for increasing the yard tracks, sidings, etc., of the 49 roads in question and the \$64,297,478 which will be spent for shop buildings, enginehouses, etc. In the latter item is included the cost of the shop machinery and tools which will be required to equip the new shops. Most of the \$9,248,249 shown under the heading "shop machinery and tools" is for additions and betterments to existing shops. A generous amount (\$32,708,392) has been granted 39 of these roads for improvements to existing rolling stock. This will increase materially the power and capacity of locomotives and permit of improving the freight cars.

The guiding principle in the consideration of all budgets has been to grant those expenditures which are necessary to help win the war. Approvals for projects which might be considered unessential to winning the war have been limited and made to cover, particularly on work that has already been started, amounts necessary to permit a cessation of the work without loss to the company. For instance, the Chicago Union Station Company was given \$1,655,293 to bring the work that was in actual process of construction to a close without loss. Another case is that of the St. Paul electrification between Othello, Wash., and Seattle. In this case \$5,417,000 was granted, as the work had progressed to such an extent that the railroad would suffer a severe loss if the work was summarily stopped. Ballasting is another item which has been held to a minimum, as it was believed that most of this could be left undone until after the war. The expenditures for bridges have been limited to the maintenance or renewal of present structures, rather than to new work. The item "freight and passenger stations" includes almost entirely expenditures for improvements in the handling of freight. Practically no money was permitted for passenger stations, except where it was inexpedient to discontinue new work on stations under construction.

The last column of one of the tables gives amounts for additions and betterments chargeable to operating expenses. These amounts added to those given in last week's issue on pages 1268-69, for the respective roads gives the sum total that will be spent for additions and betterments.

Important Projects Authorized

Of particular interest in the budget of the Baltimore & Ohio is the expenditure to be made for shop buildings, enginehouses, etc. The largest single item in this account is the shop and enginehouse at Glenwood, Pa., just outside of Pittsburgh. This shop will have a capacity of 40 to 50 locomotives per month. Over \$1,300,000 has been appropriated for the shop and enginehouse at Cumberland, Md., and a new shop and enginehouse will be built at Youngstown, Ohio, at a cost of \$740,000, an extension will be built

to the shop and enginehouse at Washington, Ind., for \$275,750, an enginehouse will be built at Gratton, W. Va., at a cost of \$528,086 and the shop and enginehouse at Dayton, Ohio, will be rebuilt at a cost of \$225,000. The bridge across the Allegheny river at Pittsburgh will be renewed at a total cost of \$2,568,000, of which \$500,000 will be required this year.

The Boston & Albany has received \$750,000 for additional yard facilities, of which \$200,000 will be spent at West Springfield, Mass., and \$300,000 for a freight handling yard at Boston. A third track will be built between Athol Junction, Mass., and Springfield at a cost of \$60,000.

A particularly large amount, \$3,497,221, has been given the Boston & Maine for shop buildings, enginehouses, etc. This includes an enginehouse at Concord, N. H., costing \$800,000; one at East Deerfield, Mass., costing \$770,000; one at Lowell, Mass., costing \$750,000; one at Dover, N. H., costing \$275,000, and one at East Cambridge, Mass., costing \$143,500.

The Chesapeake & Ohio will spend \$470,000 for third track from Big Sandy Junction to Russell, Ky., and will also reduce grades from St. Albans, W. Va., to Ferrill at a cost of \$403,596.

The Chicago & Eastern Illinois will build a new yard at Terre Haute, Ind., at a cost of \$425,000, and additional yard facilities will be provided at Yard Center, Ill., and Clinton, Ind. Second track will be built from Salen Yards, Ill., to Brubaker at a cost of \$124,000, and from Pana, Ill., to Dolville, at a cost of \$192,000.

In addition to the amounts shown in the tables the Chicago, Burlington & Quincy has been granted \$250,000 for improvements at the Hawthorne (Ill.) yard and an engine terminal costing \$155,000 will be built at Eola, Ill.

The Chicago, Milwaukee & St. Paul was allowed \$5,417,000 for the completion of the electrification between Othello, Wash., and Seattle. This was granted because a considerable loss would be entailed if the work were not completed. An expenditure of \$680,000 was granted for the engine terminal at Savanna, Ill.; \$601,870 for an engine terminal at Otumwa Junction, Iowa, and \$236,000 for a freight and engine terminal at Atkins. In addition to this \$334,000 will be spent for the yard at Godfrey and \$107,000 for the freight yard at Davenport, Iowa.

The Rock Island was granted nearly \$1,000,000 for shop buildings, enginehouses, etc., which includes improvements at Herington, Kan.; Amarillo, Texas; Manley, Iowa, and Burr Oak, Ill. Over \$1,000,000 will be spent for second track on this road.

The Cincinnati, New Orleans & Texas Pacific has been granted an expenditure of \$5,960,000 for double track from Lexington, Ky., to St. John. Of this amount \$2,800,000 is appropriated for 1918. This road will also build a new terminal yard at Danville, Ky., at a cost of \$900,000.

The Cleveland, Cincinnati, Chicago & St. Louis has received \$4,409,874 for additional main track, of which \$2,000,000 will be spent for second track work on the Cleveland-Indianapolis division. Second track, 26 miles long, will also be built on the Chicago division at a cost of \$1,658,000. A second track on the Columbus line will be built at a cost of \$475,000. A yard will be built at Sharonville, Ohio, at a cost of \$500,000. The expenditure of \$710,419 for "shop buildings" includes engine terminals at Galion, Ohio, Sheffield, Ind., and additions at various points.

The largest expenditure for the Erie is for shop buildings, enginehouses, etc., \$2,382,156. This expenditure includes a 31-stall enginehouse and engine terminal facilities at Meadville, Pa., at an estimated cost of \$411,191. New engine terminals will be built at Girard, Ohio, for \$400,000, and at Avoca, East Buffalo and Dayton, N. Y. This road will reduce grades and construct second tracks between Steamburg, N. Y., and Falconer, a distance of 14 miles, at an estimated cost of \$510,000 and between Jamestown, N. Y., and Lakewood at a cost of \$135,000. Second track will also be laid in Akron, Ohio, at an estimated cost of \$150,000, and between Sharon, Pa., and West Middlesex, a distance of eight miles, at an estimated cost of \$375,000. This will give the Erie double track from Jersey City to Chicago. An expenditure of \$351,000 will be made for grade reductions and elimination of grade crossings in Union City, Pa.,

the Creek, Charlotte, and Lansing, Mich. The information regarding the Grand Trunk expenditures was not available for last week's issue. The total capital expense for additions and betterments amounts to \$4,696,536, and capital expense for equipment is \$5,876,842.

A large amount of second tracking will be done on the Great Northern, consisting mainly of \$284,000 for second track between Long Lake, Minn., and Delano; \$212,000 from Kandiyohi, Minn., to Rennock; \$309,000 from Camp Barrow to Breckenridge, Minn., and \$121,000 from Surrey, N. D., to Minot. In addition to the amount shown in the table the Great Northern has been granted \$300,000 for improvement to the coach yard and \$270,000 for the freight terminal at St. Paul, and \$650,000 has been allowed for a dock at Seattle, Wash.

The Hocking Valley will complete 27.9 miles of second

CLASSIFICATION OF EXPENDITURES FOR ADDITIONS AND BETTERMENTS

Road	Ballasting	Rails and other track material	Bridges, trestles and culverts	Additional main track	Additional yard tracks sidings, etc.	Signals and interlocking plants	Road machinery and tools	Freight and passenger stations, etc.
Ala. Gt. So.			\$30,000				1,000	
Ateh. Top. & Santa Fe		1,331,300	1,831,702	3,548,988	4,109,373	559,417		5,000
A. C. L.		1,889,500		11,000	750,500	34,500	15,400	382,928
Balt. & Ohio	105,000	2,684,931	2,367,736	1,968,864	3,211,226	323,978		185,212
Bos. & Albany		635,000	648,100	60,000	750,000	69,400		815,900
Bos. & Maine		2,692,314	3,175,487	1,086,000	1,838,985	263,893		176,713
B. R. & P.	105,918	154,687	46,237	46,237	394,557	130,464		22,856
Central of Ga.		273,886	9,726,699		178,091	83,675		2,500
Ches. & Ohio	549,000	1,311,501	724,593	769,963	1,701,249	212,220	33,667	454,798
Chic. & Afon.	148,350	547,600			247,774			20,000
C. & E. L.	180,900	480,000	377,890	217,800	1,143,723			4,500
C. & N. W.	661,858	2,870,840	3,257,380		283,800			
C. P. & O.	406,597	1,145,212	1,127,333	582,227	298,264		392,000	34,342
C. M. & St. P.	317,335	2,048,400	1,361,051	317,000	1,616,117	264,256		222,216
C. R. I. & P.	602,322	2,451,780	1,013,471	1,397,900	1,511,631	61,917	167,562	369,157
C. N. O. & T. P.		50,000	140,000	3,960,000	1,040,000	55,000	4,000	
C. C. C. & St. L.		425,000		4,409,874	2,832,518	68,700	21,877	111,024
Cumb. Valley		158,740			4,808	4,598	4,500	55,300
D. & H.		271,156	87,588	388,052	232,700	7,784	9,530	132,996
D. L. & W.		520,013			41,732			148,219
D. M. & N.			66,790		402,347			32,554
Erie		531,788		1,210,017	1,098,426	180,414	46,932	914,633
Grand Trunk	5,000	2,191,908	1,200,000	59,410	1,648,105	353,665		252,796
G. H. & S. A.	60,856	917,770	389,530		358,601			33,451
Great Nor.	500,000	1,274,000	855,000	1,517,000	1,009,600	450,000		160,000
G. C. & S. F.	296,465	537,036	535,305		516,978	25,301		125,745
Hocking Val.		127,000	97,000	1,283,027	1,009,601			9,711
Ill. Central	121,600	774,540	1,715,340	141,750	1,402,586	556,975	156,500	622,520
K. C. S.	337,338	263,297	388,343	207,947	111,000	63,763		135,676
K. C. S. Term.					189,000			53,600
L. & W.	10,000	65,000			33,500	10,000		45,000
Lehigh Val.		722,602	628,364	454,000	939,353	250,548		337,275
Long Island		217,084	45,993	334,560	120,625		3,186	110,738
Mohonne Coal		91,600	11,600		135,165			475
Mich. Central	478,850	2,800,000	491,700		283,350	53,142		304,475
M. St. P. & S. M.	150,000	237,112	548,579		21,005			136,857
N. C. & St. L.					27,064			
N. Y. C.	432,000	7,908,678	1,198,942	1,324,385	6,150,500	2,079,123	134,400	1,617,100
N. Y. & H. & H.	87,450	1,689,942	1,970,920	1,493,930	6,816,807	1,098,336	13,435	296,065
N. & W.	852,876	388,893	487,190	20,000	4,428,948	118,190	1,250	131,175
Nor. Pac.		1,079,000	1,320,099	1,432,533	490,091	507,059		112,518
Pa. West	370,400	6,715,400	4,428,111	3,405,500	7,540,422	124,864		842,483
Pa. East	60,000	1,423,608	8,692,016	10,738,269	16,107,650	686,702	95,203	2,029,391
Phila. & Rad.		1,356,026	2,654,235	2,508,074	2,264,649	1,018,692		2,224,558
S. L. & S. F.	351,694	1,192,654	865,938		2,482,122	171,616	4,400	224,658
Southern		3,090,000	2,662,543	4,500,000	1,814,501	343,392		
Sou. Pac.	306,800	2,918,345	260,755	247,306	1,300,428	45,322		320,400
Union Pac.	74,458	3,656,074	584,454	98,500	79,643	139,953	3,900	25,200
U. Term. Improvements		1,610,446	740,988	356,000	58,600	133,450		130,000
Y. & M. V.								
Total	7,966,647	65,850,946	50,680,156	51,207,704	81,383,955	10,992,069	775,720	12,146,919

*Amounts for all items were not available.

and a modern car dumper will be built at Buffalo at an expenditure of \$406,000. A scrap reclaiming plant will be built at Meadville at a cost of \$95,000.

The Grand Trunk has an appropriation of \$1,648,105 for yard improvements, which includes new classification yards at Port Huron, Mich., for \$400,000; at Nichols, Mich., for \$203,000, and at Thornton Junction, Ill., for \$450,000. The \$1,058,609 for shop buildings, enginehouses, etc., includes a 15-stall roundhouse at Pontiac, Mich., and improvements at West Bethel, Me., Battle Creek, Mich., and Fort Gratiot. A substantial expenditure is made for signals which includes new automatic block signals in Maine; from Granger, Ind., to Port Huron, Mich., and from Detroit to Durand, Mich. New interlocking work will be done at Bat-

main track between Delaware, Ohio, and Cummings, at a cost of \$1,260,000, and additional yard tracks will be built at Walbridge, Ohio, for \$303,000, and at Parsons, Ohio, for \$120,000. The mechanical facilities at various points throughout the system will be improved, \$409,296 being appropriated for this purpose.

The Illinois Central was given \$2,345,170 for shop buildings, enginehouses, etc., which will be used to improve the mechanical facilities at Kankakee, Ill.; Clinton, Ill.; Mattoon, Ill.; Freeport, Ill.; Waterloo, Iowa; Jackson, Tenn.; McComb, Miss.; Champaign, Ill.; DuQuoin, Ill.; Benton, Ill.; Carbondale, Ill.; Mounds, Ill.; Amboy, Ill.; Fulton, Ky.; Paducah, Ky., and Central City, Ill. Over \$500,000 is to be expended for signals, which includes the equipping of

44 miles of single track and 15 miles of double track, and an interlocking plant to be built at Ramsey, Ill. In addition to this \$1,000,000 has been allowed for a new yard and terminal at Markham, Ill. This amount is not included in the tables.

The Lake Erie & Western has been given over \$800,000 for shop buildings and enginehouses, of which \$500,000 will be for a locomotive repair shop at Tipton, Ind.; \$158,200 for rebuilding the enginehouse at Lima, Ohio, and \$79,200 for rebuilding the enginehouse at Peru, Ind.

The largest item of expense in the budget of the Lehigh Valley is for \$2,514,114 to be spent for shop buildings, enginehouses, etc. A new engine terminal is to be built at Hazleton, Pa., at an estimated cost of \$1,000,000 and a new engine terminal will be built at Jersey City at a total cost of \$1,400,000, of which \$900,000 has been appropriated for

gun City, Ind. Additional shop facilities will be provided at a cost of \$355,000, and a new steel car repair shop will be built at West Detroit at a cost of \$210,000. The drawbridge over River Rouge, Detroit, will be renewed at a cost of \$200,000.

One of the largest individual items for the New York Central is \$7,707,600 for shop buildings, enginehouses, etc. This includes a car repair shop at Avis, Pa., for \$746,000; new engine terminal facilities at Watertown, N. Y., for \$700,000; a new enginehouse at Syracuse, N. Y., for \$540,000; additions to the car repair shops at East Buffalo for \$520,000; an addition to the erecting shop at Collingwood, Ohio, for \$345,000; a new enginehouse at Geneseo, N. Y., for \$200,000; a car repair shop at New Durham, N. J., for \$198,000; a new enginehouse at DeWitt, N. Y., and additions to the enginehouses at Norwood, N. Y., Clearfield, Pa.,

CLASSIFICATION OF EXPENDITURES FOR ADDITIONS AND IMPROVEMENTS

Route	For stations, etc.	Water stations and appurtenances	Shop buildings, enginehouses, etc.	Shop machinery and tools	Electric power plants	Warehouses, storage bins, etc.	Improvements to existing equipment	Acquisition of new rolling stock
Am. Exp. Co.	6,000	30,000	4,000	4,000	.....	.....	.....	7,715
A. C. & Santa Fe*	.....	.....	712,365	468,273	.....	.....	49,667	1,481,111
A. C. I.	5,100	43,340	101,648	.....	.....	.....	.....	.....
B. & O. R.	70,531	163,864	5,981,950	648,270	.....	1,021,641	1,516,173	4,618,818
B. & M.	.....	47,000	.....	.....	.....	.....	.....	47,000
D. & M.	1,107	52,688	3,407,221	216,744	278,388	1,831	621,000	4,335,879
D. R. & P.	.....	114,152	779,959	.....	.....	.....	167,649	1,062,760
Central of G.	15,760	.....	143,599	.....	8,711	.....	.....	168,070
C. & O.	48,781	346,152	780,513	368,050	86,800	71,001	1,531,109	3,085,813
C. & M.	.....	5,000	183,000	.....	.....	.....	6,000	194,000
C. & E. L.	.....	181,367	.....	.....	.....	.....	9,840,001	84,107
C. & N. W.	.....	150,530	1,119,363	198,128	.....	67,000	.....	1,575,021
C. & O.	10,246	205,734	176,671	.....	.....	.....	.....	382,651
C. M. & St. P.	128,675	344,834	1,169,378	448,000	.....	7,717	1,010,584	2,960,000
C. R. I. & P.	577,800	948,627	.....	354,106	.....	.....	1,104,425	2,085,558
C. N. O. & T. P.	.....	3,000	30,000	6,500	.....	.....	.....	40,000
C. C. & St. L.	.....	117,747	710,419	70,770	.....	.....	999,888	1,608,764
Chgo. Valley	.....	1,111	742	.....	.....	.....	72,160	1,846,213
D. & H.	49,411	10,990	60,307	30,304	5,000	.....	48,169	143,421
D. L. & W.	.....	37,557	308,014	3,775	.....	1,400	.....	353,746
D. M. & N.	.....	7,954	186,155	.....	.....	1,344,000	100,700	1,538,757
Erie	518,100	114,081	2,382,156	.....	.....	600,342	677,718	3,588,307
Grand Trunk	22,500	49,599	1,058,609	12,814	.....	666,400	20,901	1,879,224
Great Nor.	.....	200,000	538,099	.....	.....	50,000	43,511	348,610
G. C. & S. P.	13,982	109,923	.....	17,106	.....	.....	.....	137,011
H. & S. A.	71,901	140,464	.....	5,110	.....	.....	60,305	217,680
Hocking Val.	345,927	490,296	.....	100,756	.....	.....	351,500	19,000
Ill. Central	.....	401,120	2,345,170	337,934	.....	.....	1,471,843	2,501,655
K. C. S.	8,020	7,212	17,420	97,347	.....	.....	1,147,447	456,608
K. C. S. Term.	.....	.....	.....	41,130	41,300	.....	4,300	.....
L. E. & W.	15,000	31,000	800,500	40,000	.....	.....	73,840	72,200
Lehigh Val.	88,700	157,781	2,514,114	210,538	103,140	27,063	609,478	3,677,588
Long Island	17,000	2,756	92,449	57,753	.....	1,600	137,252	154,311
Michigan Coal	1,400	28,100	787,400	.....	.....	.....	.....	3,000
Mich. Central	126,000	130,800	2,231,000	192,698	.....	113,000	443,035	2,731,533
M. St. P. & S. S. M.	21,104	29,090	110,650	35,675	.....	.....	186,770	416,752
N. C. & S. L.	86,733	357,363	.....	56,000	.....	.....	151,067	317,000
N. Y. C.	531,690	438,068	7,707,600	651,690	2,238,025	59,450	6,353,337	10,339,919
N. Y. N. H. & H.	181,240	2,593	1,486,389	469,974	952,400	480,871	1,793,036	5,092,849
N. & W.	55,840	2,55,527	1,082,638	275,000	807,500	407,000	1,261,301	1,917,771
Nor. Pac.	22,000	48,161	950,000	120,000	.....	.....	1,116,170	2,034,945
Pa. West.	169,080	107,281	2,464,754	459,960	5,800	11,800	1,187,102	9,515,693
Pa. East	.....	236,378	3,780,466	1,250,000	.....	2,774,383	.....	14,161,324
Phila. & Read*	.....	.....	4,609,118	.....	.....	.....	.....	.....
St. L. & S. F.	107,566	438,956	692,150	207,141	7,530	3,552	1,139,944	1,645,617
Southern*	.....	182,696	.....	45,000	.....	.....	.....	.....
Sou. Pac.	54,635	717,671	608,964	73,555	38,721	85,005	507,761	3,844,493
Union Pac. System	133,830	41,134	448,475	.....	.....	165,000	343,898	.....
U. P. Term. Improvements*	285,000	.....	3,810,000	835,000	.....	.....	.....	.....
V. & M. V.	.....	175,471	.....	43,000	.....	.....	16,513	274,884
Total	3,250,689	5,093,958	64,297,478	9,248,149	4,741,458	8,777,208	3,798,393	60,464,484

* Amounts for all items were not available.

1918. A new classification yard will be built at East Waverly, N. Y., which will eventually cost \$2,000,000, and of which \$350,000 has been appropriated for this year. A new freight terminal will be built at Greenville, Jersey City, consisting of a warehouse, steam-ship terminal, 10 piers, yard facilities, storage space, grain elevators, etc., at a total cost of \$15,000,000, of which \$200,000 has been appropriated this year. An amount of \$75,000 has also been approved in addition to that shown in the table for the building of a barge canal terminal.

The Michigan Central will make an expenditure of \$2,231,000 for shop buildings, enginehouses, etc., which includes new engine terminals at Jackson, Mich., and Michi-

gan City, Ind. Additional shop facilities will be provided at a cost of \$355,000, and a new steel car repair shop will be built at West Detroit at a cost of \$210,000. The drawbridge over River Rouge, Detroit, will be renewed at a cost of \$200,000. One of the largest individual items for the New York Central is \$7,707,600 for shop buildings, enginehouses, etc. This includes a car repair shop at Avis, Pa., for \$746,000; new engine terminal facilities at Watertown, N. Y., for \$700,000; a new enginehouse at Syracuse, N. Y., for \$540,000; additions to the car repair shops at East Buffalo for \$520,000; an addition to the erecting shop at Collingwood, Ohio, for \$345,000; a new enginehouse at Geneseo, N. Y., for \$200,000; a car repair shop at New Durham, N. J., for \$198,000; a new enginehouse at DeWitt, N. Y., and additions to the enginehouses at Norwood, N. Y., Clearfield, Pa., and Cherry Tree, Pa. Change of grade and alignment will be made at Tonawanda, N. Y., incident to the barge canal, at an expense of \$1,242,500, the work now being under way. A new yard will be built at Depew, N. Y., at a cost of \$484,000. Additional tracks into the Syracuse yard will be laid at \$340,000. Extensions will be made to the yard at Elkhart, Ind., at a cost of \$224,000, storage and repair tracks will be built at Harmon, N. Y., and a yard at White Plains, N. Y., at a cost of \$241,000. An extensive program has been submitted for signals \$2,079,125 will be spent. This includes renewal of the interlocking plant at Rochester, N. Y., at a cost of \$271,200, renewal of the signal system between Little Falls, N. Y., and Fonda at a cost of \$261,000

and a new interlocking plant at Syracuse Junction at a cost of \$224,000. In addition to the amount shown in the table \$1,918,400 has been approved for the Grand Central Terminal and \$2,000,000 has been approved for new terminal facilities at Cleveland, Ohio.

Particularly Liberal with New Haven

The Railroad Administration has been particularly liberal with the New York, New Haven & Hartford, that being one of the roads that needs a large number of improvements. The shops and enginehouses will be improved generally for handling heavy power, particularly the Santa Fe type locomotives which that road has received. Fifteen stalls will be added to the enginehouse at East Hartford, 10 stalls to the Medway enginehouse on the New London division and seven stalls to the Waterbury (Conn.) enginehouse. Automatic block signals will be installed between Hopewell Junction, N. Y., and West Pawling, N. Y., and interlocking and track changes will be made for the junction with the New York Connecting Railway at Port Morris, N. Y.

The Norfolk & Western will spend \$879,000 for the Roanoke (Va.) yards; \$590,000 for the Hagerstown (Md.) yards and \$565,000 for improvements in the Bristol (Va.) yards. In addition to this an additional new shop building will be constructed at Roanoke at a cost of \$575,000 and \$222,634 has been appropriated for the shop building at Shenandoah, Va., which is under way.

The principal feature of the Northern Pacific budget is a new car and locomotive shop at Mandan, N. D., towards which \$500,000 has been appropriated. A new car repair shop will be built in the Como yards near St. Paul at a cost of \$250,000. Seven and a half miles of second main track will be constructed between Laurel, Mont., and Park City at a cost of \$137,231, and between Livingston, Mont., and Mission, 5½ miles, at a cost of \$112,184.

With about \$700,000 for shops the St. Louis & San Francisco will improve mechanical facilities at a large number of its repair points.

The expenditure of \$4,009,108 for shop buildings, enginehouses, etc., on the Philadelphia & Reading will include new engine terminal facilities at Reading, Pa., costing \$355,000; a new addition to the enginehouse at St. Clair, Pa., costing \$92,000; a new extension to the shops at Reading, costing \$255,000; a new engine terminal at Tamaqua, Pa., costing \$200,000; new engine facilities at Chester, Pa., \$140,000; new engine facilities at Coatesville, Pa., costing \$440,000; a new enginehouse and machine shop at Rutherford, Pa., costing \$145,000, and \$157,172 for engine facilities at Reading, which are 49 per cent completed.

\$6,000,000 for Union Pacific Terminals

The Union Pacific will spend over \$6,000,000 on terminal improvements, divided as follows: Cheyenne, Wyo., \$1,689,425; Council Bluffs, Iowa, \$1,647,351; Junction City, Kans., \$1,175,007; Green River, Wyo., \$919,674; Omaha, Neb., \$535,026; Sidney, Neb., \$158,935; Grand Island, Neb., \$43,100; North Platte, Neb., \$25,200; Ellis, Kans., \$9,000. At Cheyenne a machine shop will be built costing \$1,276,500. At Council Bluffs \$440,000 will be expended for a 40-stall enginehouse, \$293,000 for a power house, \$235,000 for a machine, boiler and blacksmith shop and \$175,000 for a 600-ton coaling station. At Junction City a machine, boiler and smith shop will be built at a cost of \$270,000, a 20-stall enginehouse at a cost of \$240,000 and a 400-ton coaling station at a cost of \$110,000. The improvements at Green River include a 28-stall enginehouse costing \$280,000, a machine, boiler and smith shop costing \$235,000, a car repair shop costing \$85,000 and a storehouse costing \$68,000. At Omaha, Neb., an extension to the machine shop will be built at a cost of \$245,000. Over \$800,000 will be spent for machine tools for the various shops in this program.

Conservation in Use of Locomotive Supplies*

By W. J. Tollerton

General Mechanical Superintendent, Rock Island Lines

THE COST OF LOCOMOTIVE SUPPLIES has increased greatly during the past several years. A few years ago 25 cents per 1,000 locomotive miles was considered a fair average cost for this item of operating expenses, whereas during the fiscal year ended December 31, 1917, the average cost per 1,000 locomotive miles was \$1.80, an increase of 620 per cent.

Locomotive supplies include, among other items, scoops, torches, brooms, chisels, globes, lanterns, hammers, wrenches, oil cans, oilers, coal picks, buckets, ropes, chains, signal lamps, flags and torpedoes.

During 1917 we issued, as an average, 9 oil cans per locomotive owned, over 1 tank bucket, 6 straight and long spout oilers, 2 dope pails, 2 torches, 1 water cooler, 2 tallow pots and 3 cups and dippers. With proper care, the life of all of these and many other items of locomotive supplies should be indefinite. Therefore, the quantity used during 1917 was excessive and would indicate these supplies are not receiving careful handling.

In addition to being difficult to obtain from the manufacturers, the cost of locomotive supplies is constantly increasing. Cotton duck has increased 220 per cent in price, brooms 140 per cent, files 125 per cent, air hose 50 per cent, lanterns 35 per cent, scoops 88 per cent, torpedoes 55 per cent and tinware 35 per cent, with practically no increase in freight and passenger rates. Therefore, inasmuch as transportation is the only commodity which the railroad company has for sale, the strictest possible economy must be practiced.

Care should be exercised to insure obtaining the maximum life out of each item of locomotive supplies and no new supplies should be drawn until absolutely necessary. When new tools or supplies are drawn from the storeroom, the old material should be turned in. A little soldering may reclaim an oil can, oiler, lantern or torch, a new handle may reclaim a scoop. To illustrate the extreme importance of conserving in the use of locomotive supplies, each item saved is equivalent to the gross revenue earned by the company for transporting a ton of freight the following distance:

½-gal. oil can.....	30 miles
Tallow pot.....	34 miles
1-gal. oil can.....	40 miles
Torch.....	50 miles
Tank bucket.....	60 miles
Long spout oiler.....	64 miles
2-gal. oil can.....	73 miles
3-gal. oil can.....	83 miles
5-gal. oil can.....	120 miles
Scoop.....	143 miles
Water cooler.....	636 miles

With the hearty co-operation and support of all concerned, there is no question but that a noticeable reduction can be effected in the cost of locomotive supplies, and it is with that end in view that the assistance of all employees is earnestly solicited.

MECHANICAL LABOR-SAVERS ON FRENCH RAILWAY.—Le Genie Civil says that the Orleans Railway, feeling the shortage of labor, has successfully adopted mechanical cleaning devices both for railway cars and hired cabs, in addition to vacuum cleaners. Various forms of revolving brushes driven at a speed of from 500 to 800 r. p. m., through flexible shafts by electric motors of ½ to ½ h. p., are employed, the apparatus as a whole being slung, according to requirements, from various kinds of portable attachments, with the aid of springs and counterweights.

*From the Rock Island Employees' Magazine.



Two Tractor Drawn Grading Outfits at Work.

Building a Seven-Mile Railroad in 32 Days' Time

Unusually Large Force Is Employed to Complete a Short
Spur in Time for Important Government Service

TEAM WORK BY A LOYAL organization in which each man knew what was expected of him and did his part to the best of his ability, was the most important factor in the construction of 7.1 miles of railroad in 32 days. This record was made by the construction forces of the Nashville, Chattanooga & St. Louis and the Mason & Hanger Contracting Company to provide rail communication for the Old Hickory powder plant now under construction in Hadley's bend of the Cumberland river, some 12 miles from Nashville, Tenn. The railroad's permanent force, which was gathered from other work in progress on that road, was enlarged many times by men picked up

organization ready to do the work and because John Howe Peyton, president of the Nashville, Chattanooga & St. Louis, realized the opportunity for the road to do the country a real service and tendered the good offices of his company to that purpose. Following negotiations during January, the road was authorized on January 31 to prepare surveys, and seven days later, on February 6, the government's representative authorized the work and expressed a desire to see it completed in 30 days.

The location of this work is of interest. The Lebanon branch of the Nashville, Chattanooga & St. Louis and the Tennessee Central occupy approximately parallel locations in a direction almost due east from Nashville, the former to the south of the latter. The Cumberland river lies just to the north of these railroads, but winds its way westward through a succession of horseshoe curves which form large peninsulas projecting alternately to the north and to the south. The new powder plant occupies a large tract of land at the north end of one of these peninsulas on the south side of the river in what is known as Hadley's bend. The distance from the yard at the plant to a connection with the two railroads is roughly seven miles.

The intervening country is rolling, entailing considerable earthwork and no small amount of skill in locating either the most economical line or the one capable of the quickest construction. The character of the line was governed to a large extent by the nature of the traffic which has already attained a movement of 450 cars per day in construction materials and supplies. The maximum traffic which will exceed this figure will be reached about the middle of September when supplies must be handled for both the initial production operations and the final construction activities. At present the traffic is practically all inbound, but even after the operating traffic has replaced the movement of construction materials, the bulk of the tonnage will be inbound, i. e., raw materials for the manufacture of explosives—sodium nitrate, cotton, sulphur, and also about 2,600 tons of coal daily.

In view of this, it was deemed desirable to have a 0.5 per cent maximum grade against inbound traffic, whereas short reaches of 1.5 per cent grades were considered satisfactory for the outbound movement, so for the sake of speed in construction it was decided first to build a line having a maximum of 1.5 per cent grades in both directions, this to be used later as an outbound line when a second track could be finished having not more than 0.5 per cent grades against inbound movements.

Unfortunately the first 1.5 miles of this line was by far the most difficult involving a trestle 2,000 ft long and a



A View of a Part of the Completed Line

by the railroad and by the contractor, wherever they could be found, but the success of this feat depended not only on the effectiveness in which the rapidly built organization was directed, but also on the rapidity with which materials and equipment were collected from various parts of the system and despatched to the scene of activity.

This line is not a part of the Nashville, Chattanooga & St. Louis, but is the property of the United States Government and is being finished and double tracked by Mason & Hanger, general contractors for the powder plant. The railroad's unique position in the role of a railroad contractor is accounted for by the proximity of its Lebanon branch to the plant in question, by the fact that it had an

rock cut of 23,000 cu. yd. close to the main line connection, so after building 700 ft. of this trestle it was concluded that better progress could be made by building a temporary detour line on a 2-per cent grade as far as station 82, this line to be abandoned after a double track line with 0.5-per cent grades could be built from station 0.0 to station 82 on the final location.

Prosecution of the Work

The government representatives estimated that a day's delay in the completion of the line represented a loss of \$50,000. As a result, speed in construction progress overbalanced any other consideration. For this reason some of the methods resorted to in pushing the work to the utmost would be considered wasteful under almost any other conditions. Although the burden of pushing the work through was largely on the railroad, the work was more or less divided between the road and Mason & Hanger, the contractors. The railroad completed all the grading and trestle work from the connection with his track to the government property line, $4\frac{1}{2}$ miles, while the contractor did equivalent work north of that point, but the railroad completed all of the track lying on the first main line with its own forces for the entire 7.1 miles to the throat of the powder plant yard.

The initiation of emergency work such as this entails the employment of a great many men and before the project was completed the railroad was employing 3,000 men on

when it was moved out over the track already laid to station 150, then across a field to station 162 into a small rock cut. A Bucyrus pile driver, locomotive crane, six steam drills and a boiler were also brought in at the same time. The extra gangs were used very largely on the track work and the carpenter gangs on the construction of the pile trestles.

The contractor used more power equipment which was moved in on the work from time to time as it proceeded. This equipment included two tractor-drawn graders and two Bucyrus caterpillar shovels with $\frac{7}{8}$ -cu. yd. dippers and 400 teams. They were used largely in a 60,000-cu. yd. fill near the far end of the line, made principally from barrow.

Materials Rapidly Gathered

The accumulation of the necessary materials was a large problem in itself. The temporary line was laid with 57-lb. relayer rail while all the remaining main line rail was 80 lb. In the yard at the plant the contractor laid 57-lb. Russian rail. The problem of supplies involved not only those needed for the initial seven miles of main line but materials had to be hauled in simultaneously for the second track and the yard tracks at the plant. For instance, the railroad company furnished 20,000 ties out of stock for use in the first line, but while this material was being supplied the company's purchasing organization was busy gathering 175,000 standard ties, 135,000 narrow-gage ties, and 160 sets of switch ties for the use of the plant contractor.

Lumber and piles were also required for the trestles, one



An 800-foot Trestle with Piles from Four States Completed in Five Days

of the $4\frac{1}{2}$ miles of line. Fortunately plenty of men were available, largely because the extremely cold weather had delayed spring work on the farms. The close proximity of Nashville was also of an advantage since a large part of the force was recruited there, although labor agents at Paducah, Ky., and Memphis, Tenn., supplied large numbers. The nearness of the large city was also of advantage in another way since it obviated the necessity for feeding and housing the men on the work. With the exception of the regular construction forces of the railroad these men were all hauled to and from their work each day in special trains, two on the Nashville, Chattanooga & St. Louis and one on the Tennessee Central.

The men were supplied quicker than the materials and equipment, so resort was had largely to the pick and shovel. The cuts were wasted and the fills were borrowed by gangs of men working almost shoulder to shoulder. As the days passed by more modern methods of construction were instituted. Men and equipment of the construction department of the railroad employed in building an extension of the Tracy City branch in the Cumberland mountains were sent to the work. This embodied six extra gangs and five bridge gangs with their camp equipment and a type 70 C. Bucyrus shovel, the latter arriving on the work on February 12,

of 700 ft. and another 100 ft. which were needed at once. Additional trestle material being required for the second track. The piles for the big trestles were brought from the various divisions of the road, in Tennessee. The first piles driven were telephone poles which the railroad had purchased for the construction of a telephone line, while the majority of the piles were cut from the woods and brought to the work.

To facilitate the handling of supplies one of the first steps taken in the work was to build a material yard with adequate trackage just north of the connection with the Tennessee Central. Until a considerable portion of the track was built, practically all of the material was despatched from this yard to points on the line by motor trucks. At the end of 32 days the track was ready to carry traffic into the plant and the railroad's part of the work was over. The railroad's work was handled by the engineering department of the Nashville, Chattanooga & St. Louis, of which Hunter McDonald is chief engineer. Direct responsibility for the progress of the work fell upon Leigh Taliaferro, construction superintendent, while the gathering and despatching of materials to the work was carried on by various members of the organization, including C. M. McDaniel, tie and timber agent.

Higher Freight and Passenger Rates Ordered

Freight Increase 25 Per Cent. Passenger Basis Three Cents Per Mile. State Rates Leveled Up

GENERAL ADVANCES IN FREIGHT RATES and passenger fares, to apply both to interstate and intra-state traffic were ordered by Director General McAdoo in General Order No. 28, which was telegraphed to the railroads from his office late Saturday night, May 25. The increases are declared to be necessary to meet extraordinary increases in operating expenses, estimated at from \$830,000,000 to \$860,000,000 for the year 1918, including the \$300,000,000 increase in wages, and the director general promises appropriate reductions later if they turn out to be greater than necessary.

Freight rates are to be increased by 25 per cent or by specific amounts in the case of certain commodities, effective on June 25.

Passenger fares are to be advanced to a minimum of three cents per mile, effective on June 10, with an extra passage charge of 8 1/3 per cent to 10 2/3 per cent for passengers traveling in sleeping and parlor cars. Commutation fares will be increased 10 per cent and reduced mileage and excursion rates, with some exceptions, will be discontinued.

The proposed rates have been worked out by the various rate committees of the railroads, under the direction of the division of traffic. In the case of the passenger fares nearly 200 rate clerks have been at work in Washington for several weeks under the direction of a committee headed by E. L. Bevington, formerly chairman of the Transcontinental Passenger Association and composed of one representative of each of the territorial passenger associations. Various bases for the increase have been suggested for the consideration of the director general and he signed the order on his return to the office after an absence of nearly two months, including his Liberty Loan tour and a period of illness, during which, however, he has been in constant touch with both railroad and treasury affairs.

A particularly interesting feature of the plan is that all intra-state rates are to be cancelled where there are interstate rates published between the same points and the interstate rates as increased will apply.

Passenger fares are to be made on a mileage basis, so that a higher fare will be charged for a longer route between two points except that the order provides that where public convenience will be served thereby fares determined by the short line may be applied over longer routes. It is understood that this means that a uniform rate will be applied between large cities reached by several routes of approximately the same length.

Director General McAdoo's Statement

In explanation of the necessity for the increases in rates Director General McAdoo made the following statement:

"The United States has taken over the railroads as a war emergency measure. They must be operated efficiently if the war is to be carried to a successful conclusion and they must be operated under the high cost conditions the war has created. These conditions are strikingly illustrated by the steady increase in the cost of railroad coal, as indicated by the following table:

1915	12,000,000 tons	\$1.17	\$13,760,000
1916	12,500,000 tons	1.32	179,500,000
1917	13,520,000 tons	1.22	329,400,000
1918	16,000,000 tons	2.95	489,700,000

"The increases in the cost of fuel oil consumed by the railroads and in the cost of other railroad materials and supplies have likewise been enormous.

"These increases have contributed inevitably to the increased cost of living, which in turn has created a demand for increased wages for railroad employees. This subject was exhaustively considered recently by the Railroad Wage Commission, consisting of Messrs. Franklin K. Lane, Charles C. McChord, J. Harry Covington and William R. Wilcox, who have unanimously recommended increases in wages which they estimated will add to railroad operating costs not less than \$300,000,000 in the year 1918. The director general has put the recommendation of the Wage Commission into effect, making at the same time certain additional increases for some classes of employees in order to meet practical necessities which cannot be escaped or postponed.

"On account of these extraordinary increases in operating costs, which have come about as a consequence of the war it is estimated that for the same aggregate business as last year, and under the same conditions except as to prices and wages, the operating expenses for the calendar year 1918 will be from \$830,000,000 to \$860,000,000 more than for the calendar year 1917.

"While these increased operating costs will be subject to readjustments and may be somewhat diminished, yet on the other hand, because of the abnormal methods by which business must be conducted to serve the needs of the war, they may be substantially increased. It seems clear that the railroads should be made self-sustaining and that sufficient revenues should be provided to prevent them from becoming a burden on the federal treasury. The immediate practical necessity is that, without delay, increases in rates should be made to provide for these increased costs of operation. At best, practically half of the year 1918 must elapse before such increases in rates can be made effective, although increases in operating expenses have been steadily effective since January 1, 1918.

"Therefore, by virtue of the power, during federal control of the railroads, which the act of Congress has conferred upon the President to initiate rates whenever the public interest requires, which power, as provided in that act, the President by proclamation has devolved upon the director general, the latter has been compelled for the reasons stated, to initiate substantial increases in freight and passenger rates for practically all transportation services performed by the railroads under federal control, including, of course, transportation services within the several states as well as transportation service across state lines. These increases are made with the approval of the President and are explained in detail in the copy of order accompanying this announcement.

"The increases in passenger rates will become effective on the 10th day of June, 1918, and the increases in freight rates will become effective on the 25th day of June, 1918.

"In making the advance effective on the dates specified a simple form of tariff authorized by the Interstate Commerce Commission must be used and this will lead to the temporary disregard, to some extent, of established groupings and differentials. But it is the intention to observe such groupings and differentials as far as practicable, and hereafter, with as much despatch as possible, restore any important relationships which may be for the time being disturbed, and concurrently therewith endeavor to remove any existing discrimination and bring about uniformity of rate adjustment throughout sections where conditions are similar.

"The act of Congress provides that the reasonableness and justness of such rates may be dealt with by the Interstate

Commerce Commission, so that no interests affected will be deprived of the opportunity for full hearing and consideration. The act of Congress provides that the commission, in passing upon these questions, shall take into consideration the President's finding and certificate that in order to defray the expenses of federal control and operation it is necessary to increase the railway operating revenues. In this connection it is important to make clear that no part of the increase in rates now initiated is on account of the making of additions and betterments or the purchase of new equipment or other expenditures chargeable to investment account. The increases initiated are solely on account of increased burdens tending to diminish railway operating income.

"In the nature of things no such far-reaching step can accomplish ideal equalization as between the numerous interests necessarily affected and doubtless the commission will find it proper to make readjustments to attain a nearer approach to such equalization. While as far as practicable, the rates as initiated are designed to avoid unnecessary disturbance of relative rate bases, the director general will co-operate heartily with the commission in any readjustments needed to accomplish still further the object of avoiding undue preferences which, nevertheless, may develop upon detailed consideration by the commission.

"It is earnestly hoped that all citizens affected directly or indirectly by this increase of rates will support the general principle of such increase as an unavoidable war measure and accept the additional burden in the same spirit of self-sacrifice in which they have accepted other inconveniences and burdens and the grievous personal losses which are parts of the price that the nation is patriotically paying for world liberty.

"In considering these increases, one vital distinction which makes them fundamentally different from any rate increases ever proposed or allowed when the railroads were under private control should be understood. This distinction is that there is no way in which the present increases will inure to private profit. If they turn out to be more than are needed to meet the grave public exigency, they will promptly be readjusted so as to prevent any unnecessary burden upon the public; but pending such readjustment the excess, if any, will be for the benefit of the people of the United States as a whole and not for the benefit of the private railroad owners or any of them.

"To the extent that savings can be effected and to the extent that reduced prices for the things the railroads must buy can be realized, it will be the purpose of the director general to make from time to time appropriate reductions."

The order is as follows:

General Order No. 28

Whereas, it has been found and is hereby certified to the Interstate Commerce Commission that in order to defray the expenses of federal control and operation fairly chargeable to railway operating expenses, and also to pay railway tax accruals other than war taxes, net rents for joint facilities and equipment, and compensation to the carriers, operating as a unit, it is necessary to increase the railway operating revenues, and

Whereas, the public interest requires that a general advance in all freight rates, passenger fares and baggage charges on all traffic carried by all railroad and steamship lines taken under federal control under an act of Congress approved August 29, 1916, entitled An Act making appropriations for the support of the army for the fiscal year ending June thirtieth, nineteen hundred and seventeen, and for other purposes, shall be made by initiating the necessary rates, fares, charges, classifications, regulations, and practices by filing the same with the Interstate Commerce Commission under authority of an Act of Congress approved March 21, 1918, entitled An Act to provide for the operation of

transportation systems while under federal control, for the just compensation of their owners, and for other purposes—

Now, therefore, under and by virtue of the provisions of the said act of March 21, 1918, it is ordered that all existing freight rates, passenger fares and baggage charges, including changes heretofore published but not yet effective, on all traffic carried by all said railroad and steamship lines under federal control, whether the same be carried entirely by railroad, entirely by water, or partly by railroad and partly by water, except traffic carried entirely by water to and from foreign countries, be increased or modified, effective June 25, 1918, as to freight rates and effective June 10, 1918, as to passenger fares and baggage charges, to the extent and in the manner indicated and set forth in the "Exhibit" hereto attached and made part hereof, by filing schedules with the Interstate Commerce Commission effective on not less than one day's notice.

Given under my hand this twenty-fifth day of May, 1918.

W. G. McAadoo,
Director General of Railroads.

The exhibit referred to describes the increases to be made as follows:

FREIGHT RATES

Section 1. Class Rates (Domestic)

- (a) All interstate class rates shall be increased 25 per cent.
- (b) All intra-state class rates shall be increased 25 per cent where there are no interstate class rates published between the same points, and shall be governed by the classification, viz: Official Classification, Southern Classification or Western Classification, exceptions thereto and minimum weights which generally govern the interstate rates in the same territory, except that the Illinois Classification will be used between points in the state of Illinois.
- (c) All intra-state class rates shall be canceled where there are interstate class rates published between the same points and the interstate rates as increased by paragraph (a) shall apply.
- (d) After such increase of 25 per cent no rates shall be applied on any traffic moving under class rates lower than the amounts in cents per 100 lb. for the respective classes as shown below for the several classifications. Any article, on which exceptions to any Classification provides a different rating than as shown in the classification to which it is an exception, will be subject to the minimum as provided below for the class provided therefor in the classification proper.

		Official Classification									
Classes	.....	1	2	3	4	5	6	7	8	9	10
Rates	.....	25	21½	17	12½	9	7	6	5	4	3
		Southern Classification									
Classes	.....	1	2	3	4	5	6	A	B	C	D
Rates	.....	25	21½	19	16	13	11	9	10	7½	6½
		Western Classification									
Classes	.....	1	2	3	4	5	A	B	C	D	E
Rates	.....	25	21	17½	15	11	12½	9	7½	6½	5
		Illinois Classification									
Classes	.....	1	2	3	4	5	6	7	8	9	10
Rates	.....	25	21	17½	15	11	12½	9	7½	6½	5

Section 2. Commodity Rates (Domestic)

(a) Interstate commodity rates on the following articles in carloads shall be increased by the amounts set opposite each:

Commodities	Increases
Coal.—Where rate is 0 to 49 cents per ton. . .	*15 cents per net ton of 2,000 lb.
Where rate is 50 to 99 cents per ton. . .	*20 cents per net ton of 2,000 lb.
Where rate is \$1.00 to \$1.99 per ton. . .	*30 cents per net ton of 2,000 lb.
Where rate is 2.00 to 2.99 per ton. . .	*40 cents per net ton of 2,000 lb.
Where rate is \$3.00 or higher per ton. . .	*50 cents per net ton of 2,000 lb.

*Where rates have not been increased since June 1, 1917, the increase to be made now shall be determined by first adding to the present rate 15 cents per ton, net or gross as rated, or if an increase of less than 15 cents per ton, net or gross as rated, has been made since that date, then by first adding to the present rate the difference between the amount of that increase and 15 cents per ton, net or gross as rated; and to the rates so constructed the above increases shall now be added.

Where rates from producing points or to destinations have been based on fixed differentials in cents per ton, such differentials to be maintained, the increase to be figured on the highest rated point or group.

Coke.—Where rate is 0 to 49 cents per ton. . .	*15 cents per net ton of 2,000 lb.
Where rate is 50 to 99 cents per ton. . .	*25 cents per net ton of 2,000 lb.
Where rate is \$1.00 to \$1.99 per ton. . .	*40 cents per net ton of 2,000 lb.
Where rate is 2.00 to 2.99 per ton. . .	*60 cents per net ton of 2,000 lb.
Where rate is 3.00 or higher per ton. . .	*75 cents per net ton of 2,000 lb.

*Where rates have not been increased since June 1, 1917, the increase to be made now shall be determined by first adding to the present rate 15 cents per ton, net or gross as rated, or if an increase of less than 15 cents per ton, net or gross as rated, has been made since that date, then by first adding to the present rate the difference between the amount of that increase and 15 cents per ton, net or gross as rated; and to the rates so constructed the above increases shall now be added.

Where rates from producing points or to destinations have been based

In case differentials are shown for the same commodities to be maintained, the increase to be less than the decrease of equal amount to prevail.

(b) From points in Colorado, Wyoming, Montana, Kansas and Nebraska to Missouri river territory and points in Arkansas, Oklahoma, Louisiana and Texas east thereof, 22 cents per 100 lb.

(c) From points in Idaho and Utah to points named in paragraph (3) rates shall be 15 cents above the rates from eastern Colorado.

(d) From points in California to points taking Missouri river rates and points related thereto under the Commission's Fourth Section Orders, and to points east of the Missouri river, 22 cents per 100 lb.

(e) Interstate commodity rates not included in the foregoing list shall be increased 25 per cent.

(f) Intra-state commodity rates shall be increased as shown in paragraphs (a) and (b) of this section where there are no interstate commodity rates published on substantially the same commodities between the same points, and shall be subject to the minimum weights applicable on interstate traffic in the same territory.

(g) Intra-state commodity rates shall be canceled where interstate commodity rates are published on substantially the same commodities between the same points, and the interstate rates as increased by paragraphs (a) and (b) of this section shall apply.

(h) In applying the increases prescribed in this section the increased class rates applicable to like commodity descriptions and minimum weights between the same points are not to be exceeded, except that the increases in rates on sugar in carloads shall be made as expressly provided in paragraph (a) of this section.

Section 3. Export and Import Rates.
All export and import rates shall be cancelled and domestic rates applied to and from the ports.

Section 4. Filing Intra-State Tariffs with Interstate Commerce Commission.
(a) All interstate rates for transportation by water, which are to be increased under this order, if not now on file, except rates cancelled under paragraph (c) of Section 1 and paragraph (d) of Section 2, shall be immediately filed with the Interstate Commerce Commission.

(b) All items which are confined in their application to intra-state traffic, but are now carried in tariffs on file with the Interstate Commerce Commission, if not cancelled under paragraph (c) of Section 1 and paragraph (d) of Section 2, shall be made applicable to all traffic.

Section 5. Minimum Charges.
(a) The minimum charge on less than carload shipments shall be as provided in the classification governing, but in no case shall the charge on a single shipment be less than fifty cents.

(b) The minimum charge for carload shipments shall be \$15 per car. Does not apply to charges for switching service.

Section 6. Disposition of Fractions.

In applying the above provisions, all fractions shall be rounded up or downward, as the case may require, to the next cent or fraction of a cent.

(a) Rates on express in amounts not over \$100 or 100 packages, to be increased to the next cent or fraction of a cent.

(b) Rates on express in amounts over \$100 or 100 packages, to be increased to the next cent or fraction of a cent, but not less than one cent.

(c) Rates on express in amounts over \$100 or 100 packages, to be increased to the next cent or fraction of a cent, but not less than one cent.

(d) Rates on express in amounts over \$100 or 100 packages, to be increased to the next cent or fraction of a cent, but not less than one cent.

(e) Rates on express in amounts over \$100 or 100 packages, to be increased to the next cent or fraction of a cent, but not less than one cent.

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(x) Rates on express in amounts over \$100 or 100 packages, to be increased to the next cent or fraction of a cent, but not less than one cent.

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(z) Rates on express in amounts over \$100 or 100 packages, to be increased to the next cent or fraction of a cent, but not less than one cent.

In applying the above provisions, all fractions shall be rounded up or downward, as the case may require, to the next cent or fraction of a cent.

(a) Rates on express in amounts not over \$100 or 100 packages, to be increased to the next cent or fraction of a cent.

(b) Rates on express in amounts over \$100 or 100 packages, to be increased to the next cent or fraction of a cent, but not less than one cent.

(c) Rates on express in amounts over \$100 or 100 packages, to be increased to the next cent or fraction of a cent, but not less than one cent.

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Section 7. Observation of Differentials.
In establishing the freight rates herein ordered, while established rate groupings and fixed differentials are not required to be used, their use is desirable if found practicable, even though certain rates may result which are lower or higher than would otherwise obtain.

PASSENGER FARES AND BAGGAGE CHARGES
Section 8.
This order shall apply to all the passenger fares, both interstate and intra-state, of the railroads under federal control. No existing fare equal to or in excess of three cents per mile shall be reduced. All fares now constructed on a lower basis than three cents per mile shall be advanced to the basis of three cents per mile. All fares which are on a lower basis than the said existing or advanced fares, as the case may be, such as mileage or excursion tickets shall be discontinued. These requirements are subject to the following exceptions:

(a) The provisions of Section 1 and 22 of the Act to Regulate Commerce, which authorize free or reduced fares or transportation may be observed, except:
First: That no mileage ticket shall be issued at a rate that will afford a lower fare than the regular one-way tariff fare, and except;
Second: That excursion tickets may be issued only to the extent and on the terms set forth in paragraphs (b) and (c) below.

(b) Round trip tourist fares shall be established on a just and reasonable basis bearing proper relation to the one-way fares authorized by this order, and tariffs governing same shall be filed as promptly as possible with the Interstate Commerce Commission.

(c) For the National Encampment of the Grand Army of the Republic and auxiliary and allied organizations at Portland, Ore., in 1918, and for the United Confederate Veterans' Reunion, auxiliary and allied organizations at Tulsa, Okla., in 1918, a rate of one cent per mile in each direction via direct routes shall be authorized and confined by certificate of identification to the membership of these organizations and members of their immediate families. For the various state meetings of these organizations held during the year 1918, fares shall be authorized under like conditions on the basis of two cents per mile in each direction and confined to limits of the state in which the meeting is held.

(d) Where public convenience will be served thereby, subject to the approval of the director general, fares determined by the short line may be applied over longer practicable routes.

(e) Officers, enlisted men and nurses of the United States Army, Navy and Marine Corps, when traveling in uniform at own expense, shall be granted the privilege of purchasing passage tickets at one-third the regular one-way fare, via route of ticket, applicable in coach, parlor or sleeping car, as the case may be, when on furlough or official leave of absence, except that this reduced fare shall not be granted on short term passes from camps when on liberty from ships or stations to nearby cities.

Applicants for such tickets shall be required to submit for inspection of ticket agent, military furlough or other official form of leave of absence and to surrender to ticket agent a furlough fare certificate signed by a commanding officer.

(f) Children under five years of age, when accompanied by parent or guardian, shall be carried free, children five years and under twelve of age shall be charged half fare.

Section 9.
Commutation fares shall be advanced ten per cent. Commutation fares shall be considered to include all forms of transportation allowances for suburban travel and for the use of those who have daily or frequent occasion to travel between their homes and places of employment or educational institutions.

Section 10.
Passengers traveling in standard sleeping cars and parlors shall be required to pay an additional passage charge of sixteen and two-thirds per cent of the normal one-way fare, and passengers traveling in tourist sleeping cars an additional passage charge of eight and one-third per cent of the normal one-way fare. The foregoing charges are in addition to those required for the occupancy of berths in sleeping cars or seats in parlor cars.

Section 11.
The following minimum number of tickets of the class paid for passage in sleeping or parlor cars shall be required for occupancy of drawing rooms, compartments or sections in parlor or sleeping cars:
Two adult tickets for a drawing room or a sleeping car.
Two adult tickets for a compartment.
One and one-half adult tickets for a section.
Five adult tickets for exclusive occupancy of a sleeping car or a parlor car.

Section 12.
Passenger fares on fares for accommodation and transportation of passengers entirely by water, or partly by water and partly by rail, shall be increased proportionately to the fares and charges for the transportation of passengers via rail.

Section 13.
The rates for carrying packages for express baggage transported under

lawfully effective tariffs shall be sixteen; and two-thirds per cent of the normal one-way passenger fare, with minimum of fifteen cents per 100 lb. and minimum collection of twenty-five cents per shipment.

Section 14

Tickets purchased prior to June 10, 1918, will not be honored for passage on and after that date, except:

(a) Passengers en route on June 10, 1918, on one-way tickets will be carried to destination by continuous passage without additional charge.

(b) Round trip tickets, portions of which have been used prior to June 10, 1918, or held by passengers en route on June 10, 1918, shall be honored in accordance with original tariff conditions under which sold without additional payment except that they shall be subject to the same requirements as one-way tickets in respect of additional payment for passage in sleeping or parlor cars as prescribed in Section 10.

Tickets made invalid for passage by this order will be redeemed from original purchasers as follows:

Unused tickets will be redeemed at amount paid therefor.

Partially used one-way tickets will be redeemed by charging tariff fare at time of journey for portion used and refunding difference between such amount and fare at which sold.

In redemption of mileage, scrip or credential forms the purchaser shall be given the benefit, for the distance traveled of a net basis proportionate to that which would have applied had the entire book been used according to its contract.

Section 15

All passenger fares, lower than those hereinbefore prescribed, such as mileage, party, second-class, immigrant, convention, excursion and tourist fares shall be discontinued until further notice, except that tourist fares shall be re-established as prescribed in Section 8, paragraph (b) hereof.

Section 16

Tariff provisions intended to assure the long haul to carriers, and which prevent the free interchange of traffic shall be eliminated.

Section 17

Stop-overs on one-way tickets, side trips at free or reduced fares, discounts by use of excess baggage permits or excess money coupon books, and the sale of one-way tickets having limit in excess of time necessary to make trip by continuous passage, shall be discontinued.

Section 18

Optional routes may be used only when specified in tariffs.

Section 19

In publishing fares and charges under this order, tariffs may be used which increase the present fares by fixed percentage to bring them to the bases authorized herein, even though the actual fares so constructed may be fractionally more or less than three cents per mile.

GENERAL

Section 20

Where the Interstate Commerce Commission prior to the date hereof has authorized or prescribed rates, fares and charges, which have not been published at the date of this order, the rates, fares or charges initially established hereunder by applying the increases herein prescribed to the existing or published rates, fares or charges may be subsequently revised by applying the increases prescribed herein to the rates, fares and charges so authorized or prescribed by the Interstate Commerce Commission.

Section 21

All schedules, viz: tariffs and supplements, published under the provisions of this order shall bear on the title page the following, in bold face type:

THE RATES MADE EFFECTIVE BY THIS SCHEDULE ARE INITIATED BY THE PRESIDENT OF THE UNITED STATES THROUGH THE DIRECTOR GENERAL, UNITED STATES RAILROAD ADMINISTRATION AND APPLY TO BOTH INTERSTATE AND INTRA-STATE TRAFFIC. THIS SCHEDULE IS PUBLISHED AND FILED ON ONE DAY'S NOTICE WITH THE INTERSTATE COMMERCE COMMISSION UNDER GENERAL ORDER NO. 28 OF THE DIRECTOR GENERAL, UNITED STATES RAILROAD ADMINISTRATION, DATED MAY 25, 1918.

*On passenger tariffs use word "fares." On baggage tariffs use word "charges."

The increases are estimated to produce an increase of revenue amounting to something over \$900,000,000 a year.

McAdoo Explains to State Commissioners

Director General McAdoo on May 27 sent the following telegram to the chairmen of all state railroad commissions:

"Apparent increases in operating expenses aggregating \$830,000,000 to \$960,000,000 for the calendar year 1918, as compared with the calendar year 1917, and consisting principally of increases in wages and cost of coal, fuel oil and other materials and supplies, leave no escape from the conclusion that the public interest requires immediate and substantial increases in the rates for practically all services, passenger and freight, now performed by the railroads under federal control, and therefore in effect performed by the United States government itself, and that there is no other reasonable way to defray the expenses of federal control and operation since it is clear that those additional burdens should not be forced upon the federal treasury at this time when it is already so heavily taxed by the needs of our own govern-

ment for war purposes and the essential demands for credit of the gallant nations associated with us in this great struggle for liberty. In these circumstances, it seems clear that the duty which rests upon me by the virtue of the act of Congress of March 21, 1918, and by virtue of the President's proclamation, should be performed by the initiation without delay of increased rates to meet the situation.

"In dealing with this supremely important subject, I have given much thought to the question as to the practical way of availing myself of the knowledge and co-operation which at all times have been so cordially put at my disposal by the state commissions. The act of Congress gives me no opportunity to share with the state commissions the responsibility which rests upon the United States Railroad Administration for the financial results to the United States Government of the operation of the railroads. In fact the government of the United States has assumed control of the railroads and the undivided responsibility for their operation, and that entire responsibility has been placed upon me. I have also felt that the exigencies of the situation are so serious as not to admit of postponement of action until full opportunity could be extended to the commissions in all the states to discuss the important problems involved and to advise me, in advance of official action, as to how my responsibility could best be discharged.

"In these circumstances, it has seemed clear that the responsibility should be promptly met in the manner contemplated by the act of Congress, and then, in the inevitable readjustments which always must come in a matter of such far-reaching character, to obtain the advice and suggestions of the state commissions and to take advantage of their views in order that in the final consideration of the subject by the Interstate Commerce Commission, that body may have the benefit of the most intelligent and equitable suggestions as to the readjustments needed to accomplish the largest measure of relative justice while at the same time obtaining the additional operating revenues which the United States government must have in order to discharge the responsibilities which it has assumed for railroad operation.

"Acting upon this view, I am initiating substantial increases in practically all rates, passenger and freight, and am arranging to have delivered to you at once a copy of the announcement on this subject. I earnestly hope that the procedure thus adopted and which is unavoidable, will have your support, and that you will give the government your full co-operation in perfecting the rates thus initiated. I also bespeak your patriotic co-operation in getting the public to support in a patriotic spirit and as a war measure these substantial rate increases which are the outgrowth of war conditions and which in principle and in substance are indispensable to enable the federal government to discharge the transportation functions which are essential to the successful conduct of the war."

Interstate Commerce Commission Issues Necessary Orders

The Interstate Commerce Commission on Monday issued a fifteenth section order that the presently effective joint rates, fares, charges and classifications applicable to the joint transportation of freight and passengers between points on the lines of carriers under federal control on one hand, and points on lines of carriers not under federal control on the other hand, may be increased to the bases set forth in General Order No. 28, and approving for filing the joint rates without formal hearings, "which approval shall not affect any subsequent proceeding relative thereto." It is further ordered that the rates may become effective on not less than one day's notice. In a general order the commission says that certain of the present freight rates, passenger fares and baggage charges of the carriers are fixed for the future by outstanding orders of the commission which were made

for the most part under normal conditions of traffic and without consideration of the present war emergency, and that the carriers have heretofore filed certain increases in these rates which have been suspended by the commission. It is therefore ordered that all orders upon formal complaint heretofore entered and unexpired, in so far as they prescribe specific maximum freight rates, passenger fares and baggage charges for the future, be modified to the extent of permitting the defendants to make effective rates not in excess of

those prescribed in Director General McAdoo's order. It is also ordered that outstanding orders of the commission heretofore entered and unexpired and orders heretofore entered in investigation and suspension proceedings be similarly modified.

Another order grants relief from the provisions of the fourth section in those instances in which carriers under federal control are required by General Order No. 28 to apply higher rates for shorter than for longer distances.

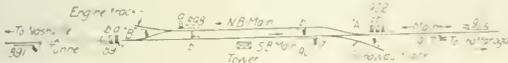
Low Voltage Switch Machines Facilitate Traffic

How Outlying Switches Operated Electrically Help Train Movements in Mountainous Territory

By G. S. Pflasterer

Signal Engineer, Nashville, Chattanooga & St. Louis, Nashville, Tenn.

IF WE MAY CONSIDER the art of signaling as divided into two general classes, block signals and interlocking plants. Block signals may again be subdivided into three general classes covering manual, controlled manual, and automatic block. Block signaling on this company's line has not been extensively applied, but certain comprehensive and important installations on sections of main line that have been made have proved very useful,



Track Layout at Rockledge

safe and efficient, and have eliminated many delays, thus greatly facilitating the movement of the heavy traffic over the single track territory involved.

Type of Signaling

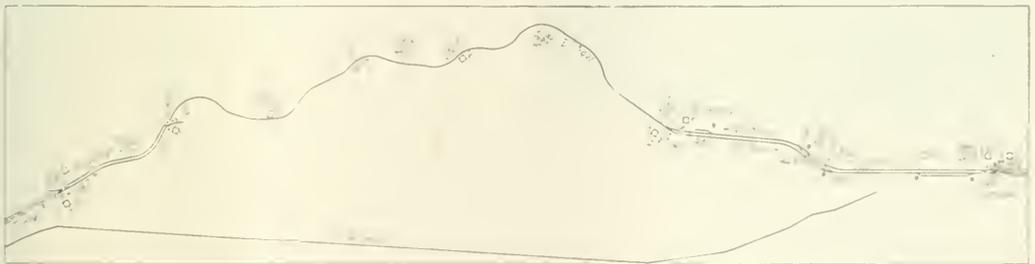
It is expected that the increased mileage of double track now in operation and that contemplated in the future will be protected by complete automatic signal installations, and also that a number of railroad crossings and junction points now unprotected, will be protected by modern interlocking apparatus. The manual block is now in service on

and Sherwood over the Cumberland mountains and includes the protection of the tunnel at the summit. Trains over this section of the road are operated by signal indications without train orders or clearance cards, and such indications supersede time table superiority by right, class and direction. All signals are semi-automatic and are operated electrically. All the switches in this territory are operated by low voltage switch machines.

The electric staff system is in use between Shops and West Nashville on the West Nashville branch. Automatic block signals are installed on the double track between Tanton and Sherwood—two miles—and are a part of and interconnected with the controlled manual block above referred to. This stretch of double track is very often operated as two single tracks and the signaling is so designed that permissive indications are provided for following movements with current of traffic, and for absolute block controlling opposing movements against the current of traffic on either side. All main lines and branches are equipped with train order signals at each station.

Low Voltage Switch Machines

In the early part of 1916 this company decided, as an experiment, to install a few low voltage switch machines. Important track changes over the Cumberland mountains between Rockledge and Sherwood having been authorized,



Line and Profile, Rockledge, Tenn., to Sherwood

100.59 miles of the line. It is necessary to issue train orders and clearance cards on this territory. From Bolton to Junta semi-automatic electric distant signals are used as adjuncts to the train order signals.

The controlled manual block is installed between Cowan

it was decided to use these machines on this territory for the operation of switches which had heretofore been handled by hand. The location of these switches was such that they could not be seen from the point of operation and to control them through regular electric interlocking apparatus would

naturally have meant an exceptionally large expenditure of money.

This territory, as well as that between Cowan and Rockledge, has since 1911 been protected by the semi-automatic controlled manual block system. The revised track arrangement necessitated a change and an addition to the signals, as all movements were then and are still being made by signal indications without train orders or caution cards. These signal indications supersede time table rights as stated above. A small electro-mechanical interlocking plant was formerly located at Rockledge, which is on the summit of the mountain. This plant handled the north end switch of the passing track and the signals were power operated. The switches at the south end were operated by hand but the signals at this point were of the power type. At the south end of the passing track is located a runaway track which made a crossover movement necessary to get on the main line. The switches of the crossover were boltlocked with each other, so that it was necessary for a train entering the passing track at the north end to stop at the south end before proceeding out on the main line. If a train was unable to stop due to the failure of brakes or from other causes, it was diverted to the runaway track which was built on an ascending grade to stop such a train by gravity.

The revised track arrangement consisted in lengthening the passing track at both ends, and retaining the runaway track with the exception that it was located on the opposite side of the main track, and the passing track was used as a second main track. This track rearrangement placed the switch which was formerly operated mechanically at too great a distance to be handled in such a manner. The switch at the south end was still more remote from the tower. The track to the south is on a 2 per cent descending grade. In order to facilitate train movements and to make them as safe as possible between Rockledge and Sherwood, it was decided that all switches in this territory should be controlled and operated electrically.

Low voltage switch machines were decided on for this



Switch at End of Double Track at Tanttallon

purpose, and five Model 13 machines were ordered from the Union Switch & Signal Company, four of which were used at Rockledge. The two machines to the north of the tower are approximately 1,500 ft. distant, while those to the south are located approximately 2,700 ft. from the point of control. The original mechanical interlocking machine, which is a National of 12 levers and was manufactured at the Nashville, Chattanooga & St. Louis Railroad shops, is still in use.

The switch and facing point lock levers formerly operating the north switch were removed and two electric units

were installed in their place. These units were made by the Union Switch & Signal Company and through these units the two sets of crossovers are operated and indicated. These electric units have mechanical connections with the mechanical lockings and in this manner are properly interlocked with all other levers in the machine, through which the power signals are operated. The power signals are controlled through rotary circuit controllers which are operated by the tail levers of the machine.

At Tanttallon, a point approximately four miles down the mountain from Rockledge, other track changes were made. Double track starts at this point and extends to Sherwood, two miles further south, or a distance of six miles from Rockledge. The fifth low voltage switch machine purchased



Electro-Mechanical Interlocking Machine at Rockledge

was used on the end of the double track switch at Tanttallon. This point is located at the foot of the grade and consequently is a very important one from the standpoint of safe and uninterrupted operation. This switch at the end of double track at Tanttallon is two miles from the interlocking tower at Sherwood, from which point it is controlled and operated. This I believe to be the record distance for low voltage switch operation.

The switch is controlled through an electric unit of an electro-mechanical machine of the S-7 type as furnished by the Union Switch & Signal Company. All the low voltage switch machines in service operate in from 28 to 30 seconds and require approximately three amperes of current with 20 volts impressed across the motor. Except for a few days after installation, they have given no trouble whatever and we consider them practical, safe and efficient.

Another important installation was made at Bridgeport, Alabama, in 1917. A low voltage switch machine was installed here to operate the end of a double track switch, located across the river south of the tower which is located on the north bank of the river, the switch being approximately one mile from the tower. In this installation a draw bridge intervenes between the tower and the switch. The balance of the switches at this point are in the vicinity of the tower and are mechanically operated. All signals are power operated. The whole layout is operated by an electro-mechanical machine of the S-7 type.

The source of power for the operation of these machines is derived from 32 cells of Type 72 high voltage battery furnished by the National Carbon Company, and this battery is housed in concrete battery wells of the Massey type. The wells are large enough to house additional cells for other purposes.

McAdoo Puts Wage Increase Into Effect

Recommendations of Wage Commission Increased in Some Instances. Eight Hour Basic Day Recognized

WASHINGTON, D. C.

DIRECTOR GENERAL McADOO on May 25 issued General Order No. 27 putting into effect with some modifications the increases in wages for all railway employees receiving less than \$250 a month on December 31, 1915, recommended by the Railroad Wage Commission.

Numerous protests that the increases recommended by the commission would add little or nothing to the wage increases made by the railroads during the last two years, and the practical necessity of greater advances to prevent a general exodus of railroad men to other employments have apparently been taken into consideration by the director general in the case of common labor and shop employees in passing upon the commission's report but, although the order makes certain additional increases for some classes of employees, no change is made in the estimate of the commission that the addition to the railroad payroll will approximate \$300,000,000 per annum.

On this basis the back payments to employees due on June 1 will amount to somewhere near \$125,000,000.

The order applies to the employees of 164 railroads named in the order, and in addition to "all terminal, union station and switching companies, all or a majority of whose stock is owned by railroads named." The order states further that such other railroads as may be retained in federal control on July 1, 1918, will be added to the list, and that "the Pullman Company, whose status is now being considered, will also be added if decision shall be reached to retain the Pullman Company under federal control."

The rates named in the order do not substantially vary from those recommended by the Railroad Wage Commission, but certain modifications are made which grant to common labor an increase of two and one-half cents per hour in excess of the wages paid on December 31, 1917, when the increase recommended by the Wage Commission is less than that amount, and which establish a minimum rate of 55 cents per hour for such shop trades as machinists, boiler makers, blacksmiths and other mechanics who receive the same basis of rates.

The original recommendation of the Wage Commission, which has been substantially adopted in the director general's order, was based upon the "average monthly earnings" for each class of service for the month of December, 1915. In the tabular statement of monthly rates recommended by the Railroad Wage Commission, the percentages of increase are as high as 43 per cent for employees receiving under \$46 per month, the percentage gradually decreasing in what appears to be a constant ratio, leaving no increase to employees whose wages were \$250 in December, 1915.

While this ratio of percentages appears to be uniform, the actual increases are shown to extend from \$20 per month to the lowest paid men up to \$33.60 for those who were receiving \$82 in December, 1915, and then gradually decreasing to no increase for those who received \$250.

The order is made effective as of January, 1918, and back payments will be made to employees as promptly as possible, separate from the current wage payment and for each month as rapidly as the computations are made for such months.

Colored firemen, trainmen and switchmen, in addition to securing the increase recommended by the Wage Commission, will have their wages advanced to the same as white men employed on the same roads and for the same work on June 1, 1918, but back payments will not apply to this increase, which is made effective as of June 1, 1918.

A marked deviation from the recommendation of the Railroad Wage Commission is found in Article 5, Rules Governing Conditions of Employment, wherein the basic eight-hour day is established. This deviation, however, does not reduce the hours of employment as at present worked, nor does it increase the total compensation fixed in the order for the number of hours now worked in excess of eight hours, but it does establish the basic eight-hour day upon which further wage adjustment will be based.

The order also creates an advisory Board of Railroad Wages and Working Conditions and appoints as members of such Board J. J. Dermody, F. F. Gaines, C. E. Lindsey, W. E. Morse, G. H. Sines and A. O. Wharton.

An abstract of the report of the Railroad Wage Commission was published in the *Railway Age* of May 17. The order of the director general begins with the following preamble:

Preamble

In promulgating this order I wish to acknowledge the patriotic service so unselfishly rendered by the Railroad Wage Commission, consisting of Messrs. Franklin K. Lane, Charles C. McChord, J. Harry Covington, and William R. Willcox, in connection with the important question of wages and hours of service of railroad employees which I referred to them by my General Order No. 5, dated January 18, 1918.

This commission took hold of the task with great energy and devotion and has dealt with the entire subject in a thoroughly sympathetic spirit.

Manifestly in a matter of such magnitude and complexity it is impossible to find any general basis or formula which would correct every inequality and give satisfaction to every interest involved. But the commission has made an earnest effort to do justice to all concerned. I have felt obliged, however, to depart from its recommendations in some particulars.

With respect to hours of service the commission says: "Manifestly, therefore, at this time, when men must be constantly taken from the railroads, as from all other industries, to fill the growing needs of the Nation's army, hours of labor can not be shortened and thereby a greater number of men be required for railroad work. . . . While the commission is strongly disposed to a standard day, in so far as the nature of the service will permit it, its firm judgment consequently is that the existing hours of service in effect on the railroads should be maintained for the period of the war."

The commission also reached the conclusion that as to overtime "the existing rules and conditions of payment should not be disturbed during the period of the war." The commission has pointed out that this is not the time for any experiments which might lessen the tons of freight hauled and the number of passengers carried when the urgent and serious necessities of the war compel sacrifices from all, and that the adoption of any plan which would prevent the government from working its men as long as they have been in the habit of working under private employers would be to take advantage of the grave war necessities of the government and to embarrass it in carrying forward essential operations of the war at a time when the need of service was never greater and the ability to call in outside men is seriously impaired.

There has never been a time when the public interest

demanding more urgently the devotion and unselfish service of all classes of railroad employees. I agree with the commission that it is not practicable at this time, when the war is calling upon every class of loyal citizens for service and sacrifices, to reduce the actual hours of labor to eight in every line of railroad work.

Nevertheless I am convinced that no further inquiry is needed to demonstrate that the principle of the basic eight-hour day is reasonable and just and that all further contentions about it should be set at rest by a recognition of that principle as a part of this decision.

Recognition of the principle of the basic eight-hour day in railroad service is, therefore, hereby made.

The question arises as to what further steps can and ought justly to be taken to strengthen the application of that principle, and when. This question must be solved in the light of the varied conditions of railroad employment and will have to be studied in detail by the Board of Railroad Wages and Working Conditions herein and hereby created and in the light of what is reasonably practicable under war conditions.

No problem so vast and intricate as that of doing practical justice to the 2,000,000 railroad employees of the country can be regarded as completely settled and disposed of by any one decision or order; therefore the Board of Railroad Wages and Working Conditions is hereby established and will take up as presented any phases of the general problem relating to any class of employees or any part of a class of employees which may justly call for further consideration.

It is my earnest hope that railroad officials and railroad employees will realize that their relations under Federal control are not based upon the old conditions of private management. Dissensions and disappointments should be forgotten and all should now remember that they are not only serving their country in the operation of the railroads, but that upon the character, quality, and loyalty of that service depends in large measure our success in this war.

It is an inspiring task—this task of putting upon a more just and equitable basis the wages and working conditions of loyal workers in railroad service—and I confidently expect the patriotic support and assistance of every railroad official and every railroad employee in performing that task with credit to each other and with honor to their country.

Rates of Wages

Then follows the order, which, in Article I names the railroads involved and in Article II, Section A, establishes the increases in wages recommended by the commission in the scale of monthly rates as of December 31, 1915, with the amounts and percentages of increase to make up the new rates, which was published on page 1239 of our issue of May 17. The only modification in this table is an exception in the case of employees under 18 years of age receiving less than \$46 per month, whose increases are provided for in another part of the report.

The remainder of the report, which gives the directions and illustrations as to the methods of applying the increases to hourly, daily, piecework and mileage rates, changed somewhat from the examples given in the Wage Commission's report because of the modifications made by the director general, is as follows:

Method of Applying Increases to Monthly Rates

(1) The employee who holds the same position today that he did the last day of December, 1915, and who then received \$75 a month and has received no increase since, will receive an additional wage of \$30.75 per month. If he has received an increase in these two years of \$10 per month, the recommended increase of his wage will be cut down by that much, making his net advance \$20.75.

(2) Employee "A" occupied the same position in 1915 and in 1918: Salary, 1915, \$150 per month; 1918, \$175 per month.

Basis of increase on salaries of \$150 per month is 16.17 per cent, or \$24.25 per month. New salary, \$174.25; present salary, \$175. Present salary undisturbed.

(3) Employee "B" in 1915 received \$100, and on the same desk in 1918 received \$112.50 per month. Basis of increase on \$100, 31.75 per cent, or \$31.75. New salary, \$131.75. Present salary, \$112.50. Employee "B" is entitled to receive back pay from January 1, at the rate of \$19.25 (the difference between \$131.75 and \$112.50), and to receive monthly, hereafter, \$131.75 instead of \$112.50. Back pay due January 1 to May 31, \$96.25.

(4) Employee in December, 1915, received \$100 per month, entitles him, with this increase, to \$131.75. His salary had been raised for same position on January 1, 1918, to \$135. He is not, therefore, entitled to any advance or back pay. Present salary undisturbed.

Method of Applying Increases to Daily Rates

(1) Employee, December, 1915, \$3.00:

Increased to new rate of \$4.23 per day.....	\$109.98
January 1, 1918, his pay was raised for same work to \$3.50 day, equal per month to.....	91.00
Difference in pay:	
1 month.....	\$18.98
5 months.....	\$94.90
At 8-hour 26-day month both years.....	\$2.9c
Worked 62 hours overtime, at new 1918 rate.....	\$32.80
Was paid 62 hours overtime at.....	37.5c 23.25
	9.55
Total back pay due January 1 to May 31, 1918.....	\$104.45

SECTION B.—RATES OF WAGES OF RAILROAD EMPLOYEES PAID UPON DAILY BASIS

Old rate per day	New rate per day	Old rate per day	New rate per day	Old rate per day	New rate per day	Old rate per day	New rate per day
0.75	\$1.52	\$2.50	\$3.53	\$4.25	\$5.40	\$5.95	\$6.85
.80	1.57	2.55	3.60	4.30	5.45	6.00	6.90
.85	1.62	2.60	3.67	4.35	5.50	6.05	6.95
.90	1.67	2.65	3.74	4.40	5.53	6.10	6.98
.95	1.72	2.70	3.81	4.45	5.58	6.15	7.02
1.00	1.77	2.75	3.88	4.50	5.62	6.20	7.06
1.05	1.82	2.80	3.95	4.55	5.66	6.25	7.11
1.10	1.87	2.85	4.02	4.60	5.71	6.30	7.15
1.15	1.92	2.90	4.09	4.65	5.75	6.35	7.19
1.20	1.97	2.95	4.16	4.70	5.79	6.40	7.23
1.25	2.02	3.00	4.23	4.75	5.83	6.45	7.28
1.30	2.07	3.05	4.30	4.80	5.88	6.50	7.32
1.35	2.12	3.10	4.36	4.85	5.92	6.55	7.36
1.40	2.17	3.15	4.41	4.90	5.96	6.60	7.41
1.45	2.22	3.20	4.48	4.95	6.00	6.65	7.45
1.50	2.27	3.25	4.55	5.00	6.05	6.70	7.49
1.55	2.32	3.30	4.60	5.05	6.09	6.75	7.53
1.60	2.37	3.35	4.65	5.10	6.13	6.80	7.58
1.65	2.42	3.40	4.70	5.15	6.17	6.85	7.62
1.70	2.47	3.45	4.72	5.20	6.21	6.90	7.66
1.75	2.52	3.50	4.77	5.25	6.26	6.95	7.70
1.80	2.57	3.55	4.81	5.30	6.30	7.00	7.75
1.85	2.65	3.60	4.85	5.35	6.34	7.05	7.79
1.90	2.72	3.65	4.90	5.40	6.38	7.10	7.83
1.95	2.77	3.70	4.94	5.45	6.43	7.15	7.88
2.00	2.83	3.75	4.98	5.50	6.47	7.20	7.91
2.05	2.89	3.80	5.03	5.55	6.51	7.25	7.96
2.10	2.96	3.85	5.07	5.60	6.55	7.30	8.00
2.15	3.03	3.90	5.11	5.65	6.60	7.35	8.04
2.20	3.10	3.95	5.15	5.70	6.64	7.40	8.08
2.25	3.17	4.00	5.20	5.75	6.68	7.45	8.13
2.30	3.24	4.05	5.24	5.80	6.73	7.50	8.17
2.35	3.31	4.10	5.28	5.85	6.77	7.55	8.21
2.40	3.38	4.15	5.32	5.90	6.81	7.60	8.25
2.45	3.45	4.20	5.36				

Old rates are those of December, 1915.

For common labor paid by the day, the scale of new rates per day shown shall apply, with the provision, however, that as a minimum 20 cents per 8-hour day, 22½ cents per 9-hour day, 25 cents per 10-hour day, 27½ cents per 11-hour day, and 30 cents per 12-hour day will be added to the rates paid per day as of December 31, 1917.

(2) Employee "C" was employed in 1918, but not in 1915. Rate of pay on the district where he is employed in 1918, in 1915 was \$1.10 per day. The 1918 rate of pay is, on the same district, \$1.50 per day. The new rate is \$1.87 per day. He will, therefore, be entitled to receive from January 1, 1918, to May 31, 1918, 37 cents per day additional for each day he worked in that period.

While it is expected that the Board of Railroad Wages and Working Conditions hereinafter created shall give consideration to all questions of inequality as between individuals and classes of employees throughout, sufficient information is available to justify certain conclusions with respect to the mechanical crafts, and in the case of machinists, boiler-makers, blacksmiths, and other shop mechanics who have been receiving the same hourly rates, the increases named in this order shall apply, with a minimum wage of 55 cents per hour.

It is recognized that this may still leave among shop employees certain inequalities as to individual employees, to which the Board of Railroad Wages and Working Conditions will give prompt consideration.

For common labor paid by the hour, the scale named herein shall apply with the provision, however, that as a minimum, 2½ cents per hour will be added to the rates paid per hour, as of December 31, 1917.

Method of Applying Increases to Hourly Rates

1) Machinist worked in January, 1918, eight hours per day, 27 days, total 216 hours straight time.

The rate of pay for this position in December, 1915, was 34 cents per hour, new rate under this order 48 cents per hour, but with minimum rate of 55 cents per hour as herein ordered, will receive \$118.80 in January, 1918, his rate of pay was 37½ cents per hour, for 216 hours, equals 81.00

Difference one month.....\$37.80
On basis of working same amount straight time each month for five months (January 1 to May 31).....189.00
Also worked in same period 90 hours overtime at pro rata one-half, new 55 cent minimum rate, equals \$74.25
Was paid at 37½ cent rate pro rata overtime for 33.75
23.62

Balance due January 1 to May 31, 1918.....\$212.62

SECTION C—RATES OF WAGES OF RAILROAD EMPLOYEES PAID UPON HOURLY BASIS

[Rates of pay in cents per hour.]		[Rates of pay in cents per hour.]		[Rates of pay in cents per hour.]		[Rates of pay in cents per hour.]	
Old rate per hour	New rate per hour	Old rate per hour	New rate per hour	Old rate per hour	New rate per hour	Old rate per hour	New rate per hour
10	19.75	38	53.75	66	78.50	94	102.50
10.5	20.25	38.5	54.25	66.5	79.00	94.5	102.75
11	20.75	39	54.75	67	79.50	95	103.25
11.5	21.25	39.5	55.25	67.5	80.00	95.5	103.75
12	21.75	40	55.75	68	80.25	96	104.25
12.5	22.25	40.5	56.25	68.5	80.75	96.5	104.50
13	22.75	41	56.75	69	81.25	97	105.00
13.5	23.25	41.5	57.25	69.5	81.50	97.5	105.50
14	23.75	42	57.75	70	82.00	98	106.00
14.5	24.25	42.5	58.25	70.5	82.50	98.5	106.25
15	24.75	43	59.00	71	83.00	99	106.75
15.5	25.25	43.5	59.50	71.5	83.25	99.5	107.25
16	25.75	44	60.00	72	83.50	100	107.50
16.5	26.25	44.5	60.25	72.5	84.25	100.5	108.00
17	26.75	45	60.75	73	84.50	101	108.25
17.5	27.25	45.5	61.15	73.5	85.00	101.5	108.75
18	27.75	46	61.50	74	85.50	102	109.25
18.5	28.25	46.5	62.00	74.5	86.00	102.5	109.75
19	28.75	47	62.50	75	86.25	103	110.00
19.5	29.25	47.5	63.00	75.5	86.75	103.5	110.50
20	29.75	48	63.25	76	87.00	104	111.00
20.5	30.25	48.5	63.75	76.5	87.50	104.5	111.25
21	30.75	49	64.25	77	88.00	105	111.75
21.5	31.25	49.5	64.75	77.5	88.25	105.5	112.25
22	31.75	50	65.00	78	88.75	106	112.75
22.5	32.25	50.5	65.25	78.5	89.25	106.5	113.00
23	32.75	51	65.75	79	89.75	107	113.50
23.5	33.25	51.5	66.25	79.5	90.00	107.5	114.00
24	34.00	52	66.50	80	90.50	108	114.25
24.5	35.00	52.5	67.00	80.5	91.00	108.5	114.75
25	35.50	53	67.50	81	91.50	109	115.25
25.5	36.00	53.5	68.00	81.5	91.75	109.5	115.75
26	36.75	54	68.25	82	92.25	110	116.00
26.5	37.50	54.5	68.75	82.5	92.75	110.5	116.50
27	38.25	55	69.25	83	93.00	111	117.00
27.5	39.00	55.5	69.75	83.5	93.50	111.5	117.25
28	39.50	56	70.00	84	94.00	112	117.75
28.5	40.25	56.5	70.50	84.5	94.50	112.5	118.25
29	41.00	57	71.00	85	94.75	113	118.50
29.5	41.75	57.5	71.50	85.5	95.25	113.5	119.00
30	42.50	58	71.75	86	95.75	114	119.50
30.5	43.00	58.5	72.25	86.5	96.00	114.5	119.75
31	43.75	59	72.75	87	96.50	115	120.00
31.5	44.50	59.5	73.00	87.5	97.00	115.5	120.50
32	45.25	60	73.50	88	97.50	116	121.00
32.5	46.00	60.5	74.00	88.5	97.75	116.5	120.00
33	46.75	61	74.50	89	98.25	117	120.00
33.5	47.25	61.5	74.75	89.5	98.50	117.5	120.00
34	48.00	62	75.25	90	99.00	118	120.00
34.5	48.75	62.5	75.50	90.5	99.50	118.5	120.00
35	49.50	63	76.00	91	99.75	119	120.00
35.5	50.25	63.5	76.50	91.5	100.25	119.5	120.00
36	51.00	64	77.75	92	100.75	120	120.00
36.5	51.50	64.5	77.50	92.5	101.25	120.5	120.00
37	52.25	65	77.75	93	101.50	121	120.00
37.5	53.00	65.5	78.25	93.5	102.00	121.5	120.00

Old rates are those of December, 1915

(2) Machinist worked in January, 1918, 10 hours per day, 26 days, total 260 hours straight time.

The rate of pay for this position in 1915 was 34 cents per hour, new rate under this order, 48 cents per hour, but with minimum rate of 55 cents per hour as herein ordered will receive \$148.00 in January 1918, his rate of pay was 37½ cents per hour, for 260 hours equals 97.50
Difference one month.....\$50.50
On basis of working same amount of straight time each month for 5 months (January 1 to May 31).....252.50
Also worked in same period 90 hours overtime at pro rata rate, new 55 cent minimum rate, equals \$49.50
Was paid at 37½ cent rate pro rata overtime for 175
15.25

Balance due January 1 to May 31, 1918.....\$243.25

(3) Machinist "D" was employed in the same shop in December, 1915, and in 1918 on the same class of work. His hourly rate in December, 1915, was 35 cents for 9 hours, 26 days a month. He was paid for overtime and Sunday work at time and one-half. On January 1, 1918, his hours were reduced to 8 and his rate increased to 40 cents. The new hourly rate applicable to his 1915 rate, viz.: 49½ cents being less than the minimum of 55 cents, his new rate will be 55 cents per hour. In 1918, from January 1 to May 31, he worked 234 hours per month or an average of one hour overtime daily on the 1918 schedule. This for five months gives him 130 hours overtime. He has been paid as follows:

1,040 hours straight time, at 40 cents.....\$416.00
130 hours overtime at 60 cents.....78.00
Total.....\$494.00

His back pay will be computed as follows

1,040 hours straight time, at 55 cents.....\$572.00
130 hours overtime, at 82½ cents.....107.25
Total.....\$679.25
Deduct payment of 1918 rates.....194.00
Back pay due.....\$485.25

and his future rate per hour will be 55 cents.

(4) In the case of employee "E," who was employed in a shop where the rate for his position was 35 cents per hour for 8 hours' work in 1915, with time and one-half for overtime, but in the same position and same shop with the same hours in 1918 his rate is 45 cents per hour; his earnings in 1915 in the standard 208-hour month would be \$72.80 per month, and he would be entitled to the new hourly rate of 49½ cents per hour. His straight time and overtime earnings and back pay would be computed in exactly the same manner as machinist "D." The principles illustrated will apply to all men paid by the hour, whatever their occupation may be.

SECTION D—Rates of Wages of Railroad Employees Paid Upon Piecework Basis

METHOD OF APPLYING INCREASES TO PRICE RATES

(1) The pieceworker shall receive for each hour worked, the same increase per hour as is awarded to the hourly worker engaged in similar employment in the same shop.

(2) If the hourly rate has been increased since 1915 to an amount greater than the increase herein fixed, then the higher rate shall prevail.

(3) Where there was no piece rate for an item or operation in the piece-rate schedule of 1915, adjust the current price by such an amount as a similar item or operation has been increased or decreased since December 31, 1915, or as near such a plan as practicable.

(4) It is understood that the application of this order shall not, in any case, operate to reduce current earnings.

(5) When a pieceworker works overtime or undertime, he shall receive that proportion of the increase provided in the schedule which the time actually worked bears to the normal time in the position

(6) Overtime is not to be considered solely as the num-

ber of hours employed in excess of the normal hours per month in the position, but rather the time employed in excess of the normal hours per day.

(7) Employee "F" was employed under a piecework schedule in a shop where the basic hourly rate was 35 cents for eight hours, with time and one-half for overtime. This rate under the plan illustrated above will be increased to 49½ cents per hour. Difference, 14½ cents.

Regardless of the schedule of piece rates under which he is paid, under this order "F" will be entitled to receive 14½ cents per hour in addition to his piecework earnings for every hour worked in 1918 unless the hourly rate shall in the interim have been raised and a proportionate increase made in the piecework schedule.

For example: Assume that "F" made \$90 in December, 1915, at his piecework. At the hourly rate he would have earned only \$72.80, and his hourly rate must therefore be increased to 49½ cents.

If, in January, 1918, he has attained sufficient skill to earn \$100 on the same piecework schedule, he will be entitled to receive, nevertheless, 14½ cents per hour for each hour of straight time worked, and for each hour of overtime, 21¾ cents additional (if time and one-half for overtime is in effect).

Assume that in the five months, January 1 to May 31, "F" has worked 1,040 hours straight time, and 130 hours overtime, and has, at his piece-work schedule thus earned \$500.

He will be entitled, nevertheless, to receive as back pay, the following amount:

1,040 hours at 14½ cents per hour.....	\$150.80
130 hours at 21¾ cents per hour.....	28.28
	\$179.08

But if in January, 1918, the basic hourly rate had been increased to 50 cents, and this increase had been correspondingly expressed in his piece-work schedule, he would be entitled to no back pay. If, on the other hand, the hourly rate had been increased from 35 cents in 1915 to 45 on January 1, 1918, and this increase had been expressed in a corresponding increase in the piece-work schedule, then "F" would be entitled to receive back pay at 4½ cents per hour for straight time and 6¾ cents per hour overtime.

If the practice in the shop, however, had been to pay pro rata for overtime, then the rate for such overtime since January 1, 1918, would be pro rata at 4½ cents, or 14½ cents per hour, according to whether piece rates had been or had not been increased.

(8) Employee's December, 1915, rate was 38½ cents; which rate in this order for 8 hours per day entitied him to 54½ cents per hour. His basic rate had, by January 1, 1918, been raised to 42½ cents per hour. Piece work rates had not been raised in the interval. This man earned in 208 hours \$100. He is entitled to a raise of 11¾ cents per hour.

113½ cents × 208:	
1 month	\$24.44
5 months	122.20

Section E.—Rates of Wages of Railroad Employees Paid Upon Mileage Basis

The following rates will apply "per day" or its established equivalent in "miles":

Passenger engineers		Passenger engineers		Passenger engineers		Passenger engineers	
Old	New	Old	New	Old	New	Old	New
\$4.10	\$4.56	\$4.53	\$5.04	\$4.95	\$5.51	\$5.55	\$6.17
4.15	4.62	4.55	5.06	5.00	5.56	5.65	6.29
4.20	4.67	4.60	5.12	5.05	5.62	5.90	6.56
4.25	4.73	4.65	5.17	5.13	5.71	6.00	6.68
4.30	4.78	4.70	5.23	5.15	5.73	6.05	6.73
4.35	4.84	4.75	5.28	5.28	5.87	6.25	6.95
4.40	4.90	4.78	5.32	5.35	5.95	6.30	7.01
4.45	4.95	4.80	5.34	5.40	6.01	6.50	7.23
4.50	5.01	4.90	5.45	5.53	6.15	7.00	7.79

Passenger firemen		Passenger firemen		Passenger firemen		Passenger firemen	
Old	New	Old	New	Old	New	Old	New
\$1.91	\$2.46	\$2.60	\$3.35	\$2.84	\$3.66	\$3.30	\$4.25
2.25	2.90	2.62	3.37	2.85	3.67	3.35	4.31
2.33	3.00	2.65	3.41	2.90	3.73	3.40	4.38
2.34	3.01	2.69	3.46	2.95	3.80	3.45	4.44
2.40	3.09	2.70	3.48	3.00	3.86	3.60	4.64
2.45	3.12	2.75	3.54	3.05	3.93	3.65	4.83
2.45	3.13	2.76	3.55	3.10	3.99	4.00	5.15
2.50	3.22	2.78	3.58	3.15	4.06	4.15	5.34
2.51	3.23	2.80	3.61	3.20	4.12	4.25	5.47
2.55	3.28						

Passenger conductors		Passenger conductors		Passenger conductors		Passenger conductors	
Old	New	Old	New	Old	New	Old	New
\$2.50	\$2.89	\$2.68	\$3.10	\$2.90	\$3.35	\$3.47	\$4.01
2.66	3.00	2.75	3.18				

Passenger baggagemen		Passenger baggagemen		Passenger baggagemen		Passenger baggagemen	
Old	New	Old	New	Old	New	Old	New
\$1.40	\$1.94	\$1.49	\$2.06	\$1.61	\$2.23	\$1.70	\$2.35
1.45	2.00	1.54	2.13	1.65	2.28	2.00	2.77

Passenger trainmen		Passenger trainmen		Passenger trainmen		Passenger trainmen	
Old	New	Old	New	Old	New	Old	New
\$1.35	\$1.88	\$1.47	\$2.05	\$1.50	\$2.09	\$1.60	\$2.23
1.43	1.99	1.49	2.08	1.55	2.16	1.87	2.61
1.46	2.04						

Freight engineers		Freight engineers		Freight engineers		Freight engineers	
Old	New	Old	New	Old	New	Old	New
\$4.25	\$4.91	\$5.05	\$5.83	\$5.40	\$6.24	\$5.90	\$6.81
4.50	5.20	5.06	5.84	5.43	6.27	5.95	6.87
4.70	5.43	5.10	5.89	5.45	6.29	5.995	6.925
4.75	5.49	5.13	5.93	5.50	6.35	6.00	6.93
4.80	5.54	5.145	5.95	5.55	6.41	6.10	7.05
4.85	5.60	5.15	5.95	5.555	6.415	6.25	7.22
4.86	5.61	5.17	5.97	5.60	6.47	6.50	7.51
4.87	5.62	5.20	6.01	5.61	6.48	6.75	7.80
4.88	5.64	5.25	6.06	5.65	6.53	6.80	7.85
4.89	5.65	5.28	6.10	5.665	6.545	6.85	7.91
4.90	5.66	5.30	6.12	5.70	6.58	6.90	7.97
4.95	5.72	5.33	6.16	5.75	6.64	6.95	8.03
4.97	5.74	5.35	6.18	5.83	6.73	7.00	8.09
5.00	5.78	5.39	6.23	5.85	6.76	7.25	8.37

Freight firemen		Freight firemen		Freight firemen		Freight firemen	
Old	New	Old	New	Old	New	Old	New
\$2.25	\$3.02	\$2.93	\$3.93	\$3.23	\$4.34	\$3.75	\$5.03
2.36	3.17	2.95	3.96	3.245	4.355	3.80	5.10
2.45	3.29	3.00	4.03	3.25	4.36	3.90	5.24
2.47	3.32	3.01	4.04	3.30	4.43	3.905	5.245
2.50	3.36	3.03	4.07	3.35	4.50	3.95	5.30
2.56	3.44	3.04	4.08	3.40	4.56	4.00	5.37
2.59	3.49	3.07	4.09	3.45	4.63	4.05	5.44
2.60	3.49	3.07	4.12	3.465	4.65	4.14	5.50
2.70	3.62	3.10	4.16	3.50	4.70	4.125	5.535
2.75	3.69	3.13	4.20	3.55	4.77	4.18	5.61
2.78	3.73	3.15	4.23	3.57	4.79	4.25	5.71
2.81	3.77	3.16	4.24	3.60	4.83	4.30	5.77
2.85	3.83	3.19	4.28	3.63	4.87	4.36	5.84
2.87	3.85	3.20	4.30	3.65	4.90	4.55	6.11
2.90	3.89	3.22	4.32	3.70	4.97		

Freight conductors		Freight conductors		Freight conductors		Freight conductors	
Old	New	Old	New	Old	New	Old	New
\$2.31	\$2.78	\$4.24	\$5.11	\$4.54	\$5.47	\$4.88	\$5.88
2.90	3.49	4.25	5.12	4.55	5.48	4.96	5.98
3.16	4.17	4.27	5.12	4.62	5.58	5.04	6.07
3.63	4.37	4.38	5.28	4.64	5.59	5.08	6.12
3.85	4.64	4.40	5.30	4.66	5.62	5.10	6.15
3.90	4.70	4.42	5.33	4.74	5.71	5.14	6.19
3.975	4.79	4.43	5.34	4.77	5.75	5.21	6.28
4.00	4.82	4.48	5.40	4.80	5.78	5.26	6.33
4.10	4.94	4.50	5.42	4.83	5.82	5.69	6.86
4.13	4.98	4.51	5.43	4.84	5.83	6.12	7.37
4.165	5.02	4.52	5.45	4.86	5.86	6.45	7.77
4.18	5.04	4.53	5.46	4.87	5.87	7.09	8.54

Freight firemen		Freight firemen		Freight firemen		Freight firemen	
Old	New	Old	New	Old	New	Old	New
\$2.25	\$3.02	\$2.93	\$3.93	\$3.23	\$4.34	\$3.75	\$5.03
2.36	3.17	2.95	3.96	3.245	4.355	3.80	5.10
2.45	3.29	3.00	4.03	3.25	4.36	3.90	5.24
2.47	3.32	3.01	4.04	3.30	4.43	3.905	5.245
2.50	3.36	3.03	4.07	3.35	4.50	3.95	5.30
2.56	3.44	3.04	4.08	3.40	4.56	4.00	5.37
2.59	3.49	3.07	4.09	3.45	4.63	4.05	5.44
2.60	3.49	3.07	4.12	3.465	4.65	4.14	5.50
2.70	3.62	3.10	4.16	3.50	4.70	4.125	5.535
2.75	3.69	3.13	4.20	3.55	4.77	4.18	5.61
2.78	3.73	3.15	4.23	3.57	4.79	4.25	5.71
2.81	3.77	3.16	4.24	3.60	4.83	4.30	5.77
2.85	3.83	3.19	4.28	3.63	4.87	4.36	5.84
2.87	3.85	3.20	4.30	3.65	4.90	4.55	6.11
2.90	3.89	3.22	4.32	3.70	4.97		

Freight conductors		Freight conductors		Freight conductors		Freight conductors	
Old	New	Old	New	Old	New	Old	New
\$2.31	\$2.78	\$4.24	\$5.11	\$4.54	\$5.47	\$4.88	\$5.88
2.90	3.49	4.25	5.12	4.55	5.48	4.96	5.98
3.16	4.17	4.27	5.12	4.62	5.58	5.04	6.07
3.63	4.37	4.38	5.28	4.64	5.59	5.08	6.12
3.85	4.64	4.40	5.30	4.66	5.62	5.10	6.15
3.90	4.70	4.42	5.33	4.74	5.71	5.14	6.19
3.975	4.79	4.43	5.34	4.77	5.75	5.21	6.28
4.00	4.82	4.48	5.40	4.80	5.78	5.26	6.33
4.10	4.94	4.50	5.42	4.83	5.82	5.69	6.86
4.13	4.98	4.51	5.43	4.84	5.83	6.12	7.37
4.165	5.02	4.52	5.45	4.86	5.86	6.45	7.77
4.18	5.04	4.53	5.46	4.87	5.87	7.09	8.54

Freight conductors		Freight conductors		Freight conductors		Freight conductors	
Old	New	Old	New	Old	New	Old	New
\$2.31	\$2.78	\$4.24	\$5.11	\$4.54	\$5.47	\$4.88	\$5.88
2.90	3.49	4.25	5.12	4.55	5.48	4.96	5.98
3.16	4.17	4.27	5.12	4.62	5.58	5.04	6.07
3.63	4.37	4.38	5.28	4.64	5.59	5.08	6.12
3.85	4.64	4.40	5.30	4.66	5.62	5.10	6.15
3.90	4.70	4.42	5.33	4.74	5.71	5.14	6.19
3.975	4.79	4.43	5.34	4.77	5.75	5.21	6.28
4.00	4.82	4.48	5.40	4.80	5.78	5.26	6.33
4.10	4.94	4.50	5.42	4.83	5.82	5.69	6.86
4.13	4.98	4.51	5.43	4.84	5.83	6.12	

If there were mileage rates in effect in December, 1915, which are not included in the above tables, they shall be increased in accordance with the following percentages:

	Per cent
Rail passenger engineers and conductors	1
Rail passenger train and engine men	2
Rail passenger conductors	15 1/2
Rail passenger baggage men	3 1/2
Rail passenger brakemen and freight	3 1/2
Rail freight engineers and firemen	5 1/2
Rail freight firemen and conductors	4 1/2
Rail freight conductors	20 1/2
Rail freight brakemen and engine men	3 1/2

Method of Applying Increases to Mileage Basis

(1) Rates for overtime as now in effect, whether providing for pro rata basis or in excess thereof, shall be increased by same percentage as straight time rates.

(2) Miles run, in excess of the established equivalent of a day (or of a month where such basis prevails) shall be paid for pro rata.

(3) If any increase has been made in the mileage rates of employees paid on that basis in December, 1915, it will be understood that the per cent of increase allowed by this order is inclusive of such interim increases and that the new rate is computed from the base rates of December, 1915.

(4) Example (1): Engineer "G," passenger service, received \$4.25 per day of one hundred miles in 10 hours in December, 1915. According to this plan, although in 1918 this rate was \$4.25 per hundred miles in 8 hours, the rate will be increased 11 1/4 per cent to \$4.73 per 100 miles (\$4.7281 equalized as \$4.73). He will be entitled to back pay for every 100 miles run at the rate of 48 cents per 100 miles.

Example (2):

Conductor through freight:	
2,950 miles at 4 cents, at new rate, would entitle him to 4.82 cents, or	\$142.19
He was paid	118.00
Leaving to be paid	\$24.19
He made 26 hours and 10 minutes overtime, equivalent, on basis of 12 1/4 miles per hour, to 327 miles, which, at the increased rate of 4.82 cents per mile, entitles him to \$15.76	
Was paid, at 4 cents per mile	13.08
A difference of	2.68
One month	\$26.87
Five months	134.35

This principle will apply to all employees of the train and engine service who are paid on the mileage basis. There are some railroads in the United States upon which men in the train and engine service are paid on a monthly wage. Such employees will be entitled to the increased rates named in Article 2, section A.

(5) Since the application of the increases hereby granted will tend in individual cases to give increases greater than is appropriate or necessary to those train and engine men who make abnormal amounts of mileage and who, therefore, make already abnormally high monthly earnings, the officials of each railroad shall take up with the respective committees of train and engine men the limitation of mileage made per month by employees paid upon a mileage basis, so as to prevent employees now making such abnormal mileage profiting by the wage increases herein fixed greatly in excess of employees habitually making a normal amount of mileage. It shall be understood that any such limitation of mileage so arrived at shall not preclude the officials of a railroad from requiring a train or engine man to make mileage in excess of this limitation when the necessities of the service require it. The officials of each railroad will report to the regional director such arrangements agreed upon and any cases of failure to reach such agreements.

Section F—General Rules for Application of Wage Increases

(1) In the application of the scale the wage runs with the place. If in the past two years an employee has been

promoted, his new wage is based upon the rate of increase applicable to the new schedule governing the position to which he has been promoted.

(2) In applying these percentages to the hourly, daily, monthly, or mileage rates for December, 1915, in order to determine the rates to be applied, beginning January 1, 1918, each decimal fraction over 1 per cent shall be equalized as follows:

Less than one-fourth of 1 per cent, as one-fourth of 1 per cent.

Over one-fourth of 1 per cent, but less than one-half of 1 per cent, as one-half of 1 per cent.

Over one-half of 1 per cent, but less than three-fourths of 1 per cent, as three-fourths of 1 per cent.

Over three-fourths of 1 per cent, as 1 per cent.

(3) These increases are to be applied to the rates of wages in effect on December 31, 1915. They do not represent a net increase at this time.

(4) As to the employee who may have been promoted since December 31, 1915, his increase will be based upon the rate of his present position as of December 31, 1915.

(5) As to the employee who has been reduced in position, his increase will be based upon the rate of his present position as of December 31, 1915.

(6) The new rates named herein, where they are higher than the rates in effect on January 1, 1918, will be applied to the occupants of positions that carried the rates in December, 1915.

(7) In those cases where increases have been made by the railroads since December 31, 1915, in excess of the amounts herein ordered, present wages shall apply, for in no instance shall the application hereof operate to reduce present rates of pay.

(8) Reductions in hours between December 31, 1915, and January 1, 1918, are not to be regarded as increases in pay.

(9) The wage increases provided for herein shall be effective as of January 1, 1918, and are to be paid according to the time served to all who were then in the railroad service or who have come into such service since and remained therein. The proper ratable amount shall also be paid to those who have been for any reason since January 1, 1918, dismissed from the service, but shall not be paid to those who have left it voluntarily. Men who have left the railroads to enter the Army or Navy shall be entitled to the pro rata increases accruing on their wages up to the time they left, and the same rule shall apply to those who have passed from one branch of the railroad service or from one road to another.

(10) This order applies to foremen, chief clerks, and others employed in a supervisory capacity, as well as to their subordinates.

(11) This order shall be construed to apply to employees of railroads operating ferries, tugboats, lighters, barges, and any other floating equipment operated as terminal or transfer facilities, but shall not be construed as applying to railroad employees on cargo and passenger carrying equipment on lakes, rivers, or in coastwise or ocean traffic.

(12) The provisions of this order will not apply in cases where amounts less than \$50 per month are paid to individuals for special service which takes only a portion of their time from outside employment or business.

(13) Office boys, messengers, chore boys, and similar positions filled by employees who are under 18 years of age will receive the following increase per month:

\$20 increase per month where December, 1915, rate was from \$50 to \$45 per month.

\$15 increase per month where December, 1915, rate was from \$20 to \$30 per month.

\$10 increase per month where December, 1915, rate was less than \$20 per month.

Article III—Rules Governing Conditions of Employment

Section (a).—THE BASIC EIGHT-HOUR DAY

The principle of the basic eight-hour day is hereby recognized. Where employees are paid upon a daily or monthly basis, the new compensation herein established will apply to the number of hours which have heretofore constituted the actual day's work. For example, where an actual day's work has been 10 hours, the new compensation will cover the 8 basic hours and 2 hours overtime. Additional overtime will be paid pro rata.

METHOD OF APPLYING BASIC EIGHT-HOUR-DAY RULES

- (1) Position which in December, 1915, paid \$2 per 9-hour day:
 - Old rate, \$2 per day.
 - New rate, \$2.51 for 8-hour basic day.
 - Overtime, 31.4 cents per hour.
 - New rate, \$2.83 for 9-hour service; 83 cents increase.
- (2) Position which in December, 1915, paid \$2.40 per 10-hour day:
 - Old rate, \$2.40 per day.
 - New rate, \$2.70 for 8-hour basic day.
 - Overtime, \$0.68—2 hours, at 34 cents per hour.
 - New rate, \$3.38 for 10-hour service; 98 cents increase.
- (3) Position which in December, 1915, paid \$75 per month, working 10 hours per day for 26 working days:
 - Old rate, \$75 per month.
 - New rate, \$84.60 per month basic 8-hour day.
 - Overtime, \$21.15—52 hours, at 40.67 cents per hour.
 - New rate, \$105.75 for same service; increase, \$30.75.
- (4) Position which in December, 1915, paid \$100 per month, working 11 hours per day for 31 working days:
 - Old rate, \$100 per month.
 - New rate, \$95.82 per month basic 8-hour day.
 - Overtime, \$35.93 93 hours, at 38.64 cents per hour.
 - New rate, \$131.75 for same service; increase, \$31.75.

Section (b).—RATES OF PAY FOR OVERTIME

This order shall not affect any existing agreements or practices for the payment of higher rates of pay for time worked in excess of any standard day. Time worked in excess of the basic eight-hour day hereby established will, when there is no existing agreement or practice more favorable to the employee, be paid on a pro rata basis, as indicated in section (a) of this article.

Section (c).—NO REDUCTION IN TOTAL INCREASE

Pending consideration by the Board of Railroad Wages and Working Conditions hereinafter provided for, no reduction in the actual hours constituting a day's work shall operate to deprive any employee, paid by the day or month, of the total increase in pay granted him by this order.

Article IV—Payments for Back Time

Each railroad will, in payments made to employees on and after June 1, 1918, include these increases therein.

As promptly as possible, the amount due in back pay from January 1, 1918, in accordance with the provision of this order, will be computed and payment made to employees separately from the regular monthly payments, so that employees will know the exact amount of these back payments.

Recognizing the clerical work necessary to make these computations for back pay and the probable delay before the entire period can be covered, each month, beginning with January, shall be computed as soon as practicable and, as soon as completed, payment shall be made.

Article V—Employment of Women

When women are employed, their working conditions must be healthful and fitted to their needs. The laws enacted for the government of their employment must be observed and their pay, when they do the same class of work as men, shall be the same as that of men.

Article VI—Colored Firemen, Trainmen and Switchmen

Effective June 1, 1918, colored men employed as firemen, trainmen and switchmen shall be paid the same rates of wages as are paid white men in the same capacities.

Back pay for period January 1, 1918, to May 31, 1918, will be based only upon the increases provided in Article II of this order for such positions. Back payments will not apply to the further increased rate made effective by this Article.

Article VII—Board of Railroad Wages and Working Conditions

There is hereby created a Board of Railroad Wages and Working Conditions which shall consist of the following members: J. J. Dermody, F. F. Gaines, C. E. Lindsey, W. E. Morse, G. H. Sines, A. O. Wharton.

This board shall at once establish an office at Washington, D. C., and meet for organization and elect a chairman and vice chairman, one of whom shall preside at meetings of the board.

It shall be the duty of the board to hear and investigate matters presented by railroad employees or their representatives affecting:

- (1) Inequalities as to wages and working conditions whether as to individual employees or classes of employees.
- (2) Conditions arising from competition with employees in other industries.
- (3) Rules and working conditions for the several classes of employees, either for the country as a whole or for different parts of the country.

The Board shall also hear and investigate other matters affecting wages and conditions of employment referred to it by the director general.

This board shall be solely an advisory body and shall submit its recommendations to the director general for his determination.

Article VIII—Interpretations of This Order

Railway Board of Adjustment No. 1 is authorized by Article 9 of General Order No. 13 to perform the following duty:

"Wages and hours, when fixed by the director general, shall be incorporated into existing agreements on the several railroads, and should differences arise between the management and the employees of any of the railroads as to such incorporation, such questions of difference shall be decided by the Railway Board of Adjustment No. 1, when properly presented, subject always to review by the director general."

In addition to the foregoing, other questions arising as to the intent or application of this order in respect to the classes of employees within the scope of Railway Board of Adjustment No. 1 shall be submitted to such Board, which Board shall investigate and report its recommendations to the director general.

Similar authority may be conferred on any additional railway board of adjustment hereafter created.

Decisions shall not be rendered by such boards until after approval by the director general.

Prior to the creation of additional railway boards of adjustment to deal with questions as to the intent or application of this order as it affects any other class of employees, such questions, with respect to such employees, shall be presented to the Director of the Division of Labor, United States Railroad Administration, Washington, D. C.

BRAZILIAN COAL FOR GOVERNMENT RAILWAY.—It has been announced that the Brazilian Central Railway (a Government-owned line) has contracted with the Sao Jeronymo Coal Mining Company, which is extracting domestic coal in large quantities, for 50,000 tons of Brazilian coal. According to a report from Vice Consul R. P. Mommson, of Rio de Janeiro, the contract price is 50 milreis (about \$12.50) per ton.



Interior View of the Large Passenger Car Shop

New Grand Trunk Car Shops at Port Huron

Special Attention Given to Arrangement to Insure
Distribution of Power and Possibility of Extension

WITH THE EXCEPTION of the installation of machines the Grand Trunk has completed the construction of a complete new layout at Port Huron, Mich., for the construction and repair of freight and passenger cars. Including tracks and buildings the new plant covers an area of 55 acres and represents an expenditure of more than \$700,000. The layout includes two buildings for the repair of passenger cars with a total capacity of 27 cars, a steel freight car shop and a wood freight car shop each with a 28-car capacity, a repair track yard with a capacity for 200 cars and auxiliary buildings including a modern power plant, a cabinet shop, blacksmith shop, machine shop, wood mill, dry kiln, general offices and paint and general stores buildings, as well as a complete system of piping and fire hydrants for fire protection, watchmen's shanties and other facilities of minor importance.

One of the principal car repair shops for the Grand Trunk lines west of the St. Clair river has been located at Port Huron for many years. During the winter of 1914-1915 the old plant was destroyed by fire. Its loss was a serious handicap to the railroad and as its replacement with as little delay as possible was essential, work was begun on the plant as soon after the fire as plans could be prepared and the necessary property acquired.

The old plant which was built almost at the beginning of the road's operation was located in the older part of the city on the river front at the terminus of the line previous to the construction of the tunnel under the St. Clair river. It was small and inadequate and the site would not permit of the expansion necessary to meet present day needs. Furthermore its location precluded the provision of ample switching facilities.

Consequently, after the fire, it was decided to abandon the old site and locate the facilities on property adjoining the tunnel line and convenient to the main switching yard and roundhouse. At this point it was possible to lay out the plant in such a way as to produce a minimum amount of switching and a maximum degree of efficiency in the handling of bad order cars.

The Plant

In planning the layout of the new plant special attention was given to the arrangement of the buildings with a view to the economical distribution of power and the possibility of extension and to ensure the materials being handled by a direct movement from the stores to the finished car. To this end as may be seen in the general map of the plant, the power plant and stores buildings occupy a central location with the various other buildings located conveniently about the central unit.

The passenger car shops include two buildings, the larger shop being 134 ft. 6 in. by 305 ft. 6 in. with a capacity for 15 cars. The small shop is 134 ft. 6 in. wide by 140 ft. long and has a capacity for 12 cars. The cabinet shop, the only two-story building in the layout, is connected to the small passenger car shop.

These shops are so planned that each car under construction or repair occupies one bay with an ample allowance for working space. The two buildings are parallel to each other with a space of 100 ft. between them which is occupied by a Nichol standard 80-ft. electrically-operated transfer table, designed to carry 50 tons of cars.

Both buildings are of concrete and brick construction with

3-in. plank floors and tar and gravel roofs. The roofs are designed with monitors running across the buildings, lighting and ventilating each bay. Additional light and ventilation are provided by the windows. The middle sash of alternate windows are hinged and metal sash chain-operating devices are provided for the ventilators in both the windows and monitors.

The cabinet shop is 53 ft. wide by 250 ft. long. The first floor is occupied by the glue room, acid room and the upholstering room. The cabinet work is done on the second floor. An electrically operated elevator is provided in this building. The freight car shops provide the facilities for the construction and repair of freight cars. These shops are divided into equal sections by brick fire walls, one section being devoted to steel cars and the other to wood cars. Both sections of the shops are planned for the cars to enter at one end. A repair track yard with capacity for 200 cars is located convenient to this shop.

Each division of the shop is 78 ft. wide and 360 ft. long, providing a capacity for 28 cars. In addition to the standing tracks, four of which are provided in each shop, both sections are provided with two service tracks. The arrangement of these tracks is shown in the sectional plan. The natural lighting and the ventilation plans are similar to those of the passenger shops, as is the construction with the exception of the floor, which is of mastic laid on a 4-in. concrete base.

The power plant consists of the boiler room 55 ft. by 98 ft. and an engine room 35 ft. 6 in. by 70 ft. This building is of concrete and brick construction, with a tar and gravel roof, carried on steel trusses, thus avoiding posts in the rooms. A brick partition separates the two rooms. The floor in the boiler room is of concrete, while a maple floor is used in the engine room.

Three 200 b.h.p. and three 150 b.h.p. return tubular boilers are provided in the power plant, the boiler pressure being 150 lb. per sq. in. The boilers are fitted with superheaters giving 150 deg. superheat when coal is used and 200 deg. when wood refuse is used. Three of the boilers can burn either coal or wood, and three can burn coal only. They are

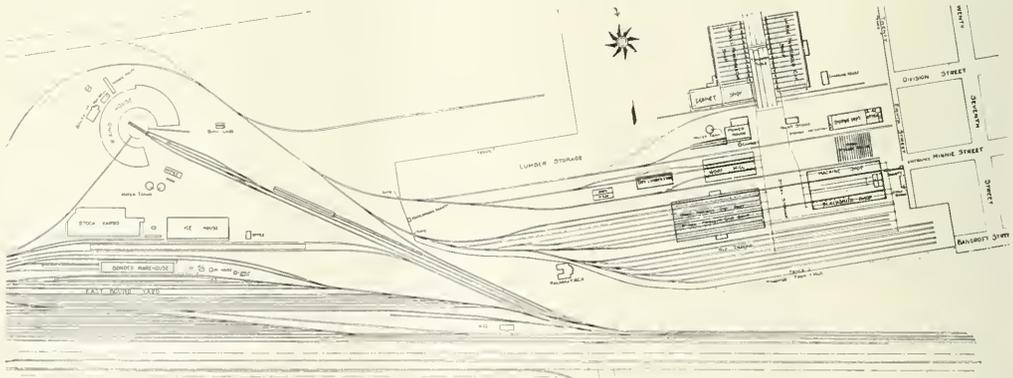
lines. Owing to the large amount of special work in painting and varnishing, the heating requirements in the plant are considerable, requiring about 50,000 sq. ft. of radiation, which is provided by means of cast iron radiators of the wall type and pipe coils distributed as required.

The brick chimney for the boilers is 150 ft. high, 13 ft. 5 in. in diameter at the base, and 6 ft. 6 in. in diameter at the



Interior View of the Wood Mill

top. It rests on a concrete base 30 ft. in diameter, and was built by the Heine Chimney Company of New York. The coal for the boilers is delivered direct to bunkers inside the boiler room by means of hopper cars discharging through a steel trestle having a capacity of two cars in the house. The ashes will be taken direct from the boilers through a pipe conveyor located beneath the floor in the building and rising



General Layout of the New Car Shop at Port Huron

adapted for hand firing because of the large amount of refuse of varied character which will be burned.

The boilers supply heat to the entire plant, power for two steam hammers in the blacksmith shop, and for testing out radiation in cars in the passenger car shops as well as for minor lines for heating water in the cabinet shop, glue room, etc. All steam lines are fitted with an asbestos insulating covering and are laid in concrete trenches in which space is also provided for steam return pipes, air lines to various buildings and tracks, water lines for fire protection and gas

outside to the proper height for delivery direct to a car. The ash ejector was furnished by the American Steam Conveyor Corporation, Chicago, and is operated by the ejection of steam from the boilers at the far end of the conveyor. The carpenter shop and woodmill are fitted with shaving exhaust systems, which delivers wood refuse to the boiler room. The draft for these systems is furnished by a fan arrangement.

The engine room contains two boiler feed pumps, two vacuum pumps, a fire pump, an open type water heater, and two air compressors of 2,500 cu. ft. combined capacity, of

the compound type, specially adapted for use with super heated steam. The superheat of these air compressors may be controlled by proportioning their supply of wet steam.

The machine and blacksmith shop building is 138 ft. by 299 ft. and is planned in a similar manner to the freight car shops, with a fire wall separating the two rooms. A cinder floor is provided in the blacksmith shop.

The woodmill is of frame construction and was built

ence as a result of having to remove one car to get at or remove another. Each compartment is separate from the other and capable of being used independently. The heat will be supplied by means of steam pipes located below the rail level. A special system of air ducts will provide ample air changes which will be capable of regulation. Provision is also made for the introduction of steam as required to check too rapid drying. The walls and the roof are insulated by air cavities so that an even temperature may be maintained.

The general stores building is constructed on the same general lines as the car shops, and is provided with racks and shelves designed especially for the varied stores which have to be carried in stock. Office space for the storekeeper and his staff is provided at one end. The other buildings include the paint stores building, the battery charging room, and a bicycle storage room and a garage at the main entrance. The paint stores building and battery charging room are of fireproof construction.

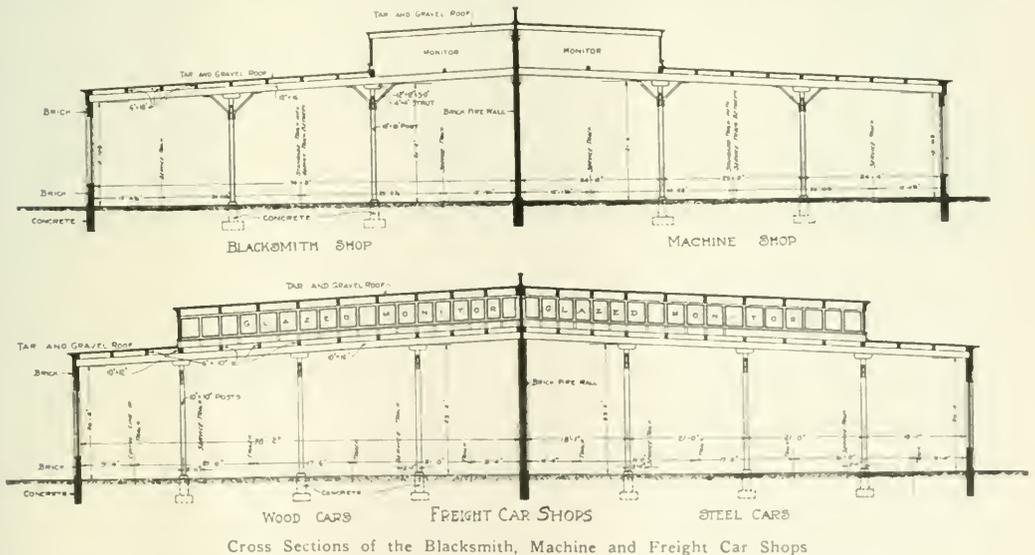
The general offices are attached to one end of the stores building with a brick firewall between. The interior is divided by means of terra cotta hollow tile walls, and the exterior walls are furred with the same material. All interior walls and ceilings are plastered and painted.

The layout provides for ample storage space for wheels, steel, lumber, etc., and special attention has been paid to economical operation. Ample sanitary facilities and lockers are provided in each building for a full quota of workmen when the plant is in operation. Electrical energy for lighting and for the operation of the machines is supplied by the Port Huron Electric Power Company. Provision has also been made for fire protection by the erection of a 100,000-gal. steel storage tank, 100 ft. above the ground line, with a complete system of piping and fire hydrants situated at convenient points. The fire pump in the engine



The Machine Shop Nearing Completion

almost entirely of material, salvaged from a former industrial plant occupying the site. Metal lath and a 2-in. stucco finish gives the building an appearance in harmony with the others. The dry lumber storage building is also of frame construction with a stucco finish. This building also was



Cross Sections of the Blacksmith, Machine and Freight Car Shops

salvaged in its entirety from the industrial plant and moved by a horse and winch one-quarter of a mile to its present location.

The drying kiln is a specially designed building of two compartments with doors at each end. This arrangement permits cars with lumber to enter at one end, and when dried to be removed at the other without any delay or inconveni-

room draws water direct from the city mains and, in connection with the tank, a pressure of 60 lb. is maintained at all times. Hand fire extinguishers are also provided, one for every 2,000 sq. ft. of floor space, or 140 in all. Two fire houses, centrally located, are also provided.

On a portion of the site acquired by the railroad were buildings of frame and brick construction which had been

occupied by an industrial plant. To utilize the land properly for railroad purposes these buildings had to be removed. From these and the old roundhouse and freight car repair shops which were wrecked after the fire, large quantities of usable material were salvaged and utilized in the construction of the new plant with a considerable saving in the requirements for new materials, time and money.

This salvaged material, in addition to an old building which was moved bodily to a new foundation and re-

This entire project has been carried out under the direction of H. R. Safford, chief engineer of the Grand Trunk. The contractor was James Stewart & Company of New York.

Alba B. Johnson Elected President of Railway Business Association

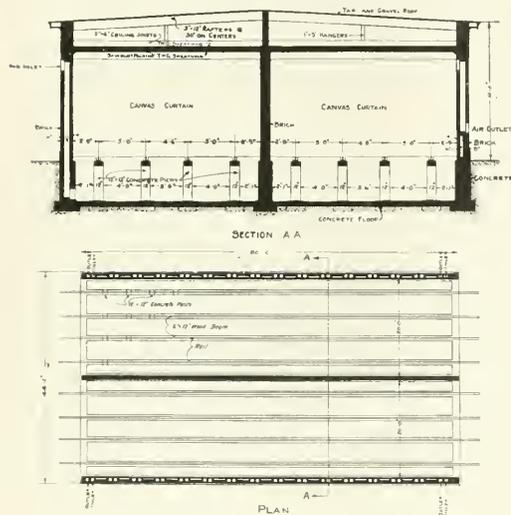
ALBA B. JOHNSON, president of the Baldwin Locomotive Works, was elected president of the Railway Business Association by the general executive committee at a special meeting held in New York, May 23, to take effect forthwith, George A. Post, who has served as president since the association was formed, having declined re-election. This was pursuant to authority given to the committee by the association at its convention in Chicago, April 8. The other elective offices, seven vice-presidents and treasurer will be filled later. The executive members, eight of whose terms have just expired, are appointed by the president. The secretary is a permanent officer during pleasure of the executive committee.

The committee on nominations and organization, in addition to recommending the election of Mr. Johnson, reported progress on organization to meet the problems arising out of adjustment to the new conditions in railway purchasing as discussed at the Chicago convention of the association.

It is expected that the election and re-organization will be completed at a meeting of the general executive committee to be called for some date in June.

Beside his work as a locomotive builder, in which capacity he is thoroughly familiar to the readers of the *Railway Age*, Mr. Johnson has for many years been active in the leadership of business organizations. He was chairman of several of the Foreign Trade conventions and president of the American Manufacturers' Export Association. He was the leader in the movement two or three years ago for strengthening and reorganizing the resources and service of the Philadelphia Chamber of Commerce, and is now president of the Pennsylvania State Chamber of Commerce. It was at the annual meeting of the Chamber of Commerce of the United States at Chicago in April that Mr. Johnson delivered his now well-known address urging a wide latitude for the individual railway manager in determining what locomotive designs are best adapted to the conditions under which he operates, and also urging that in whatever standardization might be attempted care should be taken to facilitate rather than obstruct mechanical progress.

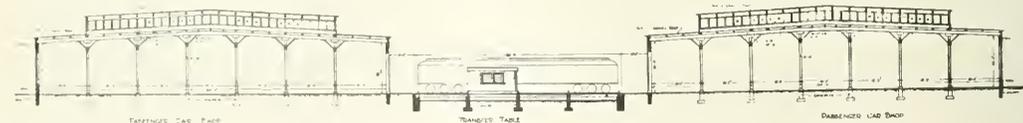
News that Mr. Johnson had consented to undertake the presidency of the Railway Business Association was received



Section and Plan of the Dry Kiln

modeled, included 517,000 ft. b.m. of timber of all sizes, 900,000 brick and miscellaneous materials. The new wood mill requiring approximately 35,000 ft. b.m. of timber was built almost entirely of salvaged materials and the second-hand timber was utilized in other buildings for plank flooring, sheathing, rafters, sleepers, forms for concrete, sheet piling, etc. The salvaged brick were used as backing in the new brick buildings.

The miscellaneous materials recovered included 400 wood and 30 steel sash, 8,600 lb. of steel rods, bars and angles which were used as reinforcing in concrete lintels and in foundation work, and 8,000 lb. of steel utilized for anchor bolts, dowels, straps and plates. Also, several thousand



A Sectional View of the Passenger Car Shops

hangers and brackets used in connection with the heating equipment, etc., were manufactured on the site from second hand material by company blacksmiths. A considerable quantity of miscellaneous material such as pipe, fittings, valves, etc., were likewise salvaged from the industrial plant which was abandoned and a material saving in expense, as well as time, was effected by this arrangement owing to the rapidly increasing costs of new material and the difficulty in getting prompt delivery.

on all sides with expressions of gratification that a man so engrossed in operations on as large a scale as Mr. Johnson should have regarded the work of the Railway Business Association as a call which he ought not to decline, and of confidence that with his prestige and personality he would command the hearty support both of the members and of many other manufacturers whom it is hoped to enroll in view of the new conditions under which railway purchasing is now done.

Doings of the United States Railroad Administration

Bituminous Coal Prices; the Federal Managers; Standardization of Operating Statistics

New Regional Directors

DIRECTOR GENERAL McADOO has announced the appointment of N. D. Maher, president of the Norfolk & Western, as regional director of the new Pocahontas Region, with office at Roanoke, Va., and of B. L. Winchell, director of traffic of the Union Pacific System, as regional director of the Southern Region, with office at Atlanta, Ga., both effective on June 1. Mr. Winchell succeeds C. H. Murkham, whose appointment as regional director of the new Allegheny Region, with office in Philadelphia, was announced last week.

The Pocahontas Region will include the Chesapeake & Ohio east of Louisville, Ky., Columbus and Cincinnati, O., including the Chesapeake & Ohio Northern, the Norfolk & Western and the Virginian and the terminals and harbor operations of all lines reaching Hampton Roads. In accordance with the policy announced by the director general last week that the regional directors, as well as the federal managers, will be required to sever their official relations with the particular companies and to become exclusive representatives of the Railroad Administration, Mr. Maher has

Administration apparently regarded the corporations as its agencies, but only a short time was required to demonstrate that the corporations and the government bore to each other the relation of landlord and tenant and the impossibility of an officer in authority being able to serve both at the same time with equal loyalty has become increasingly evident as the negotiations between the government and the representatives of the corporations regarding the contract for the compensation of the railroads have progressed. Some of the leading railroad counsel have been transferred from the operating to the corporate organizations, as have the chairmen of boards or of executive committees, and they have been free to represent the interests of the stockholders in their relations with the government unreservedly. But on some roads the president performs the function of chairman and the necessity for vigorously supporting the interests of the stockholders in dealings with the government while at the same time working for the government and in effect on its payroll as an operating officer has created an embarrassing position for many railway executives which was apparent on both sides. Moreover, many railway officers do not like some of the policies which the Railroad Administra-



B. L. Winchell
Regional Director of the Southern
Region



N. D. Maher
Regional Director of the Pocahontas
Region



W. J. Cunningham
Manager, Operating Statistics Section,
Division of Transportation

resigned as president of the Norfolk & Western and Mr. Winchell as director of traffic of the Union Pacific and both have severed all connections with corporate interests.

Federal Managers

The director general's announcement of the plan of appointing federal managers for each railroad property has caused more comment than any action taken since the government assumed control of the railroads. The dramatic effect of a proposal to displace some 200 of such powerful individuals as railroad presidents have been popularly supposed to be has led to some misunderstanding of the purpose of the plan and undue prominence has been given in many of the published reports to the idea of friction and lack of co-operation between the railroad officers and the administration. While it is known that there have been some instances of friction it has been due primarily to an inherent difficulty in the situation. For a time the Railroad

Administration is putting into effect and undoubtedly welcome an opportunity to retire gracefully from any active part in carrying out the government's program while continuing their former relation to their companies.

Pending the selection of the federal managers the railroad presidents will continue in charge of the operation of their properties, although the impression has been created by the newspapers that they were all deposed when the announcement was made that federal managers would be appointed. The selection of the federal managers is being made upon recommendations of the regional directors. It is probable that a considerable number of the presidents who are particularly operating officers will be retained in charge of operation as federal managers, leaving the corporations to be represented by the chairmen. It has already been announced that Samuel Rea, president of the Pennsylvania and Daniel Willard, president of the Baltimore & Ohio will remain with the companies rather than become identified

with the Railroad Administration. It is stated at Mr. McAdoo's office that this is of their own volition and that of their identity and that no special action has been taken in case of either of them, but it is understood that they were called to Washington recently and informed of the intention to appoint federal managers for their roads.

While the official statement referred to the preservation of the identity of each railroad as a unit except so far as may be necessary, the boundary lines of the new regions which have been created will place several large systems in two regional jurisdictions and it is understood that in the case of the Pennsylvania and possibly the Baltimore & Ohio and some other systems separate federal managers will be appointed for the eastern and western lines, reporting to the regional director for the territory in which the lines in their charge are located.

Railroads to Pay More for Coal

President Wilson has settled the protracted controversy between the Railroad Administration and the Fuel Administration as to the price to be charged the railroads for coal, by a compromise under which the railroads will pay the regular government price fixed for all consumers by the Fuel Administration, but instead of giving the coal operators the benefit of the increase it will be used to reduce the general price of bituminous coal by 10 cents a net ton. It is estimated that this will increase the railroad fuel bill by approximately \$45,000,000 per annum, or an average of about 25 cents a ton, while it will save consumers in general about \$60,000,000. The railroads have always obtained their coal at a price considerably below that paid by other consumers, because they use such a large proportion of the coal output of the mines and because they were able to guarantee a car supply to the mines producing railroad fuel coal. This reduced the overhead expenses of the mine operators. When the government prices for coal were fixed last year the railroads in most cases were not affected because they had already made contracts for the coal year beginning April 1. As these contracts were about to expire this spring, John Skelton Williams, director of the division of finance and purchases of the Railroad Administration, endeavored to have the railroad contracts renewed at a low figure, but the Fuel Administration took the position that the railroads should pay the same price as all other consumers. This would mean a large increase in the operating expenses of the railroads and the plan was opposed by the Railroad Administration, which took the position that there were sound business reasons for selling coal to the railroads at a differential price whether or not they were controlled by the government. The controversy was referred to President Wilson, who had already established a precedent by ruling that the government should pay the same price for steel and other materials that it had fixed for other consumers. The railroad officers connected with the administration, however, advanced the argument that if the railroad price was to be increased, the coal operators would thereby receive such a large additional profit as to justify a reduction in the general price and this position was finally sustained by President Wilson.

The Fuel Administration has, therefore, issued an order, under the authority of the President, directing that all prices for bituminous coal, f.o.b. mines in the coal producing districts throughout the United States, fixed by the executive order of August 21, 1917, and subsequent orders of the Fuel Administration, should be reduced as to all shipments made after 7:00 a. m. on May 25, 1918, by the sum of 10 cents for each net ton of 2,000 pounds.

Another question raised in connection with the dispute as to the price of coal involved the question of disposition of coal cars, the Fuel Administration urging the abolition of the practice of giving mines furnishing railroad fuel a pref-

erential car supply. This point was resolved in favor of the Fuel Administrator. A statement issued by the Fuel Administration says that the reduction will mean an annual saving to consumers estimated by the Fuel Administration at \$60,000,000, and that the increased cost of railroad fuel occasioned by the President's order is also estimated at \$60,000,000 per annum. The reduction of 10 cents per ton on all coal will, however, reduce the net increased cost to the railroads from \$60,000,000 to \$45,000,000 per annum.

"Under the President's plan," the statement says, "the railroads will furnish cars to all coal mines alike without discrimination except as dictated by the prior requirements of the railroads for operating purposes and the needs of domestic consumers and of the war. Under the present war demands the maximum output of every mine, working at full time, would still be insufficient to meet the country's coal needs. The principle of equal car supply has accordingly been adopted so as to make for as steady an operation as possible of all properties and for continuous employment of men, thus making for maximum output. The introduction of the principle of even car supply will reduce the general average of overhead of mine operation and thereby justifies the administration in putting out a price reduction order."

The order has no effect on the price of anthracite coal.

Reduced Fares for Soldiers and Sailors

Under an order issued by Director General McAdoo, soldiers and sailors of the United States forces when furloughed and traveling at their own expense will be granted a rate of approximately 1 cent per mile for travel on railroads under control of the government. Agitation for reduced rates for soldiers and sailors has been going on for some time and several bills have been introduced in Congress for the purpose. The director general's statement said that the reduction was in realization of the fact that the payment of full railroad fare means a serious hardship to soldiers and sailors who desire to visit their homes before going overseas. The order is to be effective as soon as necessary details can be completed and the fare will be available on delivery to ticket agents of certificates signed by commanding officers. Such certificates of standard form will be prepared and distributed with the utmost promptness.

Committee on Operating Statistics

For the purpose of standardizing operating statistics and of keeping the Railroad Administration currently informed as to the results of railway operations as revealed by the statistics, the operating statistics section of the division of transportation has been created with W. J. Cunningham, James J. Hill, professor of transportation at Harvard University, as manager, and Joseph L. White, formerly statistician in the comptroller's office of the Union Pacific System, as assistant manager. To assist in the inauguration of the work, an advisory committee on operating statistics has been formed with Mr. Cunningham as chairman, and including also J. J. Ekin, general auditor, Baltimore & Ohio; J. G. Drew, vice-president Missouri Pacific; George R. Martin, vice-president, Great Northern; H. W. Mackenzie, comptroller, Seaboard Air Line, and W. C. Wishart, statistician, New York Central.

The operating statistics section has now been at work about three weeks and has received copies of the operating statistics forms used by the various railroads, which are being studied with a view to the permanent adoption of possibly seven or eight standard forms, which will not only be uniform in size and form, but will also employ units compiled on the same basis so that comparisons between different roads may be made on the basis of standard units. The idea is to introduce into the field of operating statistics a uniformity such as has been introduced into the accounting classification by the Interstate Commerce Commission. This will

enable the administration more readily to check up and compare the results being obtained on different roads. While the preliminary work of the committee consists principally of the initiation of a standard system of statistics it is to be continued with the function of collecting and analyzing the statistical returns.

Prof. Cunningham, who is on a leave of absence from Harvard University, has had an extensive experience in railway work and at the time he was appointed to the professorship in 1916 he was president's assistant on the Boston & Maine.

Transportation Charges Put on Cash Basis

The collection of transportation charges by carriers under federal control has been put on a cash basis, effective on July 1, by General Order No. 25 issued by Director General McAdoo, which provides that as of that date credit accommodations shall be cancelled which may be in conflict with the following regulations:

(1) Tickets shall be sold only for cash in advance of service. Baggage charges are subject to the same rule as tickets, except C. O. D. baggage and storage charges, which must be paid in cash before delivery.

(2) In cases where the enforcement of this rule, with respect to freight, will retard prompt forwarding or delivery of the freight or the prompt reless of equipment or station facilities, carriers will be permitted to extend credit for a period of not exceeding 48 hours after receipt for shipment of a consignment if it be prepaid, or after delivery at destination if it be a collect consignment, provided the consignor if it be a prepaid consignment, or the consignee if it be collect, file a surety bond either individual or corporate, in an amount satisfactory to the treasurer of the carrier. The form of such bond shall be prescribed by the chief legal officer of the individual carrier, conditioned upon and providing for payment of all charges within 48 hours after forwarding or delivery of the freight. Upon receipt and acceptance of such bond a carrier may accept and forward prepaid consignments or may deliver collect consignments in advance of payment of all charges thereon to the amount covered by the bond. Failure to pay such charges within the time prescribed will automatically cancel such credit.

(3) Treasurers of individual carriers are required to arrange and conduct all matters relating to such credits. They shall designate the amount, and accept or reject the surety offered. Bonds may be required and accepted for individual consignments or blanket bonds may be accepted from individual shippers or consignees to cover all of their consignments for a given period; the period of the credit in such cases shall, however, be limited to 48 hours on each shipment as prescribed in the preceding paragraph.

(4) In case of any question as to the accuracy of charges, bills must be paid as rendered and claims presented for alleged errors. This will not prevent adjustments by agents of obvious errors.

(5) Freight consigned to "order" or to "order notify" shall be delivered only upon surrender to the agent of the carrier. If the original bills of lading for such freight, and the payment of the freight charges thereon as herein provided. Provided, however, if such bill of lading be lost or delayed the freight may be delivered in advance of surrender of the bill of lading upon receipt by the carrier's agent of a certified check for an amount equal to 110 per cent of the invoice, or upon receipt of a surety bond either individual or corporate acceptable to the treasurer of the carrier in an amount for twice the amount of the invoice.

(6) The extension or creation of local collection bureaus or agencies will be authorized by the director of public service and accounting, as and when such bureaus may be found to be necessary or expedient.

(7) Bonding or underwriting arrangements with respect to credits extended, now in effect by individual carriers, shall be discontinued as of July 1, 1918, or as soon thereafter as existing contracts are terminable.

(8) Advice of the foregoing regulations shall be promptly given to all to whom credit accommodations are now extended, so that the regulations may be put into effect at the time specified with as little inconvenience as possible.

(9) Payment of transportation charges by check will be considered as a payment in cash if the check is immediately cashed or cashed as it is known to the agent to be fully cashed. Checks are not to be taken or cashed by agents under any circumstances except for transactions in charges.

(10) Until otherwise ordered the business transacting in transportation services rendered other than to agents of the federal government.

For the purpose of preventing inconvenience which might result from a rigid interpretation of the order, C. A. Prouty, director of the division of public service and accounting, has issued an explanatory circular as follows:

"The director general is about issuing an order putting the payment of all transportation charges upon a cash basis, and is especially desirous that this shall result in as little inconvenience as possible to the public. The rule should be interpreted in a practical business way. If, for example, the consignee who is financially responsible, is accustomed to send for his freight in the morning and the collection of the freight charge is effected in the afternoon, that should be treated as a cash transaction so long as the

consignee continues to pay its freight charge promptly upon presentation of the freight bill. Similar application of the rule should be made in the collection of a prepaid charge from a shipper. That is to say, payment of such a charge if made on the day the shipment is forwarded will be treated as a cash transaction.

"The enforcement of the cash rule will require payment by the shipper and consignee for the most part, without opportunity for the correction of errors in the freight bill, but in all cases where a mistake is obvious or where it is plainly indicated upon the face of the bill, the agent should make the correction before exacting payment.

"The director general is also anxious that the public shall understand that the reason for the promulgation of this order is to prevent discrimination between shippers and consignees. The extending of credit in the payment of transportation charges to one person while it is denied to another results in a preference in favor of the person to whom credit is given. While repeated attempts have been made in the past to check this evil, competitive conditions have rendered it impossible to do so. At the present time many shippers and consignees, especially large ones, enjoy with respect to many of their freight bills a credit not only of days but of weeks and sometimes of months. There seems to be no way of dealing with this except to enforce the cash rule.

"The director general further instructs me to say that he has under consideration rules, which will be promulgated in the near future, touching upon the settlement of overcharges and claims for loss and damage which he believes will result in the prompt and fair disposition of such matters with a minimum of inconvenience to the public."

Suits Against Carriers in Remote Jurisdictions

The Railroad Administration is taking vigorous steps to do away with the practice of prosecuting suits against carriers in remote jurisdictions, such as suits for personal injury, freight and damage claims, etc., which has caused a great deal of unwarranted expense to railroads in the past. In General Order No. 18, issued on April 9, the director general ordered that all suits against carriers while under federal control must be brought in the county or district where the plaintiff resides, or in the county or district where the cause of action arose. The order was later amended slightly in the interest of convenience. The director general has now issued a further general order, No. 26, to provide that such suits now pending shall not be brought to trial during the period of federal control, although new suits may be instituted in the proper place.

The order recites that "There are now pending against carriers under federal control a great many suits for personal injury, freight and damage claims, and that the same are being pressed for trial by the plaintiffs in states and jurisdictions far removed from the place where the persons alleged to have been injured or damaged resided at the time of such injury or damage, or far removed from the place where the causes of action arose; the effect of such trials being that men operating the trains engaged in hauling war materials, troops, munitions or supplies, are required to leave their trains and attend court as witnesses, and travel some times for hundreds of miles from their work, necessitating absence from their trains for days and sometimes for a week or more; which practice is highly prejudicial to the just interests of the government and seriously interferes with the physical operation of railroads; and the practice of trying such cases during federal control, in remote jurisdictions is not necessary for the protection of the rights or the just interests of plaintiffs."

It is therefore ordered that upon a showing by the defendant carrier that the just interests of the government would be prejudiced by a present trial of any suit against any carrier under federal control which suit is not covered

by General Order No. 18 and which is now pending in any county or district other than where the cause of action arose or other than in which the person alleged to have been injured or damaged at that time resided, the suit shall not be tried during the period of federal control; *Provided*, if no suit on the same cause of action is now pending in the county or district where the cause of action arose, or where the person injured or damaged at that time resided, a new suit may, upon proper service, be instituted therein; and if such suit is now barred by the statute of limitations, or will be barred before October 1, 1918, then the stay directed by this order shall not apply unless the defendant carrier shall stipulate in open court to waive the defence of the statute of limitations in any such suit which may be brought before October 1, 1918.

"This order is declared to be necessary in the present war emergency. In the event of unnecessary hardship in any case either party may apply to the director general for relief, and he will make such order therein as the circumstances may require, consistent with the public interest. This order is not intended in any way to impair or affect General Order No. 18—as amended by General Order No. 10-A."

Safety Work Being Organized

Rapid progress is being made by H. W. Belnap, manager of the safety section, with plans for establishing safety committees on every division of every railroad in the United States. While the majority of the roads in the past have had safety organizations, some of them have been much more active than others and Mr. Belnap, in consultation with some of the principal safety officers of the railroads, has been making a study of the various forms of organization with a view to establishing a uniform plan of organization on all of the roads and of prosecuting the work vigorously in all sections of the country. At a meeting in Mr. Belnap's office on May 23 and 24, attended by about 15 of the heads of the safety organizations of the larger roads, a general plan of organization was adopted, which follows closely the organization adopted by an auxiliary committee of the committee on transportation of the American Railway Association appointed in 1913 to consider the best method of promoting the widespread establishment of safety first organizations. Mr. Belnap is receiving hearty co-operation from the men that have been prominent in the safety first work on the railroads and is planning a vigorous campaign to extend safety and accident prevention work to every division. As there are approximately 1,000 railroad divisions in the country and as the safety committees will average possibly 20 men, it is expected that an organization of 20,000 men will shortly be engaged in the campaign for inculcating safety ideas among the railroad employees.

A. C. Needles, vice-president of the Norfolk & Western, has been appointed federal manager of that road and L. E. Johnson, chairman of the board, was elected president to succeed N. D. Maher, appointed regional director of the Pocahontas Region.

Short Lines

The question of the attitude of the Railroad Administration toward the short line roads is still arousing much interest and discussion. While a considerable number of such roads have already been practically relinquished at their own request, the names are not being made public pending the decision as to the others. A. H. Smith, regional director for the eastern railroads, recently gave out in a circular a list of 87 short line roads as having been relinquished. This has been rather widely published but at the offices of the Railroad Administration it is stated that a tentative list was given out through some error or misunderstanding and now Mr. Smith has issued another circular stating that it has been concluded to cancel the list and that the lines will

be further considered. Meanwhile the railroad presidents were directed to countermand any action based thereon. Of the 87 in the list only 12 had been relinquished and some of them never were under federal control. Instructions were issued that the universal interline waybill must be used by roads not under federal control if they expect to use joint rates.

In connection with the short line situation John Barton Payne, general counsel for the Railroad Administration, wrote the following letter to Senator Overman on May 18:

"Apropos of your discussion of the Carolina & Yadkin River Railway:

"I beg to call your attention to the very great difficulties which the Railroad Administration confronts with reference to the short line roads. You know, of course, that many people believe that the government should take these roads and operate them. Many of them are not necessary for any government purpose, but it is a matter of profound interest that they be continued in operation, because they serve the highest needs of many local communities. What is best has given the director general and his staff great anxiety.

"I submit the following suggestions as to a solution of the problem:

"(a) If the roads are taken over by the government, there will be an immediate raise in wages of all employees in keeping with the wage adjustment which has just been made with the trunk lines, and there will be a demand for an improvement in service and an improvement in general conditions on the lines, so as to bring the roads up to the standard of the trunk lines. This will be due to the fact that they are under government control and the government should treat everybody alike.

"(b) It seems to me that the roads themselves, the communities, and the government will be benefited if the following happens:

"(1) That the government see that the short line roads have a fair division of the joint rates; in many cases heretofore they have not enjoyed a fair division.

"(2) Also an increase in rates—this must be by the state commissions—so as to keep them on a parity with the rates on the trunk lines, which must be raised to meet existing conditions; also the government will see that the roads are furnished, as far as possible, with an adequate supply of cars, so that they may serve the public, and that the freight shall not be so routed as to discriminate against these lines.

"Please advise me whether, in your opinion, if the administration adopts such a policy as is here outlined, it will not best serve the public and the government."

New Appointments

C. R. Capps, traffic assistant to the regional director of the Southern Region at Atlanta, Ga., has been appointed traffic assistant to C. H. Markham, regional director for the Allegheny Region, with office at Philadelphia, and A. R. Smith, vice-president in charge of traffic of the Louisville & Nashville, has been appointed traffic assistant to the southern regional director, with office at Atlanta, succeeding Mr. Capps.

The Troop Movement Section of the division of transportation has been created and George Hodges, chairman of the Committee on Relations Between Railroads of the American Railway Association, has been appointed manager of the section with office in the Homer building, Washington, D. C. The troop movement section will arrange for and supervise the details of the movement of troops with their impedimenta, routing, provision of equipment, etc. Mr. Hodges has been in charge of this work since the entrance of the United States into the war, first, as secretary of the Committee on Co-operation with the Military Authorities, later as general secretary of the Railroads' War Board, and since the government took over the railroads, as the representative of the American Railway Association.



Eugene McAuliffe
Manager, Fuel Conservation Section,
U. S. Railroad Administration



R. H. Aishton
Regional Director, Western District,
United States Railroad Administration



Thomas Britt
Chief Fuel Agent, Canadian Pacific

Annual Convention of the Railway Fuel Association

The Proceedings Were Dominated from Start to Finish By
an Enthusiastic Spirit of "Win the War"

THE OPENING MEETING of the International Railway Fuel Association was reported in the *Railway Age* of May 24, 1918, page, 1287. In addition to the papers published in that number, addresses were delivered at the first day's session by R. H. Aishton and Thomas Britt. These are given in part below.

The Railroads and Their Relation to the Fuel Problem

By R. H. Aishton

Regional Director, Western District, United States Railroad Administration

I was appointed Western regional director last January, just about the time that we were in the thick of the fuel problem, and I give you my word that the railroad's relation to the fuel problem last winter was a big one. I never want to go through such an experience again; and neither do the railroad men. There were times when there was not four hours' fuel in this city. If, by any effort of mine, and any effort of yours, we can prevent that thing occurring again, let's do it. Unless we do it, the coming winter is going to be much worse than last winter.

Facing what we face now, this association has the greatest opportunity ever laid before any set of men in the world. Our duty plainly is to support the men in uniform "over there." Suppose that we get the same enthusiasm on this fuel question—the same patriotic impulse on the part of every man in the vast army of two million railroad men in this country, that was shown in the Liberty Loan drive. There would not be any fuel famine; there would be no difficulty. There would not be any railroad problem if we would just do that. If we save one scoop of coal an hour on each locomotive it will save 765,000 tons of coal, or 17,000 carloads a year. Does any man in this audience believe he cannot do that? You may think that it is putting a heavy load on the fireman or the engineer. But there are a hundred ways in which coal can be saved other than through the engineer and fireman, and there is scarcely a man on a railroad that does not have some relation to coal saving.

Take the man in the shop. The intelligence put into the work and its inspection has an immediate effect on the

amount of coal a locomotive burns. The car man can have an immediate effect on coal consumption in the care of journals and lubrication. The train dispatcher, with a little more energy and forethought in ordering his trains over the road, can save just as much as the fireman. The agent at the country station may keep a train waiting two or three minutes. The enginemen have to burn coal generously to make up the time lost through the agent's carelessness.

There has been a great shift in the movement of traffic in this country that very few people realize. When war broke out nearly four years ago it changed the flow from every coal-producing field in this country. Before the war all the vessels that came across the water were loaded with Newcastle coal, enough to bring them here and take them back. But the minute war broke out they reversed the operation. They took coal from us at Baltimore, Boston and everywhere else to carry them over there and bring them back. They couldn't get coal over there.

There was a tremendous growth of business in the Central Eastern manufacturing territory and New England. That shifted the movement of the coal in the West and the East, and we had to change the movement of our coal in Illinois, Indiana and Kentucky and take it into other districts. That readjustment is constantly going on.

Not only railroad men but the people who mine the coal can help. I worked in a mine myself once, and I know how much gobs, as they call it, can come up in a car of coal, and I know what an awful mess it makes when you attempt to put it in the firebox. That's a point on which the miners can help.

What can the operator who sells the coal do? I know of coal being mined in Illinois that is hauled on one railroad three or four hundred miles to the City of Chicago and then switched to the line of another railroad; there is a drop-off which reaches the same point. We are trying to put arrangements whereby, for instance, coal from the hub mines will come over the Burlington and not over the C. & N. W. and we are building our terminals over with that end in view.

Then there is the consumer. I don't think the consumer has reached the point where he realizes that the saving of an hour or a day in the unloading of a car of coal means anything. He must realize that it may save some soldier's life over in France. All of us—railroad men, consumers and

everyone who has anything to do with this movement—must get into the attitude expressed in Order No. 8 issued by Director General McAdoo on February 21.

Suggestions for Saving Coal

By Thomas Britt

General Fuel Agent, Canadian Pacific

Mr. Britt, who attended the convention as the representative of Sir George Bury, chairman of the Canadian Railways' War Board, spoke in part as follows:

There is an apparent annual shortage of over 50,000,000 tons of coal to be made up by elimination of wastage. What are we going to do to conserve fuel and thus help win the war?

First of all—what are we doing? The most drastic feature of our program has been the reduction in passenger service with a simultaneous increase in freight traffic; this, of course, as a matter of sheer necessity to meet war requirements. In the handling of freight we are seeking to apply the well-established principle, that the greater the speed, the greater the consumption of coal. Hence fast freights are by no means a desideratum. In addition we have endeavored to run our freight trains at full capacity tonnage, thus securing the maximum results with the minimum of fuel consumption. Another feature of fuel conservation is the elimination of needless delays by a careful arrangement of schedules and rapid despatching.

To say that good engineering is an essential element in the process of conserving fuel is to mention a basic principle. Our locomotive and boiler-house firemen cannot be too well instructed on this point; with them, in the final analysis, rests the successful issue of our present campaign. Mechanical devices such as superheaters, automatic fire doors, etc., may accomplish a great deal in avoiding unnecessary wastage, but certainly the human element is the dominant factor—we cannot get away from it. Give us a body of expert and conscientious firemen, and I dare say the problem is solved. Our firemen are as loyal as any group in the service, but quite frequently they fail to grasp the seriousness of the situation that confronts us, as well as the importance of the occupation which is theirs.

Another tangible means of saving coal to win the war is to substitute wherever possible, utilizing gas-house coke for heating stations, etc. A considerable amount of scrap wood can be utilized as fuel in shop boilers; old ties can be gathered up and burned for the same purpose.

I might more earnestly ask in exchange for our share in this worthy enterprise that our railroads be not overburdened any longer with a lot of foreign matter under the guise of coal. I have found it necessary to have whole carloads of this extraneous matter dumped into the ditch, it being absolutely worthless as fuel for any purpose. There is certainly no economy there. The situation is much worse if such matter finds its way into ships' bunkers—transports especially—for then the lives of thousands are placed in needless jeopardy. A remedy must be found for all this, and I have no doubt that the government will insist upon the proper cleaning of coal at the mines.

The overloading of tenders has been the cause in the past of an incalculable waste. Thousands of tons have been lost by scattering coal along the highway. Measures have been taken to avoid this frightful deficit, and yet observation along the right-of-way of our railroads would indicate that there is still room for improvement. Ashpits also are frequently a source of wastage.

Looking at the question in a broad way, is it not quite evident that we are just beginning to wake up to the necessity of economy? Moreover, have we not literally squandered our inheritance by failing to economize? Now that the times are critical, we are endeavoring to amend matters. The pinch of want together with the soaring of prices are making us all realize that our only salvation lies in saving.

The Need for Fuel Conservation

By P. B. Noyes

Director, Bureau of Conservation, United States Fuel Administration

The solution of the war fuel problem is a task quite beyond the power of any administration or administrator. It lies in the hands of a thousand agencies and millions of men. It is because the men gathered here can do more to help the Fuel Administration serve the war than any similar group in the country that Mr. Garfield has taken such a keen interest in this convention.

The coal supply is short. Last winter it was short and the immense new requirements for war purposes threaten to make it shorter still the coming winter. The data we have compiled show that 625,000,000 tons of bituminous coal will be needed this year. The mines which must get out the coal, and the railroads which must carry it, were pressed nearly to their limit before the war. They cannot take on 200,000,000 tons of additional production. Fix your minds on what you know of the burdened condition of the leading railways three years ago. Add to this the tremendous burden of war supplies, troop transportation, material for ship building, and food for our Allies, and then picture to yourself what it means to those same railways with facilities little if any greater than three years ago, to provide transportation for 200,000,000 additional tons of coal. Conceive of this increase as 16 solid trains of gondola cars filling 16 tracks from New York to San Francisco. A veritable freight yard filled with coal cars extending the breadth of this continent. And this represents only the *increase* of coal transportation demanded of the railroads. All of those four million cars must be switched in and out and carried hundreds of miles by our already burdened transportation system if war demands are to be met and the usual industrial life of the country be at all preserved.

The coal business is in physical proportions so far beyond any other business in the country that emergency remedies which can be successfully applied to any of the others will hardly make a dent in the coal shortage. To meet the demands this year 12,500,000 tons of bituminous coal must be hauled every week. And yet, the success of the war is likely to depend just on this supply of coal. Coal to manufacture supplies and ammunition on a greater scale than Germany, and coal to transport these supplies and transport millions of men both in this country and across to Europe, is the first essential of our success. Behind this we have the necessity for coal to maintain life at home, to preserve our economic system and keep our ordinary industries running and keep labor employed. As much coal as was mined last year will be needed this year for war purposes alone. We must save 65 or 70 million tons or go to the restriction of so-called non-essential industries.

There has been much talk of shutting down non-essential industries but a little investigation shows that only a short distance down this road lies financial ruin and unemployment of labor on a scale which would bring disaster at home and failure in war. At least twenty billion dollars of capital is invested in legitimate manufacturing enterprises producing goods not strictly needed for the war. Ten million men support their families from the work they do in these factories.

All responsible agents of the government now realize that keeping labor reasonably employed and only taking it away from non-war work as fast as it can be employed on war work, is nearly as important for success in this war as the manufacture of munitions and ships. Granted that we must have 100 per cent fuel for munitions and ships, we shall fail as a nation if we do not provide this without a complete breakdown of our industrial system.

Here is a new aspect of fuel economy. You have often

been told how a shovelful of coal saved means more guns and more ships and more supplies for our soldiers. Have you realized that the only hope of keeping our other industries going and the great working population of the country prosperous and happy lies in a greater production of coal than seems at this time possible, or in a saving of coal now wasted by carelessness?

Fuel is a small part of the raw material of most manufacturing institutions. The fuel expense in most highly organized industries is little over one per cent of the total cost of the goods. On the other hand, this one per cent. is absolutely vital. Without it the factory closes. The other 99 per cent are useless. We are called upon to view a ton of coal as equal to five or six hundred pounds of ship plates or shells, but every ton of coal saved for our factories means the employment or non-employment of a hundred men.

This is the new idea I wish to bring you today. That over and beyond the desperate need of coal for war purposes lies an equally desperate need of coal to preserve the lives and happiness of the population. The threatened shortage of coal can easily mean unemployment and financial ruin.

Those of you here who produce coal should realize that every extra ton you take out of the mine is likely to keep a hundred extra workmen from idleness and you who are re-

enthusiasm or other stimulus, gets up to 75 per cent of his possible, is a brilliant success in his field of endeavor. The background of this terrible war is raising the efficiency of every man and woman in the United States. The more the meaning of the war has come home to us, the more we have approached our possible efficiency. This is a real force and should be applied directly to fuel economy.

There has been much discussion as to what will "win the war." Not every one, I fear, has faced the terrible alternative of what it would mean to lose the war. Let me tell you what I think it would mean.

Only once in civilized times has a single race dominated the world. Only once has a swollen tyranny proved so powerful that no human power could oppose it. The Roman Empire was such a world dominion—brutal, restless. The Roman Empire could not be destroyed from without—it died from internal decay. But what did this mean to the world? The Roman Empire was one thousand years decaying. A thousand years known in history as the "dark ages." For a thousand years civilization and all that it stands for went backward into darkness.

Here is the black threat of the present struggle as I see it. Another brutal autocracy threatens to slip the leash and get beyond the power of civilization's curb. Another world



P. B. Noyes

Director, Bureau of Conservation,
United States Fuel Administration



John P. White

Labor Advisor, United States Fuel
Administration



Harry N. Taylor

Vice-President, Central Coal & Coke
Company

sponsible for consuming the coal can enjoy the thought, when faithfulness and care have saved a ton, that you have thereby made a hundred families happy. If you remember that railway locomotives burn more than a quarter of all the coal mined in the country, you will not accuse me of exaggeration when I say that it is in your power and in the power of the railway firemen and the organization with which he works to save enough coal to turn threatened national disaster into national prosperity.

Fuel economy in a scale which will really save the country from industrial disaster demands first, a study of methods and, second, a willingness to take pains. I am especially interested today in getting through to you the full significance in this crisis of every man's "doing his best."

It has been rightly said that if every man who burns coal will do the very best he knows how without a word of new information, the saving effected will result in plenty of coal for every purpose. Under the present stimulus, I credit every one with giving more attention to economy than ever before, but this matter of doing one's best is relative. It is proportioned to the background of necessity which lies in our minds.

Few men ever reach 100 per cent of their possible efficiency. Most of us never reach 50 per cent. Any man who through

dominion, another Roman Empire. And it is not of the tyranny, the slavery and misery of that world empire in its heyday that I am thinking. It is of the ages of decay. For a thousand years, perhaps five thousand, the world would struggle in darkness while the German Empire was decaying. In my mind, we are not struggling for the happiness of our children or grandchildren. It is for 50 generations which, if we fail to win this war, may flounder in the black mire of a powerful but decaying German Empire.

It is with such a background that I appeal to you to make the efficiency of your work one hundred per cent perfect. Start today the real campaign, the most practical campaign, the every-man-do-the-best-he-knows-how-campaign. Miraculous results will follow.

A paper on the fuel oil situation was prepared by M. L. ReQua. In his absence the paper was read by Robert Collett, assistant manager of the Pierce Oil Corporation.

The normal increased consumption of fuel oil for the year 1918, based upon the average increase over a period of 14 years will approximate something over 20,000,000 bbls. An abnormal increase due to war conditions will probably greatly add to this amount.

The only possibility for reduction in consumption is that induced by high prices. To what extent this may retard

business is uncertain, but the consensus of opinion is that it will have small effect owing to war conditions. We are, therefore, faced with the necessity of handling a tonnage considerably in excess of last year, viewed solely from the standpoint of railroad transportation.

As you are aware, a large percentage of the tank steamers which have hitherto supplied the Atlantic coast refiners with their supply of crude oil from Mexican and Gulf ports have been taken over by the navy for trans-Atlantic service.

As a consequence a material readjustment in transportation facilities becomes necessary. The deficit caused by the taking over of the tank steamers, as well as by the increased consumption, will have to be made up by increased pipe-line and tank-car movement. Arrangements have been made by which crude oil deliveries by pipe line to the Atlantic coast will be increased about 26,000 bbls. per day—which is equivalent to about 20,000 bbls. per day of fuel oil. Still further increases in pipe-line capacities are under way which will materially increase their efficiency. But at the very least calculation an additional rail movement in tank cars of about 100,000 bbls. per day will be necessary in order to take care of the urgent fuel oil requirements in the Atlantic coast territory.

Production of oil in the United States is divided, approximately, in the following proportions: California 30 per cent; Wyoming, 3 per cent; Texas and Louisiana, 17 per cent; the mid-continent field of Kansas and Oklahoma, 40 per cent; Illinois and Indiana, 4 per cent; and Pennsylvania, 6 per cent.

If coal were available it would be highly desirable that the use of oil be discouraged wherever possible; but unfortunately conditions governing the supply of coal are also acute. We are stating the problem, therefore, from the viewpoint of the oil division of the Fuel Administration, in the hope that, if conditions make it possible, the substitution of coal for oil may be made wherever practicable.

It will be necessary to move a great many trainloads of fuel oil for the shipping board and the navy from Texas or Oklahoma to the various ports on the Atlantic coast, and the supply of tank-car equipment will be taxed to its utmost to fill the requirements; consequently any saving in this movement, by substituting coal for oil in the territory east of the Mississippi and permitting the fuel oil so saved to move by the shorter distances from the Indiana-Illinois fields and from the Pennsylvania fields to the Atlantic coast, will represent a very great saving in transportation.

Another feature of our problem is to convince the consumers of petroleum products of the necessity of increasing their storage capacity and to take advantage of the summer months to accumulate storage to carry them over during those months when the transportation facilities will be congested. This applies equally to the railroad companies and those industries that have been in the habit of living from hand to mouth, as it were, in the matter of their oil supplies.

A campaign of education for the prompt unloading of tank cars by the railroad shops is very urgent. Motive power departments particularly have a habit of partly unloading a tank car at one shop, then switching it to another division point for further unloading. In this way they are responsible for the outrageous abuse of tank cars of private ownership.

The probability of the return of any of the tank steamers which have been commandeered by the navy, or for the construction of new tank steamers before the spring of 1919 is very remote; consequently it is of vital importance to the war program that the oil division of the Fuel Administration should have the thorough co-operation and support of the coal men and the railroad men to prevent a fuel oil famine and a return of the conditions which obtained during January and February of this year.

What the Coal Operator Can Do

By Harry N. Taylor

Vice President, Central Coal & Coke Company, Kansas City Mo.

There are three great factors concerned in this question of fuel supply and distribution, any one of which can render helpless the other two—the producer, the transporter and the consumer.

The producer may be ready to ship the coal and the consumer be ready to take it; but if the transportation is lacking, the other two are helpless. The railroads act in a dual capacity in relation to the fuel situation—they are both transporters and consumers; but viewing them from their primary standpoint—transporters—let me say that I believe no body of men in this broad land of ours is more alive to the importance of the work before them, or will more patriotically perform their duties than the great army of railroad men.

The coal operator, whom we class as the producer, is passing through the most extraordinary period in the history of his industry. He is confronted with the most tremendous task of supplying an ever-increasing demand, while the means at his command are being constantly curtailed and production threatened. His men are being enlisted or drafted into the army, his machinery is wearing out through constant use during the strenuous year just passed; there is little hope of replacement, owing to the heavy demand made on all machinery manufacturers for war supplies.

His allies—the railroads—are also being called upon to move an extraordinary tonnage created by war demand, which taxes them beyond their power of performance. This necessarily hampers the coal operator, through lack of motive power and shortage of car supply. Surely we are all confronted by a great task, calling for determination and courage if it is to be successfully accomplished; but that is just what must be done. Every one of us must first think, then plan, then do, and the do must be spelled with a capital D.

The railroads, the second link in the problem, have had in the past five or six years a situation very similar to that of the coal operator. Constantly increasing costs of labor, material and supplies, with no means at their command to increase revenue to meet the demands made upon them, they have fought manfully against these adverse conditions, and have done wonders with the resources at their command. Now that the extraordinary demands of the war are forced upon them, they face difficulties seemingly insurmountable.

In the past few years many roads have been forced into actual bankruptcy, while others were forced to make heavy drafts on surplus earned in the past to provide motive power and cars to meet these emergencies. For years the big shippers of coal have done all they could to aid the railroads, by joint appeal to get permission to increase rates, so as to make a fair return for service rendered, and to provide means for adequate motive power and cars properly to conduct their business. This was done, not because the coal men are philanthropists, but because they realized that unless this was done they would pay far more dearly for enforced idle time at their mines for lack of adequate car supply than they would pay through a reasonable advance in rates.

The demands of the public for coal supply now requires steady and full running time at all mines, six days per week, every week in the year.

When the legislative bodies governing railroad operations finally realized the true situation, and were made to believe what the railroad managements had been saying for six long years, a change in conditions had arisen, which, even with increased revenue, made it almost impossible for the railroads to secure the necessary equipment, owing to congested conditions in all manufacturing establishments.

Link number three in the problem is the consumer. The consumer now finds the situation up to him, and as yet only

a comparatively few have realized the great responsibility resting on the vast consuming public, if the threatened shortage in coal supply is to be overcome.

Although the figures available at Washington show that there was produced in the year 1917, 550,000,000 tons, in round figures, of bituminous coal, while the largest production in any previous year was 505,000,000 tons, still in the face of the fact of this extraordinary increase in production, the year 1917 found this country so short of coal that even though the figures showed a splendid increase the country faced an actual coal famine. Every railroad, manufacturing interest and individual consumer was brought face to face with a shortage of supply, the like of which was never before experienced. In ordinary times, this great increase of almost 50,000,000 tons would have found the coal industry demoralized by over-production, while the actual condition in the war year of 1917 found us destitute of fuel in many parts of this broad land of ours, found our war preparations hampered, found our railroads and manufacturing plants crippled, and threatened the successful outcome of the war.

Coal was the main-spring of industry in peace times, but it is the very heart and sinews of the country's welfare in times of war. We have had the experience of 1917 to guide us as to our duties and necessities for 1918. We know we must produce 50,000,000 additional tons of bituminous coal in 1918 over and above the production of 1917, if we are to meet the demands and necessities of the war.

There are two ways by which the threatened shortage in coal supply can be overcome: First, by increased production; second, by conservation. Every effort is being put forth by the coal operators and miners' organization, the individual miner and the railroads to produce the maximum tonnage.

The records of production as reported from Washington from week to week since January first are not entirely satisfactory. One week we show a little gain, and another week we show a little dropping back. This record, so far this year, compared with the previous year, on the whole shows a little gain, but not enough to spell security.

We can make a splendid inroad into the shortage ahead of us if we will pay special attention to the conservation of coal, and conservation must be called upon to a greater degree this year than ever before, if we are to meet the war necessities. If the coal operator will see to it that the miner gives him clean coal, and if the miner will follow out his patriotic duty and clean the coal, as he should, at the face, by the elimination of impurities, we will relieve the railroads of the necessity of hauling the impurities, we will add greater efficiency to the performance of the locomotive power, and aid in the movement of trains. Clean coal will add to the efficiency of every manufacturing plant and every warship and transport, giving more speed to industry, and will help win the war by adding efficiency as well as supply.

By eternally trying to produce, and infernally trying to conserve, with every effort we have within us bent towards the end of our patriotic duty, with the great consuming public alive to the real situation, with every citizen a helper, not a knocker, we can and will meet this great need of coal.

What the Coal Miner Can Do to Help

By John P. White

Labor Adviser, U. S. Fuel Administration

There are upwards of 700,000 men employed in and around the coal mines. This vast army of men engaged in this very important industry plays a great part in the prosecution of the war, because upon the success of coal production largely depends the efficiency of our nation in this crisis.

The miners early realized that it was necessary to stabilize conditions during the period of the war, and when the Washington wage scale was negotiated by the miners and operators and approved by the Government an advanced step was

taken towards the attainment of maximum coal production. At no time in the history of the mining industry has there been such peace and tranquility as now prevails, and it is due to the fact that both operator and miner realize the duty they owe to the government in this crisis.

The coal miner by loading every available railroad car can aid in increasing the production of coal for transportation to the various markets of the country. During last winter's severe fuel shortage the miners in many localities in this country worked on holidays and Sundays in order to relieve the situation. If an adequate car supply can be regularly maintained in the principal coal producing districts of the country by the railroads, there will be no need for alarm about shortage of fuel, because we have an abundance of coal and a great army of the best coal miners in the world. If given steady employment the 87,000 mine workers in Illinois could produce 150,000,000 tons of coal annually instead of working 160 days and producing less than half that amount.

If the operators, the miners and the railroads co-operate, an abundance of coal for all needs, domestic and otherwise, will be supplied. My knowledge of the miner leads me to believe that he is willing and anxious to enter upon team work in this matter with his employer, the government and all concerned, if given the proper opportunity; and it is only by this method that maximum results can be obtained. The miner has always been a man who loved his independence and he can be relied upon to contribute his full effort when approached in the proper spirit. In other words, he will co-operate, but cannot be driven.

The miners sense their duties in this war as keenly and as loyally as any other group of citizens. They are engaged in a most hazardous occupation and are entitled to the sympathetic co-operation of the government and the public, as well. They are a militant body of men that love their rights, and their organization, which is the labor expression of the mining industry of this nation, has been one of the greatest agencies we have, in my humble judgment, for the promotion of industrial peace during this war.

The coal operator should see that the individual working place is ready for the miner so that he may load his day's output of clean, marketable coal; the railroad should endeavor to see that the cars which are promised are at the mines; and the miner can afford to relax those rules which in normal times he feels justified in maintaining and take into consideration that we are now engaged in the greatest war in the history of mankind. Team work from the forces herein enumerated, including the government through its Fuel Administration, will make it possible for our men at the front and our Allies to be supplied with everything necessary to the successful prosecution of the war.

Individual Effort Toward Fuel Saving

By Eugene McAuliffe

Manager Fuel Conservation Section, Division of Transportation, United States Railroad Administration

The most important angle of my subject to which consideration should be given, is that of individual effort, greater effort, a more unified effort than we have in the past attempted. We are making tremendous strides toward greater individual effort. We have passed the first mile post, but what we who remain at home, we, the real reserve force of the American army must do, is to complete the work of reconstruction of our daily lives so as to make ourselves a living, breathing, fighting part of the country's military force, standing unalterably behind the men at the front.

War is a contest, not alone of fighting skill, but of mining skill in tons output; of railroad skill as measured by raw and finished materials moved, passengers, including soldiers and sailors moved. We are, as I said before, soldiers all,

perhaps ununiformed, but standing behind our boys who are the first line troops, standing behind that first line in solid formation with every faculty alert and active, every muscle strained, ready and anxious to give support when the assault comes and not a shifting, careless, care-free dollar-seeking crowd, careless of the measure of duty we perform, indifferent to the quality of the material we produce; indifferent as to whether it arrives on time or otherwise. There can be no middle course, we must take on more responsibility. More work. One-third of the man power of the country, or more than ten million men are now directly, or indirectly, engaged in the war and the end is yet far off. The casualty list, as yet a tiny, trickling stream, will soon grow into a brook; it will pause as it runs past the door of many, many an American home. If we are to prevent this brook from growing into a river, a river of American and Allied blood, we must as miners and railroad men, mine coal, mine clean coal, move coal and save coal; we must crush our individual prejudices, our likes and dislikes. We must "Carry On"! Can we not as miners and railroad men strip ourselves of all passion for profit; all controversy and prejudice; all obstruction, of whatever character; and go out with the determination to forget self; with the firm determination to follow our ideals, the successful conclusion of which will offer worldly opportunity without end?

At this time I can only urge effort, studied effort, along the lines you men of experience well know; with the maximum of patience in dealing with the thousands of new men who are entering the mines and the transportation service. A little more effort, a trifle better understanding of the supreme necessity of completing the task we have begun, looking to the present hour as one of cheerful sacrifice, the future one of return, in spiritual and material wealth.

You have been asked to come to this meeting, perhaps at material sacrifice to yourselves to assist in launching a coal conservation movement inaugurated by the United States Railroad and Fuel Administrations. What has been said in the past two days should inspire us all to greater effort. This meeting of coal miners, coal operators and railroad men, suggested an opportunity to make a stentorian appeal for more coal, cleaner coal, and the saving of coal and fuel oil.

Other Business

Warren S. Stone, grand chief of Brotherhood of Locomotive Engineers, who was on the program of the first day's session, was unable to attend.

At the opening of Friday's session a telegram from C. R. Gray, director division of transportation, United States Railroad Administration, was read. Mr. Gray expressed regret that he could not attend the convention as he had planned. A telegram from H. A. Garfield, United States Fuel Administrator, was also read. Mr. Garfield regretted his inability to attend the convention and promised that the Fuel Administration would work hand in hand with the International Railway Fuel Association.

The meeting on Friday was also addressed by C. E. Allen, deputy fuel administrator of Illinois, who spoke on "The Supply and Distribution of Fuel."

On Thursday evening a meeting was held in the Louis XVI room of the Hotel Sherman at which motion pictures, prepared under the direction of Major E. C. Schmidt of the United States Railroad Administration on the Minneapolis, St. Paul & Sault Ste. Marie, were exhibited. These films showed the results of good and poor methods of firing by scenes on the road and close-ups of the interior of fireboxes. The proper methods of building fires were also illustrated and sections of the films pointed out the need of co-operation by employees in all departments of the railroad in order to secure the maximum economy in the use of fuel. Several copies of these films will be sent out by the United States Railroad Administration and they will be exhibited before

audiences of railroad men in all sections of the country.

On Friday afternoon a business session was held at which the following officers were elected: President, L. R. Pyle, fuel supervisor M., St. P. & S. Ste. M.; vice-presidents, C. M. Butler, supervisor of fuel, Atlantic Coast Line; J. B. Hurley, road foreman of engines, Wabash Railroad, and H. B. MacFarland, engineer of tests, Atchison, Topeka & Santa Fe; secretary-treasurer, J. G. Crawford, fuel engineer, Chicago, Burlington & Quincy. Executive committee for two years: R. R. Hibben, assistant fuel agent, M. K. & T.; B. P. Philippe, coal agent, P. R. R.; T. Duff Smith, fuel agent, Grand Trunk Pacific; A. N. Willsie, chairman fuel committee, C., B. & Q.; for one year: H. B. Brown, superintendent fuel department, L. V.; L. J. Joffray, general fuel inspector, I. C.; H. Woods, fuel inspector, C. & A.

During the meetings addresses were made by Sergeant Brown, a Canadian soldier; Trooper Scott, of the Anzacs, and Private Peat. A detachment of the band from the Great Lakes Naval Training Station furnished music.

A Simple Milk Ticket

RAYMOND C. FISCUS, chief clerk of the passenger department of the Lake Erie & Western, at Indianapolis, Ind., has devised a new and simplified ticket for use by the baggage department of that road in the transportation of milk, and he has applied for a patent on it. One of the three coupons of this ticket is reproduced in the engraving. Above the coupon here shown is a similar one for use in returning the empty can to the shipping point, and the lower one, of the same size, is used as the selling agent's stub. The matter on the upper coupon and on the

LAKE ERIE & WESTERN RAILROAD CO.	
Good for Transportation of	
ONE CONTAINER	
of the capacity and containing the commodity indicated by punch marks.	
From.....	CREAM *
To.....	MILK *
	10 *
	8 *
	5 *
<small>This coupon will be detached by baggageman of train handling shipment into destination and turned over to train Conductor for cancellation and forwarding to Auditor Passenger Accounts.</small>	
DATE	
	
Form C. M.-1	

stub has been so arranged that the three coupons, being folded together, can all be punched at the same time.

Heretofore, different forms and colors of tickets have been used for cans of different size and for different destinations; and cream tickets have been different from milk tickets. This form answers for all of the varied conditions. Where the traffic is heavy the name of the station from, or the station to, or both, can be printed on the tickets. The ticket is fastened to the can by means of an eyelet in the upper end of the upper coupon; and the upper coupon remains attached to the can until the return journey is completed.

This form has already been adopted by several lines.

SUEZ CANAL BRIDGE FINISHED.—The swinging bridge over the Suez Canal at El Kantara, about thirty-five miles south of Port Said, Egypt, has been completed. The bridge affords direct railway communication between Cairo and cities in Palestine.

Activities of Western Regional Director

R. H. MISHON, regional director of western railroads, Chicago, is the first regional director to take any steps toward the unification of telegraph service. In Circular No. 107 sent to western lines on May 22, he announced that the following wire connections had been arranged for handling the business of the executive and administrative departments of the Railroad Administration. The purpose of establishing these wire routes, he says, is to relieve commercial telegraph companies and avoid the payment of telegraphic tolls by the railroads.

Send messages to the Chicago & North Western general office telegraph office, Chicago, for following:

Director-general department, including car service section, Washington, D. C.; the regional director of eastern railroads, New York City; the regional director of southern railroads, Atlanta, Ga.; and the regional director of western railroads, Chicago, Ill. Routes to New York and Atlanta are open at all times. For Washington, through wire service is provided at 11 A. M., 4 P. M. and 8 P. M., central time.

CHICAGO-PORTLAND, VIA OMAHA

Wire route C. & N. W. Omaha, U. P., O. S. L., Denver, Ogden and Salt Lake; O. W. R. & N. Portland.

CHICAGO SAN FRANCISCO AND LOS ANGELES VIA OMAHA

Wire route C. & N. W., U. P., O. S. L., Ogden, S. P. San Francisco and Coast Line points, L. A. & S. L. Los Angeles.

CHICAGO-PORTLAND AND SEATTLE VIA ST. PAUL

Wire route C. & N. W. St. Paul; N. P. Tacoma; S. P. & S. Portland.

Wire route C. & N. W. St. Paul; G. N. points their line.

CHICAGO-ST. LOUIS-KANSAS CITY

Wire route—Wabash, St. Louis and Kansas City.
Missouri Pacific, St. Louis, Kansas City.
Rock Island, Chicago-Kansas City.
Santa Fe, Chicago-Kansas City.

CHICAGO-ST. LOUIS-KANSAS CITY FOR BEYOND

St. Louis to Southwestern points via M. K. & T., St. L.-S. W. or M. P. through Railway Exchange Building.

M. K. & T., all points including Houston.

M. P. for T. & P. and I. & G. N. points.

St. L.-S. F. and T. R. R. A. loop or pony wire connection arranged with Wabash effective May 21.

Kansas City M. P., Pueblo; D. & R. G. Denver; connection Denver with Colorado Southern by messenger.

K. C. T. and K. C. S. will later have loop or pony wire connection with M. P. for present such business can move via Santa Fe or Rock Island through K. C. T. Office.

Santa Fe, all points their line and G. C. & S. F. in Texas
Rock Island to points Southwest their line, T. & P. Fort Worth and E. P. & S. W. El Paso.

General Service

Railroads not enumerated and having wire connections with routes indicated should take advantage of this service through such connections. To make this arrangement a success it is important messages be handled promptly through relay offices.

Payments—Publications

In Supplement No. 3 to Circular No. 65, issued on May 22, the regional director says: "The director general has reached the conclusion that railroad companies will be permitted to charge to operating expenses the customary pay-

ments to such publications as Poor's Manual, Moody's Manual, John Moody's Manual, the Financial Chronicle, etc., for maps and subscriptions.

Approval of Contracts

Circular No. R. P. C. 11, issued on May 23, by the western regional purchasing committee, gives the following instructions:

Roads should continue to make contracts for material and supplies when it is advantageous to do so. Contracts should not be made for a longer period than one year, nor contain a clause permitting them to run until notice of cancellation. If it is believed that a contract should run longer than one year, the reasons should be stated and the matter will be taken up with the regional director for approval.

Contracts should conform to the regional purchasing committee's general letters dated April 24 and April 30. Copies of all contracts and extensions thereof now in force which have not been filed, should be sent this committee at once. In submitting contracts for approval, attach a tabulation of the competitive bids, and if the contract price is not the lowest explain why it was accepted. It is realized that the lowest price is not always the most advantageous, but the committee would like to have an explanation in such cases for its information.

An agreement or order for material to cover delivery over an extended period, should be treated as a contract in submitting to the regional purchasing committee for approval. As an example, it might be desirable to place order for 50,000 bbl. of cement to be delivered as required throughout the season. Purchases on approved requisitions for material for current consumption will not be referred to this committee for approval.

Abolishment of District Freight and Passenger Committees

Supplement No. 1 to Circular No. 35, dated May 23, reads: "The committee appointments shown in the memorandum accompanying Circular No. 35, dated March 1, are hereby cancelled. It will be understood that these committees will continue with any uncompleted work assigned to them pending or subject to the appointment of committees by the regional freight and passenger traffic committees under authority conferred upon them in Circular No. 88."

Movement Oil and Tank Cars

In a communication to western railroads, dated May 16, the regional director says: "Oil interests complain that some roads are not furnishing junction cards covering the movement of their tank cars. In order to reduce tracing of cars to the minimum, it is highly important that care be exercised in car record offices to insure that complete and proper junction movements be supplied all private car line owners."

Iron, Ore and Grain Traffic—Upper Lake Ports

Circular No. 104 issued by the regional director on May 24 is as follows:

Effective at once the following railroad committee is appointed to represent the railroads and this office, engaged in handling iron, ore and grain traffic at Lake Superior and Upper Lake Michigan ports: W. W. Walker, vice-president of the Duluth, South Shore & Atlantic, Duluth, Minn.; W. A. McGonagle, president of the Duluth, Missabe & Northern, Duluth, Minn.; F. S. Elliott, general superintendent of the Great Northern Superior, Wis.; E. D. Brigham, assistant freight traffic manager of the Chicago & North Western, Chicago; W. F. Tyler, superintendent of the Chicago, Milwaukee & St. Paul Great Bay, Wis.

This committee will cooperate with committees appointed to represent the iron, ore, grain and vessel interests, to insure expeditious and economical movement of this important

traffic, with the view of conserving both rail and water transportation to the greatest extent possible. Mr. Walker, in connection with his duties as representative of this office at Duluth, handling general operations at that point, will also assume the duties as chairman of this committee, with headquarters at Duluth. Such orders or instructions as may be necessary will be issued by him with the authority of this office.

Conserving Supplies and Repairing Materials and Tools

Supplement No. 2 to Circular R. P. C. No. 10, issued by the regional purchasing committee on May 25 is as follows: Some replies to Supplement 1 to R. P. C. No. 10 do not give the information desired, although they show that attention has been given to reclaiming of material. In order that data may be complete, please furnish the following information:

1. List of points at which you are carrying on general reclamation work, and facilities, buildings, organization and equipment at each point for reclaiming.
2. List of kinds of material you are at present reclaiming:
 - (a) By means of oxy-acetylene welding.
 - (b) By means of electric welding.
 - (c) By means of forging equipment.
 - (d) By means of rolling mills.
 - (e) By other means.
3. Are the facilities at all central points adequate for the work, or do you recommend additional equipment at any of the points? If so, what?
4. Could any central points with present equipment take care of more work, if desirable that they handle material from other roads in adjacent territory which may not be equipped with the necessary facilities?
5. What suggestions have you to make for reclaiming additional material?
6. Advise what equipment you have in the maintenance of way department for repairing frogs, crossings, switch points, etc.; also in locomotive and car department and outlying repair shops for repairing castings, couplers, knuckles, etc.

It is desirable that the fullest advantage be taken of all existing facilities for this kind of work. Those in charge of such work should confer with other lines in their locality, with a view of making such recommendations as are desirable. This report should be in this office not later than June 18, 1918.

Billing Export Freight

Circular No. 110, dated May 25, reads: The freight traffic committee, New York, advise their instructions contained in G. O. C. permits are not being carried out so far as applied to commercial shipments destined to north Atlantic ports for export, causing delay to shipments and cars at destination. The principal difficulty is failure to observe the following instructions:

1. Waybills must show the letters "G. O. C." followed by permit number.
2. Bills of lading must show definite consignee, as indicated in G. O. C. permit, and shipments must not be accepted billed to the "order of" any person or firm.
3. Billing agents must require shipper to name the steamship line and this information must be shown on the waybill. (This requirement applies only to commercial shipments for export.)
4. Waybills for export shipments to the allies are governed by requirements shown above except that it is unnecessary to include the name of the steamship line on waybills.

All agents should be given complete instructions to avoid delay to this class of shipments at seaboard. For your further information, the following indicates the method of securing G. O. C. permits and the information contained therein:

A shipping permit is secured by consignee by application to the export division, freight traffic committee, north Atlantic ports, Room 800, No. 141 Broadway, New York City. This permit bears a number preceded by the letters "G. O. C."

Information contained in permits is as follows:

- (a) Name of party or firm (name of steamship line) and port to which shipment is consigned.
- (b) Shipper.
- (c) Point of shipment.
- (d) Commodity.
- (e) Quantity.
- (f) Port destination.
- (g) Route.
- (h) Statement

as to the earliest and latest dates between which shipments may be forwarded. (i) Waybilling agent is instructed to endorse on waybill the G. O. C. number.

Orders of the Southern Regional Director

C. H. MARKHAM, REGIONAL DIRECTOR of the Southern roads, has issued the following circulars, among others:

Circular letter No. 182 addressed to chairmen of district and local operating committees gives the following advices as information and to prevent confusion and waste of time in committee meetings:

Credits and Collection of Freight Charges: These matters are being given general consideration, with the view of adopting some national rule. Your local committee is not, therefore, expected to act until it receives general instructions.

Milling-in-Transit, etc.: All of these questions are being given general consideration, and as changes are not permissible except through proper tariff publication, it is not necessary for committees to devote time to discussion of these questions.

Reconsigning, etc.: The matter of trap car charges is having general consideration. Trap car minimums should be advanced wherever practicable. Where committees are in doubt as to proper minimum, they should submit recommendation for instructions. Committees should endeavor to minimize use of trap cars either by having shippers substitute drays or loading cars less frequently. Local committees should endeavor to work these matters out, having in mind that the policy of the administration is to meet the convenience of shippers in these matters when it can be done without interference with its regular transportation business. Trap car service is in the nature of drayage, and railroads are not bound to perform such service.

Intra-terminal Switching and Charges: Questions of increases in charges for intra-terminal switching are being considered generally, and need not be considered by your committees. Each committee should make a thorough analysis of the intra-terminal switching services performed within its jurisdiction and prepare and send in a statement in accordance with attached form.

City Ticket Offices and Commercial Freight Agents' Offices: Questions concerning are in hands of separate committee and need not be given attention by your committee.

New Routing Plans proposed, for both carload and less than carload freight, should be submitted for approval before putting into effect.

Four O'Clock Closing Hour: Questions that have been referred to this office are being given general consideration, and further reference need not be made in your proceedings, pending final instructions. As information, at one point the local committee handled the question locally and effected the change.

Special matters on which the committee desires ruling from this office should be taken up separately by letter, instead of being covered only in proceedings of your meeting.

When reporting unification worked out, date effected, etc., proceedings should invariably show amount saved; where not actually known, same can be approximated. In reporting reductions in switching service indicate number of switch engine hours saved, showing separately wages of crew and fuel expense.

Circular letter 190 instructs the roads to expedite the return movement of all empty baggage and express cars assigned to express service to the road originating the traffic. In instances where there is inability to provide necessary equipment to handle perishable commodities in express train service, reports should be made to the office of the regional

director so the proper arrangements may be made to protect such requirements. The circular states that the Food Administration program is reported to be seriously embarrassed by reason of inadequate express car service, due apparently to failure on the part of railroads to return promptly to the owning roads or to express service on their own roads, baggage or express or other equipment assigned to express service in order that schedule car runs may be maintained.

Circular letter No. 192 states:

"There has recently occurred on tracks within the reservation of one of the army camps a very serious derailment to a troop train, resulting in loss of life and very serious injury to a number of soldiers.

"It is desired that all tracks within army camps which are maintained by the army, over which passenger movements are made, have regular and careful inspection, where repairs are necessary, the situation should be reported to the proper army representative for attention, and failing to receive attention the repairs should be made by the railroad falling against the war department for the cost."

In circular letter No. 197 attention is directed to the importance of giving prompt movement to corn shipments at this season to prevent heating resulting in losses.

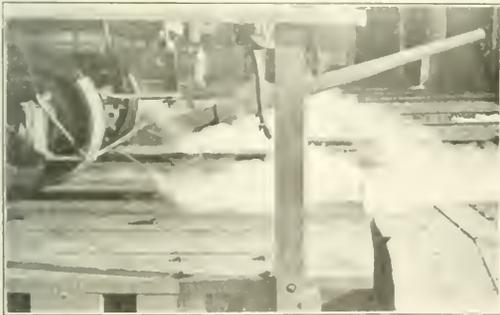
Circular letter No. 198 stresses the importance of giving prompt movement to new locomotives coming out of shops. The roads are directed to arrange so that there will be no delay in transit to new locomotives on their lines.

When Caterpillars Ran on Rails

NO STORY OF A TRIP on the early transcontinental railroad was considered complete without an account of delays due to herds of buffalo or flocks of grasshoppers crossing the track. The buffalo has disappeared and grasshoppers are no longer so numerous as to give trouble; however, there is still one of nature's creatures whose desire for a life on the rail occasionally causes trouble. The Mc-

cloud River Railroad runs from Sisson to McGavie, Cal., through a territory where caterpillars exist in large numbers. During the spring these insects climb on the head of the rail and cover it completely. As the caterpillars are crushed under the wheels both the wheels and the rails become so slippery that it is impossible to haul a train or to stop it effectively with the brakes. On heavy grades the locomotives slip and stall and the trains start to slide backward down the hill.

The difficulties of operating trains under these circumstances made it necessary to devise some method of getting rid of the pests. Trenches dug along the right-of-way are often effective in stopping the progress of the pests, but the distance over which they advanced made such a procedure impracticable in this case. Brooms and scrapers on the locomotives proved worse than useless for they crushed the caterpillars instead of removing them. The solution of the difficulty was found in steam jets directed at the rail a short distance ahead of the wheels of the locomotive. By this method the caterpillars were blown 20 or 30 ft from the rails and about half of them were killed. The others would always return to the top of the rail, however, so it was necessary to equip each engine with blowers. As the locomotives ran both forward and backward steam jets were placed behind the rear tender trucks as well as ahead of the pilot. The illustration shows the arrangement of pipes on the tender. The amount of difficulty caused by caterpillars on the McCloud River line varies from year to year. During some seasons only a few appear but one spring the trouble continued for about ten weeks.



Steam Blowers Arranged to Clear Caterpillars from the Rails

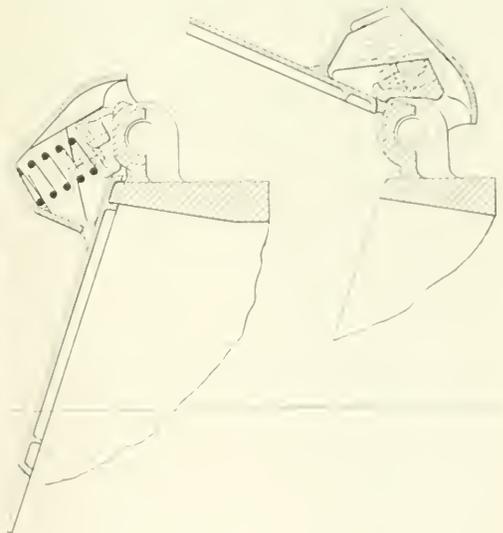
Cloud River Railroad runs from Sisson to McGavie, Cal., through a territory where caterpillars exist in large numbers. During the spring these insects climb on the head of the rail and cover it completely. As the caterpillars are crushed under the wheels both the wheels and the rails become so slippery that it is impossible to haul a train or to stop it effectively with the brakes. On heavy grades the locomotives slip and stall and the trains start to slide backward down the hill.

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Joliet Journal Box

A JOURNAL BOX with a new type of lid combining several desirable features is now being manufactured by the Joliet Railway Supply Company, Chicago. The important points of the design of this box are the complete sealing of the outer opening of the box by the lid, the use of a spiral spring for holding the lid in place, and the interchangeability of the standard M. C. B. box lid.

The complete seal on the outer edges of the Joliet journal box, with flanges on the lid both inside and outside, makes the lid dust and water proof. This is made possible by plac-



Lid of Joliet Journal Box in Open and Closed Positions

ing the lid over the mechanism avoids the friction of the box.

A spiral spring and screw are placed in a cap at the top of the lid. The screw bears on the lug, which is of a contour similar to that of the lug on the standard M. C. B. journal box. The arrangement is such that the spring holds the box firmly in either the open or the closed position. In case the original lid becomes broken or lost the standard M. C. B. journal box lid can be applied.

General News Department

The annual meeting of the Railway Signal Association will take place in New York, September 19 and 20.

A delegation of Colorado Citizens headed by Senator Shatroth called at the Railroad Administration on Wednesday to urge a loan of six million dollars to the Denver & Salt Lake to build a proposed tunnel under James Peak.

The station men of the Grand Trunk have had their pay increased. The amount of the advance has not been published, but an agreement on all points of difference between the company and the employees was announced at Montreal May 24, following protracted negotiations.

A bottle of liquor found in the cab of a Canadian Pacific locomotive, when brought into court at Windsor, Ont., on May 22, was held by the court to be evidence of a violation of the temperance law of Ontario, and the engine man and fireman of the locomotive were each fined \$250 and costs.

Fines for running unsafe freight cars were imposed on the Southern Railway in the United States district court at Macon, Ga., May 16, and also one on the Ocilla Southern for using an unsafe locomotive. The offense in each case was the absence of suitable uncoupling chains.

Hon. William G. McAdoo, secretary of the treasury and director general of railroads, went, last Monday, for a brief rest, to White Sulphur Springs, W. Va., at the order of his physician. It is expected that, while there he will give some consideration to recommendations for appointments of federal managers of railroads.

Francis A. Bonner, formerly Associate Director of the Bureau of Railway News and Statistics, Chicago, and prior to that railroad and assistant financial editor of the Chicago Evening Post, has become associated with Lee, Higginson & Company, Chicago, in charge of the department of statistics and publicity.

The Kansas City, Mexico & Orient is a railroad over 700 miles long, yet Mr. McAdoo has not taken control of it; and on Monday last, a delegation of citizens from towns along the line appeared before the officers of the Railroad Administration at Washington and urged that the Government take over the road.

The Railroad Administration has an actuary. He is Theodore H. Price, of New York. Circular No. 27, announcing his appointment, says that the actuary is to compile and analyze statistics and make reports concerning various economic problems connected with the functions of the Railroad Administration, which will be referred to him by the director general or members of the staff.

Colonel Henry W. Thornton, general manager of the Great Eastern Railway, is now a Brigadier General in the British Army, having been promoted to that position on his recent return from France. He has been a member of the British Railway Executive Committee since the beginning of the war, and has had charge of channel transport. He went from America to England in February, 1914.

Freight cars passing Columbia, Pa., in the trains of the Pennsylvania Railroad on Sunday, May 12, numbered 9,173, by far the largest movement in a single day ever recorded at that point. This total includes both loaded and empty cars, both westbound and eastbound. For the whole of the first half of May the daily average was 7,868 cars, or 357 more than the best previous record for a month. The records at Lewistown Junction, west of Harrisburg, show similar increases.

Miss Katherine Stinson, the "aviatrix" carrying letters for the Post Office Department (having been appointed special messenger) flew from Chicago, Illinois, to Binghamton, New

York, on Thursday, May 23, without a stop, thus breaking all former non-stop aviation records in America. The distance is about 783 miles, and the time was about 12 hours. The best previous non-stop record was 700 miles. Miss Stinson had set out to fly to New York, but she had to land because of lack of fuel.

The University of Illinois, at its summer session, June 17 to August 9, will offer special advanced courses in the mechanics and properties of materials of construction and in materials testing, planned especially for instructors in mechanics, for chemists who wish to fit themselves to take positions involving the physical testing of materials, and for men who wish to fit themselves for positions in commercial or government testing laboratories. The extensive equipment of the Testing Laboratory of the University will be available for this work, which will be under the charge of Prof. H. F. Moore. Taken together, these courses will constitute a short course of intensive training for men who desire to qualify as testing engineers in the government service or elsewhere.

The New York, New Haven & Hartford, has asked the Fuel Administration to send 150 additional cars of commercial coal over that road daily, and has issued to shippers and consignees a notice calling upon them to make renewed efforts to unload cars with the utmost promptness. The Fuel Administration cannot be expected to grant this increase permanently, or to order a greater increase, unless cars are emptied and sent back with the best possible despatch. The circular to consignees gives figures showing that cars are not being released so well as in former periods. All users of coal and other bulky commodities are asked to have their freight shipped regularly, not trying to rush excessive quantities the moment that an embargo is lifted; and attention is called to the necessity of frequent conferences between all concerned so that there may be no misunderstandings.

The aerial mail route between New York and Washington, has completed its second week, but some trips have had to be omitted because of fogs. From the fragmentary reports published, it appears that one set of fliers covers the route between New York and Philadelphia and another set between Philadelphia and Washington. On Wednesday, May 22, there was no start from New York, and none from Philadelphia toward New York, fog prevailing at both places. On Monday, the 27th, no start was made from New York, though the airplane from the south arrived at New York on time. On the 23rd, Lieut. Bonsall, flying in a very large airplane, equipped with a Liberty motor, made the round trip from New York to Philadelphia and return in three hours; and the total time of the northbound trip, Washington to New York, on that day, was given at two hours, fifteen minutes. Except as here noted the schedules of the second week appear to have been carried out. Wherever the weight of the mail has been mentioned it has been from 50 lb. to 160 lb.

Saving \$4,200 a Year

Brunswick people will continue to use the old, antiquated, inadequate station of the Atlantic Coast Line, while the new, up-to-date station of the Atlanta, Birmingham & Atlantic will remain closed. The matter has been discussed ever since the new order of things became effective on April 1, when the three roads (including the Southern) were put under the unification system. Brunswick people had only one kick coming, and that was that a real passenger station had been abandoned, while an old one, offering no protection for passengers in the way of sheds, etc., was still being used. Agreeing that the new station of the A., B., & A. affords the most adequate facilities, especially in bad weather, the rail-

road committee says that it would cost \$550 per month more to operate the A, B. & A. station, and for this reason, the change can not be made. But it is war time, and Brunswick people will accept the decision without further light—*Atlanta Constitution*.

Accident Bulletin No. 64

The Inter-state Commerce Commission's quarterly accident bulletin No. 64 comes out only one week behind No. 63, which was noticed in the *Railway Age* of May 24, page 1,300. The total number of persons killed on the railroads of the United States in the three months ending with June, 1917, was 2,389, and of injured 47,443, making the total casualties 49,832, or 1,594 less than in the quarter last preceding. The totals of the three principal classes of persons in the three principal classes of accidents are as below:

Casualties Three Months Ending with June 1917

Class	Passengers		Employees		Other persons	
	Killed	Injured	Killed	Injured	Killed	Injured
In train accidents	1	805	83	896	44	68
In train service accidents	42	881	474	10,779	1,619	2,270
In industrial accidents	...	...	190	31,147	26	597
	43	1,686	657	41,822	1,689	2,935

The most notable change as between this and the last preceding quarter is under the head of passengers killed in train accidents—1 as compared with 38. Bulletin 63 included the rear collision at Mount Union, Pa., February 27, in which 19 passengers were killed. A marked falling off in the number of employees killed appears in all of the three classes of accidents; in the first two classes it is to be expected because of the milder weather and more normal general conditions prevailing in the months of April, May and June, as compared with winter conditions. As was noted in connection with bulletin 63, the item "other persons" killed and injured in train accidents includes cases where a train strikes an automobile or a trolley car at a crossing. In the quarter under review there were 31 accidents of this kind, in which railroad property was damaged to the extent of \$5,500; non-trespassers killed 23, injured 32. The number of trespassers killed in train accidents was 18.

Comparisons with Quarter Ending March 31, 1917

	Bulletin 64	Bulletin 63
Total casualties	49,832	51,426
Total persons killed	2,389	2,346
Total persons injured	47,443	49,080
Passengers killed in train accidents	1	38
Employees killed	657	842
Total collisions	1,712	1,633
Collisions per million locomotive miles	3.59	3.48
Total derailments	2,554	2,370
Derailments per million locomotive miles	5.35	5.05
Damage to railroad property by train accidents	\$3,653,570	\$3,078,370
Shopmen worked, hours (Class 1 roads)	10,954,371	317,760,570
Casualties to shopmen per million man-hours	48.60	50.65
Casualties per million man-hours:		
stationmen	25.67	24.03
trackmen	22.20	23.00
bridgemen, etc.	2.58	27.60
other employees	1.92	18.03

The bulletin contains reports, made by the Bureau of Safety, on 18 collisions and derailments which were investigated. The last accident bulletin for a whole year (No. 62) was noticed in the *Railway Age* of September 14, 1917 page 462.

The Pennsylvania's Liberal Policy*

I have read your interesting discussion of the use of Pennsylvania station in New York City by other railroads. In justice to the memory and ability of the late Alexander J. Cassatt and to the judgment of the Pennsylvania Railroad management, there are some broader aspects of this whole question of the joint use of passenger terminals which are of particular interest at this time. Every additional step taken for increased use of the Pennsylvania station in New York City is in full accord with this company's policy, and is simply a further vindication of our management. This station has been used in the past not only for trains of the Pennsylvania, New Haven and Long Island railroads (to which the Baltimore & Ohio is now added) but it is the passenger entrance to New York for all of the railroad systems south of Washington. Twenty-eight years ago the

Pennsylvania negotiated plans for bringing directly into New York all of the railroads serving that City, and on an equal footing with each other. We, between 1890 and 1900, perfected, with Gustav Lindenthal, the North River Bridge and terminal project and obtained a Federal charter, but the other railroads would not agree to join, and the Pennsylvania was left to work out its own problem. There is nothing either in the history of our New York Terminal or in the present situation to justify the idea that the use of Pennsylvania station by other railroads could not be brought about, by agreement between the companies, because of divergent railroad ownerships. Yet wide circulation has been given to such misleading assertions.

In the City of Washington you will find that the great Union station there was constructed and paid for jointly by the Pennsylvania and the Baltimore & Ohio but its use was granted on equal terms to all of the railroads of the South reaching Washington, and they have an equal voice in its management. Further, you will recall that the Pennsylvania through the acquisition of a large amount of Baltimore & Ohio stock, a number of years ago, endeavored to bring about a true community of interests between the two companies, which would produce co-operation, permit the elimination of ruinous competition, and make possible more efficient and convenient service to the public, at the same time assisting to stabilize both companies financially, and enable them to use, for betterments, their surplus over reasonable dividends. Unfortunately, the agitation of those times finally resulted in shaping a public policy which discouraged all attempts of the railroads to introduce co-operative principles into the service of transportation, or to merge or combine their facilities. The consequence was an artificial and undue accentuation of competitive tendencies. To blame this state of affairs upon private ownership, as many newspapers are doing, is obviously unjust in the face of the fact that it was forced upon the companies against the will, and contrary to the efforts, of a vast majority of the owners and managers. If any reasonable criticism can be made against private ownership, it is that it has perhaps offered too many facilities and luxuries to the public, and too frequent train service.

I do not question the right of any newspaper to discuss private ownership vs. Government ownership, as economic policies, and to advocate or oppose either one fairly and in accordance with true convictions; but I resent the continual mis-statement by some newspapers and individuals of the facts concerning private ownership, and the unfair and unmerited aspersions cast upon the motives and purposes with which the railroads have been managed under it. No management will more emphatically endorse than the Pennsylvania Railroad every effort to abolish unnecessary duplication of facilities, and open others to common use, upon equitable terms, where public convenience and economic results justify such action.

Competition for Labor

The Department of Labor has been requested by the Railroad Administration to assist the latter in preventing the disorganization of the labor market by competing government contractors. Most of the railroads are now hiring their labor through the regular government service. Private contractors holding government contracts have, however, refused to cooperate with the government in the matter of securing labor, and as a consequence are disorganizing the labor market.

Many of the firms mentioned in the protests received from the Railroad Administration are said to have been inserting extensive advertisements in a great many southern papers, to the detriment of both railroads and farms. The Director General was advised by Assistant Secretary Louis F. Post that although the department does not at present possess the necessary authority, it hopes to be able to put an end to this practice in the near future.

Convention of Railroad Police

The International Association of Railway Special Agents and Police will hold a convention at Baltimore, Md., on June 19, 20 and 21, with headquarters at the Emerson Hotel. The secretary is W. C. Parrrell, Baltimore.

*From a letter to The Evening Journal, in Philadelphia, from Samuel Rea, president of the Pennsylvania Railroad.

REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF CALENDAR YEAR, 1918

Table with columns: Name of road, Average mileage operated, Operating revenues (Total, Freight, Passenger, etc.), Maintenance of way and equipment, Operating expenses (Traffic, General, Total), Operating income, Net from operations, Railway accruals, Increase (or decrease) comp. with previous year.

REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF CALENDAR YEAR, 1918, CONTINUED

Name of road.	Average mileage operated	Operating revenues			Maintenance of way and equipment			Operating expenses			Total.	Operating ratio.	Net from railway operation.	Railway accruals, (or loss).	Operating (or decrease) last year.	Increase (or decrease) last year.
		Freight.	Passenger.	Total.	Structures.	Equipment.	Total.	Traffic.	Trans- portation.	General.						
St. Louis-San Francisco.....	4,701	\$8,569,549	\$4,543,491	\$13,800,371	\$1,924,153	\$3,096,249	\$163,228	\$5,827,640	\$417,491	\$11,445,939	82.82	\$2,374,432	\$704,872	\$1,665,072	\$1,832,463	
St. Louis, San Fran. & Texas.....	143	3,257,977	41,573	3,892,264	40,930	61,596	17,853	145,689	17,853	271,131	69.70	117,949	5,038	112,667	7,826	
St. Louis, Southwestern.....	1,379	3,790,016	886,076	4,918,790	548,520	896,220	137,131	1,614,317	164,531	3,365,953	68.43	1,357,837	194,147	1,157,963	201,848	
St. Paul & Northern Pacific.....	1,732	3,113,844	2,394,615	5,508,459	795,273	1,122,700	253,676	2,814,082	202,491	5,246,112	63.40	2,857,940	317,489	2,237,769	893,776	
Seaboard.....	3,561	1,113,844	4,327,602	5,441,446	322,313	482,182	1,499	182,111	4,687	268,610	88.80	33,891	6,200	29,691	69,880	
South Buffalo Railway Co.....	698	14,287,112	7,619,758	24,500,000	2,627,235	30,509	7,235	9,150,929	513	17,247,941	78.49	7,922,283	23,000	6,110,277	70,989	
Southern.....	278	181,449	180,565	340,274	30,509	30,509	7,235	11,552	78,49	79,235	78.49	79,235	23,000	6,110,277	70,989	
Southern Miss.....	7,102	2,387,154	8,721,144	34,024,092	4,499,968	5,753,846	476,793	14,839,743	808,028	26,095,011	79.08	7,118,181	1,708,596	5,403,409	2,452,005	
Southern Pacific.....	165	164,584	39,824	211,652	34,238	19,765	4,677	71,062	10,945	140,686	66.47	70,968	9,930	61,000	24,771	
Spokane International Ry. Co.....	554	1,464,980	460,148	1,836,832	166,644	142,547	18,644	553,597	46,009	940,186	51.19	896,646	216,000	680,445	104,137	
Spokane, Portland & Seattle.....	81	227,083	41,852	282,901	28,690	171,194	8,954	111,629	12,091	176,601	60.42	115,700	27,455	88,245	14,445	
Texas & New Orleans.....	469	1,167,144	412,949	1,725,373	217,563	274,272	23,072	611,092	335,058	1,214,662	70.40	510,702	60,800	444,734	14,828	
Texas & Pacific.....	14	1,788,355	1,478,835	5,066,373	628,481	898,275	39,343	2,456,721	206,407	4,481,167	75.45	1,425,506	260,808	1,164,512	23,882	
Tomb & Ohio Central.....	435	4,994,457	1,863,735	11,294,600	389,659	491,753	20,011	914,335	34,311	1,799,324	104.06	1,425,506	84,935	1,352,539	260,313	
Toledo, St. L. & West.....	454	1,375,540	903,862	1,532,781	256,688	319,106	43,995	600,175	29,448	1,309,124	85.41	223,657	71,200	152,457	151,017	
Trinity & Brazos Valley.....	368	313,252	30,220	459,602	95,697	97,010	5,697	133,316	23,097	325,518	125.35	65,816	19,158	46,658	34,323	
Tulsa & Eastern Okla.....	100	1,171,000	1,710,000	3,881,000	1,231,917	575,492	87,829	1,837,219	17,762	1,854,981	148.21	506,209	16,933	524,332	60,677	
Union R. of Pennsylvania.....	35	1,054,411	1,054,411	2,108,822	1,054,411	1,054,411	1,054,411	2,108,822	1,054,411	4,217,642	100.00	3,163,229	1,054,411	2,112,818	1,054,411	
Utah Railway.....	100	268,603	1,710	300,567	34,829	28,503	343	67,420	18,934	140,229	46.50	161,338	9,755	151,583	.....
Valdeshire, Shreveport & Ithaca.....	171	368,740	177,138	618,455	59,282	105,820	16,876	194,892	10,479	405,362	65.52	211,260	27,000	183,360	26,105	
Virginia.....	518	1,960,794	128,768	2,247,113	237,950	491,946	18,111	963,912	46,009	1,738,333	77.00	1,517,780	121,495	393,283	508,512	
Wabash.....	2,519	5,996,445	1,787,897	8,551,051	979,234	1,787,710	199,114	4,815,133	239,076	8,075,533	94.44	475,517	321,257	153,267	1,988,515	
Washington Southern.....	35	153,969	380,565	677,416	48,131	88,164	4,068	262,294	12,554	420,454	62.07	256,962	16,378	240,582	28,842	
Western.....	1,007	1,985,806	248,410	2,348,498	371,708	318,819	59,270	812,628	63,241	1,656,730	70.54	691,768	121,019	568,614	97,580	
Wheeling & Lake Erie.....	512	1,924,619	92,444	2,250,188	345,558	570,090	20,743	1,063,943	71,585	2,077,917	92.34	172,271	144,660	27,218	400,746	
Yazoo & Mississippi Valley.....	1,382	3,593,271	1,075,793	4,888,130	637,883	912,420	52,358	1,703,751	122,078	3,430,607	70.18	1,457,523	184,584	1,272,486	316,746	

Traffic News

George A. Perry has been appointed secretary-treasurer of the Transportation Club of Louisville, Ky., to succeed W. T. Vandenberg, who recently resigned on the occasion of his removal from the city.

The Board of Railway Commissioners of Canada have issued a revised tariff of prices for interswitching, making this accommodation practically universal throughout the Dominion. The term "interswitching" is used to define the movement of loaded freight cars from one road to another for delivery to a consignee within the same city.

The Seaboard Air Line announces the discontinuance of 20 freight traffic offices as follows: Augusta, (Ga.); Boston, Baltimore, Chattanooga, Chicago, Cincinnati, Florence, (S. C.); Greenville, (S. C.); Kansas City, Louisville, Miami, (Fla.); Memphis, New Orleans, New York, Nashville, Oklahoma City, Pittsburgh, Philadelphia, Rochester and St. Louis.

In an order issued on May 22, the Nebraska State Railway Commission ordered the Chicago, St. Paul, Minneapolis & Omaha, the Chicago, Rock Island & Pacific and the Union Pacific, to discontinue within 10 days the practice of making deductions of one eighth of one per cent on small grains and one fourth of one per cent on corn in making settlement for shortage in shipments of bulk grain.

The report of lake commerce passing through the canals at Sault Ste. Marie, during the month of April shows a movement of 422,489 short tons; 356,693 eastbound and 65,196 westbound. Practically all of the eastbound traffic was grain and iron ore, the total for grain being 6,524,676 bu. and of ore 147,188 tons. The heaviest westbound traffic was soft coal, 88,076 tons of which passed through the canals.

Coal Production

A slump in loading on Saturday, after a good five-day performance, caused bituminous coal production during the week ended May 18 to decline slightly, according to the Geological Survey. The total production of soft coal during the week is estimated at 11,732,000 net tons, an average daily production of 1,955,000 net tons, compared with 1,971,000 net tons during the week of May 11. Anthracite shipments during the week increased 6 per cent. The percentage of full-time output lost on account of car shortage during the week ending May 11 was reduced to 11.2.

New Coal Mines Must Be Approved

By Railroad and Fuel Administrations

The United States Fuel Administration announces that it will encourage the opening of new coal mines, whenever it appears to its satisfaction that this can be accomplished without taking labor from mines already developed and capable of producing more coal than at present. But as coal is not commercially produced until it is loaded into railroad cars at the tippie, the Fuel Administration is unwilling to approve of the opening of new mines, even when labor is abundant, if it appears to the Railroad Administration impossible or inexpedient to furnish the necessary railroad facilities.

All applications for the development of new mines must go first to the railroad upon which the connection is desired. Copies of the application and accompanying papers will be forwarded to the Regional Director, and he will forward the papers with his approval or disapproval to the director of the division of transportation of the railroad administration. This officer will submit a copy of the application and papers with the recommendation of the regional director to the Fuel Administrator.

Representatives of the Railroad Administration and of the Fuel Administration will, thereupon, agree upon the approval or disapproval.

Commission and Court News

Court News

Uniform Live Stock Contract

The New York Appellate Division holds, in a damage action against a live stock carrier, where there was a uniform live stock contract and a waybill, that the valuations contained in the filed tariffs govern the damages for stock killed, and recovery for injuries to other stock must be in the ratio of the stipulated to the real value—*Dickerson v. Erie*, 169 N. Y. Supp., 5. Decided February 8, 1918.

Reasonable Despatch

A carrier received a carload of potatoes on the afternoon of September 1, and undertook to carry them with reasonable despatch. The normal time for delivery was 20 hours. The New York Appellate Division holds that delivery at 7 p. m. September 5, after an intervening holiday and a congestion in its yards due to a threatened strike, was not a breach of its contract of carriage.—*Carr v. Long Island*, 169 N. Y. Supp., 569. Decided March 1, 1918.

Recovery of Freight Undercharges

A tariff of freight rates duly filed and published and not disapproved by the Interstate Commerce Commission has the force of a statute, binding alike on shipper and carrier. In an action to recover undercharges computed according to the tariff in force, the Kansas Supreme Court holds that it is error for the trial court to receive and consider proof that the commodities shipped were not classified in the tariff according to correct principles—*Atchison, T. & S. F. v. Young* (Kan.), 171 Pac., 1156. Decided April 6, 1918.

Alighting from Moving Train

Generally it is negligence *per se* for a passenger in full possession of his senses and faculties to alight from a train while it is in motion. The West Virginia Supreme Court of Appeals holds that the failure of a brakeman, standing nearby, to warn a passenger, standing on the steps of a car ready to alight, did not excuse such contributory negligence. The brakeman had a right to assume the passenger would not alight while the train was moving.—*Bartley v. Western Maryland* (W. Va.), 95 S. E., 443. Decided March 5, 1918.

Duty as to Perishable Goods

In an action for damages to perishable goods in a refrigerator car, the Oregon Supreme Court holds that if the goods are sound when a carrier takes them from an initial carrier, its whole duty is fulfilled if and when it thoroughly re-ices the car, as reasonably necessary, and with fair diligence takes proper care of it over its line. A carrier of perishable goods is not liable as an insurer. The measure of its duty is to use reasonable care and diligence, considering the nature of the goods.—*Daniels v. N. P.* (Or.), 171 Pac., 1178. Decided April 10, 1918.

Twenty-eight Hour Law—Proper Feeding

Under the Twenty-Eight Hour Law the federal district court for the Eastern District of Pennsylvania held a railroad entitled to recover for 250 lb. of hay prepared in advance and furnished to each carload of a shipment of cattle, although a quantity of hay amounting to 150 lb. to 250 lb. was placed in the racks in each car by the shipper when the cars were started; it being the statutory obligation of the carrier to feed during the period of rest, and it being the opinion of the Department of Agriculture, stated in a circular issued for the information of carriers, that 250 lb. per car is a proper allowance. The court said: "The whole defense, so far as it has merit, is seen upon analysis to

rest upon the unstable foundation of the assertion of a right in the shippers to refuse to feed, and yet reserve to themselves to dictate in what manner the duty shall be performed by the carrier. They have no such right."—*Pennsylvania v. Swift & Co.*, 248 Fed., 315. Decided February 13, 1918.

Rental Contract Exempting Railroad from Liability for Negligence

A man leased part of a right of way as a pasture under a contract exempting the railroad from liability for its negligence. It was alleged that his animals were killed on the track (where there was a view for more than a mile) and that the speed of the train was excessive; that no attempt was made to stop the train. The Georgia Court of Appeals held that willful or wanton negligence was not shown. The provision of the contract exempting the railroad company from liability for negligence was not void as contrary to public policy.—*Hearn v. Central of Georgia* (Ga.), 95 S. E., 368. Decided March 12, 1918.

Liability for Undercharge on Freight

The Minnesota Supreme Court holds, in an action by a railroad company to recover from the consignee a balance of the legal freight upon an interstate shipment, he having accepted the shipment, paid the amount of the freight erroneously understated in the bill of lading, and settled with the consignor on that basis, that the defense of *estoppel* is not available; for the consignee is conclusively presumed to have had knowledge of the published legal rate. If the consignee, the presumed owner, accepts an interstate shipment and pays part of the freight, the law implies an agreement on his part to pay the balance to the carrier, where, as here, the carrier, at the time of the delivery of the shipment, has no knowledge of the arrangement between the consignor and consignee as to the payment of the freight, and the consignor then is and ever since has been insolvent.—*C. M. & St. P. v. Greenberg* (Minn.), 166 N. W., 1073. Decided March 22, 1918.

Employers' Liability Act Decisions

The Michigan Supreme Court holds that the state industrial accident board was without jurisdiction to entertain the claim for compensation under the Workmen's Compensation Act of a widow whose husband, a railroad employee, was killed in working on an interstate train, used in interstate commerce; if the widow was entitled to recover, her only remedy was under the federal act.—*Miller v. G. T. W.* (Mich.), 166 N. W., 833. Decided March 28, 1918.

The Michigan Workmen's Compensation Act provides that no proceeding for compensation shall be maintainable unless the claim shall have been made within six months after the injury. Where an employee refused to accept compensation under the Compensation Act, but sued under the federal act and suffered nonsuit, the Michigan Supreme Court holds he could not thereafter receive compensation, no claim having been filed within six months, as required.—*Schuld v. Pere Marquette* (Mich.), 166 N. W., 1018. Decided March 27, 1918.

Stoppage in Transit—Seizure of Goods

A shipper of lumber to a company in Chicago, on learning of the company's bankruptcy, stopped the lumber in transit while it was still in the State of Wisconsin. In a suit by the shipper for the value of the lumber the Wisconsin Supreme Court holds that the railroad did not convert the lumber and become liable for its value by moving it from the point where it was stopped to its yards in Chicago, especially as the plaintiff was not injured thereby, though on the arrival of the lumber in Chicago the consignee's receiver in bankruptcy obtained an order from the bankruptcy court for the delivery of the lumber to him, as the bankruptcy court would have compelled the delivery of the lumber wherever it was physically located, the railroad company having officers and agents at Chicago upon whom service of process could have been made. A carrier is not responsible for goods taken from its custody by valid legal process, provided it gives the proper prompt notice of the suit, so that he may have an opportunity to protect his interest. Even though the order of the bankruptcy

court could not be classed as legal process fair on its face, the railroad company was not liable to the shipper, as it had no power to determine the controversy between the shipper and the receiver, and was not bound to determine it at its peril. In turning over the lumber to an officer of the bankruptcy court the lumber was not lost to the shipper, but was turned over to a court having power to determine the controversy.—*Morgan v. Chicago & N. W. (Wis.)*, 166 N. W., 777. Decided March 5, 1918.

Notice of Claim by Shipper

The Oklahoma Supreme Court holds that a claim for the value of a shipment of grain misdelivered by the carrier is sufficiently made to satisfy the requirements of the bill of lading that any claim based on failure to make delivery shall be made in writing within four months after the time for delivery has elapsed, where it appears that the defendant and the plaintiff negotiated a settlement of the plaintiff's claim by letter before the expiration of the four-month period, and that the claim was declined after the expiration of such period on grounds other than that the plaintiff had not complied with the four-month clause of the bill of lading.—*Rock Island v. Pruitt (Okla.)*, 171 Pac., 718. Decided March 12, 1918.

Termination of Liability on Delivery— No Duty to Switch Delivered Goods

The New York Central, in compliance with the wishes of the consignee and in accordance with the custom between them, placed a car containing a shipment of fruit, immediately on its arrival at Utica, its destination, on a public team track for the consignee to unload. The consignee from time to time unloaded part of the fruit, and a week later, offering to pay the charges, requested the railroad to switch the car to the D., L. & W., about one-half mile, so that the car might be sent out over that road. The Central had no tariff covering the switching, and its freight agent, because of that fact, would not move the car. The consignee sued the road for damages. The New York Court of Appeals has reversed a judgment for the plaintiff and granted a new trial for the following reasons: There is no common law rule requiring the railroad to switch or transfer the car. It was not bound to accept goods for carriage beyond the terminus of its line or to carry except on its own line. Contract, express or implied, or statutory regulations or authorized regulations of a public board may modify or make inapplicable this common-law rule. That was not done here. The placing of the car on the team track for unloading, concurred in and acted on by the plaintiff, completed the delivery and terminated the defendant's duty as a common carrier; and thereafter he was not even a warehouseman. The duty of guarding and protecting the car was the plaintiff's. While a railroad is not permitted to cast aside its character as such and transmute itself into an ordinary bailee, a consignee cannot, by a mere request to change, for any purpose, the location of delivered goods, reconstitute the delivery company a common carrier as to those goods. *Anthony v. N. Y. C. (N. Y.)*, 119 N. E., 90. Decided February 26, 1918.

United States Supreme Court Hours of Service Act

Following its decisions in *Rock Island v. U. S.* and *Chicago & N. W. v. U. S.*, 226 Fed. 27, 30, the Circuit Court of Appeals for the Seventh Circuit affirmed a judgment of the district court against the Chicago & Alton for \$100 penalty for violating the Hours of Service Act by permitting a switch tender to remain on duty more than nine hours. The Supreme Court of the United States has affirmed that judgment. The switch tender was on duty for twelve consecutive hours in a shanty continuously operated night and day where, by the use of the telephone, he received and delivered orders pertaining to train movements—not mere switching within the yard; and in such service mental and physical alertness are of great importance. By permitting this the court holds that the railroad violated both the language and purpose of the act—*Chicago & Alton v. U. S.* Decided May 20, 1918.

Equipment and Supplies

Locomotives

THE CHINESE GOVERNMENT RAILWAYS, PEKIN-MUKDEN LINE, have ordered 14 Mikado locomotives from the Baldwin Locomotive Works.

Freight Cars

F. V. B. PRICE, Columbia, Miss., is inquiring for 5 40-ton tank cars.

W. K. GRACE & Co., New York, is inquiring for 5 tank cars for export.

THE BLEYER TANK LINE, Buffalo, is inquiring for 5 to 10 8,000-gal. 40-ton tank cars.

THE NEW JERSEY ZINC COMPANY, New York, is inquiring for 10 to 35 sulphuric acid tank cars.

Signaling

PENNSYLVANIA LINES WEST OF PITTSBURGH.—This road has contracted with the Union Switch & Signal Company for the installation of a 59-lever Type "F" interlocking machine at Logansport, Ind. This machine will have 15 levers operating 16 switches and 8 derails and 25 levers operating 26 signals and 19 spare spaces. Style "B" signals and Type "M" switch movements will be used throughout.

THE JACKSONVILLE TERMINAL COMPANY (Jacksonville, Fla.) is to install a Union electro-pneumatic interlocking at Myrtle avenue (Tower No. 2) the machine to have 122 working levers, 5 spare levers and 8 spare spaces. There will be 63 three-position dwarf signals, 22 suspended bridge signals, 5 high ground signals, 66 single switches and derails, 25 double slip switches (with movable frogs) and 1 movable point frog. The field work will be done by the construction forces of the Terminal Company.

LIGHT RAILWAYS AFTER THE WAR.—At the last meeting of the Essex County Council of England, a resolution was passed urging the Government to include in any scheme for after-war reconstruction a national system of light railways in which adequate provision should be made for the needs of Essex.—*The Engineer, London.*

SOUTH MANCHURIA RAILWAY REORGANIZATION.—The South Manchuria Railway has announced a reorganization of the staff of its general offices at Dairen, according to the report of Consul A. A. Williamson from that city under date of January 17. The principal branches under the new arrangement are: Secretariat (under Dr. S. Kuniyama, director-in-chief); department for general affairs (T. Kawakami, director); mining department (S. Kabayama, director); land department (K. Kaino, director); accounting department (R. Kawamura, director). The Manchuria Daily News quotes Mr. Kawamura, director and acting superintendent, as follows: "The real aim of the reorganization is to give greater attention to all matters concerning the personnel (appointments, promotions, retirements, and disciplining of the company's employees), and also constant inspection of the efficiency of work done by the different units of the company. From this consideration the two new sections of personnel and inspection have been created in the secretariat under the director-in-chief. Since the affairs concerning the personnel demand specially careful consideration and are matters of interest to the governor-general of Kwangtung, under whose direct control lies the South Manchuria Railway, a member of the company's directorate is put at the head of the personnel section. The bureau for general affairs and the bureau of foreign intercourse have been abolished, together with the bureau of technics. The mining section and the geological institute have been amalgamated into the geological section. Assistant superintendents are to be appointed to each unit, opening a way of advancement to the capable and worthy."

Supply Trade News

Ward W. Willetts, vice president and treasurer of the Curtin Supply Company, Chicago, who was one of the organizers of that corporation in 1899, was re-elected at a recent meeting of the board of directors.

George A. Post, Jr., western representative of the Standard Locomotive Company, has received a commission as captain in the Ordnance Department. Mr. Post graduated from Cornell University in 1905 and has been connected with the railway supply field since graduation.

William Dewar Ellis, who was president of the Schenectady Locomotive Works when it was merged with the American Locomotive Company some years ago, died at his home in New York, May 23, aged 63 years. His father, John Ellis, had been one of the founders of the Schenectady Locomotive Works, and Mr. Ellis succeeded his brother in the presidency of the corporation. He retired about fifteen years ago.

Stephen C. Mason of the McConway & Torley Company, Pittsburgh, was elected president of the National Association of Manufacturers at a meeting of the board of directors held in New York, May 23, following the three-day convention. Mr. Mason is the seventh president of the association. He succeeds as president, **Colonel George Pope**, who died April 19 last.

The National Lumber Manufacturers' Association held its sixteenth annual meeting in the Congress hotel, Chicago, on May 20 and 21. About 150 representatives of manufacturers, retail dealers and consumers of lumber participated in the meeting, which considered some of the special problems confronting the lumber industry at this time. Following the meeting an economic conference was held for the discussion of cost economies as related to the production of lumber.

Chicago Pneumatic Tool Company

The following changes in the organization of the manufacturing and sales departments of the Chicago pneumatic Tool Company have been effected by H. A. Jackson, the



W. P. Pressinger

company's new president. **W. H. Callan**, manager of the company's two compressor plants at Franklin, Pa., has been appointed general manager of plants, with headquarters in Chicago. **W. P. Pressinger**, manager of the compressor and engine departments at Chicago, has been appointed general manager of sales, with the same headquarters. **H. D. Megary**, previously with the Bethlehem Steel Company, South Bethlehem, Pa., has been made assistant to the president at Chicago. **G. A. Rees**, general

purchasing agent, has been promoted to manager of purchases and stores at Chicago. These officers will report directly to the president.

In addition, the following changes have been made in the sales department. These officers, most of whom formerly reported directly to the president, will hereafter report to the general manager of sales and will constitute his staff: **J. G. Osgood**, manager of the pneumatic tool sales division; **C. B. Coates**, manager of electric tool sales division; **H. L. Dean**, manager of compressor sales division, formerly assistant manager of the compressor department at New York; **B. R.**

Hawley, manager of engine sale division, formerly assistant manager of the engine department at Chicago; **T. J. Hudson**, manager of the motor truck sales division. All of these men will have headquarters in Chicago. The above appointments were effective May 27.

W. P. Pressinger, who has been promoted to general manager of sales, was born in New York City on September 27, 1871. In 1887, he entered the employ of the Clayton Air Compressor Works, New York. He remained with that company for 13 years, rising to the position of manager of sales. In 1900 Mr. Pressinger organized the New York Air Compressor Company of which corporation he was secretary and general manager. In the following year the company was assimilated by the Chicago Pneumatic Tool Company. Mr. Pressinger has been manager of the compressor department of that company up to the time of his appointment as general manager of sales, as afore-mentioned. He is also president of the Compressed Air Society.

Westinghouse Electric & Manufacturing Company

The Westinghouse Electric & Manufacturing Company in its fiscal year ending March 31, 1918, did a gross business of \$95,735,407, over \$6,000,000 more than in 1917. The volume of sales for the regular products of the company was greatly in excess of any previous year. The net income available for dividends and other purposes at the close of the year was \$15,405,681 as compared with \$18,079,889 for the year ending March 31, 1917.

In addition to the regular quarterly dividends at the rate of 7 per cent on the preferred and common stocks a special "Red Cross" dividend was paid, making a total of \$5,610,848 for all dividends paid during the year. Special appropriations were made for the protection of inventory book values and to establish a research and development fund. After deducting these appropriations and other miscellaneous adjustments the net surplus as of March 31, 1918, is \$26,404,695, an increase of \$8,299,396 over the net surplus as of March 31, 1917.

New Plants.—The property and plant account includes expenditures during the year in connection with the new plant known as the Essington Works, located near Philadelphia. This plant, which is now completed and nearly equipped, is operating with a force of about 3,000 men which it is expected will be increased to approximately 5,000 during the year. Contracts with the United States Government for equipment for cargo ships will occupy the capacity of this plant for approximately two years.

Another important improvement completed during the year was a factory at Trenton, N. J., for the manufacture of incandescent lamps. This factory has been in operation for some months.

British Westinghouse Electric & Manufacturing Company, Ltd.—In 1916 a proposal was made to the company's directors for the purchase of the holdings in the British Westinghouse Electric & Manufacturing Company in order that a controlling interest might be transferred from the United States to England. After careful consideration the directors concluded that the commercial position of the British Westinghouse Company would be improved if the control of that company were owned in England instead of the United States, and decided that the sale of the American company's entire holdings was the only satisfactory solution of the situation. Accordingly negotiations were concluded under which its holdings of 4 per cent debenture stock and preference and ordinary shares in the British Company were sold to a syndicate formed in London (Electric Holdings, Ltd.), and payment therefor has been received in 5 per cent prior lien debenture bonds maturing in ten years. These bonds are secured by the pledge of all the gold securities sold and certain other additional collateral. This change in the investments was made without change in book values and has, therefore, not affected the balance sheet. Certain new trading agreements of mutual advantage have been entered into between the British Company, Electric Holdings, Ltd., and this company.

Increased Inventories and Notes.—One of the features of the year was the large increases in inventories made necessary by the unprecedented volume of the company's busi-

ness. As a result the company during the year increased the total of its outstanding notes payable by \$12,282,301, the total amount of notes payable outstanding as of March 31, 1918, being \$30,186,051. This includes \$15,000,000 one-year notes and \$2,433,551 on account of Liberty Loan Bonds subscribed for by the company and its employees.

Orders on Hand.—As of April 1, 1918, the value of unfilled orders in hand was \$147,857,580, of which \$110,185,007 was for the regular products of the company. No facilities heretofore employed on regular products are engaged on munition work.

CONSOLIDATED AND CONDENSED GENERAL BALANCE SHEET, MARCH 31, 1918
(Except New England Westinghouse Company)

ASSETS		
Property and plant.....		\$41,167,874
Sinking fund.....		34,177
Investments.....		19,212,071
Cash.....		8,918,556
On deposit for redemption of debentures, etc.....		92,256
Notes.....		29,150,836
Working and trading assets.....		60,548,533
Other assets.....		5,590,075
Total.....		\$164,714,378
LIABILITIES		
Capital stock:		
Preferred.....		\$3,998,700
Common.....		70,813,950
Total capital stock.....		\$74,812,650
Funded debt (Westinghouse Machine Company issues).....		6,396,000
Fifteen year 5 per cent notes—issue of 1909, due January 1, 1924.....		52,500
One year notes due February 1, 1919.....		15,000,000
Real estate purchase money mortgages.....		175,000
Notes payable—current bank loans.....		12,700,000
subscriptions to Liberty Loan Bonds.....		2,433,551
Accounts payable.....		8,016,098
Interest, taxes, royalties, etc., accrued, not due.....		3,142,206
Accrued dividends.....		1,309,221
Advanced payments on contracts.....		10,624,926
Unpaid debenture certificates, bonds, notes and interest and dividends.....		92,255
Reserve.....		3,555,276
Profit and loss—surplus.....		26,404,695
Total.....		\$164,714,378

Trade Publications

LIBRARY CATALOG.—The Portland Cement Association, Chicago, Ill., has issued a 60 page catalog of the books, periodicals and pamphlets in the library of that association on the literature of the cement industry. This library which is open to the public has an up-to-date index containing approximately 65,000 cards, following the standard library practice.

KEYSTONE QUALITY.—The Keystone Manufacturing Company, Buffalo, N. Y., has issued a 40-page booklet describing and illustrating the line of ratchets for both drills and wrenches manufactured by that company. Prices and dimensions for ratchets designed for various purposes are shown as well as the auxiliary parts used. Several pages are devoted to cataloging the various styles of Westcott Adjustable S-wrenches.

CONSTRUCTION EQUIPMENT.—The Waterloo Cement Machinery Corporation, Waterloo, Iowa, has issued a new catalog of 60 pages which illustrates and describes the line of equipment manufactured by that company including concrete mixers, hoisting equipment operated by gas engines, pumps and air compressors. Information is given in sufficient detail to demonstrate the application of the various styles of equipment to special purposes.

RAILWAY WATER SUPPLY.—The Layne & Bowler Company, Memphis, Tenn., has issued a 64-page booklet which contains an exposition of its plan for developing water supplies in the dual role of engineer and contractor, with a contract stipulation guaranteeing a certain water discharge for the source developed. The book is also a catalog of the line of water service equipment manufactured by that company which includes turbine pumps and well screens. The book describes the various types of this equipment with illustrations of typical installations in actual service. The last 8 pages are devoted to tables and formulae of use in connection with water service problems.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company, which was authorized by the Railroad Administration to resume construction on the Osage County & Santa Fe from Caney, Okla., to Pawhuska, as announced in the *Railway Age* of May 24, has also been granted permission to extend this line from Pawhuska to Fairfax Junction, 27 miles further.

The Santa Fe has also been authorized to extend for 30 miles the North Texas & Santa Fe, the track on which has already been completed from Shattuck, Okla., 28 miles west.

CHICAGO, MILWAUKEE & ST. PAUL.—This company will build a new engine terminal at Ottumwa Junction, Iowa. The grading contract for the terminal and for a new freight yard at the same point has been awarded to Roberts Brothers & Peterson, Chicago. The construction of the buildings will be handled by the Wither- spoon-Englar Company, Chicago. The new structures will include an 18-stall roundhouse, an 85-ft. terminal, a water-softening plant, powerhouse, water tanks and other terminal buildings. The track work will be done by the St. Paul's own forces. The estimated cost of the improvements to be made at Ottumwa Junction is \$500,000.

The St. Paul is also contemplating the extension of numerous passing tracks to permit the handling of longer freight trains on the main line between Chicago and Omaha and between Chicago and Minneapolis. The grading work will be contracted out and the track work will be done by the railroad's own forces.

DENVER & RIO GRANDE.—This company has awarded a contract to the Utah Construction Company for the construction of a new freight and engine terminal at Soldier Summit, Utah. This will consist of division terminal tracks to hold 1,000 cars with a total trackage of 15 miles, including repair tracks, a wye and engine terminal tracks. The engine terminal will contain a rectangular engine house of 24 stalls, a power house, a small shop and store house, oil house, ice house; coal, ash and sanding facilities; a car shop, a station and office building, a hotel and 24 cottages for employees, and section buildings. The work will require 430,000 cu. yd. of grading and 2,500 cu. yd. of masonry.

ILLINOIS CENTRAL.—This company is asking bids on a building for the American Express Company at 14th street and the Illinois Central tracks, Chicago. The structure will be 26 ft. by 300 ft., with brick walls and a composition roof.

THE SOUTHERN PACIFIC PLANS have been completed for enlarging and lining with concrete 17 tunnels through the Tehachapi mountains and work will be started soon. This work will be done by pneumatic methods, the concrete mixer being located at the portal of the tunnel and the material being conveyed to place by air pressure.

SPANISH EXPORTS TO UNITED STATES AND POSSESSIONS.—Total declared exports from Spain to United States and possessions during 1917 were valued as follows: To United States, \$35,733,492 against \$33,768,822 in 1916; Philippines, \$95,330 against \$1,022,757; Porto Rico, \$887,593 against \$851,601; total, \$37,606,415 against \$35,643,180.—*Commerce Reports.*

JAPANESE RAILWAY COAL NEEDS.—The Imperial Japanese Railways will buy from 300,000 tons to 500,000 tons of coal during the fiscal year 1918 in some foreign market, partly for the purpose of economizing its fuel cost and partly for the purpose of reducing the prices of coal in the home market. The yearly consumption of the Government railways amounts to, roughly, 2,000,000 tons.—*The Far Eastern Review.*

CUBAN RAILWAY CONSTRUCTION.—Work is soon to be begun on that part of the Maniciragua branch, extending from Caunao to Cumanayagua, a distance of 20 miles. This branch goes through very undulating country, and will require a large amount of fill and trestlework, the trestle later giving way to steel. From Caunao to the Bay of Cienfuegos, a distance of 6¼ miles, a separate line, consisting for the greater part of double-track, is now in process of construction, and it is stated that work on the pier terminal will soon be commenced.

Railway Officers

Executive, Financial, Legal and Accounting

L. Moore has been appointed chief land appraiser of the New York Central with principal office at New York

H. J. Holt, vice-president and auditor of the Manitou & Pikes Peak, has been elected president, with headquarters at Manitou, Colo., succeeding **C. W. Sells**, resigned

L. B. Williams has been elected treasurer of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, succeeding **Otto Miller**, resigned to enter the army

E. P. Clawson has been appointed auditor of the Peoria Railway Terminal Company, in charge of all accounts, with headquarters, at South Bartonville, Ill., succeeding **J. McMahon**, resigned.

Charles C. James, chief clerk in the office of the vice-president and controller of the Southern Pacific, at New York, has resigned to become assistant controller of the Merchant Shipbuilding Corporation, with headquarters at Bristol, Pa.

Irving Herriott, general attorney for the Chicago & North Western, with headquarters at Chicago, has resigned to take up the general practice of law, and has associated himself with the legal firm of Montgomery, Hart & Smith, Chicago.

Operating

W. N. Deramus has been appointed superintendent of car service, of the Kansas City Southern, with headquarters at Kansas City, Mo.

The transportation, traffic and accounting offices of the Dayton, Toledo & Chicago have been moved from Dayton, Ohio, to Covington, Ohio.

W. W. Fuller has been appointed safety supervisor of the Seaboard Air Line, with headquarters at Norfolk, Va., vice **J. L. Query**, assigned to other duties.

P. T. Reilly, who has been appointed superintendent of the Mahanoy & Hazleton division of the Lehigh Valley, with headquarters at Hazleton, Pa., as has been



P. T. Reilly

general superintendent, with headquarters at Bethlehem, Pa., which position he held at the time of his recent appointment as superintendent of the same road, as above noted.

H. C. Bixler, superintendent of stations and transfers of the Pennsylvania Railroad, with office at Philadelphia, Pa., has been appointed superintendent of the Manhattan division, with headquarters at New York. This division has been re-established and will embrace the freight and passenger terminal facilities of the Pennsylvania Railroad in New York

City, New York Harbor, including Brooklyn and Greenville. **J. F. Deasey**, assistant district chief agent at Philadelphia, succeeds Mr. **Leach** as superintendent of stations and transfers, with office at Philadelphia. **F. G. Grimshaw**, superintendent of motor cars at the New Jersey division at New York, has been promoted to assistant to the general manager, with headquarters at Philadelphia. **E. J. Cleave**, superintendent of the Trenton division at Trenton, N. J., has been transferred as superintendent to the Philadelphia Terminal division with headquarters at West Philadelphia to succeed **A. B. Clark**, who has been transferred as superintendent to the Trenton division to succeed Mr. **Cleave**. **J. B. Hutchinson, Jr.**, acting superintendent of the Centerville division, with office at Pittsburgh, has been appointed superintendent of the same division and **A. B. Cuthbert**, acting superintendent of the Cresson division, with office at Cresson, has been appointed superintendent of the same division.

H. C. Bixler who has been appointed superintendent of the Manhattan division of the Pennsylvania Railroad, with headquarters at New York, was born on March 21, 1868, at Bradford, Pa.



H. C. Bixler

He entered the service of the Pennsylvania Railroad on May 17, 1887, as a telegraph operator on the Pittsburgh division. He subsequently served successfully as train despatcher and assistant trainmaster and in 1910 and 1911 was trainmaster at the Pennsylvania Terminal, New York City. On November 9, 1911, he was promoted to assistant superintendent of the Philadelphia Terminal division and on May 1, 1916, was promoted to superintendent of stations and transfers with office at Philadelphia, Pa., which position he held at the time of his recent appointment as superintendent of the Manhattan division of the same road as above noted.

W. H. Foster, general superintendent of the New York, New Haven & Hartford Lines West, has been appointed also general superintendent of the Central New England, with headquarters at New Haven, Conn., vice **G. W. Clark**, assigned to other duties, and **Harry C. Oviatt**, who resigned in October, 1917, as general superintendent of the New York, New Haven & Hartford Lines West, to enter the service of the American International Corporation, has been appointed superintendent of the Central New England, with headquarters at Polighkeepsie, N. Y.

J. A. MacDonald, superintendent of the Prairie du Chien and Mineral Point divisions of the Chicago, Milwaukee & St. Paul, **R. E. Sizer**, trainmaster, and **A. J. Klumb**, master mechanic, with headquarters at Milwaukee, Wis., have been transferred to Madison, Wis.

A. E. Lloyd, superintendent of the Alliance division of the New York Central at Alliance, Ohio, has been transferred to the Western division, with headquarters at Chicago. **E. W. Brown**, assistant division superintendent at Chicago, has been appointed division superintendent, with office at Alliance, Ohio.

Harry W. Forman, the well-known writer on train despatching and train rules, formerly for several years train rule examiner on the Nashville, Chattanooga & St. Louis, has been appointed assistant to the general superintendent of the Western Pacific, with office at San Francisco, Cal. Mr. Forman has been in the service of the Western Pacific for some time past. He entered railroad service in August, 1873. He has worked for fifteen different railroads and has served as trackman, as a mechanic in the machine shops, and in clerical positions. In the train service he began as brakeman, and was soon promoted to conductor. Next he became

telegraph operator and station agent, from which he was promoted to the position of train dispatcher. In this department he has served for many years, and on a number of different roads. Under various titles—chief dispatcher, superintendent of telegraph, chairman of train-rule boards, trainmaster and inspector of transportation—he has been constantly engaged in the promotion of good practice and good discipline. He was one of the pioneers in grappling with the difficult, elusive, and never-ending problem of securing for American railroads a perfect code of train rules, and highest standards of efficiency in train operation. His well-known book, "Rights of Trains on Single Track," embodies the fruits of his long and profitable studies of this branch of the railroad art, and is the only thorough discussion of it that was ever published.

Traffic

T. J. Wright has been appointed general agent of the Atlanta, Birmingham & Atlantic, with office at Brunswick, Ga., vice **J. B. C. Blich**.

John D. Carter, general agent of the freight department of the Atchison, Topeka & Santa Fe, with headquarters at Detroit, Mich., has been appointed assistant general freight agent of the Trans-Oceanic Company, of San Francisco, which operates a steamship line between San Francisco, Seattle and the Orient. Mr. Carter will have headquarters at Chicago.

D. E. Sullivan has been appointed division freight agent of the Baltimore & Ohio, with headquarters at Chicago; **E. C. Law**, commercial freight agent at Toledo, Ohio, has been appointed division freight agent, with office at Toledo; **J. R. Lee**, commercial freight agent at Detroit, Mich., has been transferred as commercial freight agent to Toledo, Ohio, and the position of commercial freight agent at Detroit has been abolished.

J. G. Cantrell, general western agent of the Seaboard Air Line, with office at St. Louis, Mo., has been appointed assistant general freight agent, with office at Jacksonville, Fla., vice **C. A. Carpenter**, who has been appointed district traffic agent, with office at Orlando, Fla. **C. E. Muller**, general agent at Baltimore, Md., has been appointed assistant general freight agent, with office at Savannah, Ga., vice **V. C. Cluded** driveway for the ball, with a spring at one end, leads **Tompkins**, transferred. **M. O'Connor**, southwest freight agent at New Orleans, La., has been appointed commercial agent, with office at Montgomery, Ala., vice **F. C. Cheney**, transferred. **C. E. Thomas**, commercial agent at Memphis, Tenn., has been transferred as commercial agent to Richmond, Va., vice **C. L. Parker**, resigned to accept service with another company.

Engineering and Rolling Stock

A. R. Kipp, mechanical superintendent of the Chicago division, of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Fond du Lac, Wis., has been transferred to Minneapolis, Minn.

C. H. Blake has been appointed road foreman of engines on the Southern Kansas division, of the Atchison, Topeka & Santa Fe, with headquarters at Chanute, Kan., succeeding **W. A. Moon**, assigned to other duties.

Elliot Sumner, superintendent of motive power of the Central division, of the Pennsylvania Railroad, with office at Williamsport, Pa., has been appointed superintendent of motive power of the New Jersey division, with office at New York, succeeding **F. G. Grimshaw**, promoted, and **E. W. Smith**, master mechanic of the Philadelphia division succeeds Mr. Sumner.

James B. McClain who has been appointed bridge engineer of the Seaboard Air Line, with headquarters at Norfolk, Va., as has already been announced in these columns, was born in 1877 at Washington, Pa. He began railway work in July, 1906 as masonry inspector on the Seaboard Air Line and two years later was promoted to inspecting engineer. In 1911 he was appointed resident engineer and on January 1, 1917, was appointed assistant bridge engineer, which position

he held at the time of his recent appointment as bridge engineer, of the same road, as above noted.

George H. Brown, acting principal assistant engineer of the Eastern Pennsylvania division of the Pennsylvania Railroad with office at Altoona, Pa., has been appointed principal assistant engineer of the same division, and **Elmer Irving**, acting division engineer of the Philadelphia division, with office at Harrisburg, has been appointed division engineer of the same division.

William S. Jackson, whose appointment as mechanical superintendent of the Erie, with headquarters at New York, has already been announced in these columns, was born on August 12, 1878. He began railway work on August 16, 1892, with the Lake Shore & Michigan Southern and served to July, 1911, consecutively as engine dispatcher, roundhouse foreman, and general foreman. He then went to the Interstate Commerce Commission as locomotive boiler inspector, and later was made locomotive inspector at Cleveland, Ohio, until January, 1917, when he entered the service of the Erie as general inspector. In August of the same year he became master mechanic of the Kent division at Marion, Ohio, which position he held at the time of his recent appointment as mechanical superintendent of the same road, as above noted.

Purchasing

M. C. Moles was appointed storekeeper of the St. Louis division of the Chicago, Rock Island & Pacific, with headquarters at St. Louis, Mo., succeeding **F. E. Hartzler**, who has enlisted in the 49th Regiment, U. S. Railway Engineers. **John Stammers** was appointed storekeeper of the Kansas division of the Chicago, Rock Island & Pacific, at Herington, Kan., succeeding **J. E. Thomas**, resigned.

Obituary

Thomas H. Simmons, formerly general freight agent for the Chicago, Rock Island & Pacific, at Chicago, died at his home at Chicago, on May 23, at the age of 69 years, following a long illness. Mr. Simmons was born in Augusta, Me., on May 28, 1849. His railroad career began, when in the spring of 1872, he joined an engineering corps that was running the preliminary surveys for the Omaha & North Western, now a part of the Chicago, St. Paul, Minneapolis & Omaha. In August, 1872, he went to Marshalltown, Iowa, as a timekeeper for the Central Iowa, now the Minneapolis & St. Louis. Subsequently he was clerk and chief clerk in the general freight department and agent at the Eddyville Transfer, Iowa, of the same road and the Keokuk & Des Moines, now a part of the Chicago, Rock Island & Pacific. In November, 1879 he was appointed assistant general freight agent of the Iowa Central, now a part of the Minneapolis & St. Louis, at Marshalltown, Iowa. On April 1, 1886 he went to St. Paul, Minn., as general northwestern freight agent, of the Minnesota & North Western, now a part of the Chicago Great Western, and the Central Iowa, returning to Marshalltown in August of the same year as general freight agent of the Iowa Central. In the following year he became assistant general freight agent at Cedar Rapids, Iowa, of the Burlington, Cedar Rapids & Northern, now a part of the Rock Island, and in 1893, he was made general freight agent. From June 1, 1902 until May 1, 1903, Mr. Simmons was assistant general freight agent of the Rock Island at Cedar Rapids and on the latter date was transferred to Chicago as assistant general freight agent of the lines east of the Missouri river. On February 1, 1906 he was promoted to general freight agent, working in that capacity until January 1, 1910, when he was assigned to special work. The latter part of the same year, upon his own request, he was sent to Cedar Rapids as commercial agent, which position he held until July 1, 1916, when he was forced to leave the service of the company on account of ill health, and was placed on the pension roll.

RELIEF FUND FOR FILIPINO RAILWAYMEN.—The directors of the Manila Railroad have started a relief fund for the benefit of the employees with an initial appropriation of \$15,000, which is two per cent of the total salaries paid last year. Two per cent of each year's salaries, deducted at the end of each quarter, will be added to the fund.

EDITORIAL

Railway Age

EDITORIAL

By far the most important work to be accomplished by the men who will meet in Chicago at the joint convention of the Master Car Builders' and the Master Mechanics' Associations will be the revision of the present M. C. B. Interchange Rules, in order that they may meet more adequately the requirements of the unified operation under government control.

Opportunities for the M. C. B. Association

There are nowhere men more capable of doing this work than in the M. C. B. Association. It is their mission and their duty to adapt the rules to the present conditions. If they don't, somebody else will. Already some local agreements have been made to meet these new conditions, but they are not standard nor in accordance with general practice. The M. C. B. Association has here a great opportunity to justify its existence. It will do so if its members have a vision broad enough to view the unification of railways in the proper perspective. There are several important questions that have been discussed which must be settled definitely. One of these is the elimination of billing for repairs to foreign cars and an adequate method for checking the work done. Another is the advisability of adopting a "run, repair or transfer" rule. A third is the uniformity of repairs to cars. Still another, and by far the most important, is, What can be done to speed up the repairs to cars? It is the function of the M. C. B. Association to discuss all of these problems and to pass authoritatively on them. All discussion must be based on the fact that now the railroads are under government control.

Quite a large percentage of the population of the United States is foreign born or children of foreign-born parents. Far too little attention has been given to Americanizing these people; many of them cannot even speak the English language and have no conception of American ideals. This is a deplorable state under normal conditions, but is particularly dangerous in time of war. Misunderstandings in industrial plants and communities which threatened to become serious have frequently been easily adjusted by getting these people to see the situation in its proper light. These situations must, of course, be handled with patience and tact as they arise, but more than this, it is necessary that these people be thoroughly Americanized as rapidly as possible. This is all the more important because German agents find so fertile a field for spreading their propaganda among them. The railroads have many foreign-born employees and not a few Americans who need to be educated in a higher degree as to their duties and responsibilities to this country. Special attention should be given, therefore, to observing a simple Flag Day program in order that all employees may gain a clearer understanding of the war and the reasons for our participation in it, and that they may be stirred to put forth greater efforts in strengthening the transportation machine to meet the abnormal demands which are being placed upon it. A simple program has been recommended, including a flag-raising to be accompanied by singing the Star Spangled Banner, a salute to the flag with the Pledge of Allegiance, an appropriate address, and the singing of "America." Railroad officers should use their influence also

June 14
is
Flag Day

in encouraging the industries in their immediate neighborhood to observe Flag Day.

Railway Strikes in War Time

The apprehension expressed in these columns a short time ago that some railway employees, especially those in shops, would be dissatisfied with the wage increases granted by the Railroad Administration, has been justified. Strikes have occurred in shops of the Southern Railway and the Rock Island, and more extensive trouble seems to be impending. These things have prompted Director General McAdoo to issue a statement sharply criticising employees who have struck. It reminds them that they are now working for the government, and in the present emergency should give it loyal support. As a matter of fact, there was no sufficient justification for strikes or threats of strikes on the railways before the government took over their operation. The country was at war then as now; it needed the most efficient service the railways could render then as now to enable it to carry on the war; and therefore every employee who was disloyal to the railways then was through them disloyal to the nation. Since the government assumed the operation of the railways, however, it has made special efforts to eliminate discontent and the causes of it from the ranks of railway employees. It has granted them an increase in wages, and has provided means for acting on all their legitimate complaints. In the circumstances, it would seem that the government has a right to ask railway employees to stay at their posts and render it efficient service, even though their conditions of employment and wages are not satisfactory in all respects. The government has done considerable for railway employees as a class and nothing, or even less than nothing, for railway officers as a class; and yet if railway officers should organize and threaten to leave their posts in a body they would be branded as traitors by everybody, including the railway employees. Does the fact that a man is a railway officer rather than a railway employee determine the kind and amount of duty he owes to his country in time of war?

The operation of trains over lines not used extensively may be carried out without any form of block signals, but it is necessary in the operation of an ordinary steam road at maximum capacity to use some form of block signaling, for otherwise the greatest capacity of the tracks cannot be obtained nor can train movements be made with safety. It is therefore generally recognized that signals are necessary for intensive operation with safety, and the question is, as to the manner in which this operation can be effected by signals and the character of signals necessary. The answer to this question depends to a great extent upon the kind of traffic handled and the extent to which tracks are assigned to certain classes of trains. A type of signaling that may be applicable to one road may not be suitable on another line where different operating conditions exist.

Signaling on Multiple Track Lines

In order to derive the greatest benefit from signals, it is assumed that a careful study will be made of conditions before the type or character of equipment is recommended.

While manual block may be used to advantage in certain places, there are manifestly drawbacks to its use in the great majority of cases on busy multiple track lines. The principal disadvantage of this type of block signaling is the excessive cost for the operation of a number of block stations if any material results are to be obtained. The element then affecting track capacity is the length of the blocks. Theoretically, the shorter the blocks are, the greater is the track capacity. This is true only within certain limits. If a track is assigned to high speed passenger train operation it is necessary that such trains get the caution indication of the signal ahead at a point far enough in the rear that a service stop may be made. This means that beyond a certain limit it is not advantageous to shorten the blocks for such trains. On a track assigned exclusively to a certain class of freight trains where the speed is materially less than that on high speed passenger tracks, the blocks may be made considerably shorter as these trains can be stopped within a shorter distance. When a track is used for both high and low speed movements, a different length of block is again necessary to obtain the best results. With the proper assignment of tracks for various classes of service on a road with four or more tracks, and with these tracks properly signaled, the best use of the tracks is obtained. The tracks assigned to passenger traffic exclusively are almost without exception not used to their capacity, while the freight tracks are quite often over-taxed. The congestion on the latter can be relieved materially by running freights over the passenger tracks during certain periods. Where such use is made of these tracks, the capacity can be materially increased and this can be bettered further by the location of interlocking plants governing cross-overs at certain points.

Elsewhere in this issue is an article on the effect of signals in increasing track capacity on busy multiple track lines of this character. Inasmuch as the proper installation of automatic signals and interlocking increases the track capacity materially, and at such a low cost as compared with other means of producing the same results, it would appear advisable that such work be given careful consideration by all whose duty it is to provide increased track facilities for the present huge volume of traffic.

Time is the Important Consideration

CURRENT MAINTENANCE WORK is usually started as soon as the frost leaves the ground. In most parts of the country it is well under way by the middle of April. It is now the first of June, but only limited progress has been made, particularly in such heavy work as the renewal of rails and ties. This delay is already serious and will become increasingly so as it continues from week to week.

Most maintenance work is seasonal in character, much of it necessarily so. On the average line, forces are increased to the summer basis by April 1 and work is pushed rapidly until about July 1. By that time, particularly in the central and middle western states, the small grains are ripe and a large part of the men leave for the harvest fields, reducing the forces on the roads practically to those required for routine work only. It is then generally impossible to make much progress with the heavier work until early in September and by that time it becomes necessary to concentrate attention on the closing of the season's work and preparations for winter. Therefore, with two of the three best working months already gone it is necessary that activities be greatly increased if serious consequences are to be avoided next winter.

The need for a heavy season's work should be universally realized. There has been a gradual accumulation of deferred maintenance for the last three or four years until the

roads are now probably two full years behind their normal rail renewals. On top of this condition came the unusually severe winter with its increased wear and tear on the track. As a result more than the usual amount of work *must* be done if the roads are to go into the winter in *even as good condition* as last year.

The general uncertainty among railway men as to the government's policy is responsible for some of this year's delay. However, the most important causes contributing to this condition are shortage of labor, rails and ties, and the agencies for the relief of all of these problems have been transferred entirely or in large measure into the hands of the government.

The roads were notified early in the year that the government had taken over the purchase of rails. Since that time no rails have been ordered, and although only about 2,000,000 tons, or less than two-thirds of a normal season's requirements, are now under contract on earlier orders, only about 25,000 tons are being rolled per week, at which rate less than one-half of the tonnage now on order will be secured in time to be laid this year. The outcome of such a condition is apparent to all familiar with the maintenance of railway tracks.

Similarly conditions in the tie industry, accentuated by the centralization of purchases and inspection, are leading to a serious shortage of ties. This situation is particularly acute on those roads which use untreated ties and which do not, therefore, store them any considerable length of time. While most of those roads which treat their ties have a sufficient number on hand to meet the requirements for this season, they also will be short when this supply runs out owing to the fact that the stocks in the tie yards are not being fully replenished. The tie situation is particularly serious because good ties are absolutely essential to safe operation, furthermore, ties cannot be produced and seasoned in a day.

The shortage of labor is universal. The government took a radical step which is expected to relieve the situation considerably when it issued an order a few days ago specifying certain occupations as non-essential for men of draft age and giving men in such occupations the choice of entering industries essential to the welfare of the country or of being inducted into the army at once. The government can go still further by opening certain sources of supply which will afford further relief, particularly to the railways. For instance, it was said several months ago on the authority of the United States Department of Labor that 100,000 Porto Ricans were ready to come to this country and that shipping had been provided to bring them here. Over two months have elapsed and none of these men has been reported as arriving on the railroads in this country. Another source of labor is Mexico. The roads in the southwest have recruited their track laborers almost entirely from Mexicans for a number of years, and have found them satisfactory. This avenue was closed on May 1, 1917, by the alien immigration law, which imposed a head tax and a literacy test on all immigrants. Since that time the immigration of Mexicans has been so small as to be almost negligible. The government has recognized the existence of this source of labor by arranging for the temporary admission of agricultural laborers from that country for a period not exceeding six months. A considerable number of men were brought into the Southwest under this arrangement in 1917, and under date of April 12, 1918, the Bureau of Immigration of the United States Department of Labor issued a circular outlining the conditions under which laborers of this character may be admitted this year.

With labor available in Mexico and with the pressing need for it in this country it would seem advisable, as a matter of public policy, to lift the restrictions, at least for the duration of the war, in order that the railways and other

industries may secure the men so essential to their proper operation. Action must be taken, and taken promptly, if serious results are to be averted. As stated above, maintenance of way work is seasonal in character and must be done before fall, if at all. In the meantime the roads must soon be prepared to freeze in the winter.

The Position of the Accounting Officers

IT IS A LONG STEP from the old conception of the railroad auditor as a confidential bookkeeper for the president of a railroad company to the recognition by the government that the accounting officers are a necessary part of the economical operation of the transportation system of the United States under government control. Charles A. Prouty, director of the Division of Public Service and Accounting of the United States Railroad Administration, was to have made an address before the Association of American Railway Accounting Officers at the annual convention at St. Louis on May 29, but, being prevented from doing so, wrote the Association a letter, setting forth his views as to the position of accounting officers under government control. In the course of this letter he says: "The operating revenues, which are reflected in the accounts kept by our accountants, belong to the United States. The director general can remove or employ any accountant upon any railroad under federal jurisdiction. Our accountants are, therefore, in a direct sense, the employees of the government." The letter is published elsewhere, together with the proceedings of the accountants' association, and it apparently clears up the situation about which some accounting officers felt more or less uncertainty.

The duty of the accounting officers who are thus taken into government service is single and undivided. Their entire responsibility is to the government. On the other hand, the association has still among its members railroad officers whose responsibility is to the stockholders and who are employed by the corporation, not by the government, and it has also among its members accounting officers of railroads which have not been taken over by the federal government, so that its responsibilities as an association are three-fold.

In commenting on the amalgamation of the various railroad associations in these columns last week, it might have been pointed out that the association of accounting officers is distinct and separate from those associations which may be combined with the American Railway Association. It would appear necessary to keep this accounting officers' association separate. Just as in a railroad company's organization, that part of the personnel which originates expenditures and receives money is kept entirely distinct from that part which audits expenditures and receipts, so it would appear to be proper to continue this broad distinction in so far as the associations are concerned.

Ever since 1906, the Association of American Railway Accounting Officers has been working in co-operation with the Interstate Commerce Commission in the perfection of a system of railway accounting, and probably the Interstate Commerce Commission, and especially those members of it who had to deal directly with the association, would be the first to acknowledge the value of the services which the association, and more especially its executive committee and committee of 25, have rendered. The continuation of the association and of the work of the committees and the meeting together of the membership is of great importance. A railroad auditor is peculiarly liable to get into a rut, to permit himself to get so close to the mass of detail work under his supervision as to lose perspective. The meetings of the association are the best and about the only antidote to this

tendency. Discussion of what the other fellow is doing, discussion of general principles and of new methods are a necessity for any progress and even for keeping abreast of day to day requirements.

A great deal of credit is due to American railway accounting officers for the independent stand which they have maintained, especially since 1906. The accounting officer was peculiarly liable to pressure from above, he was considered a non-revenue producing man. The fact that with the moral support of the government the accounting officers have stood out against their own executives in some cases and worked for a sound system of accounts open to public inspection is worthy of note. Now that the officers of the railroads under federal control become government employees, the Association can continue to perform a most important work by carrying on the ideals of sound accounting and full publicity.

The Railroad Administration and the Railway Officers

THE EFFECTIVENESS of an army of any given size depends mainly on its having enough experienced and competent officers to train, discipline and lead the soldiers in it and on the spirit of its official personnel. Even though the privates of an army are intelligent and courageous, it will not long be an efficient fighting machine unless it has plenty of good officers, and the officers are full of fighting spirit and are able to command the unstinted respect, confidence and loyalty of the men in the ranks.

The organization of a railway bears a closer resemblance to that of an army than the organization of any other kind of industrial institution. The railways of the United States have about 20,000 general and divisional officers, or approximately one officer for every 100 employees. The efficiency with which our railways have been operated in the past has been due mainly to the kind of officers they have had, from those who have had direct, detailed supervision over the work of the employees up to the presidents and the chairman of the board.

In a very large majority of cases the officers of all classes have risen from the ranks; and the higher officers usually have come up step by step through the various official grades to the positions which they now occupy. They have learned their business by experience and have owed their promotions to merit. This has not been true in every case, but the exceptions have not been numerous. Promotion having been based on merit, there has been intense emulation between ambitious officers on the same road, and between officers occupying corresponding positions on different roads, to get results which would demonstrate their superior capacity and gain for them commensurate rewards. While there has been friction especially within recent years, between some classes of the employees, on the one side, and the officers, on the other, the men usually have had respect for and confidence in their superiors, and there has resulted the able leadership and esprit de corps which have enabled our railways to combine excellence of service with economy of expenditure as they had not been combined on any other system of railways in the world.

It is unfortunately necessary to take cognizance of the fact that recent developments have had a tendency to impair the official morale and discipline on our railways. Since government control was adopted there has been a feeling on the part of both employees and officers that the latter cannot exercise the same authority over the former that they have in the past. Furthermore, the higher officers have had a large part of their power of initiative and decision regarding important matters taken from them and transferred to the Railroad Administra-

tion. Many men of official rank, especially in the traffic department, have been dismissed from the service, and others in some departments are apprehensive regarding the future of their positions. Many in the law departments have had their salaries reduced. Finally, to mention the most conspicuous and important example of all, notice has been given that the presidents of the companies are to be superseded as the chief executive officers of the physical properties by federal managers. The federal managers will report to the regional directors, and they, in turn, to the office of the Railroad Administration at Washington.

It has been understood that many of the presidents will be offered the positions of federal managers of their railways, but it has been reported that their salaries will be sharply reduced. Questions have been raised as to the effect which this will have upon the positions of operating officers, such as vice-presidents, general managers, superintendents of motive power, chief engineers, and so on, and upon the salaries and the opportunities of such officers. There are many ambitious men of lower rank who have looked forward to the time when they would be promoted to the highest offices, and many of these have become much disturbed regarding their prospects of retaining their positions and of securing promotions such as they feel they must secure to satisfy their ambitions and to compensate them for the energy and ability they are willing and anxious to put forth.

The result of these developments is that an alarming and dangerous feeling of uncertainty, unrest, irritation and pessimism is spreading among railway officers. It is not shared by all, but it is rapidly extending farther and farther among all classes and all ranks. There are also many employees who are intensely loyal to their officers and if this feeling continues to grow it will permeate extensively among the employees. It was hoped that the advance in wages recently granted would tend to encourage and stimulate employees, but, on the contrary, it is not as much as many expected, and, in consequence, while it has reduced discontent in some quarters, it has actually increased it in others. There are many officers, high and low, who are indignant and pessimistic because they believe that the officers as a class have not been treated considerably or fairly by the Railroad Administration, and while they entertain this belief it is not to be expected that they will exert themselves energetically to quiet the discontent among the employees. Men who feel that they have "troubles of their own" are more likely to think about their own troubles than to try to promote contentment among others.

So far as concerns the officers of the railways the existing situation presents a striking contrast to that which existed twelve months ago. At that time, as now, railway officers had more hard work to do than they ever had. Then, however, they were not merely trying to operate the roads more efficiently than ever before, but they were enthusiastic, optimistic and full of "punch." The railway managers voluntarily had undertaken to work the railways as a single system to demonstrate to the government and public that railway owners, officers and employees in a time of national stress could and would, without any governmental compulsion, submerge their competitive and selfish rivalries and interests and render to the government and public a larger and more efficient transportation service as a means to helping win the war than could possibly be secured under government management. From the optimism which prevailed then to the pessimism which prevails now, from the keenness for achievement which prevailed then to the spirit of hesitation and doubt which prevails now, there has been a long descent for the worse.

The *Railway Age* in thus describing the situation is not indulging in conjecture. It is its business to know, not merely what railway officers are saying, but what they are thinking, and the assertions made here as to their present state of mind are based upon information which has been gathered by intimate conferences with officers in all departments

and of all ranks in all parts of the country. Of course, they do not all regard matters in the same way. They look at the situation from different angles and are subject to different influences. But the general atmosphere of railway officialdom at present is one of dubitation, apprehension and gloom.

This is a condition which the welfare of railway employees and officers of the railways themselves and of the nation ought not and must not be allowed to continue. Men are made efficient or inefficient largely by the influence of fear and of hope. But in all men of spirit and ability the hope of appreciation and of reward is a far more powerful stimulant to efficiency than is fear. Persistent pessimism wins no battles for individuals, organizations or nations.

The present condition of mind of the railway official personnel can be corrected partly by the Railroad Administration and partly by railway officers themselves. The Railroad Administration should make a greater effort than it has to get the point of view of the officers who are out on the lines and actually operating the trains and maintaining the track, structures and equipment. Railway officers of all ranks have been much disturbed about their futures ever since government control was adopted. Their concern was naturally turned into deep apprehension when it was announced that the presidents were to be deposed as the chief executive officers of the roads. The present officers, high and low, have been used to the leadership of these presidents, and directly or indirectly owe their positions to them. Naturally, they have apprehended that the deposition of the presidents would result in radical changes in the official personnel of the roads, and with lightning playing all around them they do not know where it is going to strike.

To those who have closely watched developments under government control, the decision of the Railroad Administration to appoint federal managers of the various lines caused little surprise. When the railroads were first taken over it was generally assumed that the government was going merely to take control of their management and that the actual operation would be left in charge of the companies and their agents. In course of time it has become apparent that the term "government control" is a misnomer and that the government is not merely controlling management but is assuming the function of operation. Now, while men representing the companies could without trouble or embarrassment operate the properties under government control, their position under a system of government operation was sure to become difficult and embarrassing. Government operation having been decided upon it was natural for the Railroad Administration to prefer to put federal managers representing only itself in charge of operation.

In order, however, to get the best possible operating results, while at the same time avoiding having in charge of operation men who owe duties to both the railway corporations and to the government, it seems vitally important that in all cases where it is practicable the presidents of the railways shall be appointed the federal managers, and that where this is not practicable the vice-presidents in charge of operation, if competent men, shall be appointed. This would tend greatly to reduce the general fear now so prevalent that sweeping changes will be made in the official personnel.

Furthermore, it seems extremely desirable that there should be none of the wholesale slashing of salaries of which there has been so much talk and so much apprehension. It would be impracticable to make heavy reductions in the salaries of the higher operating officers without scaling down the salaries of other officers. Now the railway industry is a great industry, and one which demands the best talent that can be obtained. But the best talent will not stay in it and will not enter it unless it is made clear, not merely by words, but by acts, that as great opportunities for carving out successful careers by merit are to be afforded in it as in any other industry.

Fortunately, some late developments indicate that this

is the general policy which probably will be followed by the Railroad Administration. All the regional directors who have been appointed are former railway presidents. All the federal managers who have been appointed, with one exception, have been either the presidents or the operating vice-presidents of the roads of which they have been put in charge. There has as yet been no general cutting of salaries except in the law department. It is a cause of regret from the standpoint of operating efficiency that some of the ablest railway executives of the country are going to stay with the companies, and therefore will not be able in future to direct the operation of the properties, but most of the selections thus far made for regional directors and for federal managers have been good. If the same general policy in making appointments is followed in future, and if the Railroad Administration makes clear, not merely by what it says, but by what it does, that ambitious and able men will be given the same opportunity for careers in the railway business in future that they have had in the past, a large part of the gloom which now hangs over the railway business ought to be dispelled.

Meantime, to a large extent regardless of these matters, railway officers have a duty to perform to themselves, to the railways and to the country. It is indisputable that the lot of many of them has not been recently, and is not now, a happy one. Some of the ablest and most public-spirited railway executives in the country have had their careers suspended, if not actually terminated, by the adoption of government operation. This is a tragedy for them and a misfortune for the country. Those who stay in the service probably will not find their lots as satisfactory under government operation as they have been under private operation. But neither they nor anybody else can afford to forget for a moment that the country is at war, and that war is having unhappy and even disastrous results for many persons. Many young men who had just got well started in their careers have had to leave their offices and business places and go into the army. Men engaged and employed in many essential lines of business are making more money than they ever did, but, on the other hand, many engaged in so-called "non-essential" lines are seeing their businesses drift downward and are confronted with heavy losses, if not ruin. As for the labor situation on the railways, employers in every line of industry are having serious difficulties in dealing with labor. Therefore, as unsatisfactory as the lot of many railway officers is at present, if they will look around them they will find, if that is any consolation, that there are many persons whose situation is fully as disagreeable as their own.

Some railway officers are likely to reply that if they could look forward, as people in other lines of endeavor can, to an improvement in their condition the present situation would be more tolerable, but that government operation probably will lead to government ownership, and that official service on the railways under government ownership would be entirely intolerable to them. That is doubtless true. Few men of ambition and brains would care to stay on the railways under government ownership. But even if government operation were certain to lead to government ownership the duty of railway officers to stay at their posts during the war and do the best work that they can would be plain. Furthermore, it is very far from certain that government operation will lead to government ownership. It seems much more probable now that government operation will prove to be the most effective preventive of government ownership.

Many of the people of this country had come to favor government ownership because they had accepted the view of the advocates of state socialism that government operation of the railways would in some way work a miracle which would result in better service, lower passenger and freight rates, higher wages and large profits for the public treasury. The present trial of government operation, even though it be as successful as human genius and energy can make it, will

demonstrate that there is no magic in government management, and it may and probably will greatly increase rather than diminish the chance of a continuance after the war of private ownership and management of railways.

Railway officers are now going through what probably will prove to be the most trying part of their experience with government operation, because they are right in the midst of the transition from private operation to government operation. When this transition is completed we believe and hope that they will find that they are still serving under very many of the same leaders that they were before, that there have not been as radical changes in personnel and salaries as they fear, and that an increasing amount of consideration for their interests, their rights and their legitimate ambitions will be shown by those in authority. Unless this is done the morale of the railway official staffs will be destroyed and government operation will prove an utter failure. Those in high places in the Railroad Administration undoubtedly are keenly conscious of this; and being conscious of it, they are not likely to act in a manner which in the long run would inevitably defeat every plan and effort they may make to operate the railways efficiently. The future of railway officers as a class, both during and after the war, probably will prove to be far more happy and successful than so many of them now fear.

A New Field for Pork Hunters

THE POSSIBILITIES of the Railroad Administration's revolving fund as a pork barrel have already been scented from afar by many eager citizens and their constituted representatives, some inspired by local pride and interested in local improvements at national expense, and others merely enthusiastic over the possibilities in the way of increased transportation efficiency to be derived from the expenditure of a few millions in places which private capital has not regarded as promising fields for investment.

While there is as yet no indication that the Railroad Administration proposes to allow the large funds at its disposal and under its control to be drawn upon for expenditures in parts of the country where it will do the most good politically instead of from a railroad standpoint, many of the same people who have been active in soliciting and procuring appropriations for their districts have not been slow to perceive the possibilities along that line afforded by the fact that the government is now administering the railroads. Mr. McAdoo's outside office has frequently been thronged with delegations of waterway advocates anxious to point out the immense relief that could be afforded the transportation systems of the country by the improvement of waterways that have been neglected or whose usefulness had been put at a disadvantage by railroad competition and the announcement of the railroad budgets amounting to \$288,000,000 that had been approved by the division of capital expenditures, together with the invitation to the roads to apply to the division of finance and purchases for loans if necessary, has opened up a vista of new opportunities.

Even before the budgets were announced Judge Lovett's office was the recipient of much advice from Senators and Congressmen as to where railroad improvements were imperatively needed. Thus far it has been possible to give such applicants the reply that capital and labor are limited on account of the war and that expenditures must be confined strictly to necessities. As a result the budgets as recently announced were in the form in which they were made up by railroad officers as revised by the regional directors and approved by the division of capital expenditures according to the principles of railroad efficiency and with recognition of the fact that the country is engaged in a war. For example, very few expenditures were approved for new passenger stations or for extensions.

But many members of Congress who hardly knew where the Interstate Commerce building was have been seen in its vicinity of late at the head of large delegations who knew of excellent projects which might be furthered by a government loan to a railroad whose own credit would not stand the strain. Senator Shafroth of Colorado thus appeared with a delegation last week to urge that the government loan \$6,000,000 to the Denver & Salt Lake Railroad for the purpose of building the much bruted tunnel through James Peak which Denver will never be happy without.

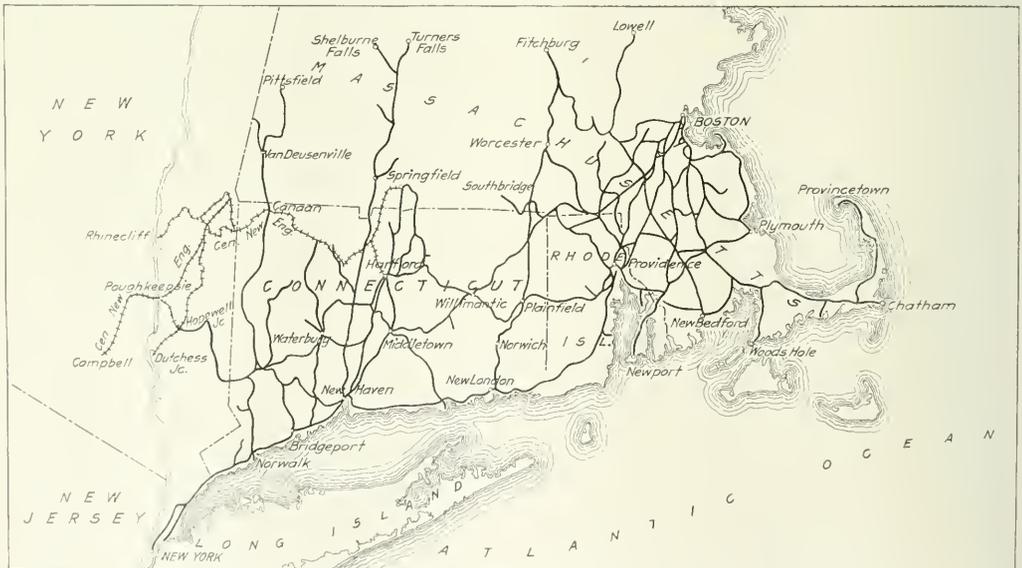
A minor but illuminating illustration of the attempts communities already are beginning to make to secure from the railroads by political influence what cannot be secured by other means is afforded by the case of Delaware, Ohio, a small place a few miles from Cleveland. Formerly the Big Four Railroad operated some shops there. The Journal-Herald, a local newspaper, records that "the Delaware shops have been practically extinct for seven years." The railroad has made them so for reasons of transportation efficiency. "When the government took over the railroads of the country 13 freight trains were passing through Delaware daily eastbound and 10 westbound," says the Delaware Journal-Herald. "All these trains are now going over the Bellefontaine route." In order to get the operation of the practically abandoned shops renewed and the freight trains run through Delaware again—for the sake of Delaware, of course, and not of railroad efficiency—the Chamber of Commerce of that town has appealed to Congressman William A. Ashbrook, of the district in which Delaware is located, and

similar matters through Congress. The method of approach to a congressional appropriation is well-known but Congress now has very little to say about running the railroads and the Railroad Administration organization consists mainly of practical railroad officers and not of the type of men usually found in government offices. It is easy to get appropriations through Congress because members who have no interest in them vote for them on a reciprocity basis so that a similar courtesy will be shown as to projects in which they are interested.

Moreover it is much easier to turn down raids on the pork barrel during war times than during times of peace.

New York, New Haven & Hartford

THE RISE IN MARKET PRICE of the stock of the New York, New Haven & Hartford within the past two months has led to the calling of the stock among brokerage house customers, the "mystery stock." While it is true that, under the government guarantee of railroad net income, the New Haven will receive an amount that would not presumably justify it in immediately beginning payment of dividends on its stock, it is, nevertheless, far from a mystery as to the improvement that has taken place in the affairs of the company. During 1917, there was a big improvement in operating conditions; there was a steady progress in carrying out a plan for much needed betterments; there was marked progress in untangling the complicated intercorporate relations of the New Haven



The New York, New Haven & Hartford

to United States Senator Pomerene. The Journal-Herald says that Congressman Ashbrook "gladly offered to look into the matter in the interest of Delawareans," and that Senator Pomerene "was heartily in favor of taking up the cause of Delawareans." What is national railroad efficiency from a political point of view compared with the local interests of Denver, Colo., and Delaware, Ohio?

Applicants for money for projects of this kind now have a more difficult task to perform than when trying to get

and its subsidiaries and controlled companies; and, since the close of the calendar year 1917, the floating debt situation has been cleared up by the government buying at par the \$43,964,000 one year 6 per cent notes, the proceeds of which paid off the greater part of the \$45,000,000 notes which were issued April 16, 1917, and due April 15, 1918. The New Haven's floating debt is now taken care of till April 15, 1920, through a provision which permits of the renewal of the notes taken by the government for a second year. Total

operating revenues in 1917 amounted to \$88,788,000; an increase over 1916 of \$5,353,000. Of this increase \$3,343,000 was in passenger revenue. Total operating expenses amounted to \$61,970,000; an increase of \$7,598,000 and of this increase \$5,161,000 was in transportation expenses. This was an increase of 14 per cent in transportation expenses, but it would appear that the entire amount represented increased rates of wages and per unit costs of fuel and material and that actually the company expended less units of work in moving a 13 per cent greater freight business and an 11 per cent greater passenger business than in 1916.

The ton mileage moved in 1917 was 2,776,000,000; an increase over 1916 of 208,000,000 ton miles. The total number of passengers carried one mile in 1917 was 1,814,000,000; an increase over 1916 of 164,000,000 passenger miles. The mileage of revenue freight trains decreased by 817,000 and the average revenue freight train load was 397 tons in 1917, an increase of 71 tons over 1916. With an increase of nearly 11 per cent in passenger revenues, there was a decrease of over 3 per cent in passenger train mileage. These results were obtained without any increase in the number of locomotives in freight or passenger service. As a matter of fact, 55 locomotives were scrapped or sold and only one added.

Since the end of 1917 the New Haven has begun to receive some of its heavy Santa Fe type freight locomotives which have been ordered for more than a year. Preparatory to putting in service these heavier locomotives, the company during 1917 carried out a quite extensive program of additions and betterments.

There was \$1,072,000 spent for new and improved bridges; \$1,017,000 for additional yard facilities; \$626,000 for improved locomotive facilities; and \$571,000 for additional yard passing sidings. The total, chargeable to capital account, for additions and betterments, exclusive of equipment, was \$5,473,000. There was \$621,000 spent for new equipment and improvements to equipment; and payments on equipment trusts amounted to \$960,000. The greater part of the income which should result from the additions and betterments to roadway and track will not be shown before the figures for 1918 are made up. Some of the expenditures for equipment, however, were immediately productive. For instance, the company spent \$146,000 for superheaters and additional safety appliances. The expenditures on superheaters added during the year 131,000 pounds to the tractive power of the locomotives in service. As already mentioned, 55 locomotives were scrapped; but the addition to tractive power through the installation of superheaters was alone equal to the tractive power of nine of the locomotives disposed of.

President Pearson, in his annual report, gives credit for the improvement in freight train loading, car loading, and number of passengers per passenger train mile, to the public as well as to his organization, and the public did unquestionably co-operate with the management, especially as regards car loading, and it put up with the inconveniences in the way of passenger service because of a better understanding of the New Haven's problems. The board of directors, in a resolution which was ordered printed in the annual report, give full credit to Howard Elliott, who resigned as president on May 1, 1917, for the greatly improved public relations of the company. There could be no doubt of the importance of Mr. Elliott's services in this respect. The removal of the obstacles in the way of permanent financing by the action of the Massachusetts, Rhode Island and Connecticut railroad commissions and legislatures may safely be assumed to have been due in good part to Mr. Elliott's efforts. Making full allowance, however, for this and certain other favorable circumstances, there still remains a large measure of the total progress made which must be credited

to the aggressive business-like methods of the new management. Neither the increase of 70 tons in average train loading nor the increase of 12 per cent in average revenue lading per loaded car could have been accomplished without a determined and well directed effort on the part of officers and employees of the railroad company. Further evidence of better operation is given by the fact that the amount spent for hire of equipment was \$676,000 less in 1917 than in 1916; the total in 1917 being \$2,671,000.

The operation of the New York, New Haven & Hartford has often been likened to the operation of a vast freight and passenger yard. It is pretty generally recognized that one of the most important features in the economical operation of a large yard is to have ample yard facilities. The New Haven has suffered severely, especially in the last three years, from the lack of yard facilities, engine house facilities and passing tracks. With so large a part of its business passenger business and so large a part of its freight business fast freight, the main tracks have been subject to severe congestion. One important object in ordering the heavy Santa Fe freight locomotives which are now beginning to be put in operation was to obtain a much heavier train load without reducing the average speed of freight trains to any harmful extent. There have been differences of opinion as to how effective this experiment will prove, but the past year has demonstrated that even without these locomotives it has been possible to inspire the organization so as to produce greatly improved results in moving more tonnage with less freight train mileage.

Mention has already been made of the temporary clearing up of the floating debt situation. The government has approved of \$24,316,000 for additions and betterments to the New Haven, eliminating only \$4,248,000 of the sums which the company asked approval of for this purpose.

At the end of the year, the company had \$4,495,000 cash and had written off through profit and loss during the year \$6,276,000 loss in the liquidation of the New England Navigation Company, \$1,163,000 loss in the liquidation of the Millbrook Company, \$3,000,000 loss in the surrender of the New England Steamship Company, and \$328,000 on loss in the sale of securities. The profit and loss surplus now stands at \$3,429,000. It is rather interesting to note that settlement was made with E. H. McHenry by the payment as recommended by a board of arbitration of \$100,000, and with Charles S. Mellen, former president, by the payment of \$95,000.

The time for the sale of the stock of the Boston & Maine, which is held by the Boston Railroad Holding Company and controlled by the New Haven, has now been extended to February 1, 1919.

Throughout the report there is a business-like facing of facts, even when they are unpleasant, and a record of progress being made especially in better operation which should be good reading to holders of New York, New Haven & Hartford securities.

The following table shows the principal figures for operation in 1917 as compared with 1916:

	1917	1916
Freight revenue	250,000,000	246,743,000
Passenger revenue	14,400,000	11,048,815
Total operating revenue	264,400,000	257,791,815
Material and supplies consumed	66,112,000	66,724,000
Maintenance of equipment	12,450,000	12,650,000
Travel expenses	89,000,000	79,000,000
Transportation expenses	20,000,000	17,500,000
General expenses	17,500,000	17,500,000
Total operating expenses	205,512,000	201,924,000
Profit	58,888,000	55,867,815
Operating income	205,512,000	201,924,000
Operating expenses	146,624,000	146,624,000
Net income	58,888,000	55,299,815

Letters to the Editor

More on the Short Line Problem

ST. PAUL, MINN.

TO THE EDITOR:

Since the power given to the President by the act of March 21, 1918, to relinquish of his own volition control of railroads that are not needful or desirable, must be exercised before July 1, 1918, the director general necessarily has had to make rapid decisions and to act promptly in the matter of the relinquishment of the short line railroads, control of which he does not wish to retain, and he will have to continue to act quickly during this month, if he is to make use of that power. On the other hand the President has power to take into federal control any needful or desirable railroad, and therefore can take a relinquished road again.

If it should be clear that the President would not retake control of a large number of the short line railroads, control of which was relinquished, are they to be left to shift for themselves? Is there, or can there be no middle ground between federal control and abandonment of responsibility and assistance to the United States? Should there not be some further method devised for the handling of the short line railroads not under federal control, in a uniform manner, affiliated with the controlled railroads and supervised and assisted by the United States Railroad Administration. There seem to be fears on the part of some of the owners of these roads that in the midst of handling the more dominating problems of the larger railroads, the short lines may be overlooked or given scant consideration. It may be admitted that these fears are groundless; nevertheless too much stress cannot be laid on the fact that their disposition and operation is a serious question for many persons and communities, particularly in the West, and therefore, one of the most important problems presently to be solved by the United States Railroad Administration. It is therefore important to study the short line problem.

The Railroad Administration has one of the greatest problems ever laid on one man or set of men in managing and directing the transportation system of the country, and naturally would not wish to be hampered with the care of roads that need continual nursing and special attention in order to be kept in operation. There are many roads whose financial problems would not be solved by being kept in federal control (though other difficulties above adverted to would be avoided) because the just compensation as defined, calculated and allowed under the terms of the act of March 21, 1918, would not be sufficient to pay their charges and war taxes; and yet no conditions of war operation, receivership or recent expenditure, not fully reflected in operating railway income of the prescribed period, exist to warrant the President to make a special agreement. Some other means must be found.

It is not a sufficient answer to say that it is not the business of the United States to protect private investments, for though this might have been said before federal control had been taken of the railroad systems of the United States, a new element has been introduced in the fact that the Railroad Administration by its control over routings can make or break any railroad that is outside of federal control. Yet though this is persuasive of an obligation on the part of the United States to make some arrangements for the protection of the short line railroads, it is by no means conclusive. The great national purpose is to win the war, and to that end everything else must be subordinated and, if necessary,

sacrificed. The decisive question is whether a railroad is needful or desirable in a comprehensive national system of transportation; but there are many viewpoints to be considered in reaching a conclusion on the question of need or desirability.

The case of the railroad which handles a large quantity of essential commodities is simple. But it is unlikely that such a road would have very serious financial difficulties in any case. This would also be true of the plant facility.

There is a larger question than whether a community produces sufficient essential commodities to make it immediately necessary that a railroad be maintained. If, without fulfilling this condition, a community is a growing one, entirely dependent for its transportation on the short line railroad, or if large numbers of people who work in other communities on essential commodities live on the line of such short line railroad and are entirely dependent on it for transportation, then it would seem to be desirable that such a railroad should be insured of future existence. The development of new communities, and the protection of the normal conditions of life for the people is an important function of the government in the war emergency. Developing communities must be encouraged if the future of the country is to be made secure, and it would be no ultimate economy to save money by abandoning a railroad if the equivalent, or more, were lost by making people, dependent on that railroad, move to other communities.

Reduced to lowest terms, it would seem that the only railroad that can be left to its fate is the railroad which ought never to have been built, and which might better now be scrapped.

The owners of the short lines naturally recognize that the control of routings is the power of the Railroad Administration which affects them most, and they urge particularly that if left out of federal control an arrangement be made whereby routings in their favor will be observed. Such an arrangement would seem to be entirely impracticable, for it would destroy one of the most valuable gains resulting from unified control of railroads, namely, the ability to ship over the shortest and most direct line and the elimination of traffic solicitation. But, on the other points some uniform arrangement and some federal assistance ought to be given.

It would seem that the government should make agreements with the short lines which are not kept within federal control, (a) to assist the short line in financing itself during the period of the war, the budget of operating expenses and financial requirements of the short line to be subject to governmental approval and control; (b) that the government should allow to the short line railroad the same percentage of division of rates that it had prior to the beginning of federal control; (c) that the government should insure its pro rata share of car supply; (d) that the government should permit it to make all of its purchases through the regional purchasing committee and that it be given the benefit of prices fixed or obtained by the government; and (e) that it be given the right to call upon the United States Employment Service for labor and stand upon the same plane as other railroads.

This would probably require additional legislation; but there is no essential objection to that. The government is in a new and uncharted field, and it cannot be expected that the first plan and the first law passed in pursuance thereof, however wise the framers, will cover every possible phase of so widespread and intricate a problem as taking from private ownership and control and placing in federal control the vast railroad transportation system of this country.

SANFORD H. E. FREUND,
Assistant General Counsel, Great Northern.



Electrification of New York Connecting Railroad

Link Between the Pennsylvania and the New Haven Eliminates
Eleven and Thirteen Mile Car Ferry Routes

THE NEW YORK CONNECTING RAILROAD, constructed and owned jointly by the Pennsylvania Railroad Company and the New York, New Haven & Hartford Railroad Company, forms an important connecting link in the heart of greater New York City between the existing railroad lines of these two companies. It is used both for freight and passenger service, separate tracks being provided for each. The connection with the New Haven Railroad is at Port Morris and the connection with the Pennsylvania Railroad for passenger service is at Sunnyside Yard in Long Island City, from which point through trains are operated into the Pennsylvania Station, New York, via the Pennsylvania tunnels under the East River. The two-track freight line extends from the New Haven connection at Port Morris to Fresh Pond Junction, thence over the Long Island Railroad to Bay Ridge, from which point a short car ferry (about three miles long) completes the connection with the Pennsylvania Railroad Company's main freight terminal at Greenville, N. J., on New York Bay. The New York Connecting Railroad with its connections with other railroads is shown in Fig. 1.

The principal New York Connecting Railroad data are as follows:

Length of two-track passenger line, Port Morris to Sunnyside Yard, miles	1.1
Length of two-track freight line, Port Morris to Fresh Pond Junction, miles	2.0
Length of two-track freight line, Port Morris to Bay Ridge, miles	2.0
Maximum grade westward, approaching Hell Gate bridge, two miles, per cent.	1.2
Maximum grade eastward, approaching Hell Gate bridge, 1.7 miles, per cent.	7.2
Length of four-track passenger and freight section, Port Morris to Sunnyside Junction, miles	3.3
Length of Hell Gate bridge, between approaches, ft.	427
Length of Hell Gate bridge, outside of piers, ft.	1,150
Cleared height of bridge above mean high water, ft.	115
Cost of Hell Gate bridge	\$4,000,000
Cost of the New York Connecting Railroad	\$6,000,000
Total cost of line, including the Bay Ridge improvement	\$10,000,000

Method of Operation

Formerly, the interchange of a few passenger trains between the Pennsylvania and the New Haven Systems was by a car ferry route of about 11 miles from Jersey City to Harlem River and the freight interchange was by a still longer ferry, about 13 miles, between Greenville and Oak Point. As these float services were conducted by the New Haven, the New York Connecting which takes their place is operated entirely by the New Haven.

For satisfactory operation in connection with the New Haven Railroad's electric passenger service between New York and New Haven it was decided to electrify the passenger tracks of the New York Connecting Railroad so that through trains may be operated into the Pennsylvania Station, New York, without changing engines. This electrification has been carried out by the single-phase, overhead catenary trolley system of the same operating characteristics as that employed on the New Haven, the current delivered being at 11,000 volts and 25 cycles. The New Haven passenger locomotives used in this service are of the A.C. D.C. type and are, therefore, capable of operating through the East River tunnels, which are equipped with third rail into the Pennsylvania Station, the change from overhead to third rail operation being effected at the east end of Sunnyside Yard. Power for operating the trains on the New York Connecting Railroad is supplied direct to the trolleys from the New Haven System at Port Morris without auxiliary transmission or feed wires as these are not necessary for the present passenger service.

Trolley Supporting Structures

Two general types of structures are used for supporting the overhead catenary trolley. Where the track is located on

the ordinary type of right-of-way tubular pole structures (either with cross-catenary supporting spans or with brackets) similar in design to those used for the Pennsylvania Railroad electrification at Philadelphia have been adopted;

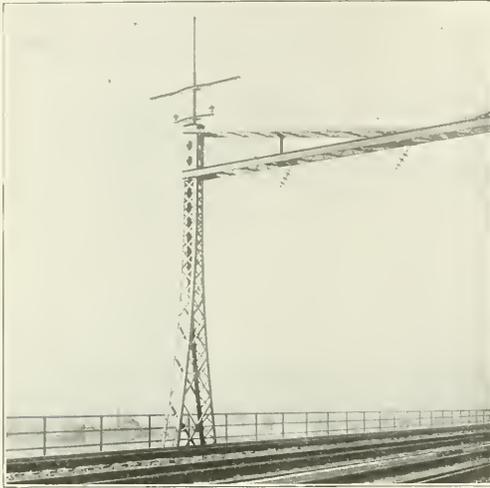


Fig. 2. Type of Post Used to Span Bridge Expansion Joints

on the bridges and viaducts it is not feasible to use this type of construction and here substantial structural steel bridges are employed.

On the steel viaduct either side of Hell Gate, the bridges

are supported on heavy double brackets riveted directly to the girders underneath the track. As most of these supports are at expansion joints between the deck girders, it was necessary to separate these brackets in order to provide for expansion and obtain satisfactory widths of bearing. The bolts on one side of each post fit into slotted holes to allow for movements due to temperature changes. Because of this width of base, posts with curved members were used on the trolley bridges as shown in Fig. 2. The cross-beams on these bridges are built up of double channels laced together and



Fig. 3. Trolleys Are Supported on Hell Gate Bridge by Attaching the Cross Wires to the Steel Members of the Bridge

reinforced at the center by sag braces. A special bridge which is similar in design to the other structures except that the truss is considerably deeper is used to carry signals.

Within Hell Gate Bridge the trolleys are supported by cross-wires attached to the steel members of the bridge, making a very light, inconspicuous system not detracting from the appearance of the bridge, as is shown in Fig. 3. At either end of Little Hell Gate Bridge ornamental reinforced concrete bridge towers are used to support a cross-beam for carrying the trolleys. One of these beams is also used as a safety anchor for the trolleys. This is shown in first illustration.

On Bronx Kill Bridge, Fig. 4, the trolley insulators are attached directly to overhead steel members with safety anchors at each end. At Port Morris on the north end where the tracks approach the junction with New Haven the trolleys are supported on single track structural brackets part of which also support certain of the New Haven trolleys of the line to Harlem River. These may be seen in the background of Fig. 5, the structure in the foreground being of special design for the transition between the two types. On the southern approach where the railroad is carried on fill between concrete retaining walls for about 3,000 feet, the trolley structures rest on the retaining walls and are similar to those on the steel viaduct, except that the sides of the posts are parallel instead of being curved.

Between this retaining wall section and Sunnyside Junc-

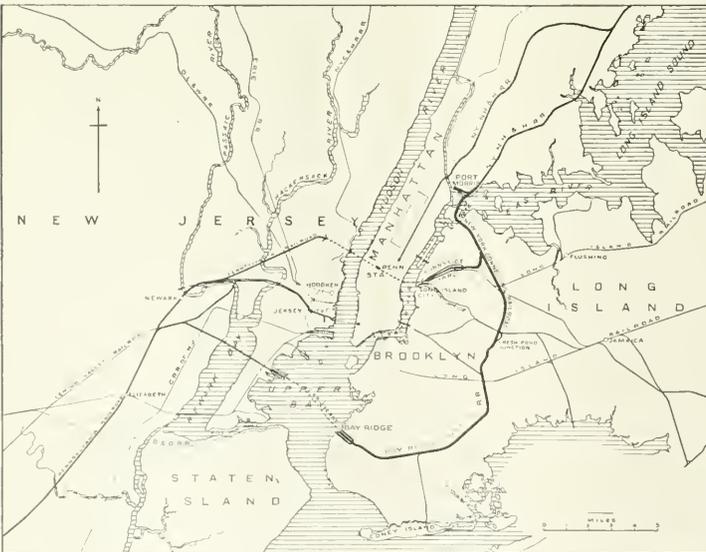


Fig. 1. Map of New York Connecting Railroad

are supported on heavy double brackets riveted directly to the girders underneath the track. As most of these supports are at expansion joints between the deck girders, it was necessary to separate these brackets in order to provide for expansion and obtain satisfactory widths of bearing. The bolts on one side of each post fit into slotted holes to allow for movements due to temperature changes. Because of this width of base, posts with curved members were used on the trolley bridges as shown in Fig. 2. The cross-beams on these bridges are built up of double channels laced together and

tion which is the head of the four-track railroad where the passenger tracks leave the freight line for the connection at Sunnyside Yard, there are several trolley supports consisting of guyed tubular poles with cross catenary wires to support the trolley, as shown in Fig. 6. Between Sunnyside Junction and Woodside avenue on the passenger line, trolley supports are of the two-track guyed tubular bracket type and beyond Woodside avenue they are single track tubular



Fig. 4. On Bronx Kill Bridge, the Trolley Insulators Are Attached Directly to Overhead Steel Members

brackets without guys. This type of construction is shown in Fig. 7.

Catenary Trolley System

As the New York Connecting Railroad is to be maintained and operated by the New Haven Railroad, details of hardware that have become standard on the New Haven System have been followed closely. The trolleys have been erected over the passenger tracks throughout their length, and over



Fig. 5. Transition Structure Used Between Two Different Types of Trolley Construction

the westbound freight track from Port Morris to the top of the grade at Hell Gate Bridge to permit electric pushers to be used to help the freight trains up the grade.

The trolley system consists of a 9.16 in., 7-strand, extra high strength galvanized steel catenary messenger supporting with hangers a 2.0 B. & S. gage grooved copper auxiliary messenger and 3.0 B. & S. gage grooved high strength bronze

trolley wire. The hangers consist of a galvanized iron rods screwed into a clamp that engages the messenger at the upper end. On tangents the hanger screw into a clamp at the lower end that is attached to the copper auxiliary messenger. On curves the lower end of the hanger is used as a bolt to hold a clamp which engages both the auxiliary messenger and the contact trolley. The spacing of the hangers on tangents is approximately 40 ft. with two bolted clamps between each pair of hangers attaching the contact trolley to the auxiliary messenger. On curves the hangers are placed about 15 ft. apart. A typical view of the trolley supports and the trolleys on a curve is shown in Fig. 8.

The trolley is insulated from the structures by three 10 in. free swinging porcelain discs, similar to those used in the yards of the New Haven Railroad. An insulator arrangement of this kind has the advantage of economy, insulation, ample strength and, most important of all, provides insurance against interruption to service due to the failure of any one insulator unit. In anchoring and sectionalizing the catenary system three 6 ft. wood strain insulators have been used in multiple with an equalizing yoke.

At each trolley bridge on tangents there is a steady to prevent excessive swinging of the trolley during high winds. These steadies are insulated from the structures by strings of three porcelain insulators similar to those used to support



Fig. 6. Guyed Tubular Poles with Cross-Catenary Wires to Support the Trolley Are Used Where the Passenger Tracks Leave the Freight Line

the trolley. The trolleys are insulated from each other by single 6 ft. wood strain insulators. No steadies or pull-offs are used on curves, the system floating naturally into an inclined position. The height of the contact trolley above the top of rail on and between Bronx Kill and Hell Gate bridges is 18 ft. because of overhead structural clearances within the bridges. Either side of these points the trolley rises to a normal height of 22 ft. above the rail.

Transmission Lines

The four-track structural trolley bridges are fixed on each side with tubular banded poles cemented into the structural posts. Cross arms are provided to carry four high voltage wires on the upper arm and two on the lower arm. At present there are no wires on the upper arm, as the extent of the present electrification does not require trolley feed wires. The lower arms each carry 2.0 B. & S. gage power wires for the signal system. These are mounted on a New Haven standard insulator for 11,000 volts, although the initial voltage is only 2,200. In case of failure on one side the current will be automatically thrown to the circuit on the other side.

On the passenger connection between Sunnyside Junction and Sunnyside Yard the signals are fed by a single 2,200

volt rubber-insulated cable, which is carried on a $\frac{1}{2}$ in. Siemens-Martin steel cable outside of the one- and two-track bracket structures. A switch at Sunnyside Junction automatically throws this cable onto the power circuit that is energized. On these structures a cross-arm is provided for four future trolley feeders.

A $\frac{1}{2}$ in. galvanized Siemens-Martin ground wire has been run on top of the bonnet poles on both sides of the four-track bridges and on the top of the single post structures.

At each signal bridge on the viaduct circuits have been run between the signals and relay boxes which are on top of the concrete piers and against the steel girders. Access has been provided to the relay box by means of ladders and platforms.

The rails used on the New York Connecting Railroad are the Pennsylvania Railroad standard 125-lb. steel rail. Each joint is bonded with two No. 1/0 duplex pin terminal bonds, similar to those used on the New Haven Railroad, except that the thickness of web in the extra heavy rail required a slightly longer terminal.

Communication Lines

For the purpose of railroad communication a telephone and telegraph conduit line has been built connecting with the Pennsylvania Railroad at Sunnyside Yard, and the New Haven Railroad at East 132d street between Harlem River and Port Morris, with connections into the railroad towers and to frequent telephones on the railroad.

On the viaduct the conduit line consists of six fibre ducts

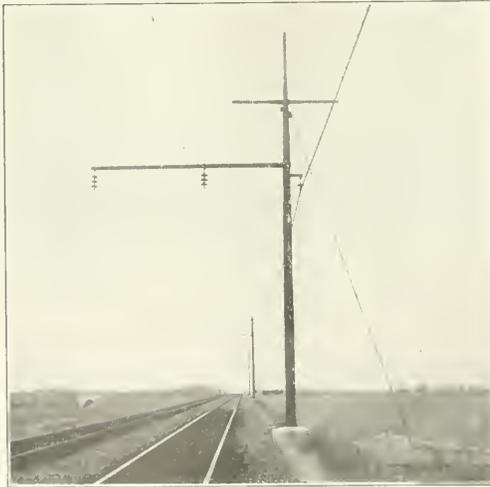


Fig. 7. Guyed Tubular Bracket Type Poles Are Used for Single and Double Track Construction

protected by heavily reinforced concrete and provided with steel splicing chambers. In the fill south of the viaduct a six-way underground conduit line has been constructed of vitrified clay duct encased in concrete. The standard manhole is a pre-cast oval reinforced concrete type with concrete covers. Rectangular concrete manholes cast in place have been used at special locations and in a short 12-duct section west of Woodside avenue. Concrete test houses are provided on the passenger section at East 132d street, Sunnyside Junction and at Woodside avenue, where the telephone cables are terminated for testing and for lateral circuits.

A 45-pair cable has been installed along the passenger

section. This cable is lead-covered and consists of 12 pairs No. 13 B. & S. gage copper wire quaded, and 32 pairs No. 16 B. & S. gage copper wire quaded, and one lead encased test pair. The test house at East 132d street is connected with the Harlem River Station by an aerial cable. In the steel splicing chambers on the viaduct the telephone cable has been offset to allow for expansion and contraction of the steel girder, which amounts to about three-quarters of an inch. On Hell Gate and Little Hell Gate bridges, however, the maximum expansion in the bridge system will be about 10 in. and here the cable has been terminated with potheads and flexible rubber insulated cables used for connection between the potheads. South of Sunnyside Junction a similar cable has been run along the freight line to Bay Ridge, most



Fig. 8. Typical Trolley Construction for Use on Curves

of the way being carried overhead. The poles used are southern pine impregnated with creosote by the vacuum process. This cable line connects with the Long Island Railroad System at their East New York Substation, a new 24-pair cable connecting with Jamaica.

The principal materials were furnished by the following manufacturers:

Structural bridges	Virginia Bridge & Iron Company.
Tubular poles	National Tube Company.
Steel messenger and ground wire.....	American Steel & Wire Company.
Copper auxiliary messenger.....	John A. Roebling's Sons Company.
Copper alloy contact trolley.....	Bridgeport Brass Company, Standard Under-
	ground Cable Company.
Copper signal transmission wire.....	John A. Roebling's Sons Company.
Bonds	American Steel & Wire Company.
Insulators	Ohio Brass Company.
Guy rods	American Iron & Steel Mfg. Company.
Steel castings	Atlantic Steel Castings Company.
Malleable iron castings.....	Malleable Iron Fittings Company.
Catenary hangers and castings.....	Westinghouse Elec. & Mfg. Company.
Special bolts, nuts, rods, etc.....	American Iron & Steel Mfg. Company,
	Thomas Laughlin Company, Greenlie-
	Halliday Company.
Turnbuckles and sockets.....	Thomas Laughlin Company.
Signal power cable.....	The Okonite Company.
Vitrified clay duct.....	Shawmut Manufacturing Company.
Communication cable and eqpt.....	Western Electric Company.
Pre-cast concrete manholes and	
test houses	C. F. Massey Company.

THE BRITISH BOARD OF TRADE is given further powers for the restriction of railway passenger traffic by additions to the Defense of the Realm Regulations. Authority is now given for prescribing the conditions on which tickets may be issued and passengers carried, either generally or in specified localities, or for journeys exceeding specified distances, and for enabling priority to be given on railways to any passengers or classes of passengers, and for enabling railway companies to refuse to carry passengers, and to refuse access to stations or trains in order to give priority to other passengers, and to remove passengers obtaining such access without authority.

Doings of the United States Railroad Administration

First Appointments of Federal Managers Announced— Administration Meets Shop Labor Troubles

WASHINGTON, D. C.

THE APPOINTMENTS already announced of federal managers to operate the railroads for the government instead of for their companies undoubtedly give some indication of the policy to be followed in the selection of the others, whose names are expected to be given out shortly. Five appointments have already been announced and in at least four of the cases the men selected are those who would naturally have been expected to be picked out. In two cases the new federal managers have been presidents, and in three cases they have been operating vice-presidents. Mr. Stevens, who has been appointed federal manager of that

Western, might have been appointed federal manager of his road, but he was made regional director and, therefore, required to give up his direct connection with his own road. In the case of the Pennsylvania and the Baltimore & Ohio the presidents have practically occupied the position of chairman of the board and as their systems are located in two regions, and therefore will have two federal managers, the appointment of either as federal manager would have been a distinct demotion.

The appointments already announced show that the integrity of many railroad systems is to be considerably dis-



Elisha Lee
Federal Manager, Pennsylvania Lines
East



A. W. Thompson
Federal Manager, Baltimore & Ohio
Lines East



G. W. Stevens
Federal Manager, Chesapeake & Ohio



J. H. Young
Federal Manager of the Virginian.



A. C. Needles
Federal Manager, Norfolk & Western

part of the Chesapeake & Ohio that lies within the Pocahontas region, has been president of his road in charge of its operation, while the company had a chairman in New York. In the case of the Virginian, Mr. Young, the operating president of another road, was appointed in place of a president who had his office in Wall Street. Mr. Needles, the operating vice-president of the Norfolk & Western, was chosen as its federal manager and a similar policy was followed in the case of the Baltimore & Ohio and the Pennsylvania, where Mr. Thompson and Mr. Lee were appointed in charge of the lines included in the Allegheny region.

Undoubtedly Mr. Maher, president of the Norfolk &

turbed by the creation of the new regions because their lines extend beyond the regional boundaries. This is the case with the Baltimore & Ohio and the Pennsylvania, part of whose lines are in the Eastern region and part in the Allegheny region, and the Chesapeake & Ohio also has lines in both the Eastern and Pocahontas Regions. Some smaller lines are also added to the jurisdiction of the federal manager for the Norfolk & Western. As a result, the jurisdiction of a federal manager, as it is apparently the intention that they shall report to only one regional director, in a great many instances will not correspond to the jurisdiction of the former railroad organizations. A similar result will

probably be seen when announcement is made of a further decentralization of the Western region.

The selection of federal managers, in addition to the few that have been announced, has been under consideration by the regional directors who met with Director General McAdoo at White Sulphur Springs on Wednesday of this week to go over the entire subject with him, so that the appointments may be announced this week.

George W. Stevens

George W. Stevens, federal manager of the Chesapeake & Ohio, with headquarters at Richmond, Va., was born on June 29, 1851, at Utica, Ohio, and began railway work February 1, 1864. He served successively as office messenger, agent's clerk and operator on the Baltimore & Ohio until February 1, 1870; then as agent, despatcher's assistant and train despatcher on the Pittsburgh, Cincinnati & St. Louis. From 1873 to 1890 he was in the service of the Wabash, St. Louis & Pacific and its successors as follows: Eight years train despatcher, two years superintendent Ohio & Indiana division, 3½ years superintendent Eastern division; from January 1887 to 1890, assistant general superintendent; on January 1, 1890, he was appointed general superintendent of the Chesapeake & Ohio, and then to February 1900 he was general manager. Since February 1, 1900, he served as president of the same road, also since March 1910 as president of the Hocking Valley and since July 1910 as president of the Chesapeake & Ohio of Indiana.

Elisha Lee

Elisha Lee, who has been appointed federal manager of the Pennsylvania Railroad, Lines East of Pittsburgh and Erie, with headquarters at Philadelphia, Pa., was born September 24, 1870, at Chicago, and was graduated from the Massachusetts Institute of Technology in the class of 1892. He entered the service of the Pennsylvania Railroad in November of the same year as a rodman in the office of the division engineer, Tyrone division. From August, 1895, to October, 1897, he was on leave of absence. In April 1899, he was appointed assistant supervisor, and two years later was promoted to supervisor. In August, 1903, he was appointed assistant engineer in the maintenance of way department and in April, 1907, was promoted to principal assistant engineer on the Philadelphia, Baltimore & Washington. On March 24, 1909, he was appointed superintendent of the New York, Philadelphia & Norfolk, and two years later was promoted to assistant to the general manager of the Pennsylvania Railroad Lines East of Pittsburgh and Erie. In April, 1914, he was appointed general superintendent of the Philadelphia, Baltimore & Washington with office at Wilmington, Del., remaining in that position until May, 1916, when he was appointed assistant general manager of the Pennsylvania Railroad, with headquarters at Philadelphia; since April 1, 1917, he has served as general manager. Mr. Lee served also as chairman of the Conference Committee of managers of the eastern railroads of the United States from 1912 to 1914. In that position he had charge, on behalf of the various railroads interested, of the negotiations with the trainmen's brotherhoods, and of the presentation of the railroads' case in the arbitration of employees' demands for increased pay. In 1915 he became chairman of the National Conference Committee of Railroads, representing practically all the railroads in the United States in the controversy with the trainmen.

A. W. Thompson

A. W. Thompson who has been appointed federal manager of the Baltimore & Ohio lines east, with headquarters at Baltimore, Md., was born on May 8, 1875, at Erie, Pa., and was graduated from Allegheny College, Meadville, in

1897, as a civil engineer. The following year he began railway work in the engineering department of the Pittsburgh & Lake Erie, and in 1899 was appointed assistant engineer of surveys on the Pittsburgh division of the Baltimore & Ohio. He was made assistant engineer of the Pittsburgh division in 1900, and the following year was appointed engineer of the Cumberland division. In 1902 he returned to Pittsburgh as division engineer, and the following year went back to the Cumberland division as superintendent. He was transferred to Wheeling, W. Va., in 1904 as superintendent of the Wheeling division, and from 1907 to April, 1910, he was chief engineer maintenance of way. In April, 1910, he was promoted to chief engineer of the Baltimore & Ohio system including the Baltimore & Ohio Southwestern, and remained in that position until December, 1910, when he was made general manager with office at Baltimore, Md., and since April 11, 1912, he has been vice-president.

Arthur C. Needles

Arthur C. Needles, who has been appointed federal manager of the Norfolk & Western, was born on January 10, 1867, at Baltimore, Md. He was educated in the public schools and at Swarthmore College, Pennsylvania. He began railway work in 1882, as a rodman on the Washington, Ohio & Southern, and in 1883, became a rodman in the engineering department of Norfolk & Western, and was then yard clerk and brakeman on the same road. In 1884 he was made night and day yardmaster, and from April, 1887, to August, 1890, he was yardmaster first at Pulaski, Va., and then at Bluefield, W. Va. On August 1, 1890, he was appointed assistant trainmaster and on December 25, 1898, was made trainmaster of the Radford division. He was then for one month assistant superintendent of the Pocahontas division, and in June, 1901, was promoted to superintendent of the Shenandoah division. The following year he was transferred to the Norfolk division. From December, 1902, to February, 1904, he was superintendent of the Pocahontas division and was then promoted to general superintendent. In December, 1912, he was appointed general manager and subsequently became vice-president with headquarters at Roanoke, Va., of the same road.

Joseph H. Young

Joseph H. Young, who has been appointed federal manager of the Virginian Railway, was born January 17, 1864, at Salt Lake City, Utah, and was educated at the University of Utah. He began railway work in 1882, with the Utah Central as office boy and warehouseman, and was later agent and operator at various stations, and then bill clerk on the same road. He was with the Union Pacific as ticket clerk and train agent at Ogden, Utah, from 1883 to 1886, and was superintendent of the Utah division of the same road from 1891 to 1902. From 1886 to 1889 he was traveling passenger agent of the Chicago & North Western, and then to 1891 was general agent of the Salt Lake & Eastern, and general superintendent of the Utah Central. Mr. Young was general superintendent of the Rio Grande Western, now part of the Denver & Rio Grande, at Salt Lake City, for two years from 1902, and then became general superintendent and later general manager of the Colorado & Southern at Denver. For a short time during 1907, he was general superintendent of the St. Louis & San Francisco. He was general superintendent of the Southern Pacific at San Francisco from 1907 to 1910, and in the latter year was elected president of the Alaska Steamship Company, the Northwestern Steamship Company, Ltd., the Northwestern Commercial Company, the Northwestern Fisheries Company, and the North Coast Lighterage Company, and vice-president of the Copper River & Northwestern. From May, 1912, to January, 1914, he was president of the Spokane.

Portland and Seattle, the Oregon Trunk Railway, the Oregon Electric Railway, the United Railways, the Spokane & Inland Empire, the Pacific & Eastern, and the Dalles, Portland & Astoria Navigation Company, with office at Portland, Ore. In May, 1914, he was elected president of the Norfolk Southern, which position he now leaves to become federal manager of the Virginian Railway as above noted.

Railroad Administration Has Labor Troubles

The Government does not propose to tolerate strikes as a method of securing wage increases and those who attempt to employ that method were characterized in effect as friends of the Kaiser in a telegram addressed by Director General McAdoo to the officers of the various organizations of railway shop employees on May 30 as his comment on the action of shop employees of the Southern Railway at Alexandria, Va., who went out on strike on May 28 as a protest because the increase in wages awarded them in the director general's wage order was smaller than they considered satisfactory.

Mr. McAdoo's telegram, reminding the shopmen that

report of the Railroad Wage Commission and he had ordered a minimum of 50 cents an hour for such employees, but general dissatisfaction with the rates was expressed throughout the Southeast where the wages had recently been fixed by arbitration on an eight hour basis, as well as from other parts of the country.

The first manifestation of the complaint in the form of a strike was at the Alexandria shops, where between 300 and 400 men stayed away from their work on May 28. The strike apparently was not authorized by the organizations and on the following day, after conferences between the men and J. F. Anderson, acting president of the International Association of Machinists, with E. C. Sasser, superintendent of motive power of the Southern, they agreed to return to work. It was also reported that strikes were contemplated on other roads but the assurance that the board would soon meet to take up the matter induced the men to remain at work.

Director General McAdoo's telegram, sent to the executives of the various shop craft unions, was as follows:

"The strike of certain shopmen, machinists, etc., in the



The Regional Districts

they are now government employees and declaring that any complaints as to the wage decision should be referred to the new Board of Wages and Working Conditions was also intended as a general reply to many protests which have been sent to the Railroad Administration that the increases ordered represent little or no advance in the case of many classes of employees who had already received from the railroads enough to approximate or exceed the new scales. A large proportion of these protests came from representatives of the shop employees and others whose wages as fixed in the order were less than the same men could receive by leaving their railroad work for munitions plants or other government contract work where the wages are high. The complaints were referred to W. S. Carter, director of the division of labor, who telegraphed replies saying that the new wage board had been created to adjust such conditions. Special consideration to the case of the shop employees had been given by Director General McAdoo in revising the

railroad shops at Alexandria, Va., has created a very painful impression on the public mind. I cannot believe that these men knew what they were doing. They are all employees now of the United States Government. They are not employees of any railroad corporation, therefore, this was a strike against the Government of the United States. It is the first time in the history of our Government that any of its employees have attempted a strike against their Government. Such action is incredible. For the good of our beloved country and for the honor of railroad men in the service everywhere, I hope that there will be no repetition of what every one must condemn as unpatriotic in the highest degree.

"The Government cannot, of course, be coerced or intimidated by any of its employees. It is anxious to do justice to all, and will do justice to all as far as it is possible to measure justice. Recognizing that there are probable inequalities in the recommendations of the Wage Commission

which should be impartially considered and dealt with, I appointed in my General Order No. 27, dated May 25, a Board of Railroad Wages and Working Conditions, composed of three representatives of labor and three representative railroad men, whose duty it is to hear and to pass upon all petitions and complaints. Every class of employees or parts of classes of employees who feel that they have just ground for complaint under the wage decision should submit their cases promptly to this board, and they will be given just and impartial consideration. The American people have just been called upon to pay largely increased freight and passenger rates for the purpose of paying in part the increased wages, amounting to more than \$300,000,000 awarded to railroad employees.

"Suppose they should strike against the Government because they do not think they are fairly treated in being forced to pay these increases for the benefit of railroad labor, what would happen to our country? Suppose the railroad officers should strike because they disliked the orders of the government, and should refuse to obey them, what would happen to them? Suppose that railroad employees should strike against the decisions of their government and hamper the operation of the railroads at a time when transportation is essential to protect the hundreds of thousands of American boys now fighting on the battlefields of Europe to save the lives and property and liberty of railroad employees serving here at home, what would happen to our country?"

"The Kaiser probably would get it. We cannot all get exactly what we want in this world, nor can we win this war unless each and every citizen is willing to submit to the laws of the land and to the decisions of those in authority.

"We railroad men particularly must give unswerving and loyal support to our government, no matter what our individual views and disappointments may be, relying upon a fair hearing of our complaints and the justice of our cause, and accepting patriotically the final decisions of those in authority who under our laws are charged with the responsibility of making them.

"While in the German drive now going on the sons of railroad men and the sons of Americans of every class are dying on the battlefields of France to save America and democracy in the world, shall there be found among us any set of men who are unwilling to sacrifice something of their personal views and individual desires to support America's heroes, who are making the supreme sacrifice for us?"

"I earnestly hope that from one end of this great land to the other it may never be said again that any railroad man, officer, or employee was so unpatriotic as to strike against his own government when it is in the midst of the most perilous war of all history. It is the highest duty of patriotic men to remain at their posts with the railroads, where they are so urgently needed for the safety of the country, and to rely upon the Board of Railroad Wages and Working Conditions and the director general for the just consideration of their claims.

"I am sure that I can count upon you to immediately urge upon your men by wire the wisdom and patriotism of the course I have suggested."

When, in spite of this appeal, word was received that the employees of the Silvis shops of the Chicago, Rock Island & Pacific had gone on strike, demanding an increase to 75 cents an hour, J. A. Franklin, assistant to the director of the division of labor, was despatched to the scene to investigate the situation.

The Board of Wages and Working Conditions, created in the director general's wage order, held its first meeting at Washington on Saturday, June 1, and organized by electing G. H. Sines, vice-president of the Brotherhood of Railroad Trainmen, as chairman, and F. F. Gaines, formerly superintendent of motive power of the Central of Georgia, as vice-chairman. The other members are J. J.

Dermody, vice-president of the Order of Railroad Telegraphers; A. O. Wharten, president of the railway employees' department of the American Federation of Labor; C. E. Lindsey, formerly division engineer of the New York Central; and W. E. Morse, formerly general manager of the Denver & Salt Lake.

Representatives of the shop craft unions appeared at a hearing before the Board of Wages and Working Conditions on Monday and urged that the wage scale ordered by Director General McAadoo be not put into effect until it is revised, saying that great dissatisfaction would be created, and that it might be impossible to avoid many strikes. They pronounced the proposed scale as applied to the shop employees to be inequitable, saying that it would nullify all the reforms that have been worked out in their wage scales since 1915, because the proposed increases are based on the wages of December 31, 1915, whereas since then there has been a considerable readjustment in wages as the result of arbitration. In place of the new scale proposed, they asked for the rates which they had originally asked at the hearing before the Railroad Wage Commission, which included an eight-hour standard day, six days a week, time and a half for overtime, 75 cents an hour for most classes of employees, and 56¼ cents an hour for car men of less than four years' experience. They urged speedy action to revise the scale in order to prevent an exodus of employees to shipyards and munitions plants, and based their claims for higher pay principally on the comparison with the wages and conditions in the shipyards. The shop employees were represented by J. F. Anderson of the International Association of Machinists, G. C. Van Dorens of the Brotherhood of Blacksmiths and Helpers, Otto E. Hoard of the Amalgamated Sheet Metal Workers, John J. Purcell of the Brotherhood of Electrical Workers, J. S. Wilds of the Brotherhood of Railway Car Men, and D. M. Jewell of the Brotherhood of Boilermakers and Iron Shipbuilders and Helpers. They claimed to represent directly 250,000 men and approximately 500,000 men, including the employees not members of the organizations. G. H. Sines, chairman of the board, explained that Director General McAadoo is anxious to see justice done for all classes of railroad employees.

I. C. C. Authorizes Special Supplements

The Interstate Commerce Commission, which is given authority in the railroad control act to review the increased rates ordered by the director general, is issuing the necessary orders to enable the director general to comply with the law in the filing of the tariffs which are to go into effect on June 10 and June 25. In his statement announcing the proposed increases issued on May 25, which was published on May 27, Mr. McAadoo said that in making the rates effective a simple form of tariff authorized by the Interstate Commerce Commission must be used and that this would lead to the temporary disregard, to some extent, of established groupings and differentials. A few days later the commission gave out copies of special permission orders, No. 45,950 and No. 45,951, "for the use of common carriers under federal control," modifying the provisions of its tariff circular rules to permit the carriers to file special supplements to their freight and passenger and baggage tariffs, respectively, in abbreviated form in order that they may begin to secure the advantage of the increased revenues on the scheduled dates. The form of the special supplements is prescribed in the orders. A similar procedure was followed in the 15 per cent rate case last year in order to expedite the proceedings.

Special Permission No. 45,950, which applies to freight tariffs, is as follows:

"Whereas, The President of the United States through the director general, United States Railroad Administration, has initiated and prescribed freight rates to be applied on all freight traffic carried by railroad and steamship lines

under federal control, except the traffic carried entirely by water to and from foreign countries, as set forth in General Order No. 28, dated May 25, 1918, of said director general;

And Whereas, The director general, United States Railroad Administration, has requested such modification of the tariff rules of the commission as will permit said carriers under federal control to file special supplements to freight tariffs in abbreviated form and to permit filing with this commission by such carriers freight tariffs and effective supplements which have not been heretofore filed, thereby enabling carriers under federal control, in the present emergency, to secure in an economical and expeditious manner increased revenues to be derived from increases in freight rates initiated and prescribed, in said General Order No. 28, of May 25, 1918; and

It appearing, That the commission's rules and regulations, Tariff Circular 18-A, in section (i) of Rule 4 require an explicit statement of the rates, in cents or in dollars and cents, per 100 lb., per barrel or other package, per ton or per car, together with the name or designation of the places from and to which they apply; in section (e) of Rule 9 limit the number of, and the volume of effective supplements to any tariff and forbid supplements to tariffs issued in loose-leaf form; in section (k) of Rule 9 prohibit a change in any rate sought to be increased by a rate which is under suspension by order of the commission; and in section (a) of Rule 54 provide that rates filed must be allowed to go into effect, and cannot be changed for at least 30 days after the date when the rates have become effective;

It is ordered, That the provisions of Tariff Circular 18-A in Rules 4 (i), 9 (e), 9 (k), and 54 (a), be, and they are hereby, temporarily waived in the particulars hereinafter set forth, but not otherwise, as to, and confined to, special supplements filed under authority hereof by common carriers under federal control; *Provided*, That there shall not be in effect at any time more than one such special supplement to the same tariff; and

It is further ordered, That said carriers under federal control be, and they are hereby, permitted to file special supplements to freight tariffs to provide for cancellations, minimum weights, minimum charges, and increases in rates and charges by the percentages or amounts set forth in said general order of the director general; and such special supplements shall be in form as follows:

The special supplement form includes a table of increased rates which is made effective by the following: "Effective June 25, 1918, all rates then in effect named in tariffs enumerated herein and in prior supplements thereto, as indicated, to each of which tariffs this is a special supplement, are increased to the rates shown in column B in table of rates on pages — to — inclusive, hereof. If a prior supplement thereto contains rates to become effective upon a later date as indicated thereon, such rates will, on such later effective date, be increased to the rates shown in Column B in the table of rates." It is also stated that the supplement does not increase charges for terminal or transit services or facilities, switching, weighing, demurrage, car service, transfer, diversion, reassignment, refrigeration, icing, storage, elevation or other special services. Other rules regarding the application of the rates are given.

The special permission as to passenger fares and baggage charges is similar in form and modifies the rules which require an explicit statement of the fares in cents or in dollars and cents, together with the name of the places from and to which they apply, which limit the number of supplements, which prohibit a change in any fare sought to be increased by a fare which is under suspension by order of the commission and which provide for 30 days' filing of tariffs. It is provided that the increased fares

may be stated by the use of any of the three following plans, viz:

By a mileage table of fares when the distances are published in the tariff which is to be supplemented.

By a table, where the fares in tariff as amended are specifically named, providing that the increased fares will be as named in the special supplement.

By the publication of specific fares, in cents or in dollars and cents, from and to specified points, and to provide that fares from and to other important points will be made by use of extension basis, also to omit temporarily the unimportant points.

The rate tables prescribed for the special supplement are to show that where the mileage or rate published in tariff or effective supplement is as shown in Column 1 the fare in coaches will be as shown in Column 2, the fare in standard sleeping or parlor cars will be as shown in Column 3 and the fares in tourist sleeping cars will be as shown in Column 4. Additional details are prescribed as to constructing fares on a mileage basis and other tariff features.

Protests Against Increased Rates

A flood of protests against the new rates ordered by the director general in General Order No. 28 has poured in upon the Railroad Administration by letters, telegrams and personal calls. While there are many complaints because of the size of the increase, which came as somewhat of a surprise to those who have listened to predictions in the past that the government could raise wages and reduce rates at the same time, the bulk of the protests were directed to the disturbance in rate relationships which will result from the plan of putting the increases into effect and readjusting them afterwards. Some of the complaints came from state railroad commissions, some of whose rates are said to be increased two and three fold.

The director general on May 31 announced the appointment by the regional directors of traffic committees to deal in their respective territories with all questions as to freight rates arising under General Order No. 28. These included the following committees whose appointment has heretofore been announced as succeeding the various traffic associations and rate committees to deal with general rate matters:

- Eastern Freight Traffic Committee, B. O. Conner, chairman, 143 Liberty street, New York City, official classification territory.
- Seaboard Freight Traffic Committee, Raymond W. Hays, chairman, Walton building, Atlantic City, for Seaboard Classification territory.
- Western Freight Traffic Committee, A. L. Johnson, chairman, Transportation building, Chicago, for Western Classification territory.

The following district freight traffic committees have also been appointed:

- New England District Freight Committee, H. E. Kirtland, chairman, South Station, Boston, Mass.
- Texas Line District Freight Committee, E. J. Gorman, chairman, 143 Liberty street, New York City, N. Y.
- Long Line District Coal and Coke Committee, W. Frank, chairman, Railway Terminal, Union Station, Pittsburg, Pa.
- Central District Freight Committee, C. J. Brann, chairman, Transportation building, Chicago, Ill.
- Central District Coal and Coke Committee, J. C. Young, chairman, 143 Pennsylvania building, Pittsburg, Pa.
- Chicago District Freight Traffic Committee, J. P. Fryer, chairman, Third Street, Springfield, Chicago, Ill.
- St. Louis District Freight Traffic Committee, J. W. Williams, chairman, Broadway, St. Louis, Mo.
- St. Paul District Freight Traffic Committee, J. H. Foy, chairman, St. Paul, Minn.
- Kansas City District Freight Traffic Committee, H. P. Dunning, chairman, Kansas City, Mo.
- Portland Water District Freight Committee, W. R. Smith, chairman, 115 Broadway, Portland, Me.
- San Francisco District Freight Traffic Committee, W. C. Bennett, chairman, San Francisco, Cal.

The announcement says:

"The director general invites the co-operation of the shipping public in working out a satisfactory adjustment of freight rates on the higher level now necessary. All shippers who desire to make suggestions as to the maintenance of

established differentials, or the re-adjustment of freight rates under General Order No. 28, may present their views through the freight traffic officers of the railroads serving them; but if shippers feel, after presenting such matters to their home roads, that they want their views given further consideration, the freight committee for the territory or district involved will be glad to hear and consider any proposal or suggestion the shippers have to offer."

Under an administrative order all protests were referred to the division of public service and accounting but after a conference it was decided to refer them to the local freight committees. All telegraphic inquiries were answered but the letters received were so numerous that early in the week it had not been possible to give replies to them. Clifford Thorne's protest arrived in advance of the issuance of the order, based on newspaper predictions as to the amount of the proposed increase. It was in the form of a memorial addressed to the director general, signed by representatives of western and central western live stock and petroleum and grain shippers' associations which, he said, have a combined membership of over a million.

The memorial pronounced the proposed increase a travesty on justice and attempted to remind the director general that the increase does not mean just one payment of the estimated billion dollars, but a billion dollars annually, "equivalent to more than 6 per cent on the par value of all railroad securities outstanding." It is stated that an advance of 20 per cent in passenger fares and 5 per cent in freight rates would take care of the largest estimate on the proposed wage increase and that the shippers should not be expected to pay all the increased expenses of the railroads resulting from the war. Mr. Thorne also points out that the director general has surrounded himself with a staff composed exclusively with a few rare exceptions, of former railroad officials, who would be unconsciously biased by the general desire of the railroads to have rates on a high level in case they are returned to private management or even in case government ownership should follow, because the net income at the time might be a factor in determining the purchase price. These circumstances, he said, render it imperative that the recommendations made by the director general's staff should not be followed until the shippers have been heard from. It is declared to be impossible to state at the present time what economies may be effected by the unification of the railroads under government control and the falling off of net income for one or a few months is said to be of little significance. It is declared that the guaranty to the railroads, based on their net income for the past three years, is a war measure and should be borne by the people as a whole rather than by the shippers, who are denied any protection from the increased costs in their business.

Mr. Thorne had previously wired to the commission for a hearing on the subject of oil rates, but the commission had to inform him that it could do nothing in advance of a formal complaint after the effective date of the tariffs. Mr. Thorne was given an appointment with Director Prouty on June 4 to talk over the matter.

A meeting of representatives of the state railroad commissions consisting of the executive committee and the special war service committee of the National Association of Railroad and Public Utilities Commissioners, was held at Washington on June 4 and 5 at the call of C. E. Elmquist, Washington representative of the association. The meeting was also attended by some of the Interstate Commerce Commission members who were formerly state commissioners. Mr. Elmquist had written a letter to Mr. McAdoo on May 16, requesting a consultation with the state commissioners before rates were increased and expressing the opinion that under the federal control act the President cannot initiate intrastate rates except in accordance with the laws of the several states. He, therefore, suggested not only that the state com-

missions be consulted about the proposed increase and the effect it would have upon the public and the revenues of the carriers in the several states, but also that the director general comply with the local laws by filing intrastate tariffs. He also asked for an opportunity to examine the proposed tariffs or any memoranda outlining the proposed increase in advance, as the representative of the state commissions. Mr. McAdoo did not answer the letter, but on May 27, after announcement of the proposed increase, sent a telegram to the state commissions expressing the hope that they would understand the necessity for the increase and regretting that he had not been able to consult with them beforehand.

The new rates will bear rather heavily upon the iron and steel industry and manufacturers of these products, many of whom have government contracts on a lump sum basis, so that their profits will be greatly reduced unless an allowance is made for the increased rates. The railroads in Central Freight Association territory had already initiated an increase in iron and steel rates from a commodity to a class rate basis, before the general order was issued, by filing with the Interstate Commerce Commission applications for permission to file tariffs.

Most of the protests against the higher passenger fares come from state commissions and users of mileage books, who must turn in their unexpired mileage on June 10 for exchange. It has been announced that unexpired commutation tickets will be honored until they are used-up and will not be cancelled on June 10.

It has been reported that the electric interurban railroads would also file applications with the state commissions and the Interstate Commerce Commission for increases in their fares to 3 cents a mile and that the Pullman Company would propose a minimum of \$2 for overnight rates in sleeping cars in place of \$1.50.

It has been announced that round trip excursion passenger rates to the Pacific Coast will be made this year on a basis 20 per cent higher than last year's rates. This rate was allowed for the convention of the Associated Advertising Clubs at San Francisco in July.

The Interstate Commerce Commission has issued special permission order No. 47,060 prescribing a form of tariff supplement to be used in putting into effect the order of the director general that officers, enlisted men, and nurses of the Army, Navy and Marine Corps, when traveling at their own expense, shall be allowed to purchase tickets at one-third of the regular rates.

The commission has also issued a supplemental order modifying its outstanding orders fixing rates for the future to permit the rates and fares ordered by the director general to be made effective.

Canadian railroads have also filed applications with the Interstate Commerce Commission for authority to advance rates on their traffic within the United States to the level of the new rates ordered by Director General McAdoo.

Commerce Counsel for the Railroad Administration

R. Walton Moore, of Washington, D. C., who as commerce counsel for the Southeastern railroads has been a prominent figure in rate litigation before the Interstate Commerce Commission and who represented the southeastern lines in the fifteen per cent case, has been taken over as a member of the staff of the Railroad Administration as assistant general counsel in charge of matters before the Interstate Commerce Commission. In this position Mr. Moore will have charge of representing the administration in the proceedings to ensue before the commission in connection with the large number of protests and the readjustment of the rates to preserve existing relationship as far as possible. Frank W. Gwathmey, who has been associated with Mr. Moore, has also become connected with the legal department of the Railroad Administration.

Four Express Companies to Be Consolidated

One Company to Be Agent for Railroad Administration Under
Private Management But Will Share Profits

THE FOUR PRINCIPAL express companies operating in the United States, the Adams Express Company, the American Express Company, Wells Fargo & Company, and the Southern Express Company, are to be combined into a new company, effective on July 1, to be known probably as the American Railroad Express Company, which will be given virtually a monopoly of the express business by a contract with the United States Railroad Administration for the carrying on of the express business for all the railroads under federal control.

This plan, which has been worked out after several weeks

per cent of the gross earnings. This percentage was arrived at by taking the average for ten years of the payments by the express companies to the railroads.

Out of the balance of the revenues the express company will pay operating expenses and taxes and, if earned, a dividend of 5 per cent on the capital stock. If more than 5 per cent is available for distribution, out of the next 2 per cent the express company will receive 1 per cent and the government 1 per cent; out of the next 5 per cent available for distribution the express company will receive 1 per cent and the government 2 per cent; any further amounts available for distribution will be divided one-quarter to the express company and three-quarters to the government.

An important feature of the arrangement is that the new company will be capitalized only to the extent of actual property and cash put into the business and it was stipulated by the government that this should not exceed \$40,000,000. The actual amount determined upon is \$35,000,000, including that issued to the old companies in proportion to the physical properties to the amount of \$30,000,000



B. D. Caldwell,
Chairman of the Board

of negotiations with the representatives of the express companies and the division of public service and accounting of the Railroad Administration, has been sanctioned by the director general in place of the plan earlier proposed, which it is understood was advocated by the express companies, for placing the express companies under government operation in the manner adopted for the railroads.

Under this arrangement there will be no government guarantee of earnings but the express company will be a private corporation acting as the director general's agent for carrying on the express business. The character of the service and the character of the rates will be under the director general's control and subject to initiation by him and the government will share in any profits above 5 per cent on the capital stock.

Whereas the express companies now have contracts with the railroad companies by which they pay to the latter a fixed percentage of their gross earnings, usually about 50 per cent, for "express privileges," they will now have but one contract with the government and the director general will receive 50



George C. Taylor,
President

and \$5,000,000 issued at par for cash to represent working capital.

One of the points which received considerable discussion during the negotiations was as to whether railroad employees should continue to act as agents for the express company as station agents now do, receiving as compensation a percentage commission on the business handled. Under the plan decided upon, while the new express company is permitted, upon arranging therefor with the director general, to use railroad employees in express service,

the entire compensation of all such employees, both for railroad and express services, will be fixed and paid by the director general and the express company will compensate the director general for services rendered by such employees to the express company. The Railroad Administration, which was represented chiefly in the negotiations by Luther M. Walter, assistant to the director of public service and accounting, objected to a plan which would give opportunity for competition between railroad and express in the person of the agent, who might be interested in diverting shipments to the express if he were to receive a commission on such business.

The new arrangement will make it possible to avoid a great deal of wasteful duplication of facilities and to eliminate a large amount of accounting with the individual railroads, which while necessary under the old system of separate contracts between the express companies and the various railroad companies will be unnecessary under the new system.

The offices of the competing companies will be consolidated or otherwise readjusted to the new conditions and new routes will be opened.

The government should receive as its proportion of the express earnings, on the basis of last year's business about \$100,000,000 a year in revenue. An application of the express companies for a 10 per cent increase in rates is still pending before the Interstate Commerce Commission.

A statement announcing the plan issued by the director general says: "The director general is greatly pleased to inaugurate this salutary method of division of profits. The express company is given a continuing inducement to accomplish the greatest efficiency and economy, and yet the government will enjoy an increasingly great proportion of the benefits of all such efficiency and economy."

Officers

George C. Taylor, president of the American Express Company, is to be president of the new company. B. D. Caldwell, president of Wells Fargo & Co., is to be chairman of the board. William M. Barrett, president of the Adams Express Company, will be a director and member of the executive committee. The following have been selected as operating vice-presidents:

R. E. M. Cowie, now vice president and general manager of the American Express Company, will have charge of the Atlantic Departments.

E. A. Stedman, now vice president and general manager of Wells Fargo & Co., Chicago, Central Departments.

C. D. Summy, general manager of the American Express Company at Chicago, in charge of Southwestern Departments.

A. Christesen, vice president and general manager of Wells Fargo & Co., San Francisco, in charge of Pacific Departments.

E. M. Williams, vice president in charge of traffic for the Adams Express Company, in charge of Southeastern Departments.

F. M. Hollbrook, vice president in charge of traffic of Wells Fargo & Co., New York, will be located at Washington as assistant to the president.

D. S. Elliott, vice president in charge of traffic of the American Express Company, New York, will be in charge of traffic for the new company.

J. W. Newlean, vice president and controller for Wells Fargo & Co., Chicago, will be the vice president in charge of accounting for the new company.

E. E. Bush has been selected as manager of maintenance and purchases.

T. B. Harrison and C. W. Stockton, now general attorneys for the American and Wells Fargo & Co., respectively, will act as general counsel.

President Taylor's Statement

President Taylor issued a statement regarding the new arrangement as follows:

"Hereafter the express companies will eliminate the individual identity which has separated them for the last three-quarters of a century and offer to the government and to their joint patrons a unified, single express service. In the future merchants, manufacturers, and individuals need merely specify 'by express' and the entire man power and vehicle power of the express world will respond to their call.

"At no time in the history of the railroads has the volume of express traffic been so great as it is today, the business reaching a total during the last fiscal year of over \$200,000,000.

"Already the vast terminals now maintained by the various companies are being unified for a practical saving of time and transfer.

"The new move will bring into one organization over 100,000 men now trained in express service. It will be the policy of the company to maintain a broad gage attitude toward its employees, many of whom have spent their lives in the service and thousands of whom have made great personal sacrifices in carrying the immense burden of the last three and a half years.

"In the past the express companies have been vital factors in the conveyance of merchandise and foodstuffs. They have eliminated distance and the time element between the manufacturer and his market. The move is designed to improve the distribution of commerce and agriculture and the business of the country may look upon it with confidence that their interests will be carefully and intelligently served."

The non-transportation activities of the separate companies, such as money orders, travelers' checks, travel department, and foreign exchange will not come under the consolidation, but will be conducted by the individual companies as in the past, the officers of the new company acting as agents for the old companies in the handling of these features.

Mr. Taylor also said: "The policy of the new express company will be that of close co-operation with all patrons and the public in general, in an effort to give better service in every way. The fact that competition disappears will in no way be taken advantage of in our attitude toward the public. The merchant bodies and shippers with whom I have been so fortunate to come in contact during the past 25 years of service with the American, as well as the officers and employees, will, I am sure, attest to the policy of courtesy, fair treatment and prompt action in all dealings with them and this same policy will be rigidly followed with the new company. The task of joining together all the lines and facilities of the several companies and the providing of new and necessary equipment will take time but it will be accomplished as rapidly as possible. The new company will settle up the unadjusted matters, such as claims and others items, of the old companies so as to give to the public the least possible delay or annoyance.

"The new company will take over the pension plans of the old companies and a new pension plan will be worked out at once for application in the future. Plans are already under way for scaling up of wages of many employees, toward more uniformity in the various classes, first consideration being given to those in the service drawing the lower rates of pay.

"New through car routes will be established to do away with rehandling and to better utilize railroad facilities, all going toward greater efficiency and better service. With but one express company, any officer of which will afford a contact with all express matters, no confusion will exist and the public will be saved many delays and annoyances which have obtained in the past. Considering the interest of the

Officers of the New Express Company



J. W. Newlean
Vice-President in Charge of Accounting



E. A. Stedman
Vice President in Charge of Central
Departments



C. D. Summy
Vice-President in Charge of South-
western Departments



F. S. Holbrook
Assistant to the President



D. S. Elliott
Vice-President in Charge of Traffic



R. E. M. Cowie
Vice-President in Charge of
Eastern Departments.



E. M. Williams
Vice-President in Charge of
Southern Departments



C. W. Stockton
General Counsel



T. B. Harrison
General Counsel



E. E. Biss
Manager of Maintenance and Purchases

government and the co-relation of the express companies with the United States Railroad Administration, we are sure the public will soon realize that the change is in the right direction."

Burns D. Caldwell

Burns Durbin Caldwell, chairman of the board of the consolidated express company, was born at Placerville, El Dorado county, Cal., on April 27, 1858. He was graduated from high school, at Chambersburg, Pa., in 1873, at the age of fifteen, and the same year began railway work as a clerk in the auditor's office of the Vandalia Railroad, at Terre Haute, Ind. He was rapidly promoted and in 1881 became chief clerk in the general passenger and ticket department of the Vandalia at St. Louis, Mo., remaining in that position for about four years. In 1885 he was appointed chief clerk in the general passenger and ticket department of the Missouri Pacific and the St. Louis, Iron Mountain & Southern at St. Louis and in 1888 was appointed assistant general passenger agent of these lines. In June, 1892, he was chosen chairman of the Western Passenger Association, with headquarters at Chicago. This position he filled until July, 1899, when he went to the Delaware, Lackawanna & Western as traffic manager and later he became vice-president of the same road.

In 1911, he resigned to become president of Wells, Fargo & Co., with headquarters at New York. Mr. Caldwell is a director of a number of railway companies and is also president of the Harlem Transportation Company.

George C. Taylor

George C. Taylor, the new president of the consolidated express company, has had a meteoric career. Not yet 50 years of age, he entered the service of the American Express Company at Ripon, Wis., in 1885, as a wagon helper. While attending Ripon college in the same city he was employed at night on a short express run between Ripon and Winneconne, and in that manner paid his way through school. In the next few years he filled practically every position in the office service of the company, such as transfer clerk, trace clerk, money clerk, cashier and agent at various points throughout the western states. He was subsequently chief clerk to the superintendent of express service on the Great Northern and then route agent on the same railroad and on the Missouri, Kansas & Texas, the Illinois Central and the Yazoo & Mississippi Valley when American Express service was inaugurated on those lines in 1892 and 1893. He was then appointed assistant superintendent of the southern division of the American Express Company, with headquarters at St. Louis, following which he went to Chicago as general agent. From Chicago he went to Cleveland, Ohio, as assistant general manager of the Central division, and from there was transferred two months later to the newly created Pacific division, with headquarters at Salt Lake City, with the title of manager. On July 1, 1911, he returned to Chicago as general manager of the western department in charge of all the company's lines west of Buffalo, N. Y. In February of the following year he was also elected vice-president. Hardly more than two years later, on June 16, 1914, he was elected president of the American Express Company with headquarters at New York, to succeed James C. Fargo.

Mr. Taylor makes friends easily and has an exceptionally large acquaintance among the employees of the American Express Company. He does not believe it necessary for an executive to hold aloof from his subordinates, but on the contrary mixes with all on terms of sympathetic comradeship. Furthermore, he possesses the faculty of maintaining the best of discipline in his organization and, at the same time, of winning the respect and loyalty of all who are associated with him in his undertakings. He always gives heed to the counsel of others, and, in fact, encourages all

employees from the lowest to the highest to submit suggestions calculated to improve express service. While he appreciates the advice of others, he needs no assistance in making decisions. After giving thorough consideration to a matter he decides quickly and subsequent experience generally confirms the soundness of his judgment. Naturally frank and devoid of guile, he is equally outspoken in criticism and commendation. In a word, he is a natural executive and organizer. Perhaps no incident better illustrates his initiative than his prompt action on behalf of American tourists in the central empires at the opening of the European war. The precipitate inception of the great conflict had demoralized international credit to such an extent that travelers' checks were not honored except when the issuing company had deposits to cover them in the countries of our present enemies. Accordingly, Mr. Taylor lost no time in sending several million dollars in gold to Germany, with the result that all travelers' checks drawn on the American Express Company were cashed in full. Mr. Taylor is a native of Ripon, Wis., where he was born Oct. 21, 1868.

Robert E. M. Cowie

Robert E. M. Cowie, vice-president of the Eastern departments of the new company, with headquarters in New York, entered the service of the American Express Company October 2, 1883, as an office boy or junior clerk in the office of R. B. Poore, then superintendent of the Ohio division at Cleveland, Ohio. On June 1, 1886, he was promoted to the position of secretary to the general superintendent of the Southwestern division at Cleveland, Ohio, and on June 23, 1890, he was transferred to Chicago as secretary to General Manager Antisdell. Later, upon the advancement of Mr. Antisdell to the position of vice-president and general manager, Mr. Cowie became assistant vice-president and general manager. In November, 1906, he was appointed assistant general manager of the Western department. On January 25, 1910, he was appointed manager of the Central department at Cleveland, Ohio, and the following July he was transferred as manager of the Pacific department at Salt Lake City, Utah, the headquarters later being changed to Denver, Colo., and Los Angeles, Cal., respectively. In January, 1915, he went to New York as vice-president and general manager in charge of the Eastern lines.

E. A. Stedman

E. A. Stedman, vice-president of the Central department of the new company, with headquarters at Chicago, entered the service of the American Express Company in June, 1878, as a clerk and cashier and served at various places in Iowa. In June, 1882, he went to Wells, Fargo & Co. as money clerk at Denver and the next year he was appointed agent at the Union Pacific transfer depot at Council Bluffs. In 1884 he became route agent at Bismarck, N. D. The following year he was assigned to the position of route agent with headquarters at Emporia, Kan., and in 1886 he served as cashier at Kansas City.

Mr. Stedman was appointed assistant superintendent at Chicago, in charge of the Illinois division, in 1887, when Wells Fargo service was first extended east of Missouri. He was made superintendent of the New York division, with headquarters at Binghamton, N. Y., in 1888, when Wells, Fargo & Co. inaugurated its service east over the Erie Railroad and two years later his headquarters were transferred to Jersey City. On January 1, 1892, Mr. Stedman was made general agent at New York and seven years later he was appointed assistant manager of the Atlantic department and on January 1, 1902, assumed the duties of acting manager. The following October he was made manager of the same department. Mr. Stedman became general manager of the company on September 1, 1906, and was appointed vice-president and general manager at New

York in August, 1908. He became vice-president and general manager at Chicago on August 1, 1911, and has served also as a director of the company since 1910.

C. D. Summy

C. D. Summy, acting general manager of western lines of the American Express Company at Chicago, Ill., has been elected vice-president of the new company and has been placed in charge of the southwestern department. Mr. Summy started his career as agent and transfer man of the American Express Company at Barnesville, Minn., in 1890. In that capacity he met all trains night and day and made deliveries in a push cart, for which he received a salary of \$50 a month. Three months later he was transferred to Red Wing, Minn., where he held the agency of the company for a year. He spent another three months as clerk in the superintendent's office at St. Paul, Minn., following which he went to Dallas, Tex., as chief clerk to the superintendent there. In the next year he was appointed assistant route agent and subsequently route agent in Texas with headquarters at Sedalia, Mo., St. Louis and Dallas, Tex., consecutively. In 1901 he became chief route agent, in 1903 assistant superintendent, and two years later superintendent of the Texas division with headquarters at Dallas. On the first of January, 1907, Mr. Summy was appointed assistant to the assistant general manager at Chicago. In the following year he was transferred to Omaha, Neb., as assistant general superintendent of the Iowa-Nebraska division. When American Express service was inaugurated on the Union Pacific lines in 1910 he was placed in charge of the newly created Overland division at Omaha. In 1911 he went to St. Louis, Mo., as manager of the southern department, and in 1915 was appointed acting general manager in charge of western lines at Chicago in place of J. A. D. Vickers, deceased.

A. Christeson

A. Christeson, vice-president of the Western departments of the new company, with headquarters at San Francisco, Cal., has been engaged in the express business for 40 years. He began as a driver for the American Express Company at Fort Dodge, Ia., in 1873, and the following year served as driver for that company at Dubuque. In 1875 he was promoted to messenger between Sabula and Marion, and later served as messenger on Sioux City and Yankton route. From 1877 to 1881 he was agent at Creston and in 1882 served at different times as agent and route agent. He was appointed assistant superintendent for Wells Fargo & Co. at Denver, Colo., and served in that capacity between 1883 and 1884. In the latter year he was appointed superintendent at St. Paul, Minn., which position he held until 1886, when he was made superintendent at Lincoln, Neb., and continued there until 1887. From January, 1888, to 1897 he was superintendent at Houston, Tex., and in January of the latter year he was appointed manager for the central department with headquarters at Kansas City. On January 1, 1899, his headquarters were transferred to San Francisco and he subsequently became general manager and finally vice-president and general manager of the same company.

Edgar M. Williams

Edgar M. Williams, who has been appointed vice-president of the Southern departments of the new company, with headquarters at Atlanta, Ga., entered the service of the Southern Express Company at an early age. In 1891 he was appointed secretary to M. J. O'Brien who was vice-president and general manager. Following the election of Col. O'Brien to the presidency of the company, Mr. Williams was appointed assistant to the president, which position he held until 1907, when he was made general superintendent and later general manager of the Western department. On

July 15, 1912, he was appointed second vice-president in charge of traffic, and in 1915 he was elected vice-president. On October 5, 1916, he was appointed vice-president in charge of traffic also of the Adams Express Company with office at New York.

Frederick S. Holbrook

Frederick S. Holbrook, assistant to president of the new company with headquarters at Washington, D. C., was born September 25, 1864, and began railway work in 1881 as a clerk on the Ogdensburg & Lake Champlain at Norwood, N. Y. He served consecutively from 1886 to 1889 as chief clerk to the general agent of the same road, and later was agent of the same road, the Central Vermont and Canada Atlantic. From 1890 to 1893 he served as cashier of the Ogdensburg Transit Company at Chicago, then to 1895 he was cashier on the Central Vermont, New York, until 1899 when he was appointed commercial agent of the same road at New York. In February, 1900, he was appointed assistant general freight agent of the West Shore and about one year later became first assistant general freight agent of the New York, New Haven & Hartford at Boston. In July of the same year he was made general freight agent of the same road with office at New Haven and from September, 1908, he was chairman of the Committee on Uniform Classification at Chicago. From May, 1909, to January, 1912, he was chairman of the Official Classification Committee at New York. He was then appointed general traffic manager of Wells Fargo & Co., and since October, 1913, has served as vice-president in charge of traffic of that company.

Dixon S. Elliott

Dixon S. Elliott, vice-president in charge of traffic of the new company, entered the service of the American Express Company on December 9, 1879, as office boy and all-around assistant in the office at Kewanee, Ill. Two years later he was sent to Streator, Ill., as clerk. The same summer he was transferred to Geneva Lake, Wis., as a clerk and the following November was promoted to cashier at Galesburg, Ill. On January 1, 1883, when the joint office in Peoria, Ill., was discontinued and the American opened an office of its own, Mr. Elliott was sent there as one of the assistants to the agent. In October of the same year he was transferred to Davenport, Ia., as cashier and in the summer of 1884 was promoted to agent at the transfer point at Pacific Junction, Ia. After serving a year at Pacific Junction, Mr. Elliott was transferred to St. Joseph, Mo., as chief clerk in the superintendent's office of the Missouri division which position he held until the fall of 1887, when he was promoted to route agent with headquarters at Sioux City, Iowa. In 1889 he went to Chicago as chief clerk in the office of the general superintendent and in 1893, was made chief clerk of the specially created World's Fair Department of the American Express Company, having charge of the details of management of the World's Fair office. He was then appointed superintendent of the Nebraska division, but before the appointment could take effect changes in railway lines necessitated transfers in superintendents and another officer was assigned to the duties. When the American Express gave up its contract on the Great Northern in favor of the newly organized Great Northern Express Company in July, 1893, Mr. Elliott became superintendent of the Great Northern Company at St. Paul, Minn., at the same time looking after the interests of the American Express Company. In 1896 he was placed in charge of the accounting department of the Great Northern Company as auditor, and in 1901 was appointed general manager. In 1910 he was elected president of the Great Northern Express which position he held for the next five years. In March 1915 he returned to the American Express Company to become vice-president in charge of traffic.

J. W. Newlean

J. W. Newlean, vice president and controller of Wells Fargo & Co., at Chicago, will be vice-president in charge of accounting of the new company. Mr. Newlean was born at Chicago in 1875 and entered railroad service in 1891 in the freight claim department of the Burlington & Missouri River, now a part of the Chicago, Burlington & Quincy. He later served in various capacities in the accounting department of the Union Pacific System and Southern Pacific. In 1909 he was appointed general auditor for the receivers of the Chicago Great Western and upon the reorganization of that company was appointed auditor. On January 1, 1911, he was appointed general auditor of the Illinois Central, the Yazoo & Mississippi Valley and the Indianapolis Southern. On March 7, 1912, he resigned to become controller of Wells Fargo & Company with headquarters at Chicago. He was elected vice-president and controller of that company on September 1, 1913.

E. E. Bush

E. E. Bush, manager of maintenance and purchases of the new company, entered the service of the American Express Company in December, 1880, as a driver and money clerk at Cedar Rapids, Ia. The following year he was transferred to the office of the superintendent of the Iowa division to serve as over and short clerk, and later as chief clerk first at Council Bluffs, Ia., and later at Des Moines. In 1887 he went to Chicago as chief clerk in the office of the general superintendent and three years later was appointed secretary to the second vice-president at Chicago. While in this position Mr. Bush became interested in the work of the western traffic department. When the traffic department in charge of all lines was established in New York in 1898, he was appointed secretary to the general traffic manager. Since that time he has been engaged exclusively in traffic department work, and in March, 1915, was appointed traffic manager in charge of all the company's lines.

T. B. Harrison

T. B. Harrison, general counsel of the new company, was born in Russellville, Ky., October 12, 1866, and was educated at Bethel College in Russellville, and in the University of the South at Sewanee, Tenn. In March, 1889, he was appointed stock claim agent and clerk to the district attorney for the Owensboro & Nashville division of the Louisville & Nashville, and at the same time practiced law in Russellville. In 1892 he went to Louisville as law clerk in the law department of the same road, and served successively as chief clerk, assistant district attorney for Kentucky, district attorney for Kentucky and general attorney for the whole system. He came to New York in January, 1908, as special counsel for the Adams and American Express companies, since which time he has been handling rate and tax and other important matters for these companies before the Interstate Commerce Commission, also before the state commissions and in the state and federal courts.

Charles W. Stockton

Charles W. Stockton, general counsel of the new company, entered the service of Wells, Fargo & Co. in 1881 as agent at Silver City, Idaho. The following year he was promoted to clerk in the superintendent's office in Portland, Ore. He was steadily promoted and in the early nineties served as division superintendent of Wells Fargo in Kansas. As part of his duties he helped to end outlawry in southern Kansas and Indian Territory and during a period of seven years in connection with Grover B. Simpson, now general superintendent at St. Louis, succeeded in cleaning up the

territory. He later studied law and was admitted to the bar. He then entered the legal department of Wells Fargo and gradually advanced until in 1913 he was promoted from commerce counsel to general counsel. On June 26, 1917, he became vice-president and general counsel at New York of the same company.

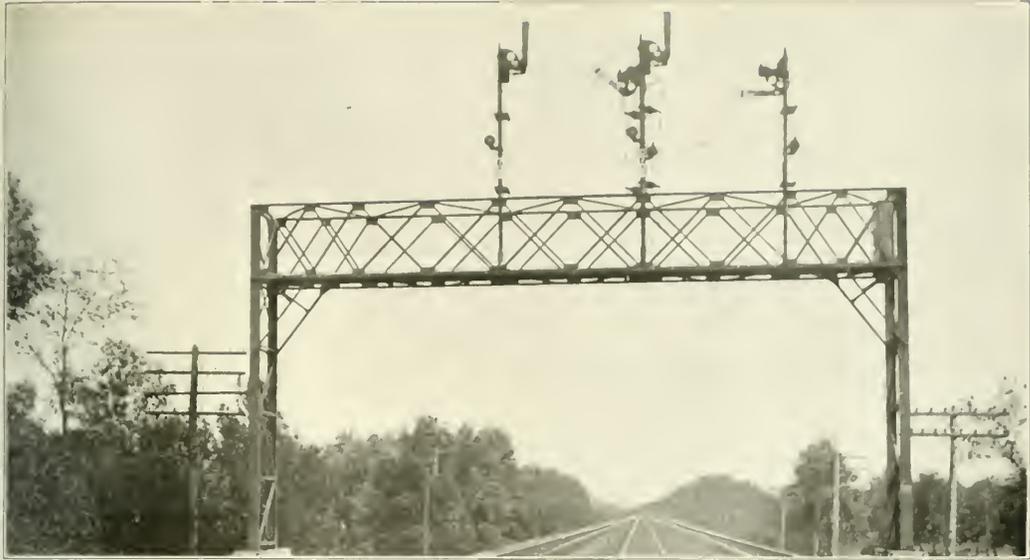
Agreement Between the Government and Express Companies

The agreement between the government and the express companies recites that "whereas the director general is of the opinion that the express transportation business upon the railroads and systems of transportation under federal control can be most efficiently carried on through the agency of a single corporation, which shall act as the sole agent of the government in conducting said business," the express companies shall cause to be organized a corporation for the purpose of carrying on for the director general the express transportation business upon the railroads under federal control and elsewhere, as may be determined by the director general.

From the gross revenue from express traffic on lines under federal control the company shall pay the director general 50¼ per cent. To the balance there is to be added the net revenue derived from operation over other lines, miscellaneous income and income from invested money or securities, to make up what is known as "gross contract income." From this the express company is to pay operating expenses, rentals, taxes, except war taxes, and other proper expenditures, the remainder being termed "contract income for division." From the contract income for division an amount equal to 5 per cent on the capital stock shall first be set apart for the payment of dividends or general corporate purposes, which shall be cumulative, and shall be termed "primary allowance." Any excess of contract income for division over the primary allowance up to 2 per cent on the capital stock shall be divided, one-half to the company and one-half to the director general. The remainder, to the extent necessary, shall be paid into a guaranty fund which shall not exceed 10 per cent on the capital stock and which shall be held by the express company to insure its ability to pay each year 5 per cent on its capital stock. Any earnings from this fund shall be considered as contract income for division. If the contract income for division in any year shall not be equal to 5 per cent, the amount lacking shall be withdrawn from the guaranty fund and the fund shall therewith be restored in the same manner as it was originally created. Any amount in the guaranty fund at the termination of the contract or that may be due thereto and not required for the purpose for which it was established is to be divided between the express company and the director general in the proportion of 40 per cent to 60 per cent. After the accumulation of the guaranty fund any contract income for division in excess of the 5 per cent primary allowance and the 2 per cent shall be divided as heretofore described.

It is provided that all salaries paid by the express company to its officers shall be reasonable and all salaries in excess of \$10,000 a year shall be reported to the director general. If he shall determine that any such salary is unreasonable and shall notify the express company in writing the maximum salary which he regards as reasonable, any amount in excess of the salary so fixed which shall be paid shall be excluded from any accounts of the express company used in determining the contract income for division.

Any controversy which may arise as to the performance of any part of the contract is to be submitted to and determined by the Interstate Commerce Commission after full hearing and its decision thereon shall be final.



How Signals Can Increase Track Capacity

A Ready Means of Increasing the Amount of Traffic That
Can Be Moved on Busy Multiple Tracks

By C. C. Anthony, Los Altos, Cal.,
Formerly Assistant Signal Engineer, Pennsylvania Railroad.

WITH A MODERATE train movement, not closely approaching its capacity, a railroad may be operated without signals with a fairly good degree of safety. Under certain peculiar conditions, such as are found on some elevated roads, operation at maximum capacity may even be carried on quite safely without signals. Under ordinary steam-road conditions, however, operation at maximum capacity, with a satisfactory degree of safety, is practically impossible without block signaling, at least. The question, therefore, is not whether greater capacity can be attained with or without signaling. Signaling being necessary for intensive operation with safety, the question is, How is the capacity of the road affected by the kind and character of the signaling? Block signaling, while increasing the safety of operation in a greater or less degree, may either increase or decrease the number of trains that can be run with reasonable safety on a given unsignaled road; its effect depends upon certain features of the installation. Of interlocking it may be said generally that it always facilitates train movement in some measure and so adds something to the capacity of the road.

Elements Affecting Capacity

The principal element of the block system that affects the capacity of the road, is, of course, the length of block; and, since manual blocks, because of the excessive operating cost of short blocks, are typically much longer than automatic blocks, automatic blocking may be said generally to be essential for maximum capacity. The effect of shortening blocks is shown, and a very fair comparison between manual and automatic blocking is supplied by calculations made on a large road on which controlled manual block had been in service for many years. It was assumed that passenger trains

averaged 1,275 feet in length and 35 miles an hour in speed; fast freight 2,075 feet and 20 miles an hour; slow freights 4,075 feet and 10 miles an hour. For the purpose of arriving at a maximum capacity it was assumed that there would always be a train ready to run when the track was available.

On a division having blocks (controlled manual) averaging 8,951 ft. in length on the passenger tracks, with a maximum length of 29,949 ft., it was found that 115 passenger trains could be run on each track in 24 hours, or 67 fast freight trains; or 32 slow freights. That is, these were the calculated track capacities for the three kinds of trains, assuming, in each case, that trains of the specified kind were run exclusively. With automatic blocks 4,200 ft. long, the corresponding figures were: 288 passenger trains, 180 fast freights, 90 slow freights. Except as the length of block varies in proper relation to the variations of speed imposed by physical conditions, etc., the maximum length of block controls the spacing of trains. But, from the point of view of signal equipment and operating force, average length is the basis of comparison. In this case, then, it appears that the reduction of the average length of the block from 8,951 ft.—a moderate length for manual block—to 4,200 ft., would multiply the track capacity for passenger trains about two and one-half times, for fast freights somewhat more, and for slow freights nearly three times.

Effect of Reducing Length of Block

If trains could be run a block apart, every reduction in the length of block would mean a corresponding increase of capacity, but this is evidently impossible except in the case of trains moving at very moderate speed, which might safely run at an interval of a little more than the length of a

block. For high-speed trains there must be provision for a cautionary signal indication at a point so far in the rear of the stop signal at the entrance of any occupied block, that a train running at the highest practicable or permissible speed can make a service stop between that point and the stop signal. In the ordinary course, when trains are running unobstructedly, each train will keep far enough in the rear of the train ahead to find each signal clear as it approaches. Practically, therefore, the minimum interval between the rear of one train and the front of the following train must be somewhat more than the length of block plus the distance within which the fastest trains can make a service stop. This latter distance being fixed, reducing the length of block has relatively less and less effect on the interval between trains, as the blocks are made shorter. If the length of block is made less than the stopping distance, the cautionary indication must be carried back more than one block, at the cost of some added complication in the signal system; and the number of signals and the cost of the signaling will increase rather rapidly in comparison with the benefit in the way of permitting closer spacing of trains and consequently increasing the capacity of the road.

The running of trains at different speeds on the same track of course complicates the situation. For the slow trains the distance required for stopping is short; and short blocks with the cautionary indication one block in the rear of any signal at stop, as in ordinary practice, would be satisfactory, and would allow several such trains to be run in succession with about the minimum occupancy of the track. The fast trains, on the other hand, require cautionary indications at a greater distance from the stop signals; and if the length of block is made equal to this distance, so that the cautionary indication is again carried back only one block, the distance between slow trains, if they are spaced so as to receive clear signals, will be much greater than in the previous case, where the signals were assumed to be spaced to suit the speed of these trains. It is possible, of course, to meet both conditions in a measure, by a suitable arrangement of signals—with a certain amount of advantage in the particular case, for example, where there is frequently occasion to run several slow trains in the intervals between fast trains on a given track. High cost of the road or of additional trackage, as in a subway, may also require the attainment of extreme capacity by similar expedients in the arrangement of signals for relatively short blocks, even where all trains are of the same kind and all run at high speed. For ordinary conditions, however, a length of block equal to the distance required for stopping the fastest trains, gives about as great capacity as can be utilized to advantage.

Use of Passenger Tracks for Freight Movements

In practice, except sometimes in suburban territory, a multiple-track road does not usually have, or have in prospect, a passenger-train movement that approaches the capacity of two tracks; although the movement of freight trains may tax the capacity of two tracks. Under these conditions manual block may not seriously limit the capacity of the road if permissive blocking of freight trains, or of slow freights at least, is practiced. A few times each day it might be convenient to run two or three passenger trains closer together than (absolute) manual block will permit; but the greater spacing of the trains in a few cases of this kind does not greatly lessen the capacity of the tracks. The situation is not at all as it would be if a considerable number of passenger trains could be sent over the road in close succession, and the track could then be used by freight trains during a long interval; the conditions determining the schedules of passenger trains rarely permit such a favorable arrangement. The absolute block for passenger trains also causes a small loss of track use when freight trains are run on the passenger tracks in the longer intervals between passenger trains. The first freight going

on to the passenger track may have to wait a few minutes for the comparatively long manual block to be cleared by the last passenger train using that portion of the track; and the last freight may have to clear the passenger track a little earlier, for the next following passenger train, than would be necessary with the much shorter blocks that would naturally be used in the automatic block system on such a road. Here again the practical effect on track capacity is not very serious; although there is, of course, a greater effect on theoretical capacity based on the assumption that there is always a freight ready to enter upon a passenger track at the beginning of any interval between passenger trains sufficient for the movement of one or more freights. Permissive blocking of freight trains, however, or of most of them, assuming that slow freights are largely in the majority, makes possible almost, if not quite, as large a movement on a road of average alinement, as can be attained under any other method of operation.

Benefits of Automatic Signals

It is an interesting fact that automatic blocking has even been opposed, when about to be installed, on the ground that, with it, as good train movement would not be possible as under the manual block in use at the time, with permissive blocking for the numerous slow freights. This occurred on a busy four-track division of an important trunk line—a division having a very large through freight movement, and not a particularly favorable alinement for "running on sight." It is a still more interesting fact that, after automatic signals had been in service for a time, it was frankly admitted that the movement had never been handled better. Naturally the freight trains, when moving normally, would keep far enough apart under the automatic block to get clear signals and so avoid frequent stops. Presumably the freer and steadier movement due to running mostly on clear signals more than made up for the sacrifice of the closer running that is possible under permissive manual block.

The Assignment of Tracks

Interlocking affects the capacity of a multiple-track road in two quite different ways. In the first place, as on any road, whatever the number of tracks, it may facilitate the train movement by eliminating the stopping or slowing of trains at drawbridges, junctions and grade crossings of other roads. If such places are numerous the effect on capacity may be very material.

In the second place, the tracks of a multiple-track road cannot generally be used to capacity unless trains of different classes can be run on each track as opportunities arise. For this purpose groups of crossovers must be provided at frequent intervals; and these facilities practically cannot be used to advantage without interlocking. This full utilization of facilities depends also upon the assignment of the tracks, as to the current of traffic on each. In practice this seems to have been, to some extent, a matter of policy; use of the tracks to capacity has not always been the chief end. Probably the most notable examples of two exactly opposite policies in this matter is furnished by the assignment of tracks on the four-track lines of the New York Central (between Albany and Buffalo) and of the Pennsylvania.

When the New York Central was four-tracked the interchangeable use of the tracks was, very likely, given little if any consideration; the main idea seems to have been to separate the freight from the passenger traffic as completely as possible—partly, if not largely, for the sake of safety. Accordingly the arrangement was that of two double-track roads—the two south tracks assigned to passenger trains, eastward and westward, and the two north tracks to freight trains. Even with both pairs of tracks run righthandedly, an eastward train, for example, in moving from the passenger to the freight track, or vice versa, would have to obstruct the inter-

vening westward passenger track, and westward crossover movements would, similarly, block the eastward freight track. With right hand running on the passenger tracks and left-hand on the freight tracks, as the tracks have been used for many years, eastward crossover movements block both westward tracks; although westward trains can be crossed over readily enough. In fact, in the absence of interlocked crossovers arranged for direct movement, without backing, the crossing of eastward trains, except in emergencies, was so nearly out of the question that back off passing sidings connected with the eastward passenger track were provided for the use of certain fast freights that were regularly run on that track.

On the Pennsylvania the advantage of being able to use the tracks as desired, by crossing trains over without obstructing other tracks and without backing, was seen very early in the development of four-track operation. The two tracks on one side of the center line were, therefore, assigned to eastward trains, passenger and freight, and the two on the other side to westward trains. Except where the character of the traffic or some local conditions make the interchangeable use of the tracks impracticable or of no advantage, this is the most usual arrangement—as seen on the Lake Shore (now the New York Central West of Buffalo) and the New Haven roads, among others. At the same time full sets of crossovers (for direct movement from passenger to freight tracks and freight to passenger, at each place) with interlocking were provided. Finally, on four-track lines so equipped, trains were run with the current of traffic by signal; a freight train, for example, receiving a signal to cross over to the passenger track (used for movement in the same direction) would proceed without a train order and regardless of any passenger trains that might be overdue, and would continue on the passenger track until crossed back to the freight track at another interlocking. The dispatcher, watching and directing the movement, was thus able to use every minute of available time on any track, without any of the losses of time or opportunity frequently met with in the use of train orders. By this method of operation, wherever each track is not fully occupied by trains of the class assigned to it, the capacity of a four-track road can be utilized in the highest degree. This kind of operation is also very convenient, and is often taken advantage of, as a means of getting a fast passenger train past a slower one without delay to either. In that case one of the passenger trains, of course, uses the freight track for a considerable distance. The result is often delay to freight trains, which may, in the aggregate, amount to a material *reduction* of capacity for freight-train movement. However, this is a matter of balancing the gain against the loss.

The Use of More Than Four Tracks

When more than four main tracks are required, it is commonly advantageous to assign at least two tracks to certain kinds of trains, either because one or more pairs of tracks can each be kept pretty fully occupied most of the time by trains of one speed; or because four of the tracks, say, can be operated more satisfactorily with certain entire groups of trains removed to tracks assigned to them exclusively than can six or more tracks with all kinds of trains intermingled to a certain extent in the effort to facilitate the movement of all as much as possible and to make the best use of every track. For example, two tracks on a six-track road may be assigned to slow freights which, following one another at the same speed, require very little attention from the dispatcher. In fact, these two tracks may not even adjoin the other four, but, as in some actual cases, may be located several miles away where better grades and alignment can more readily be secured. There are also examples of two tracks so separated from the others and provided with passing sidings that trains of more than one speed can be run on them—as slow freights and certain fast freights—to the greater relief of the

four tracks operated interchangeably and in use quite frequently for running passenger trains around one another. In that case the advantage of interlocking again becomes apparent. Plants at the entrance switches of the sidings, by saving stops of trains, add something to the capacity of the tracks, and saving stops of freight trains of course means money saved whether or not increased track capacity is of any present value.

Even when the traffic is quite heavy for the number of tracks, the train movement may be so irregularly distributed that one track or another may be idle over considerable distances and for considerable periods a few times every day; at the same time the movement in the direction opposite to that of the current of traffic on the idle track may tax the capacity of the assigned tracks.

Movements Against Current of Traffic

Provision for movements against the current of traffic may then add materially to the capacity of the road under the actual conditions of train movement, which may not admit of much change and must, therefore, be handled as it exists. Such movements can be and are made readily enough by train order. But that these movements may be made to the greatest effect and so as to utilize every available interval on any portion of a track, it is highly important that the crossovers at every point be arranged for direct movement from any track to any other, in either direction, and, of course, interlocked. The ideal provision for such operation would be controlled manual block, permitting the running of trains in either direction on a given track by signal, without train orders, and automatic block signals for both directions. The latter is, perhaps, the more important equipment of the two; for if several trains can use an idle track, as many of them as possible should be sent through in the available time; they should not be impeded by long manual blocks from interlocking to interlocking in the direction against the normal current of traffic.

On the other hand, it may be found in practice that tracks can seldom be used against the current of traffic for any more extensive movements than the running of one or two trains around slower trains occupying their normal track. In that case, short (automatic) blocks in the reverse, in addition to the normal, direction, may not be of great advantage. Short blocks would be desirable, however, if there were frequent occasion, for example, to use two tracks in the normal direction for passenger trains of different speeds, for a distance of ten, twenty or more miles, while keeping a procession of freights moving by using one of the other tracks against the current of traffic.

Controlled manual block adds to the facility of the movements, as compared with train orders, in a rather small degree, and affords some increase of safety. If automatic signals are installed for the reverse movements, however, the additional cost of controlled manual block is a relatively small item. Up to the present time such elaborate equipment has been applied chiefly on the middle track of three-track roads, where the traffic is frequently reversed and short blocks are as important in one direction as in the other. Whether the cost of an extensive installation on a line of four or more tracks would be justified would have to be worked out by a careful study of the train movement, to determine how much time various stretches of track would be available, and how many trains there would be to use them against the current traffic. It is to be noted, however, that equipment of the inside tracks of a four-track road would ordinarily be sufficient. There could rarely be any advantage in crossing trains over one of the tracks assigned to trains in the opposite direction, in order to use the other, the outside, track against the current of traffic; it would be much simpler to concentrate the light movement on the outside track and use the inside track to facilitate the heavy movement.

The use of tracks against the current of traffic by train order seems to have been developed—at least to have attracted attention—on double track much more than on four-track roads. Well-known examples are the Chicago, Burlington & Quincy and the Cleveland, Cincinnati, Chicago & St. Louis roads. The latter particularly has been extensively signaled for movements in both directions on each track. The reason for the difference undoubtedly is that on double track the advantage stands out prominently; in no other way can fast trains pass slower trains without more or less delay to the slow trains on sidings. Whereas, on a four-track road, interference between fast and slow trains is largely eliminated by the duplication of tracks, and operation against the current of traffic may not seem to offer anything more than a small increase of this advantage; although a careful study might show that it would improve the train movement considerably.

The Importance of Interlocking

From everything here considered it is plain that signaling plays an indispensable part in the operation of a multiple-track road at or near capacity. Except possibly in a few special cases, block signaling is essential for the reasonably safe operation of trains at close intervals; and the necessity of short blocks makes automatic signals practically the only choice. With the heavy traffic for which a multiple-track road exists, interlocking at drawbridges, junctions and crossings becomes increasingly important as a means of keeping trains moving and so getting the maximum number over the road. Sets of interlocked crossovers, at intervals of a few miles, arranged for direct movements between all tracks, are essential for the full utilization of the tracks. And complete signaling for movements in both directions on part of the track is, in some cases at least, an effective means of adding to the capacity of the road under the actual conditions of train movement.

Important Orders of Western Regional Director

DURING THE PAST WEEK R. H. Aishton, regional director of western railroads, issued a number of orders, the most important of which are reproduced below:

Increased Freight and Passenger Rates

Circular No. 117, dated June 1, is an interpretation of the director general's General Order 28:

Many inquiries are being received relating to the application of General Order No. 28—Increased Freight and Passenger Rates—so far as the smaller roads are concerned. To correct any misunderstanding, this is to advise that General Order No. 28 applies to all steam railroads. Tariffs, therefore, should be filed increasing rates under General Order No. 28 for or by all steam railroads, and such tariffs should bear on the title page the legend shown at the end of exhibit attached to General Order No. 28, reading as follows:

"The rates made effective by this schedule are initiated by the President of the United States through the director general, United States Railroad Administration, and apply to both interstate and intrastate traffic.

"This schedule is published and filed on one day notice with the Interstate Commerce Commission under General Order No. 28 of the director general, United States Railroad Administration, dated May 25, 1918."

On passenger tariffs use word "fares." On baggage tariffs use word "charges."

Capital Expenditures

Circular No. 112, dated May 28, reads: The following is in answer to several inquiries which have been made by carriers relative to capital expenditures:

1. Carriers may contract and start work in excess of \$25,000 in advance of approval of D. C. E. Form 4, pro-

vided the work is included in the budget which was approved by the director-general or the director, division of capital expenditures, excepting those budgets which were conditionally approved. It is possible, however, that under certain conditions work authorized in the approved budget may be stopped, and in all contracts provision should be made by the carrier for such contingency.

2. Some carriers have understood the language of director general's Circular No. 25, calling for a progress report on additions and betterments, to make it applicable only to work approved on D. C. E. Forms 3 and 4. It is the intention that reports called for in said Circular No. 25 shall cover all work included both in the approved budget and in D. C. E. Forms 3 and 4 which have been submitted.

3. D. C. E. Form 3, which covers work costing less than \$25,000 and more than \$5,000, should be submitted at the time it is decided to proceed with the work covered thereby, and it is not necessary to wait until the work has been actually commenced.

Conserving Rubber

Supplement No. 3 to Circular R. P. C. No. 10, dated May 28, states: The division of transportation and the central advisory purchasing committee at Washington are again calling attention to the grave situation resulting from the shortage of crude rubber. In connection with the conservation of rubber the following should be observed:

1. All hose to be as small in size and short as possible consistent with the use it is to be put to. Check up car heating and washout plants particularly, as considerable saving can be made in some places.

2. Wire wound hose of less number of plies and at correspondingly decreased cost may often be substituted for special hose frequently used for withstanding high pressure.

3. Substitute lengths of iron pipe for hose wherever possible.

4. Discontinue the use of rubber mats and step treads in cars and other places where used.

5. Sheet rubber can often be replaced with composition packing at less cost and at the same time conserving the supply of rubber.

6. Old rubber should be carefully collected and disposed of as scrap.

Contracts Involving Labor and Material

Circular No. R. P. C. 12, dated May 28, reads: Apparently there is some misunderstanding as to the meaning of that paragraph in regional director's Circular No. 54, of March 27, which reads as follows:

"It should be understood that authority to do work does not carry with it authority to purchase material; if the material is not in stock, the department doing the work should procure it on approved requisition through the purchasing department."

The misunderstanding seems to exist in those cases where departments other than the purchasing department make contracts for erection of buildings, etc., which include both labor and material.

In such cases the following should apply: Competitive bids should be obtained from contractors. The bid should include an itemized list of equipment and material to be furnished, specifying grades of lumber, specification for brick, etc., with unit prices and the f. o. b. point at which they apply, with the understanding that the railroad company may furnish any or all of the items as it sees fit, and the bid be reduced accordingly.

These propositions should be submitted to the purchasing department and prices carefully checked by it to ascertain that they are not higher than government prices, on such material as prices have been fixed, and that prices quoted on other materials correspond with prices the railroad company is paying for similar grades. If the purchasing department can furnish some of the material more advantageously, the engineering or other departments should make

requisition for such material and the purchasing department should handle it. The desire is to obtain material at the lowest possible prices and to see that *no higher than government prices are paid* where such prices have been fixed. The fullest co-operation should be had between the engineering or other departments and purchasing department in respect to the handling of such contracts so that no delay will ensue.

Scrap Prices

Circular No. R. P. C. 13, dated May 28, states: The following ruling by the chairman of the sub-committee on scrap iron and steel, of the American Iron & Steel Institute, has been issued by the central advisory purchasing committee:

"We are having considerable trouble as a result of buyers making offers to scrap purchasing agents on scrap material to be used for special purposes, and it now becomes necessary for us to enforce more rigidly the ruling recently made by Mr. Replogle and approved by us, namely:

"The prices approved by the President for iron and steel scrap cover all sales of scrap, because it would be impossible to determine accurately at the time of sale for what purpose the material sold would finally be used. This basic principle may not be abrogated by any specific technicality."

"This means that rails, unless sold for relaying purposes, may not be sold at a price in excess of \$34 for any purpose whatsoever, while scrap rails may not be sold at any price in excess of \$29. Railway steel axles may not be sold at any figure in excess of \$46.50 delivered, irrespective of the use to which the buyer says they are to be put."

Locomotive Crane Requirements

In a communication, dated May 29, western roads were asked to wire not later than May 31, their requirements of locomotive cranes, steam shovels, electric traveling cranes and gantry cranes for the remainder of the year and not now under order, showing each separately.

District Freight Traffic Committee Is Appointed

The western freight traffic committee, A. C. Johnson, chairman, has appointed six district freight traffic committees in the western railroad region which will have charge of freight rules and regulations in their respective jurisdictions and will constitute standing committees, the members of which will give their entire time to this work when necessary. A proposal to change rates, rules or regulations may originate with the district committee or with any railroad operating within the jurisdiction of the committee. While it is expected and preferred that shippers shall deal with the appointed representatives of the railroads directly concerned, the district committee will be accessible to the public and will consider promptly any applications, complaints, or suggestions that may be submitted. Until further advised, the district committees will refer to the western freight traffic committee all proposals of changes in rates, rules or regulations on which they recommend action. The district committees are authorized to appoint sub-committees or call upon officers or employees of railroads in their respective jurisdictions for any required service or information.

The Chicago district freight committee will have headquarters at Chicago, and its jurisdiction will include the northern peninsula of Michigan, Wisconsin, Iowa, Illinois and Missouri on and north of the Chicago, Rock Island & Pacific between St. Louis and Kansas City. The members of the committee are as follows:

F. P. Eymann, chairman, freight traffic manager of the Chicago & North Western, Chicago. H. E. Pierpont, freight traffic manager of the Chicago, Milwaukee & St. Paul, Chicago. H. H. Holcomb, assistant freight traffic manager of the Chicago, Burlington & Quincy, Chicago. S. G. Lutz, vice president in charge of traffic of the Chicago & Alton, Chicago. F. G. Banister, secretary.

The St. Louis district freight traffic committee will have headquarters at St. Louis, Mo., and will have jurisdiction over Missouri, south of the Chicago, Rock Island & Pacific between St. Louis and Kansas City, and all of the states of Oklahoma, Arkansas, Texas and Louisiana. The members of the committee are as follows:

J. L. West, chairman, freight traffic manager of the Missouri, Kansas & Texas, Dallas, Texas. W. A. Hamblin, assistant freight traffic manager of the Missouri Pacific, St. Louis. L. Koch, member of rate committee Southwestern Tariff Committee, St. Louis. J. E. Johnson, member of rate committee Southwestern Tariff Committee, St. Louis. T. A. Leland, secretary, chairman Southwestern Tariff Committee, St. Louis.

The St. Paul district freight traffic committee will have headquarters at St. Paul, Minn., and will have jurisdiction over Minnesota, North Dakota, South Dakota and Montana east of Butte, Helena and Havre inclusive. The personnel of the committee is as follows:

H. M. Pearce, chairman, general freight manager, Chicago, St. Paul, Minneapolis & Omaha, St. Paul, Minn. Henry Blakely, general freight agent, Northern Pacific, St. Paul, Minn. H. H. Brown, assistant freight manager of the Great Northern, St. Paul, Minn. G. O. Somers, secretary.

The Kansas City district freight traffic committee will have headquarters at Kansas City, and will have jurisdiction over the states of Wyoming, Nebraska, Colorado, Kansas and New Mexico (Albuquerque and Deming and east). The committee is constituted as follows:

D. R. Lincoln, chairman, assistant general freight agent Missouri Pacific, St. Louis, Mo. F. Montmorency, general freight agent of the Chicago, Burlington & Quincy, Omaha, Neb. J. R. Kuntz, general freight agent of Atchison, Topeka & Santa Fe, Topeka, Kansas. C. P. Dowlin, secretary, member of the rate committee of the Southwestern Tariff Committee, St. Louis, Mo.

The Portland district freight traffic committee, with headquarters at Portland, Ore., will have jurisdiction over Washington, Oregon, Idaho and Montana (west of Butte, Helena and Havre). The committee is as follows:

F. W. Robinson, chairman, traffic manager of the Oregon, Washington Railroad & Navigation Company, Portland, Ore. W. D. Skinner, traffic manager of the Spokane, Portland & Seattle, Portland, Ore. E. D. Burroughs, western freight traffic manager of the Chicago, Milwaukee & St. Paul, Seattle, Wash. S. J. Henry, secretary, assistant general western freight agent of the Northern Pacific, Tacoma, Wash.

The San Francisco district freight traffic committee, with headquarters at San Francisco, Cal., will have jurisdiction over California, Nevada, Utah, Arizona and New Mexico (west of Albuquerque and Deming). The personnel of the committee is as follows:

W. G. Barnwell, chairman, assistant freight traffic manager Atchison, Topeka & Santa Fe, San Francisco. G. W. Luce, freight traffic manager of the Southern Pacific, San Francisco. H. K. Faye, traffic manager of the Western Pacific, San Francisco. F. W. Gomph, secretary, agent of the Pacific Freight Tariff Bureau, San Francisco.

The western freight traffic committee also announces that the tariff publishing agencies named below will be continued:

Trans-Continental Freight Bureau, Chicago. R. H. Countiss, chairman. Western Trunk Line Committee, Chicago. E. B. Boyd, chairman. Southwestern Tariff Committee, St. Louis, Mo. F. A. Leland, chairman. Pacific Freight Tariff Bureau, San Francisco, Calif. F. W. Gomph, agent. Texas Tariff Bureau, Austin, Texas. A. C. Fonda, chairman.

Priority Instructions Re Material from Steel Companies

Bulletin No. 1, sent to purchasing agents of western roads on June 3, by the regional purchasing committee, reads: For your information we quote below paragraphs from instructions issued to steel companies, May 20, by E. B. Parker, Priorities Commissioner:

It is imperative that Railroad companies and locomotive builders should secure with reasonable promptness plates required to repair and build locomotives so that the railway motive power may be maintained, and additional locomotives constructed to meet war requirements. Instead of issuing priority certificates covering each order placed by railroad companies and locomotive builders, you are hereby authorized and directed to manufacture and ship to steel companies plates with you such fire box, boiler and tank plates as may be ordered by them of you, not to exceed, however, the production of your 1918 plate output which the total percentage of orders placed with you by railroads and locomotive builders is to be the first percentage of the total plate orders covered by "Class A" agreements. Such manufacture and distribution of plates to railroad and locomotive builders will be made concurrently with the manufacture and shipment of plates of the "Class A" certificate.

Circulars of the Southern Regional Director

C. H. MARKHAM, regional director of the Southern district, has issued the following circulars:

Circular letter No. 199 directs attention to the order of the Interstate Commerce Commission specifying headlight requirements on locomotives and says:

"It is understood that some of the roads are not complying with the provisions of this order, pending the outcome of court proceedings. The director general has instructed that the order should not be modified, and that the railroads should proceed in good faith to carry out the terms of the order, i. e., that locomotives shopped for general repairs should be equipped with electric headlights, that any new locomotives should be so equipped, and that the work should be followed diligently. Please be governed accordingly. The locomotives which have been ordered by the Railroad Administration are all to be provided with electric headlights, conforming to the requirements of the Interstate Commerce Commission's order."

Circular letter No. 204 directs railroads to take up with the office of the regional director for authority before entering into any contracts for freight car repair work at outside shops. It is stated that this matter is being gone into extensively by the Car Repair Section, which will be prepared to undertake whatever freight car repair work it may be necessary to have done at outside shops.

In Circular No. 200 railroads are asked to furnish information regarding the handling of loss and damage claims, including a reproduction of the pay roll for the freight claim department for the month of May, enlarged to show the name of each clerk and department head, the duties of the employees in detail, their daily or monthly rate of compensation, percentage of time devoted to the handling of loss and damage claims and other classes of work, etc.

With Circular letter No. 201 was sent a statement showing claims for loss and damage to freight received during the year 1917, claims on hand May 1, 1918, and the number of months behind in final disposition of claims for roads under government control in the Southern region. Roads were asked to use this statement for the purpose of determining by comparison with other roads as to whether or not, judged by the number of claims received, each line is getting proper results in the matter of claim reduction, whether or not claims are being disposed of with a reasonable degree of promptness, and whether or not proper attention is being given to the clearing from suspense of claims charged to that account.

In Circular letter No. 202 the roads are asked to issue instructions covering the detailed regulation for the inspection, cooperation and selection of cars in fit physical condition for handling such commodities as grain, flour, sugar, etc., to the end that every possible precaution may be taken to insure the proper transportation of freight of a character likely to be damaged by reason of the condition of the equipment.

In Circular letter No. 205 roads are asked to advise promptly the percentage of section labor short on each line as of June 1.

Circular letter No. 207 states that in line with the general standardization scheme it has been recommended that the 40-ft. stock car be used rather than the 36-ft. car. That conclusion may be reached, the roads are asked to express their views on such questions as whether the all year revenue from a 40-ft. car will justify carrying around a 4-ft. longer car, the effect of the 40-ft. car on trackage, loading and unloading chutes, and as to which is the better car from a revenue-producing point of view.

Circular letter No. 208 states that the Norfolk & Western

has 15 light weight locomotives which it can spare for service elsewhere. A description of the locomotives is given and the roads are asked to advise if they desire to utilize any of these locomotives.

Conserving Material

Circular letter No. 211 outlines various ways of conserving material and reclaiming and repairing old material. In view of the increasing difficulty in obtaining a sufficient amount of iron and steel products, the circular says, it is more important now than ever that every piece of material that is fit for further use or that can be repaired and used should be used in place of new material. Under no circumstances must any material be scrapped until it is positively known that it cannot be repaired by some process or that the cost of repairs by suitable means is prohibitive, or that by some economical process it cannot be converted into another class of useful material. A list of some of the materials to be saved and methods of reclaiming is appended and roads are asked to send to the office from time to time lists of additional articles and methods, with full description when necessary, so that they may be published for the benefit of the other regional roads.

Industrial Railroads

In Circular letter No. 215 the railroads are asked to furnish complete lists of all industrial railroads touching any part of their systems, with name of owning industry, officer in charge, character of industry, junction point and connections with any other carriers, also number of miles operated and division or allowance, if any, per car or per ton, and total allowance for the calendar year 1917.

Passenger Fares

In order to familiarize agents and conductors with new tariffs ordered by General Order No. 28 and the method of constructing the new fares thereunder, it is suggested in circular letter No. 217 that the railroads arrange to hold day or evening schools of instruction, established in the larger cities, where there are headquarters of lines whose representatives have been in attendance at the rate meeting in Washington and who are familiar with the situation. This should be extended so far as possible by calling in the principal ticket agents on the line for similar instruction. Tariffs for this purpose are to be available by June 5. In this connection it is stated that as much publicity as possible should be given to the conditions that specific forms of tickets sold prior to June 10 will be redeemed and that this does not apply to commutation tickets.

Circular letter No. 220 quotes a letter from Edward Chambers, director of the division of traffic, stating that several complaints have been received in regard to the failure of railroads to make desirable passenger train connections, particularly at intermediate points, when it can be done by only slight readjustments in train schedules. Often these connections are broken by a few minutes of time, but the resultant delay to passengers is several hours. The railroads are asked to have this subject given the necessary consideration and to advise as to such connections as may need adjustment.

Circular letter No. 221 advises that contributions of railroads to Railroad Young Men's Christian Associations during the period of federal control may, until otherwise ordered, be made in reasonable amounts as heretofore.

B. L. Winchell became regional director of the Southern district on June 1. His first circular letter was No. 222 regarding salaries of railroad officers, in which the presidents of railroads in the Southern district were asked to furnish him with a statement of salaries paid to executive officers and heads of the several departments, indicating the titles of such officers and department heads.



Association of American Railway Accounting Officers, St. Louis, Mo.

Meeting of Railway Accounting Officers

A Strictly Business Meeting Attended by 250 Members
Important Report on New Conditions

THE 30TH ANNUAL MEETING of the Association of American Railway Accounting Officers was held on May 29 and May 30 at the Hotel Statler, St. Louis. After the singing of the Star Spangled Banner and an address of welcome by Mayor Keil of St. Louis, a letter from C. A. Prouty, director, division of public service and accounts of the United States Railroad Administration, was read in part as follows:

Letter from Director Prouty

At the last moment matters which cannot be postponed keep me in Washington. May I ask you to convey to your association and through it to the railway accountants of this country a single word from me?

The operating revenues which are reflected in the accounts kept by our accountants belong to the United States. The director general can remove or employ any accountant upon any railroad under federal jurisdiction. Our accountants are, therefore, in a direct sense the employees of the government. What the director general asks is that our accountants shall at all times bear this in mind and shall render to him loyal and efficient service. The accountant who measures up to that standard will be fully protected in his position, nor is there in contemplation any reorganization nor disruption of present organization which will affect his status for the future.

Personally I will, to the extent of my authority and of my influence with the director general see that every accountant has fair treatment according to his desert, having reference both to the present and to the future.

But I appeal to you now upon a much broader ground. These railroads were taken under government control to win this war. The transportation which they alone furnish is fundamental and the war cannot be won without it. Whether our railroads can be successfully operated depends entirely upon their employees. No man, no matter what his

ability may be, can accomplish much without the loyal and efficient support of his co-workers from the lowest up to the highest.

The accountant who desires to do his full part in the present crisis can best serve his country by the faithful and painstaking performance of that thing which he is employed to do. Upon the broad ground of public duty, therefore, I appeal to you one and all to pull together, each man in his own particular sphere for the winning of this war.

It is a personal regret that I cannot be with you. I am not an accountant and could not discuss the problems of technical accounting, but there are certain things which I feel should be accomplished during this period of federal control in which the accountant plays a most important part and some of these things I should have been glad to suggest to you.

I am also anxious to become acquainted with our railway accountants. If anyone sees anything which in his opinion ought to be brought to my attention, he will confer a favor by writing to me. If his letter is marked personal I shall be sure to read it. I also hope that no accountant visiting the city of Washington will fail to call at my office. Let him state who he is and that he comes at my request.

Report of the Executive Committee

After some correspondence with Charles A. Prouty, director, Division of Public Service and Accounts, United States Railroad Administration, the following committee was appointed to confer with Director Prouty and also to represent the association in its dealings with the director general's office: A. H. Plant, chairman, controller Southern Railway; C. B. Seger, vice president and controller Union Pacific; A. B. McDonald, vice president and controller, Southern Pacific Company; R. A. White, general auditor, New York Central, and Frank Nay, comptroller Chicago, Rock Island & Pacific. The remainder of the ex-

ecutive committee's report dealt with the various subjects connected with the administration of the association's affairs.

Corporate, Fiscal, and General Accounts

The attention of the committee was directed to a letter written by the chairman of the committee to the director general of railroads in which the aid of the Committee on Corporate, Fiscal and General Accounts, either as a whole or through an appropriate sub-committee, was tendered to him in connection with any matters relating to railway accounting which may arise under his administration.

The action of the chairman was approved and a sub-committee, consisting of A. H. Plant, chairman; C. B. Seger, R. A. White and A. D. McDonald, was appointed and directed to hold itself in readiness to act in the event its services are required. The sub-committee was given full power to act for the committee without referring individual conclusions to it for approval. Its actions and activities, however, are to be reported from time to time to the full Committee.

Government Transportation Accounts

The chairman of the committee advised it of the activities of the sub-committee on military transportation accounting in its efforts to speed up the settlement of accounts of the railroads against the several departments of the federal government for the transportation of men and materials. He pointed out that while substantial progress had been and is being made, delays to some extent continue, some of which are due, apparently, to inability to secure adequate clerical forces trained in the application of land grant rates and equalizations; others to the technical initial audits required under regulations, and still others to the adjudication of freight claims.

Efforts are being made in the following manner to overcome such delays and to, as far as practicable, enable the railroads to collect currently revenues earned by them for services rendered the government:

It has been suggested that the original audit be limited to administrative examinations, and that the accounts be paid immediately after such examinations. The railroads to guarantee to the government repayments of all discrepancies found in final audits to bases of classifications and tariffs applicable. Such a guarantee was authorized by the war board—a further guarantee has been authorized by the director general of railroads.

The adjudication of claims for losses and damages under existing regulations is more or less arbitrary, and to some extent unnecessarily delays the settlement of transportation accounts. The matter was brought to the attention of the Secretary of War, who promptly directed that a plan be devised by which such claims could be promptly and properly adjusted without delaying the settlement of transportation accounts.

Colonel G. F. Downey, Depot Quartermaster, Washington, D. C., wrote to the chairman of the Subcommittee on Military Transportation Accounting, in part as follows:

My plan is as follows: Do away with government bills of lading, and use commercial bills of lading with the same railroad routine for government freight now in use for private shipments, which is the bulk of the railroads' traffic and on which their methods of doing business have been based and brought to their present condition.

Instead of issuing a government bill of lading as now, give a freight transportation request to be exchanged for the accomplished railway bill of lading at the point of origin, similar to the present transportation request for passenger service which is exchanged for a railroad passenger ticket. In other words, handle freight traffic in exactly the same manner as passenger traffic, issuing a request to the initial carrier in return for the railroads' written guarantee to perform the service and make delivery.

The freight transportation request should be issued in triplicate and serially numbered, the railroad commercial bill of lading carrying the number of the transportation request and the transportation request carrying the number of the commercial bill of lading, which will be sufficient to connect up the shipment, thus leaving both the government and the

railroad to handle their records, accounts and billing by their own methods and not force them to adopt parts of the systems of the other. Of the three copies, the original signed by the shipping quartermaster is given to the carrier's agent at point of origin, who turns it in to his railroad accounting head, who in turn uses it as a voucher in an account to the depot quartermaster, who will make settlement with the initial carrier as provided by law. The duplicate copy will be sent by the shipping quartermaster to the depot quartermaster, Washington, D. C., on the date of issue; while the third or tissue copy should remain with the shipping officer as his record of shipments made.

In exchange for this transportation request, the shipping quartermaster receives from the railroad agent an accomplished commercial bill of lading, and in turn sends it to the consignee. The consignee calls on the railway agent at destination, receives the goods, and surrenders the commercial bill of lading, thus closing the transaction. Claims for losses and damages will be adjusted by the consignee at time of delivery. If there is a shortage, the railway agent should so certify to the receiving quartermaster, who sends the certificate to the depot quartermaster, who will collect the claim from the carrier.

If the receiving quartermaster and the carrier's agent at point of destination cannot agree as to losses and damages and responsibility for the same, a full statement by each of the facts in the case with the bill of lading should be sent to the depot quartermaster, who will submit it to a board composed of a member from the railway accounting branch, a member from the auditor's office, and the depot quartermaster, or a similar board, who will settle the disputed claim. The action of this board to be final and settlement made immediately by the final carrier, if the responsibility is placed on him.

Presentation of this plan will be made to higher authorities, but I am submitting it to you in order to get an expression of opinion from the railroads before taking action. It proposes such a radical change, involving not only the war department, but also the treasury department and all other government agencies, that it may take time to put the plan into operation. But the railroads' approval and acceptance will materially hasten its adoption and will serve to relieve the present congestion of accounts.

The plans proposed by Colonel Downey were discussed and endorsed by the committee. The general scheme is approved. It was, however, pointed out that it would be necessary to work out the details of the plan proposed. The Accounting Committee, U. S. Railroad Administration, will endeavor to do this.

War Revenue Tax

The sub-committee handling this matter, consisting of A. H. Plant, chairman; A. D. McDonald and R. A. White, reported that it is co-operating with the Internal Revenue Department in handling questions arising with respect to the application of the war revenue tax and it has prepared a pamphlet covering all matters relating to the application of the tax.

Compilation of Ton Mile Statistics

The committee considered a letter of August 9, 1917, from G. J. Bunting, comptroller, Chicago, Milwaukee & St. Paul, with respect to carriers discontinuing the compilation of tons one mile in connection with merchandise or l.c.l. shipments. The committee is of the opinion that carriers should continue to compile ton miles.

The report was signed by A. H. Plant, chairman and was accepted by the association.

Committee on Freight Accounts

Interline Waybilling and Percentage Divisions

The special subcommittee to which this subject has been assigned did considerable preliminary work in the way of conferences with traffic officers and traffic organizations, and substantial progress was made looking to the adoption of through rates and simplified division bases.

As a result of the interest taken by members of Director General McAdoo's staff early in the year 1918, the attention of traffic officers and others was directed to the necessity for improvements along these lines, and in many cases the traffic associations were found ready and willing to undertake constructive work.

In view of the promulgation of general order No. 11 by the director general, and the expectation of a further general order providing for simplified divisions, as indicated in paragraph 13, of Order No. 11, it is felt that the subcommittee, for the time being at least, should cease its activities.

Shipping Bill as a Waybill

At its annual meeting held in Chicago, Ill., September 26 and 27, 1917, the Association considered the following letter from A. W. Lishawa, Assistant Auditor Freight and Ticket Accounts, Delaware, Lackawanna & Western Railroad Company, dated June 28, 1917, addressed to President Robinson:

At this period of activity when it is incumbent upon carriers to use every expedient toward greater efficiency in the transportation of freight and at the same time conserve their interests and reduce to a minimum the errors which, it is reasonable to expect, will increase as a result of the necessity of placing inexperienced clerks at stations, I wish to make a suggestion, the adoption of which will eliminate considerable work in waybilling and render the freight less liable to go astray, therefore, recommend the following:

Receiving agents, instead of preparing a waybill, shall use the shipping bill portion of the bill of lading in lieu thereof; this to be effective not only for freight local to the carrier transporting it, but for traffic to immediate connections, the idea being to allow the original document to go through to destination and treat it as a waybill. This would be advantageous in many respects and there will be no occasion for errors caused by transcription of information.

Under present conditions, the shipper prepares the bill of lading in three or more parts, of which he retains two; a third part, containing all the information necessary to move the freight, is given to the agent and is used as a basis for the issuance of the waybill, all the data originally shown on the shipping bill being transcribed thereon. To this operation alone it is safe to say that the majority of errors in waybills are due, especially in misreading the number of articles which in itself results in a large percentage of Overs and Shorts—mistakes in copying the name of consignee (which delays delivery; also, when waybills are prepared by forwarding station, the haste with which they are made, due to the "dupes" not being picked up until 4:00 p. m., is the cause of many errors therein—and other irregularities, all of which might be avoided by the use of the shipping bill as the original document.

Your committee considers the proposed plan as practicable by special arrangement with a limited number of shippers that are willing to co-operate with the carriers and have the necessary traffic organizations.

The plan is impracticable, under existing conditions, for general adoption, for the reason that forms in use by many shippers throughout the country are not uniform as to size and arrangement, and such uniformity is not obligatory upon shippers. There would be the further difficulty that carriers could not require shippers to furnish documents suitable for use as waybills.

Government Transportation

At the present time there does not exist any reason for not settling currently in interline accounts, waybills covering property for the government, and it is, therefore, recommended that paragraph 117, 1917 Synopsis, be canceled and that interline waybills covering property for the government be settled currently in the same manner that other interline waybills are settled.

Unit Waybill

The form of waybill prescribed in General Order No. 11, issued by the director general, is recognized as the A. A. R. A. O. standard form of interline waybill in lieu of A. A. R. A. O. forms 101, 101a, and 101b.

Incomplete and Illegible Freight Bills

The National Industrial Traffic League and your association are working together to bring about an improvement in the preparation of freight bills.

It is further suggested that the railroad agents and receiving clerks call attention of shippers, at time of receipt of freight for shipment to any illegibility or defects in shipping orders with a view to proper correction at that time, and that similar co-operation be extended on the part of consignees in drawing attention of railroad agents to illegible or defective freight bills at the time such freight bills are tendered.

The report signed by W. W. Strickland, chairman, was accepted.

Committee on Passenger Accounts

Daily Plan of Interline Ticket Accounting

On account of the duplication of work in handling a multiplicity of items both for the initial and honoring carriers, this association does not recommend the daily plan of interline ticket accounting.

Government Transportation

Resolved, That all tickets issued on government orders be reported to interested carriers with revenue in the current month, such items to be transcribed on separate sheets marked "Government," the total to be included in regular report.

The association's recommendation as contained in paragraph 212, page 93 of the 1917 Passenger Synopsis is hereby rescinded.

Abolition of Prepaid Orders

Resolved, That this association reaffirms its previous recommendation for the absolute abolition of prepaid orders, system, local and interline, both in accepting and placing the orders by telegraph, mail, or sale of such orders or the transmission of cash for any such purpose, and be it

Further Resolved, That the members of this association prevail upon their respective passenger traffic officials to agitate this question in the various associations who have not as yet taken action in line with the foregoing.

The report was signed by L. C. Esschen, chairman, and was accepted by the association.

Committee on Disbursement Accounts

War Taxes Upon Foreign Lines' Freight Charges on Company Material

Resolved, That war taxes, when assumed as such by the carrier, on express charges or on foreign lines' freight charges on company material, also war taxes on parlor car and Pullman fares, telegraph and telephone tolls, club dues, etc., paid by the carrier or by its officers or employees, should be charged to Account 532, "Railway Tax Accruals," except that these taxes, when in connection with Road and Equipment projects, if assignable, should be included in the cost of the property acquired or constructed, and accounted for in accordance with the note under Account 75, "Taxes." And be it

Further Resolved, That the increased cost on account of increase in rates of postage should be charged to the appropriate Stationery and Printing Account.

These resolutions were referred back to the committee.

Other Committee Reports

A very comprehensive report was made by the committee on disbursement accounts, A. P. Disbrow, chairman, on the use of mechanical devices in disbursement accounting. This report was accepted and will be published in full in these columns next week.

The committee on terminal companies' accounts, on accounts with governments, on conference with the Master Car

Builders' Association, and on conference with the Freight Claim Association reported that they had had no matters referred to them and they, therefore, held no meetings. The committee for conference with the American Association of Passenger Traffic Officers, J. C. Briggs, chairman, asked that the subjects of uniform interline tickets, separate ticket coupons required by subsidiary companies, etc., be left with it, and the association, therefore, left these subjects with the committee for further consideration.

Revision of the Constitution

At its annual meeting in Chicago, September 26-27, 1917, the association adopted the following resolution:

Resolved, That the president and the two vice-presidents shall constitute a special committee on the revision of the constitution and by-laws, whose report shall be submitted for action at the next annual meeting of the association.

In order that the association may have before it an explanation of the reasons for some of the more important changes suggested, your committee submits the following explanatory statements:

Change in Name.—The present name of the association is composed of six words and is so long that it is practically never referred to by its full name, either in conversation or in writing. Members generally refer to it as "The Association." Railway periodicals and even some members call it the "Accounting Officers' Association," or some other abbreviated form.

The name suggested is the Railway Accounting Officers' Association.

Membership Qualifications.—Your committee submits a revision of the membership qualifications to the extent of restricting honorary membership, so as to make it truly an honor, and, therefore, difficult to obtain. The experience of the executive committee has demonstrated that this is necessary in order to prevent the honorary membership list growing beyond its bounds and to prevent honorary membership becoming so general as to lose its significance.

Voting.—Your committee submits a suggestion for clarifying the provision under which a vote by roads shall be taken, so that there may be no doubt as to the procedure under such conditions.

Ex-Presidents to be Members of the Executive Committee.—As the executive committee is charged with the duty of supervising and administering the affairs of the association, your committee has suggested a provision in the constitution that the ex-president is to be a member of the executive committee. That is the practice with some railway associations, clubs and other organizations. Your committee has suggested that the number of elective members on the executive committee be reduced to six, three for each year, the ex-president to serve for two years. The executive committee would then consist of: President, first vice-president, second vice-president, two ex-presidents (one to drop off each year and the last retiring president to succeed him), six elected members (three to be elected each year, instead of four as now).

This would have the effect of making the executive committee consist of each existing administration and would constantly give that committee the benefit of the ideas and experience of the two previous presidents, as well as the president, the two vice-presidents, and the six elected members.

A provision has been incorporated in the suggestion of your committee to take care of the situation arising from your members of the executive committee having been elected to serve on it one year beyond the term when this amended constitution would become effective. In order to provide for that condition, it is necessary that in the first year, if this suggestion is adopted, that only one ex-president serve on the ex-

ecutive committee and in the second year after the adoption of this provision and thereafter the full effect of it would be in force.

Change in Committees.—Your committee has offered the suggestion that the word "standing" be eliminated from the title of each committee, for the word is superfluous, as every committee provided in the constitution is inevitably a standing committee.

Your committee has also offered the suggestion that the name "Committee on General Accounts" be used in lieu of "Committee on Corporate, Fiscal, and General Accounts." The words "corporate" and "general" are synonymous, and, of course, all or nearly all railroad accounts are "fiscal."

Believing that the work of the Committee on Accounts with Governments might properly be handled by the Committee on General Accounts, your committee has suggested abolishing the Committee on Accounts with Governments.

Time of Annual Meeting.—The time provided for the annual meeting, the last Wednesday in the specified months, falls in the busiest part of the month for most accounting officers and automatically acts to decrease the attendance at the meeting. Your committee has, therefore, suggested that the association's annual meeting be held on the second Wednesday in the months from April to September.

President's Address

After the reports of the committees had been discussed and accepted, J. A. Taylor, president of the association and controller of the Central of New Jersey, made an address in part as follows:

Such momentous events have come to pass during the year just ended and our minds are so full of them that it is impossible to forego some reference thereto and as particularly affecting the members of this association, I refer to the fact that we are now directly enrolled in the service of the government and it behooves everyone of us to realize and appreciate that fact by standing shoulder to shoulder in support of it and putting aside all selfishness, buckle on the armor of self-sacrifice.

We are working in the office, some because our country requires it, some because age or condition demands it. We are doing hard work, good work, patriotic work, but compared with the lot of our soldiers in France, it's pretty easy for us. They live in the slime of the trenches, prepared to make the supreme sacrifice at any moment and we are slackers and traitors to them if we fail in one iota in our loyalty and our duty to them. We can do very little for them in comparison with what they are doing for us, but we can and must give them our deepest loyalty, not only in thought, but in deed and deny ourselves that they may not suffer.

Election of Officers

R. E. Burger, first vice-president of the association and assistant auditor of the Wabash, was elected president; A. D. McDonald, second vice-president of the association and vice-president of the Southern Pacific, was elected first vice-president, and J. G. Drew, vice-president of the Missouri Pacific, was elected second vice-president. Jerry Welch, assistant general auditor of the Chicago, Milwaukee & St. Paul, J. Leslie, controller of the Canadian Pacific, and H. D. Foster, assistant general auditor of the Chicago, Burlington & Quincy, were elected to succeed the retiring members of the executive committee.

EQUIPMENT EXPORTS from the port of New York during the month of March, 1918, consisted of locomotives valued at \$964,492, freight cars at \$455,360, and steel rails at \$305,198.—*Bulletin of the National City Bank, New York.*

General News Department

The National Safety Council has been restored to the list of associations, to the support of which the Railroad Administration allows railroad companies to contribute and charge the amount to operating expenses.

Moving oil in train loads as practiced in the west has been recommended for adoption on eastern railroads, and the car service section is holding a conference on the subject at Washington this week. E. B. McIntyre, of the western regional directors' staff, and P. L. Swearingen, supervisor of oil traffic at Kansas City, are explaining to eastern men the details of western practices.

The Switchmen's Union of North America, which held its annual convention in St. Louis, Mo., last week, passed a resolution petitioning the director-general to prevent the Brotherhood of Railway Trainmen from renewing percentage contracts with the railroads which guarantee that 85 per cent of railroad employees shall be members of the brotherhood. These contracts, the switchmen declare, operate to the disadvantage of switchmen who are members of their organization.

The Airplane Mail Service

The airplanes carrying mail between New York and Washington appear to have made good records on two of the six days in the third week of their career; or, at least, we find no unfavorable mention in the newspapers except on four days. On Thursday, May 30, there was no start from either end, because of mist. There is not much difficulty in starting in a fog, but there is liable to be great difficulty in selecting a place in which to land. On the 31st, a similar condition was reported, both from New York and Philadelphia. On Saturday, June 1, there was no start from New York, but the plane arrived at New York from Philadelphia on time, in 62 minutes. On Monday, June 3, Lieut. Miller started from New York about noon, but was forced to land at Woodbridge, N. J., near Rahway, because of trouble with his motor. He telephoned at once to New York, and Lieut. Webb, in another machine, went out to take his place. On Monday it was planned to take 200 pounds of letters by airplane from New York to Boston, but mishaps occurred in starting and the trip was given up. Cable despatches of May 27 announced the beginning, on that day, of a regular airplane mail service between Paris and London.

Chicago Railway Supply Companies' Red Cross Fund

The committee organized by the railway supply companies of Chicago to raise contributions to the Red Cross Fund succeeded in raising \$188,864. The committee's quota was only \$175,000, and, under all the conditions, the showing made is very gratifying.

Short Lines

In Atlanta, on May 24, the state railroad commissioners of Georgia, Alabama, North and South Carolina, Tennessee, and other southern states, held a conference on the matter of the status of the short line railroads, and will follow the lead of the Texas commissioners in making representations to Director General McAdoo in behalf of the taking over of all of the short lines.

Railroad Earnings for April

The Interstate Commerce Commission has made public a partial summary of railway returns showing revenues, expenses and income of 149 large roads for the month of April and for the four months ending with April. While the report shows a considerable improvement in April as compared with the preceding three months, the railway operating income for April is about \$2,000,000 less than for April, 1917, or \$95,234,392 as compared

with \$97,521,014. For the four months the report shows operating income of \$132,520,313 as compared with \$230,661,022. Operating revenues in April show an increase of \$45,000,000, but expenses increased \$47,000,000. For the four months the operating revenues were \$93,000,000 greater than in 1917, while the expenses were \$189,000,000 greater.

A Personal Injury Catechism

[Grand Trunk Safety Bulletin No. 15—Michigan]

Q.—What kind of a safety record did Grand Trunk men make last year?

A.—There was a decrease of about 22 per cent in the number of employees killed and of about 8 per cent in the number injured in 1917 compared with 1916.

Q.—Are most of the injuries received by employees of a serious or permanent nature?

A.—No. Only a small per cent are serious or permanent; but any case *may become serious*, especially cuts, open wounds and eye injuries where infection (blood poison) may develop. Every real injury should be given some attention and first aid obtained.

Q.—Why do we have to make reports of every little trivial injury?

A.—For two reasons. The injury itself may possibly develop more seriously than expected, in which case there should be a record; and we want to know how it happened, regardless of how serious was the result.

Q.—Then when you say a certain number of employees were injured during a certain period there is no distinction between the case of a mashed finger and the loss of an arm?

A.—No. And really there is no distinction from a prevention standpoint. What counts is the *cause, not the result*. It may, and often is, purely a matter of good fortune that a man receives only a mashed finger instead of loss of his limb or his life. For instance, a brakeman went between two moving cars to stop leakage between air hose. He slipped and fell, but fortunately his body was thrown clear of rail and only the ends of his fingers were caught by wheels. Every time a *preventable* injury occurs, one thing is absolutely certain. *There is something wrong with man, methods or material*; and the first thought in the mind of the foreman, or other person in charge, after the injured has been cared for, is to find out what and where the wrong is and correct it. Fully 80 per cent of all injuries sustained by railroad men can be and should be prevented. Train, yard, engine and trackmen get hurt most frequently, but this does not mean that these branches of the service are naturally of an extra hazardous nature. Hundreds and thousands, in fact a great majority of the total number engaged in train and track service, never get a scratch. But while this service is reasonably safe for the man who complies with the rules, it's mighty unsafe for the chance-taker and rule violator. There are some men who would get hurt if they had a job as floor walker in a department store. The man who has gone between moving cars time and again, when he hears of some other fellow getting killed doing that stunt (and it's a stunt that kills a lot of them every year), should do some mighty serious thinking. He should end up by saying "I'm alive and that had to be dead, not because I deserve to live, but solely because I was lucky." Doing work that way is a gambler's proposition, simply and solely. Guess I'll call it off right here and now. There's many a man in the cemetery or crippled for life who would be alive and able today if he had applied this little homely truth.

The two chief sources of injuries and deaths to train yard, engine and trackmen are being struck by cars or engines and falling from cars or engines. It's the same on every road. If we could remove these two causes from our casualty lists the statistical report of the Board of Railway Commissioners and of the Interstate Commerce Commission, so far as they would apply to these employees, would contain no more figures than a railroadman's income tax schedule.

Railway Revenues and Expenses

The Interstate Commerce Commission has issued a summary of railway revenues and expenses for the month of March and three months of the calendar year, covering the returns of 191 roads out of the 196 for which reports are usually issued. Railway operating revenues for March were \$365,347,593, as compared with \$316,614,123 in March, 1917. Expenses were \$282,864,256, or \$54,000,000 greater than for March, 1917, and railway operating income was \$67,351,846, or \$6,000,000 less than for March, 1917. For the three months, railway operating income shows a reduction of \$108,000,000, from \$189,882,892 in March, 1917, to \$81,630,244. Operating revenues were \$939,165,933, an

increase of \$57,000,000; operating expenses were \$813,192,279, an increase of \$162,000,000, and taxes were \$44,175,806, an increase of nearly \$4,000,000. The eastern roads had a deficit of \$4,989,725, while the southern roads had operating income amounting to \$31,124,822, and the western line had an operating income of \$55,495,147.

The Interstate Commerce Commission has also issued summaries for January, February and March, covering only roads having operating revenues above \$1,000,000 in the year ended December 31, 1917. These tables include 180 Class 1 roads and 16 switching and terminal companies and are reprinted herewith.

SUMMARY OF MONTHLY REPORTS OF LARGE ROADS FOR JANUARY, 1918.

Item.	United States				Eastern District			
	Amount		Per mile of road operated		Amount		Per mile of road operated	
	1918	1917	1918	1917	1918	1917	1918	1917
1. Average number miles operated.....	232,848.84	231,858.36	.....	.....	59,323.97	58,990.95	.....	.....
REVENUES:								
2. Freight.....	\$188,665,129	\$211,651,106	\$810	\$913	\$74,997,036	\$92,624,432	\$1,264	\$1,570
3. Passenger.....	66,467,628	\$9,418,166	285	256	26,417,557	25,482,731	445	432
4. Mail.....	4,575,990	5,441,955	20	24	1,751,939	2,026,832	29	37
5. Express.....	8,785,956	7,847,754	38	34	4,082,939	3,545,383	69	60
6. All other transportation.....	7,571,380	8,665,542	32	37	4,018,621	4,704,758	68	81
7. Incidental.....	8,752,071	7,634,233	38	33	4,821,005	4,084,022	81	69
8. Joint facility—Cr.....	389,360	325,354	2	2	142,273	154,428	3	3
9. Joint facility—Dr.....	123,766	130,355	1*	1	74,039	78,261	1	1
10. Railway operating revenues.....	\$285,083,748	\$300,843,745	\$1,224	\$1,298	\$116,197,831	\$132,784,325	\$1,959*	\$2,251
EXPENSES:								
11. Maintenance of way and structures.....	\$40,755,871	\$32,043,121	\$175	\$138	\$18,645,760	\$13,776,250	\$314	\$234
12. Maintenance of equipment.....	66,990,814	\$3,515,969	288	231	3,143,468	25,670,757	542	434
13. Traffic.....	4,912,701	5,524,127	21	23	1,960,149	1,989,180	32	34
14. Transportation.....	147,066,612	114,856,583	631	496	70,605,944	55,048,604	1,190	943
15. Miscellaneous operations.....	3,017,622	2,594,218	13	11	1,433,359	1,219,145	4	21
16. General.....	8,434,769	7,799,328	36	34	3,734,933	3,399,775	63	58
17. Transportation for investment—Cr.....	421,639	636,992	2	3	6,675	57,468	1	1
18. Railway operating expenses.....	\$270,756,750	\$215,496,356	\$1,163	\$930	\$128,460,938	\$101,596,283	\$2,164	\$1,723
19. Net revenue from railway operations.....	\$14,326,998	\$85,347,389	\$61	\$368	\$81,706,107	\$31,188,042	\$80.6	\$5.8
20. Railway tax accruals (excluding "War Taxes").....	\$14,684,639	\$13,708,362	\$63	\$59	\$5,844,050	\$5,550,186	\$98	\$94
21. Uncollectible railway revenues.....	42,773	51,485	.....	.....	16,074	18,486	.....	.....
22. Railway operating income.....	\$840,414	\$71,587,542	\$82	\$309	\$88,046,251	\$25,619,370	\$80.04	\$434
23. Equipment rents.....	\$81,795,599	\$83,338,036	\$89	\$815	\$83,156,658	\$84,272,457	\$853	\$872
24. Joint facility rent (Debit).....	1,092,192	1,009,986	4	4	596,716	518,046	10	9
25. Net of items 22, 23 and 24.....	\$8,288,205	\$67,339,526	\$814	\$290	\$82,179,925	\$20,288,867	\$836*	\$53
26. Ratio of operating expenses to operating revenues.....%	94.97	71.63	.....	.....	110.50	76.51	.....	.....
	Southern District				Western District			
	Amount		Per mile of road operated		Amount		Per mile of road operated	
	1918	1917	1918	1917	1918	1917	1918	1917
1. Average number miles operated.....	42,963.16	4,734.68	.....	.....	130,561.71	130,132.73	.....	.....
REVENUES:								
2. Freight.....	\$31,765,298	\$34,565,177	\$739	\$809	\$81,902,795	\$84,461,497	\$627	\$640
3. Passenger.....	12,058,852	9,312,644	281	218	27,991,219	24,622,795	214	181
4. Mail.....	725,517	779,322	17	18	2,098,534	2,450,891	16	18
5. Express.....	1,309,958	1,214,556	31	28	3,393,059	3,087,815	26	24
6. All other transportation.....	604,630	677,267	14	16	2,948,129	3,119,517	23	25
7. Incidental.....	1,059,468	894,477	26	21	2,831,578	2,645,734	22	20
8. Joint facility—Cr.....	97,984	21,118	2	2	108,603	99,402	1	1
9. Joint facility—Dr.....	21,923	21,118	1	1	7,804	30,986	.....	.....
10. Railway operating revenues.....	\$47,639,804	\$47,493,955	\$1,109	\$1,111	\$121,246,113	\$120,565,465	\$929	\$927
EXPENSES:								
11. Maintenance of way and structures.....	\$6,196,906	\$5,389,539	\$144	\$126	\$15,913,705	\$12,877,332	\$122	\$99
12. Maintenance of equipment.....	1,349,817	8,309,682	241	195	4,497,870	19,585,530	188	151
13. Traffic.....	925,420	1,073,594	22	23	3,084,138	3,261,353	25	27
14. Transportation.....	1,437,003	15,116,102	499	354	6,073,666	44,601,874	41	30
15. Miscellaneous operations.....	269,035	278,593	6	7	1,315,550	1,096,440	10	10
16. General.....	1,245,648	1,167,292	29	27	3,454,188	3,233,261	27	26
17. Transportation for investment—Cr.....	45,029	107,789	1	3	111,375	471,735	.....	4
18. Railway operating expenses.....	\$40,378,800	\$31,227,018	\$940	\$731	\$61,974,011	\$46,740,555	\$79*	\$46
19. Net revenue from railway operations.....	\$7,261,004	\$16,266,937	\$169	\$380	\$59,272,101	\$73,824,910	\$148	\$91
20. Railway tax accruals (excluding "War Taxes").....	\$1,153,545	\$2,061,063	\$50	\$48	\$1,770,444	\$1,007,114	\$55	\$47
21. Uncollectible railway revenues.....	7,410	8,793	.....	.....	4,660	4,660	.....	.....
22. Railway operating income.....	\$5,109,449	\$14,197,681	\$119	\$332	\$57,501,657	\$72,817,801	\$90	\$44
23. Equipment rents.....	\$4,258,848	\$1,137,146	\$84	\$7	5,491	\$18,1713	\$7	\$82
24. Joint facility rent (Debit).....	146,562	295,584	5	5	28,314	28,314	.....	.....
25. Net of items 22, 23 and 24.....	\$5,866,285	\$15,120,938	\$114	\$324	\$51,981,135	\$54,621,611	\$100	\$240
26. Ratio of operating expenses to operating revenues.....%	84.76	65.75	.....	.....	84.10	68.57	.....	.....

Note: There are included in this statement 79 roads in the Eastern District, 35 in the Southern District, and 82 in the Western District—total, 196 roads.
 *Debit item.
 *Includes interest for 1918 on bonds of the Baltimore & Washington R. R., and
 *Includes interest for 1918 on bonds of the Washington & Annapolis R. R., and
 *Includes interest for 1918 on bonds of the Missouri Pacific R. R., and
 *Includes interest for 1918 on bonds of the St. Louis, Iron Mountain & Southern Ry. Co.

Safety and Loyalty*

Never in our history was there a greater need for persistent accident prevention work than there is at the present time. A conservative estimate indicates that by the time this war is over the man-power of the world will be decreased 25,000,000 men, a number almost equal to the wage earning population of this country. Even today with our country at war must the cause of safety be upheld and its progress continued. Because lives are

necessarily sacrificed for a righteous cause on the battle front, other lives must not be unnecessarily sacrificed at home through carelessness and neglect. The killing of 22,000 and the injuring seriously of half a million industrial workers a year in all classes of industry in the United States is a serious drain on the man-power of the nation, at a time when every available man is needed for the work that is to be done. Our duty is clear; we must keep the machines going, keep the railroads and industries up to their highest point of productive efficiency—but we must keep as far as possible from having accidents or anything that will tend to lessen that efficiency.

Safety today involves a bigger thing than only industrial safety.

* Extract from an address delivered by Marcus A. Dow, General Safety Agent of the New York Central Lines, at a Safety Rally held in Keith's Theatre, Indianapolis, Ind., on Sunday, May 5.

SUMMARY OF MONTHLY REPORTS OF LARGE ROADS FOR FEBRUARY, 1918

Item	United States				Eastern District			
	Amount		Per mile of road operated		Amount		Per mile of road operated	
	1918	1917	1918	1917	1918	1917	1918	1917
1. Average number miles operated.....	232,887.00	231,847.22	.....	.....	59,322.71	58,990.91	.....	.....
REVENUES:								
2. Freight.....	\$198,508,874	\$185,138,707	\$852	\$799	\$82,389,517	\$80,215,739	\$1,389	\$1,360
3. Passenger.....	11,583,534	53,400,883	267	226	24,758,620	22,144,834	417	375
4. Mail.....	4,373,656	4,192,730	19	18	1,647,643	1,994,812	28	34
5. Express.....	9,033,427	8,666,245	39	36	4,336,379	3,416,096	73	58
6. All other transportation.....	7,867,080	7,802,940	34	34	4,248,532	4,341,397	72	74
7. Prudential.....	1,001,867	6,958,635	32	30	4,034,866	3,828,672	68	65
8. Joint facility—Cr.....	418,158	316,262	2	1	206,396	148,884	3	2
9. Joint facility—Dr.....	126,844	113,985	1	.....	64,617	64,927	1	1
10. Railway operating revenues.....	\$289,683,833	\$265,362,397	\$1,244	\$1,144	\$121,551,276	\$116,025,507	\$2,049	\$1,967
EXPENSES:								
11. Maintenance of way and structures.....	\$38,789,321	\$30,231,170	\$167	\$130	\$17,536,406	\$12,600,833	\$296	\$214
12. Maintenance of equipment.....	66,363,966	49,647,702	295	214	32,326,331	23,881,469	545	405
13. Traffic.....	4,570,160	3,303,003	20	22	1,757,857	1,940,424	30	33
14. Transportation.....	140,170,736	113,221,798	601	488	67,258,282	56,827,996	1,133	963
15. Miscellaneous operations.....	2,735,689	2,489,963	12	11	1,271,262	1,127,337	21	19
16. General.....	8,432,518	7,448,753	36	32	3,713,385	3,236,910	63	55
17. Transportation for investment—Cr.....	471,390	447,092	2	1	81,469	36,699	1	1
18. Railway operating expenses.....	\$260,590,900	\$207,795,297	\$1,119	\$896	\$123,781,954	\$99,578,260	\$2,087	\$1,688
19. Net revenue from railway operations.....	\$29,092,933	\$57,567,100	\$125	\$248	*\$2,320,678	\$16,447,247	*\$38	\$279
20. Railway tax accruals (excluding "war taxes").....	\$14,630,828	\$13,664,826	\$63	\$59	\$3,779,993	\$3,458,067	\$97	\$93
21. Uncollectible railway revenues.....	45,996	40,759	.....	.....	13,831	14,854	.....	.....
22. Railway operating income.....	\$14,416,109	\$43,861,515	\$62	\$189	*\$8,024,502	\$10,974,326	*\$135	\$186
23. Equipment rents.....	*\$1,068,656	*\$1,136,763	*\$5	*\$5	*\$2,579,613	*\$3,076,036	*\$44	*\$52
24. Joint facility rent (Dr. balance).....	1,104,816	1,032,888	5	4	595,972	\$580,191	10	10
25. Net of items 22, 23 and 24.....	\$12,242,637	\$41,691,864	\$52	\$180	*\$11,200,087	\$7,318,099	*\$189	\$124
26. Ratio of operating expenses to operating revenues.....%	89.96	78.31	.....	.....	101.84	85.82	.....	.....
Item	Southern District				Western District			
	Amount		Per mile of road operated		Amount		Per mile of road operated	
	1918	1917	1918	1917	1918	1917	1918	1917
1. Average number miles operated.....	42,969.04	42,735.46	.....	.....	130,595.25	130,120.85	.....	.....
REVENUES:								
2. Freight.....	\$36,041,809	\$30,893,712	\$839	\$723	\$80,077,548	\$74,029,256	\$613	\$569
3. Passenger.....	11,583,534	8,762,698	270	205	25,917,895	21,493,331	198	165
4. Mail.....	707,173	832,309	16	19	2,018,480	2,365,709	15	18
5. Express.....	1,207,727	1,208,230	28	28	3,489,331	3,041,919	27	23
6. All other transportation.....	625,941	607,891	15	14	2,992,607	2,853,652	23	22
7. Prudential.....	1,601,947	881,854	23	21	2,312,760	2,248,109	18	17
8. Joint facility—Dr.....	114,128	72,402	2	2	103,634	94,976	1	1
9. Joint facility—Dr.....	18,433	19,462	.....	.....	43,794	29,596	.....	.....
10. Railway operating revenues.....	\$51,263,746	\$43,239,534	\$1,193	\$1,012	\$116,868,811	\$106,097,356	\$895	\$815
EXPENSES:								
11. Maintenance of way and structures.....	\$6,301,947	\$5,045,338	\$147	\$118	\$14,950,868	\$12,585,009	\$114	\$97
12. Maintenance of equipment.....	10,298,752	7,622,851	340	178	23,738,983	18,143,382	182	139
13. Traffic.....	863,595	1,067,180	20	24	1,948,708	2,255,309	15	17
14. Transportation.....	20,285,982	14,707,709	472	344	52,626,472	41,686,093	403	320
15. Miscellaneous operations.....	271,706	282,978	0	7	1,192,721	1,073,618	9	8
16. General.....	1,234,848	1,131,561	29	26	3,484,285	3,080,282	27	24
17. Transportation for investment—Cr.....	86,753	64,486	2	1	303,168	345,907	2	2
18. Railway operating expenses.....	\$39,170,077	\$29,733,131	\$912	\$696	\$97,638,869	\$78,483,906	\$748	\$603
19. Net revenue from railway operations.....	\$12,093,669	\$12,506,403	\$281	\$316	\$19,229,942	\$27,613,450	\$147	\$212
20. Railway tax accruals (excluding "war taxes").....	\$2,183,127	\$2,075,845	\$51	\$49	\$6,667,208	\$6,130,914	\$51	\$47
21. Uncollectible railway revenues.....	13,078	6,745	.....	.....	19,087	19,160	.....	.....
22. Railway operating income.....	\$9,897,464	\$11,423,813	\$230	\$267	\$12,543,147	\$21,463,376	\$96	\$165
23. Equipment rents.....	\$247,818	\$1,406,660	\$6	\$33	\$1,263,139	\$532,613	\$10	\$4
24. Joint facility rent (Dr. balance).....	139,449	137,938	3	3	369,395	\$314,759	3	2
25. Net of items 22, 23 and 24.....	\$10,005,833	\$12,692,535	\$233	\$297	\$13,436,891	\$21,681,230	\$103	\$167
26. Ratio of operating expenses to operating revenues.....%	76.41	68.76	.....	.....	83.55	73.97	.....	.....

May 18, 1918.

*Debit item.

Excludes figures for Philadelphia, Baltimore & Washington R. R., and Washab, Pittsburgh Terminal Ry.

Excludes figures for Colorado Midland Ry., Missouri Pacific Ry. and St. Louis, Iron Mountain & Southern Ry.

It involves not only the prevention of accidents but also the prevention of an invasion of our fair land by a cruel and destructive enemy. Every American today, to be true and loyal, has got to be a good safety man. He has got to put his shoulder to the wheel and give the best service that it is possible for him to give. He must give a full day's work every working day and should do nothing that will in any degree impair his ability or the ability of others to give that full measure of service. He must perform more work, steadier work, more conscientious work and more willing work than he has ever performed in his life before. For a railroad man to be off work, even temporarily, merely to suit

his own personal ends, deprives the country unnecessarily of services that are needed, and whether intended or not is an act of disloyalty. Careless work, trifling work, indifferent work, "Don't give a hoot" sort of work on the part of any man today is disloyalty to the country. No one of our handiwork our boys ever there in their effort to win this war. Every American man only realize this and go to his work every day with a clear head determined to give a hundred per cent service, keep his mind on his job, work continually and set work carefully, he will do more than all else to back up the splendid boys who are extending the gates of liberty over in France.

SUMMARY OF MONTHLY REPORTS OF RAILROADS FOR MARCH 1918

Item	United States				Eastern District			
	Amount		Per mile of road operated		Amount		Per mile of road operated	
	1918	1917	1918	1917	1918	1917	1918	1917
1 Average number miles operated	27,913,336	31,672,601			10,169,311	12,034,411		
REVENUES:								
2 Freight	\$ 39,588,843	\$27,771,167	\$1,115	\$961	\$1,104,344	\$1,029,677	\$1,124	\$973
3 Passenger	73,170,336	59,311,895	314	255	304,403	278,066	301	247
4 Mail	4,548,634	5,113,334	19	22	7,761	10,566	8	14
5 Express	9,577,770	8,501,931	41	37	45,737	40,711	46	39
6 All other transportation	9,446,257	9,186,433	41	40	78,104	77,143	81	81
7 Incidental	3,300,234	7,862,665	12	34	57,533	131,028	57	127
8 Joint facility—Cr.	430,151	423,000	1	1	423,000	423,000	4	4
9 Joint facility—Dr.	132,885	120,319	1	1	64,881	63,881	7	7
10 Railway operating revenues	\$36,911,476	\$37,149,867	\$1,571	\$1,399	\$1,634,481	\$1,480,634	\$1,711	\$1,541
EXPENSES:								
11 Maintenance of way and structures	\$43,805,888	\$35,358,498	\$158	\$153	18,885,182	\$14,730,394	\$188	\$121
12 Maintenance of equipment	73,849,923	55,295,506	317	239	36,507,811	27,687,767	317	219
13 Traffic	4,531,054	5,349,598	19	23	6,089,934	6,146,514	61	74
14 Transportation	159,106,420	1,331,665,905	645	53	73,187,840	61,666,514	731	623
15 Miscellaneous operations	2,982,641	2,681,119	13	11	1,886,137	1,197,678	19	19
16 General	8,565,106	7,782,183	37	34	3,798,392	4,454,000	37	39
17 Transportation for investment—Cr.	473,846	603,600	2	3	71,946	51,963	1	1
18 Railway operating expenses	\$83,428,186	\$229,028,419	\$3,117	\$899	\$155,330,831	\$116,807,871	\$3,088	\$1,872
19 Net revenue from railway operations	\$8,484,290	\$88,121,418	\$354	\$50	\$70,711,555	\$68,818,169	\$484	\$101
20 Railway tax accruals (excluding "War Taxes")	\$15,714,140	\$4,179,712	\$65	\$61	\$7,614,304	\$5,174,716	\$76	\$57
21 Uncollectible railway revenues	78,880	60,170	—	—	16,685	17,798	—	—
22 Railway operating income	\$9,308,270	\$73,881,536	\$339	\$37	\$62,970,766	\$63,525,735	\$308	\$494
23 Equipment rents	\$3,074,744	\$2,380,283	\$13	\$8	\$3,741,045	\$2,819,288	\$17	\$12
24 Joint facility rent (Dr. balance)	38,660	1,062,173	—	4	57,660	\$57,660	—	10
25 Net of items 23, 24 and 24	\$6,194,866	\$70,499,080	\$271	\$305	\$59,172,061	\$60,648,887	\$291	\$302
26 Ratio of operating expenses to operating revenues	77.46	72.1	—	—	88.5	76.94	—	—

Item	Southern District				Western District			
	Amount		Per mile of road operated		Amount		Per mile of road operated	
	1918	1917	1918	1917	1918	1917	1918	1917
1 Average number miles operated	4,209,94	4,273,04			10,093,47	10,033,13		
REVENUES:								
2 Freight	\$4,688,898	\$35,784,516	\$1,000	\$837	\$1,101,119	\$8,085,711	\$111	\$800
3 Passenger	13,178,153	12,482,335	707	276	3,012,488	4,064,865	66	401
4 Mail	7,308	790,690	17	1	672,664	666,860	1	1
5 Express	1,820,901	1,297,741	30	3	3,600,334	2,203,139	36	22
6 All other transportation	7,075,513	28,240,000	18	38	7,070,690	13,224,242	70	130
7 Incidental	1,272,745	2,222,110	3	4	3,531,311	2,967,111	35	29
8 Joint facility—Cr.	10,9374	71,131	—	—	108,770	706,400	—	—
9 Joint facility—Dr.	7,984	1,000	—	—	48,234	57,200	—	—
10 Railway operating revenues	\$6,156,708	\$89,930,009	\$1,404	\$1,395	\$16,043,006	\$24,731,725	\$1,404	\$1,395
EXPENSES:								
11 Maintenance of way and structures	\$7,146,461	\$3,577,111	\$170	\$110	\$2,274,012	\$1,044,787	\$166	\$107
12 Maintenance of equipment	73,387,515	8,461,217	1,718	1,8	3,012,488	1,177,711	1,718	1,8
13 Traffic	846,676	1,747,777	39	4	1,000,434	1,000,000	39	4
14 Transportation	18,77,707	163,977,777	100	270	1,000,000	1,000,000	100	270
15 Miscellaneous operations	300,000	300,000	—	—	300,000	300,000	—	—
16 General	1,100,000	1,174,891	20	2	1,000,000	1,000,000	20	2
17 Transportation for investment—Cr.	10,9374	89,131	—	—	—	—	—	—
18 Railway operating expenses	\$4,077,349	\$3,973,134	\$197	\$195	\$4,000,000	\$4,000,000	\$197	\$195
19 Net revenue from railway operations	\$2,079,359	\$85,956,875	\$1,207	\$1,200	\$12,043,006	\$20,731,725	\$1,207	\$1,200
20 Railway tax accruals (excluding "War Taxes")	\$1,16,167	\$3,108,284	\$5	\$80	\$1,16,167	\$3,108,284	\$5	\$80
21 Uncollectible railway revenues	—	—	—	—	—	—	—	—
22 Railway operating income	\$1,963,192	\$82,848,591	\$1,202	\$1,120	\$10,826,839	\$17,623,441	\$1,202	\$1,120
23 Equipment rents	\$4,227	\$1,100,000	—	—	—	—	—	—
24 Joint facility rent (Dr. balance)	38,660	1,062,173	—	4	57,660	57,660	—	10
25 Net of items 23, 24 and 24	\$1,924,505	\$81,746,418	\$1,202	\$1,116	\$10,769,179	\$17,565,781	\$1,202	\$1,116
26 Ratio of operating expenses to operating revenues	66.2	67.2	—	—	25.0	16.5	—	—

*Debit item.
 †Includes figures for Philadelphia, Baltimore & Western and L. O. S. Iron Mountain & Southern.
 ‡Wabash Pittsburgh Terminal.

Traffic News

Twelve miles an hour for over 35 hours is the speed record said to have been made recently by five loaded motor trucks from Akron, Ohio, westward to Chicago, 440 miles. The trucks arrived at Chicago in the evening, were unloaded and received east-bound loads, and started back the next morning.

The Wabash has discontinued the following trains: No. 6 leaving Chicago for Montpelier, Ohio, at 4:05 p. m., and No. 9 leaving Montpelier for Chicago at 6:30 a. m.; No. 3 leaving Detroit for Chicago at 3:15 p. m.; No. 13 leaving Detroit for Montpelier at 5 p. m., and No. 52 leaving Montpelier for Detroit at 7:45 a. m.

The Department of Agriculture reports that a commercial truck load of eggs was carried recently from Vineland and Millville, N. J., to New York city, about 140 miles, and was delivered with not one egg broken. Delivery from the shipper to the wholesaler was made in 15 hours. The 5-ton truck carried 150 crates of eggs weighing nearly 4 tons.

The North Pacific Coast lines have asked the Interstate Commerce Commission for authority to issue tariffs showing increased terminal charges on export freight. The proposal does not affect shipments (made in due season) for which government licenses have been issued and shipping space engaged, the purpose of the present action being to prevent congestion at the ports by freight for which necessary arrangements have not been made.

The freight traffic committee of the Railroad Administration for the Eastern territory announces that C. C. McCain, 143 Liberty street, New York city, will furnish information concerning through freight rates to and from points on railroads not reaching New York, in this function taking the place of the numerous offices heretofore maintained in New York city by Western and Southern roads. On westbound freight destined for shipment by steamship on the Pacific Ocean, Mr. McCain will issue export bills of lading, in exchange for the domestic bills of lading given by the Eastern railroads when the freight is forwarded.

Round trip passenger rates to the Pacific coast have been announced by the Railroad Administration, typical examples of which are:

New York to San Francisco.....	\$138.24
Boston to San Francisco.....	143.04
Baltimore to San Francisco.....	130.74
Washington to San Francisco.....	130.74
Pittsburgh to San Francisco.....	115.68
Chicago to San Francisco.....	87.60
Kansas City to San Francisco.....	72.60

These rates will go into effect on June 15 and the tickets will be good to return until October 31. The rates are about 20 per cent higher than those of last year.

Resolutions of Lumber Manufacturers' Association

The National Lumber Manufacturers' Association at its annual meeting at Chicago on May 21 adopted resolutions concerning minimum weights, weighing rules, and the bulkheading of lumber. The association opposes the plan of bulkheading lumber loaded on open cars, as proposed by a committee of the Master Car Builders' Association but approves the method of loading, as indicated by test car 90114, loaded under the auspices of the M. C. B. committee and the Southern Pine Association. It is believed that this last-mentioned method of loading is adequate to prevent shifting of load by ordinary handling. The association is opposed to the method of varying minimum weights according to the cubical capacity of cars, and favors a minimum of, for example, 34,000 pounds for cars under 36 feet long and 40,000 pounds for cars 36 feet long and over, provided that actual weights shall govern when cars are loaded to their full visible capacity, and that the minima applicable to the size of cars ordered shall be protected in the event cars of larger size are furnished by the carrier. Carriers are urged to accept the principle that lumber does not usually change in weight in transit, and that the initial weight should govern, except where reweighing shows a palpable error. The lumbermen desire that

carriers in Southwestern and Western Trunk Line territory shall become parties to the national code of weighing rules, whereby it becomes incumbent upon them to notify shippers of changes in weights en route.

Time for Paying Freight Bills

A large delegation of commercial traffic managers headed by G. M. Freer, president of the National Industrial Traffic League, protested vigorously to C. A. Prouty, director of the division of public service and accounting, on May 27, against some of the provisions of General Order No. 25, establishing a 48-hour credit basis for the payment of freight charges. They contended that payment within 48 hours would mean duplication of work in connection with the handling of claims for overcharges, and that both shippers and carriers would have to increase their clerical forces to carry out the plan. They suggested a period of one week instead of 48 hours. The principal point made by the shippers was that correct freight bills cannot be rendered within 48 hours, and that sufficient time is not allowed for checking by the shipper. Arrangements were made for further discussion of the subject in a conference of accounting officers and representatives of the shippers.

Coal Production

Production of bituminous coal during the week ended May 25 equalled and even slightly exceeded the record week of May 11, according to the Geological Survey report. The output of soft coal, including lignite and coal made into coke, during the week ended May 25 is estimated at 11,811,000 net tons, an increase of approximately 100,000 net tons over the production of the preceding week. The average production per working day is estimated at 1,968,000 net tons as against 1,952,000 net tons during the week previous and 1,829,000 net tons in May, 1917. Anthracite shipments fell off slightly during the week of May 25, amounting to 40,752 cars, against 41,011 during the week of May 18.

A Coal-Loading Record

A world's record was made, according to a report to Director General McAdoo in loading coal on the steamer "Tuckahoe," which docked at the Baltimore & Ohio Curtis Bay Pier, Baltimore, at 9:15 a. m., May 25, and started loading at 9:15 a. m., finished loading at 11:55 a. m., finished trimming at 12:05 p. m. and sailed at 2:10 p. m., having loaded in 2 hours and 55 minutes 4,992 tons, or 108 cars of bituminous coal for New England ports. The steamer was built by the United States Shipping Board, having been launched in 27 days and started on its cruise in 35 days, another world's record.

Extensive Thefts of Silk

The Silk Association of America has issued a statement in which it is declared that since January 1, 1918, thieves have operated 184 times in the New York and New Jersey districts, stealing parcels or bales of silk worth at least \$1,500,000. The war time price of silk has resulted in the organization of bands of thieves that rob lofts, express company stations and railroad cars night and day. Dealers and burglary insurance companies have been requested to be on the alert for the stolen silk, complete descriptions of which are furnished. The Erie Railroad alone is said to have suffered to the extent of about \$750,000; and other roads report thefts proportionally large. It is believed that much of the thieving is done by railroad employees, yardmen and switching men, who rob cars at night, conceal the loot and then get rid of it through confederates and "fences."

In Paterson one night last week a band of thieves backed a wagon up to a silk warehouse, removed bales of silk containing 14,000 yards, worth \$1 a yard, got away without detection and rushed the goods to a dye house, where they were changing to color from pink to black when discovered.

Every important silk manufacturing concern or dealer in the New York district has suffered heavily. The list of robberies, with details of stolen goods, covers fifteen closely typewritten pages.—*New York Sun*.

Commission and Court News

Personnel of Commissions

William A. Magee, of Pittsburgh, has been appointed a member of the Pennsylvania Public Service Commission.

Court News

Consignors' Liability for Freight Charges

In a suit brought by a railroad against the consignors and the consignee it was shown that 36 carloads of hay were shipped from Newport, Neb., to South Omaha, I. o. b. The hay was delivered to the Union stockyards Company on the consignee's order and without collecting the freight charges. The consignee became insolvent. The Nebraska Supreme Court held that the consignors were liable for the legal freight charges with the consignee.—*Chicago & N. W. v. Queenan (Neb.)*, 167 N. W., 410. Decided April 12, 1918.

Overcharges and Undercharges

The federal district court for the Southern District of California holds, citing decisions of the United States Supreme Court and other jurisdictions in regard to other statutes, that under the California Public Utilities Act, if a rate be charged or collected different from the one published in the tariff a refund may be had in the case of an excess, or a recovery of the difference in case of an undercharge. No mistake of fact, or special practice, engagement, or understanding of the parties, will suffice to change this general rule.—*In re Independent Sewer Pipe Co.*, 248 Fed., 547. Decided March 4, 1918.

Rights of Purchaser of Railroad

The Ohio Supreme Court holds that where a railroad company organized under the laws of that state, with authority to exercise the sovereign power of the state, has built and operated as a common carrier a line of railroad, portions of which are along and across public highways or other railroads, the railroad becomes impressed with a public interest. A purchaser of it, either at judicial sale or otherwise, has no right to operate it for his own private purposes or the purposes of those with whom he may privately contract, to the exclusion of the public.—*State v. Black Diamond Co. (Ohio)*, 119 N. E., 195. Decided November 13, 1917.

Connecting Railroads—Penalty for Delay

The South Carolina Supreme Court holds that the state statute making connecting carriers agents of each other and liable for damages caused by delays occurring on connecting lines with a right of action against the carrier at fault does not render a railroad liable under a statute penalizing delays where the delay occurred on the line of a connecting carrier. It would not be a reasonable construction to hold that the carrier which was not in default could be held responsible for loss, damage and injury to the property which it could recover and also for a penalty which it could not recover.—*Marion Cotton Oil Co. v. Atlantic Coast Line (S. Car.)*, 95 S. E., 536. Decided March 8, 1918.

Webb-Kenyon Act in Oklahoma

The Oklahoma Constitution and Laws forbid the manufacture and sale of intoxicating liquors in that state. The Circuit Court of Appeals, Eighth Circuit, holds that as the purpose of the Webb-Kenyon Act was to remove from the protection of interstate commerce all shipments of liquor into those states, territories, or districts where the manufacture or sale thereof is unlawful, and to render the state law applicable, the interstate shipment of intoxicating liquor into the state of Oklahoma is unlawful, and a common carrier cannot be engaged from refusing to receive such shipments. Interstate shipments of intoxicating liquor into por-

tions of Oklahoma which formerly were comprised in an Indian reservation are not authorized because the Indian titles have been extinguished.—*Missouri, K & T. v. Danciger*, 248 Fed., 36. Decided December 27 1917.

Res Ipsa Loquitur

The doctrine of *res ipsa loquitur* means that the circumstances connected with an accident are of such an unusual character as to justify, in the absence of other evidence, the inference that the accident was due to negligence. A locomotive boiler explosion was caused either by the engineer's negligence in admitting cold water into the boiler or the railroad's failure to repair the locomotive. In an action by the engineer for injuries caused by the explosion, the New York Court of Appeals holds that the plaintiff had the burden of proving that the accident was due solely to the second cause, and the rule of *res ipsa loquitur* did not shift that burden. *Francy v. Rutland (N. Y.)*, 119 N. E., 82. Decided February 12, 1918.

Passenger on Shipper's Pass—Contributory Negligence

One who was traveling on a shipper's pass accompanying stock being carried to market got off the caboose at a station where the train was stopping, and while waiting at the station was ordered or directed by the station agent and a brakeman to take a key and deliver it to a trainman at the cattle pens and to ride back on that part of the train. He voluntarily obeyed the order or direction, and while getting upon the side of a car to ride back was caught between the side of the car and the cattle chute and received injuries from which he died. The Kansas Supreme Court holds that as he voluntarily placed himself in a position of obvious danger and was not engaged in looking after or caring for the stock in his charge, the railroad was not liable in an action to recover for his death.—*Shore v. Atchison, T. & S. F. (Kan.)*, 171 Pac. 612. Decided March 9, 1918.

Notice of Arrival of Shipment

One who delivers property to a carrier consigned to himself at a place where he does not reside and has no representative or place of business, is bound to put himself in a position to receive notice, and, failing to do so, cannot be heard to complain that notice was not given. A consignor in Monte, Wash., shipped a carload of apples to himself at Crosby, N. D., with directions to stop for partial unloading at Kenmare, N. D. The party with whom the consignor had made arrangements to care for the apples at Kenmare knew of their arrival and found them in good condition when he made inspection. The Washington Supreme Court, in an action for damages alleging failure to properly care for the shipment, holds that, as the party at Kenmare was the consignor's agent for purposes of receiving notice, the railroad's failure to notify the consignor of the arrival of the shipment at Kenmare would impose no liability, notice to the consignor being unnecessary. The railroad's duty thereafter was that of a warehouseman.—*Rosenbaum v. Northern Pacific (Wash.)*, 172 Pac., 238. Decided April 18, 1918.

Discrimination as to Switching Charges

The Illinois Supreme Court holds that it is a discrimination against shippers, within the prohibition of the State Public Utilities Act, for a railroad having the line haul to absorb the switching charges of cars delivered to it by certain roads, while refusing to absorb those on cars delivered by other roads, the only difference in the situation being that some of the roads are steam and the others electric. As the shipper, and not the connecting carrier, is the one affected, this is not a matter for contract between the roads.—*Commission v. Illinois Central (Ill.)*, 119 N. E., 264. Decided April 17, 1918.

Section 52 of the Illinois Public Utilities Act provides that the Public Utilities Commission shall have power to enforce reasonable regulations for the weighing of cars and freight. The Illinois Supreme Court holds that this provision is inconsistent with, and therefore impliedly has repealed the prior state statute requiring railroad companies to install track scales on demand of shippers at stations from which a required amount of grain is shipped.—*Commission v. Cleveland, C. C. & St. L. (Ill.)*, 119 N. E., 310. Decided April 17, 1918.

Equipment and Supplies

Government Cars and Locomotives

The central purchasing committee of the Railroad Administration is still meeting representatives of the specialty manufacturers and is distributing the orders for the equipment of the cars and locomotives ordered by the government. Most of the contracts have been decided upon in the case of the locomotives and the committee is working this week on the car specialties and some of those for the locomotives which have not yet been settled. It is expected that all of the orders will have been placed by the end of this week.

It is reported that orders for 392,000 axles for the cars have been awarded as follows: 95,000 to the Carnegie Steel Company, 84,000 to the Illinois Steel Company, 149,000 to the Pollak Steel Company, 16,000 to the Laclede Steel Company, 18,000 to the Pittsburgh Forge & Iron Company and 30,000 to the Midvale Steel Company.

Contracts for the draft gear for the 100,000 cars have also been distributed as follows: Sessions, 50,000; Westinghouse, 20,000; Cardwell, 15,000; Miner, 10,000, and Murray, 5,000.

Freight Cars

A. J. OLIVER, Houston, Tex., is inquiring for tank cars.

THE UNITED STATES WAR DEPARTMENT is inquiring for 100 40-ton tank cars.

THE INDUSTRIAL MANUFACTURING COMPANY, New Orleans, La., wants to rent three to six tank cars.

THE OKLAHOMA PETROLEUM & GASOLINE COMPANY, Tulsa, Okla., is inquiring for 100 to 200 10,000-gal. tank cars.

Miscellaneous

FOREIGN TRADE OPPORTUNITIES.—Commerce Reports for May 31 contains the two following foreign trade opportunities. Information concerning them may be obtained from the office of the Bureau of Foreign and Domestic Commerce at Washington or from any of its district and co-operative offices.

27012.—A railway company in Spain desires to purchase 2,000 tons of steel railroad rails about 10 meters in length, weighing from 20 to 30 kilos per meter, and profile of section to follow as closely as possible to that shown in drawing, which may be examined at the Bureau or its district offices. (Refer to file No. 100525.) It also wishes to purchase all secondary material, such as plates, spikes, etc. Quotations may be made f. o. b. New York. Payment will be made by cash against documents or to suit seller. Correspondence should be in Spanish. Reference.

27016.—A French firm in England wishes to purchase locomotives, trucks, carriages, wagons, etc., for railways, new or second-hand. Is also open to any agency proposition. Reference.

Signaling

THE RICHMOND, FREDERICKSBURG & POTOMAC has placed an order with the Union Signal Construction Co. for the complete installation of an electro-pneumatic interlocking at Acca Wye, Richmond, Va.; a 57-lever machine including 6 spare spaces. The switches will be operated by Model 14 electro-pneumatic movements, equipped with Style "C" switch valves. A. C. track circuits will be provided throughout. The material is being furnished by the Union Switch & Signal Company.

THE NEW YORK, NEW HAVEN & HARTFORD has ordered from the Union Switch & Signal Company the material for an electro-pneumatic push button machine for the operation of the switches and signals at the new Cedar Hill Classification yard, New Haven, Conn. The machine has 42 units for switch operation, 2 for signal operation and 4 spare spaces. The switches will be operated by direct acting electro-pneumatic switch movements with direct current track circuits provided for detector locking.

Supply Trade News

The United States Metallic Packing Company, Philadelphia, has moved its offices in that city to 221 North Thirteenth street.

Lloyd H. Atkinson has resigned his position as president of Atkinson & Utech, Inc., to become vice-president of the Air Reduction Company. He will, however, continue to serve on the board of directors of Atkinson & Utech, Inc. John J. Utech has been elected president to succeed Mr. Atkinson, and I. W. Glasel has become secretary and treasurer of the same company.

Joseph W. Weinland, sales manager of the brake beam department in the Chicago office of the American Steel Foundries, has been appointed district manager of the

Liberty Steel Products Company, with headquarters at Chicago. Mr. Weinland was born at Chatsworth, Ill., on December 13, 1877. In 1902, he entered the service of the Western Steel Car & Foundry Company, as assistant purchasing agent. A considerable part of his time was spent on the Pacific coast, purchasing lumber to be used in the building of cars. Later he was promoted to purchasing agent of the Anniston, Ala., shop. For a period of five years following 1907, he was engaged in the construction and sale of 50 houses at Burnham, Ill. In 1912 he re-entered the railway supply field with the American Steel Foundries as sales manager in the brake beam department, which position he held until his recent appointment, as mentioned above.

Charles A. McCune, for 12 years connected with the Commercial Acetylene Company of 80 Broadway, New York, has resigned to accept the position

of sales engineer with the Page Steel & Wire Company, 30 Church street, New York. Mr. McCune was born in Jersey City, N. J., in 1879, and before entering the acetylene field was for several years connected with the Safety Car Heating & Lighting Company. He left in 1906 to take up the duties of assistant engineer with the Commercial Acetylene Company and since then has been actively engaged in this industry, his work in the greater part being devoted to the development and application of dissolved or compressed acetylene.

In 1908, he perfected the first successful inverted acetylene burner and mantle for railroad car lighting purposes; this system being partly used on the Delaware, Lackawanna & Western until a few years ago, when the road practically went over to electric lighting. In 1916, Mr. McCune became chief engineer of the Commercial Acetylene Company. Mr. McCune will



J. W. Weinland



C. A. McCune

he succeeded by David Ahldrin, who was formerly connected with the A-G-A Company and also the Commercial Acetylene Company.

Walter J. Cummings, vice president of the McGuire Cummings Manufacturing Company, Chicago, has been elected president, succeeding John J. Cummings, deceased.

The Parkersburg Iron Company announces the following changes among its resident sales managers, effective June 1, 1918: R. J. Sheridan, New York and G. W. Denyssen, Boston, after July 1, 1918; J. A. Kirkhead, San Francisco. The other selling representatives remain the same as at present.

Frank Lucas DeArmond, who for a number of years has been an officer of the Protectus Paint Company, Philadelphia, has severed his connection with that company for the duration of the war, having been appointed a captain in the quartermaster's corps, construction division.

The Dayton Manufacturing Company, Dayton, Ohio, announces the election of the following officers at its recent annual meeting: J. Kirby, Jr., president and general manager; N. Emmons, Jr., vice-president and assistant general manager; J. Leidenger, second vice-president, and H. D. Hendrick, secretary and treasurer.

The election of Stephen C. Mason, secretary of the McConway & Torley Company of Pittsburgh, as president of the National Association of Manufacturers, announced in last week's issue, is of more than ordinary interest to the railway and railway supply field, because Mr. Mason's entire business career has been confined to some branch of railroad work. He began on November 10, 1880, as a station agent in his home town, Lyndonville, Vt. As soon as he took up the work he learned telegraph operating, and before he was 20 years old was called to the headquarters of the Connecticut & Passumpsic Railroad, and made local freight agent at the headquarters of the division. After a few months' service there he was taken into the superintendent's office and made his private secretary. After the creation of the Interstate Commerce Commission, Mr. Mason applied for and secured a position with that body in Washington first in the office of the auditor of the commission, where he had charge of the tariffs filed by the railroad companies. Upon the creation of the division of statistics, of which Professor Henry C. Adams was the head, Mr. Mason was placed in that department, and remained there until 1896, when he occupied the position of assistant statistician. At that time he was offered a position with the McConway & Torley Company of Pittsburgh, which he accepted in January, 1896, and in whose service he has been continuously ever since. He has served in various capacities. His first experience was gained as a traveling representative, after which he acted as assistant to the superintendent of the plant, thus gaining a practical experience in the manufacturing operations. Later he was designated assistant to the president, in office which he held until the death of Charles B. Krauth, when he was elected secretary of the company, and some two or three years later made a member of the board of directors.



S. C. Mason

Alfred R. Miller, treasurer of the Canadian Westinghouse Company, Hamilton, Canada, died at his home in that city, April 28. His whole business life was devoted to the interests of the Westinghouse Company. He entered their service as bill clerk in 1897, was promoted consecutively to head bookkeeper in 1903, acting assistant treasurer in 1904, assistant treasurer in 1907, and treasurer in 1917.

Alb's-Ch In.crs Manufacturing Company

The net income of the Alb-Chadwick Manufacturing Company, Milwaukee, Wis., for the year 1917 was \$4,010,490.51, compared with \$3,167,020.21 for the calendar year 1916. The comparative earnings by quarters for the last two years are as follows:

	1917	1916	1915
First quarter	1,000,000.00	750,000.00	1,000,000.00
Second quarter	1,000,000.00	750,000.00	1,000,000.00
Third quarter	1,000,000.00	750,000.00	1,000,000.00
Fourth quarter	1,000,000.00	750,000.00	1,000,000.00
Total	4,000,000.00	3,000,000.00	4,000,000.00

The large volume of business now on order, the company's annual report states, insures the utilization of stocks of materials at present on hand. The company has continued to establish liberal reserves to cover the contingencies of operation. The larger production requiring more intensive operation, and the bringing into service of machines and equipment unused for some time together with expenditures designed to increase efficiency in manufacture, have resulted in increased expenditures for maintenance and larger reserves for depreciation. The amount expended during the year for maintenance, renewals and general upkeep of plant and equipment was \$1,889,603, all of which amount has been charged to the cost of manufacture. In addition to this sum there has been set aside for depreciation of plant and machinery and charged to cost of manufacture a total amount of \$841,908.

Reserves have been set aside before the determination of profits, which it is estimated will meet all requirements for taxes. Development expenditures for drawings, patterns, tools and experiments designed to improve and broaden the present lines of manufacture and to provide for new lines have aggregated \$251,257. These expenditures have been charged to the cost of manufacture.

In 1917 four dividends of 2 1/2 per cent each were declared on the preferred stock; this is a total of 10 per cent for the year, of which 7 per cent was for regular dividends and 3 per cent was to apply on account of accumulated dividends. After these payments there remained 7 per cent in arrears on accumulated dividends on the preferred stock. The book surplus at the close of the year 1917, after deducting dividends paid and declared, was \$5,463,604.

To provide for the delivery of the largely increased volume of business, it has been necessary to expend larger amounts than usual for plant improvements. These expenditures, aggregating \$1,187,500 consisted principally of additions to equipment and extensions to plant buildings. A large portion of the additional equipment was built in the company's shops, and the extensions to plant have been along lines contemplated in the original plans.

The net working capital of the company as of December 31, 1917, comprising cash, receivables, marketable securities, and current inventories, less accounts payable, payrolls, dividends and taxes accrued and other current obligations, amounted to \$16,431,546, as compared with \$13,831,163 on December 31, 1916, an increase of \$2,600,383 for the year. While offering our services and available equipment to the government, and co-operating in every way possible in the government's program connected with the successful prosecution of the war, the company has accumulated its regular customers and continued to extend its regular lines of manufacture to the fullest extent possible under the present status. The volume of business on hand on December 31, 1917 was \$27,087,251, an amount substantially in excess of the made orders on hand at any time of the previous history of the company.

Income Statement for Year Ended December 31, 1917	
Sales (including interest on investments)	\$10,000,000.00
Cost of materials and labor	(6,000,000.00)
Manufacturing plant	(1,000,000.00)
Other expenses	(1,000,000.00)
Interest on investments	(100,000.00)
Total	(9,100,000.00)
Net income	\$900,000.00

Financial and Construction

Railway Financial News

ALABAMA, TENNESSEE & NORTHERN.—The United States District Court at Mobile, Ala., on May 20 issued a decree of sale of this road which has been in the hands of receivers since November 22, 1915.

CANADIAN NORTHERN.—The Board of Arbitration appointed to fix a value for the \$60,000,000 capital stock of this company, not previously owned by the Dominion Government, and now acquired or authorized to be acquired by it, gave out its decision May 26. On the basis that the depreciated value of assets exceeds the liabilities by not less than \$25,000,000 (contrasting with the company's figures of \$85,000,000 and the government counsel's \$22,000,000), and having given consideration also to the prospective earning capacity of the system, the arbitrators conclude that the \$60,000,000 stock October 1, 1917, was worth \$10,800,000. The Act of Parliament, however, limits the award to not exceeding \$10,000,000.

CHICAGO, MILWAUKEE & ST. PAUL.—The directors met on May 29, but again took no action on the dividends which were due March 1. This is the fifth successive monthly meeting which has occurred without any decision on the semi-annual dividends due last March. Failure of the directors to take action on either the preferred or common dividends which would normally have been declared in January, combined with the facts that the company's articles of association prohibit payments of dividends for any period during which they were not earned and that the St. Paul's profits last year were equivalent to only \$3.85 a share on the preferred stock, or little more than enough to meet the semi-annual payment made last September, make it seem probable that no further dividend on either stock can be declared out of 1917 earnings. This does not, however, mean that, with the conclusion of the contract with the Government, now under negotiation, regular dividend on the preferred, at any rate, may not be paid in future. The next meeting of the board will be held on June 27 when it is expected that some action will be taken on the dividend question provided the contract with the government is signed in sufficient time.

NATIONAL RAILWAYS OF MEXICO.—Rafael Nieto and Mario Mendez have been appointed chairman and vice-chairman, respectively, of the board of directors. Mr. Nieto will act as executive president of the company succeeding Alberto J. Pani, resigned.

NEW YORK, NEW HAVEN & HARTFORD.—See editorial comments elsewhere in this issue.

Railway Construction

CANADIAN GOVERNMENT RAILWAYS.—Plans are being made to carry out work on the western lines during the next year as follows: District No. 2, double 16-ft. reinforced concrete culvert and fill to replace pile trestle at O'Brien, Superior district, mile 30.2, to cost about \$45,000; district No. 3, main line, 8-ft. by 10-ft., stream tunnel and fill to replace timber trestle at Winnipeg, Superior district, mile 47.1, to cost about \$60,000; district No. 3, 50-ft. deck plate girder and fill to replace timber bents, Grand Trunk Pacific branch, Fort William, Superior district, mile 27.7, to cost about \$22,500, and 10-ft. by 10-ft. stream tunnel and fill to replace timber bents at Fort William, Superior district, mile 41.3, to cost about \$59,000; double 16-ft. reinforced concrete culvert and fill to replace timber bents at Raith, Superior district, mile 118.1, to cost about \$52,500, and 10-ft. by 10-ft. stream tunnel and fill to replace timber bents at Raith, Superior district, mile 124.4, to cost about \$30,000.

CLOCKS IN RUSSIA ADVANCED TWO HOURS.—Beginning May 31, clocks throughout Russia were advanced two hours in order to save light and fuel.

Railway Officers

Executive, Financial, Legal and Accounting

Bond Anderson, freight claim agent of the Southern Railway, with office at Atlanta, Ga., has been appointed assistant comptroller, with office at Cincinnati, Ohio, vice **E. Miller**, resigned.

William Kissam Vanderbilt, Jr., vice president of the New York Central Lines, with headquarters at New York, has been elected president, to succeed **A. H. Smith**, who has



W. K. Vanderbilt, Jr.

resigned because of his position as regional director. Mr. Vanderbilt was born on October 26, 1878, at New York, and was educated at Berkeley, St. Mark's and Harvard College. He began railway work in December, 1903, with the New York Central & Hudson River under vice-president **W. J. Wilgus**. Upon the acquisition by the New York Central of the majority ownership of certain trolley lines of the Mohawk Valley Company, in 1905, he was made vice-president of the Mohawk Valley Company and other subsidiary trolley lines. In July, 1910, he was appointed assistant to the president of the New York Central & Hudson River, and on March 7, 1912, was elected vice-president of the New York Central Lines. In January, 1914, he was made a member of the finance committee.

Charles Augustus Peabody, president of the Mutual Life Insurance Company of New York, has been elected president of the Illinois Central to succeed **C. H. Markham**, who has resigned because of his position as regional director. Mr. Peabody does not pretend to have any special knowledge of railway operation and has taken the office temporarily to look after the corporate interests and tide over the present period of transition. Mr. Peabody was born on April 11, 1849, at New York, and is a graduate of Columbia University. He is also a vice-president and a member of the board of managers of the Delaware & Hudson; a director of the Illinois Central, the Union Pacific, the New York & Harlem, the Baltimore & Ohio, and Wells Fargo & Co.



C. A. Peabody

Operating

W. P. Lamb, chief clerk in the Chicago office of **A. H. Smith**, president of the New York Central, has been promoted to assistant superintendent of the western division, with headquarters at Chicago, succeeding **E. W. Brown**, effective May 15.

J. R. Banks has been appointed trammaster of the Coal & Coke, with office at Charleston, W. Va., vice R. E. Samples, resigned

A. E. Pistole, trammaster on the Texas & Pacific at Marshall, Tex., has been promoted to superintendent of the Rio Grande division, with headquarters at Big Springs, Tex., succeeding W. M. Kent, transferred to Ft. Worth, Tex., in place of W. H. DeFrance, transferred, effective June 1.

Earl W. Brown, assistant superintendent of the western division of the New York Central, with headquarters at Chicago, whose promotion to superintendent at Alliance, Ohio, was announced in the *Railway Age* on May 31, was born on April 7, 1871. He began his railway career on June 5, 1887, as a track laborer on the Lake Shore & Michigan Southern, following which he was freight brakeman, car tracer and clerk in the trammaster's office. On November 15, 1902, he was appointed yardmaster, and subsequently became assistant trammaster and trammaster. On December 15, 1913, he was appointed assistant superintendent of the western division of the New York Central lines at Chicago, which position he held until his recent promotion, as mentioned above.

Edward Clemens, chief clerk to general manager of the Terminal Railroad Association of St. Louis, has been promoted to superintendent of car service, succeeding W. T. Aylesbury, assigned to other duties. Mr. Clemens was born in St. Louis County, Mo., in 1884, and began his railroad career as a messenger in the freight department of the Terminal Railroad Association of St. Louis, 17 years ago. He was chief clerk in the traffic department of that road for a number of years, and from that position was advanced three years ago to chief clerk to the general manager. Mr. Clemens' promotion to superintendent of car service of the Terminal Railroad Association of St. Louis was effective on May 22.



E. Clemens

J. E. Snedeker has been appointed superintendent of the Wichita division of the Missouri Pacific, with headquarters at Wichita, Kan., and M. McKernan, acting superintendent at that point, has been appointed superintendent of the southern Kansas division, with headquarters at Coffeyville, Kan., succeeding R. G. Carden, effective June 1.

Pocahontas Region

In Circular No. 1, issued under date of June 1, N. D. Maher, regional director of the Pocahontas Region, announces the appointment of three federal managers, covering the roads included in the Pocahontas Region, as follows:

George W. Stevens, president of the Chesapeake & Ohio, as federal manager of the Chesapeake & Ohio east of Louisville, Ky., Columbus and Cincinnati, Ohio, including the Chesapeake & Ohio Northern, with office at Richmond, Va.

A. C. Needles, vice-president of the Norfolk & Western, as federal manager of the Norfolk & Western, including the Virginia & Carolina Railway and the New River, Holston & Western, with office at Roanoke, Va.

J. H. Young, president of the Norfolk Southern, as federal manager of the Virginian Railway, with office at Norfolk, Va.

Until further notice, the terminals of all railroads at Norfolk and Portsmouth and the Norfolk & Portsmouth Belt Line Railway will be under the jurisdiction of the federal manager of the Norfolk & Western. Terminals at Newport News will be in charge of the federal manager of the Chesapeake & Ohio.

In Circular No. 2, Mr. Maher also announces the following appointments:

T. S. Davant, vice president of the Norfolk & Western, as the traffic assistant of the regional director, and of D. E. Spangler, general superintendent of transportation of the Norfolk & Western as transportation assistant to the regional director. Both will have offices at Roanoke, Va.

Traffic

J. H. Mara has been appointed industrial commissioner of the Missouri Pacific, with headquarters at St. Louis, effective June 1, succeeding D. E. King, deceased.

W. P. Behen, general agent of the Cincinnati, Indianapolis & Western, at Chicago, has left the service of that company to go with the Liberty Steel Products Company, as sales agent, with headquarters at Chicago.

Following the elimination of certain passenger and freight traffic positions recently by the Railroad Administration, the Chicago & Aton has made the following appointments, effective May 28: Barth Reidy, general agent at Indianapolis, Ind., has been appointed district traffic agent, at Kansas City, Mo.; James Mann, district freight agent, at Springfield, Ill., has been appointed district traffic agent, at Springfield; S. B. Wade, general agent, at Little Rock, Ark. has been appointed district traffic agent, at Bloomington, Ill.; C. E. Norris, division freight and passenger agent, at Mexico, Mo., has been appointed district traffic agent at Mexico; E. C. Meyer, general agent, at Milwaukee, Wis., has been appointed district traffic agent at Chicago. Will G. Howard, general agent, at Pittsburgh, Pa., has left the service.

Engineering and Rolling Stock

John Vass, road foreman of engines of the Grand Trunk, at Battle Creek, Mich., has been appointed assistant master mechanic of the Ontario lines, with headquarters at Allandale, Ont., in place of J. R. Donnelley, retired.

E. W. Smith, who has been appointed superintendent of motive power of the Central division, of the Pennsylvania Railroad, with office at Williamsport, Pa., as has already been announced in these columns, was born at Charlesburg, W. Va., on September 21, 1885. He is a graduate of the Virginia Polytechnic Institute, and he entered the service of the Pennsylvania Railroad on August 1, 1906, as a special apprentice. On July 26, 1909, he was made motive power inspector, was advanced to motive power foreman on September 1, 1912, and on October 15, 1913, he was appointed assistant master mechanic at the Altoona machine shops. On July 1, 1916, he was advanced to assistant



E. W. Smith

engineer of motive power in the office of the general superintendent of motive power at Altoona, and on October 10, 1917, he received his appointment as master mechanic of the Philadelphia division, with office at Harrisburg, which position he held at the time of his recent appointment as superintendent of motive power of the same road as above noted.

Railway Officers in Government Service

P. E. Hennessey has been appointed joint livestock agent at the National Stock Yards district, East St. Louis Ill.

George R. Loyall, assistant vice president of the Southern Railway, has been appointed assistant to B. L. Winchell, Regional Director of the Southern district, with office at Atlanta, Ga.

Thomas L. Lipsett, district passenger agent of the Pennsylvania Railroad, with office at Washington, D. C., has been appointed by the Railroad Administration as district passenger agent representing the Washington terminal lines, with office at Washington.

George Hodges, who has been appointed manager of the troop movement section of the division of transportation of the Railroad Administration, with office at Washington, D. C.,

was graduated from St. Paul's School at Concord, N. H., and entered railway service in 1886 with the Erie. He remained with that road until 1903 when he entered the service of the Baltimore & Ohio. In 1908 he was appointed assistant agent for the receivers of the Seaboard Air Line. At the expiration of the receivership in 1910, he took up the work of the Special Committee on Relations of Railway Operation to Legislation, which was then under the chairmanship of the late F. O. Melcher, vice-president of the Chicago, Rock Island & Pacific, and in 1912 he became secretary and treasurer of that committee, and also assistant general agent of the American Railway Association, with headquarters in Chicago. In April, 1916, he was elected chairman of the Committee on Relations between Railroads, of the American Railway Association, and in this position he was also chairman of the Per Diem Rules Arbitration Committee, and chairman of the American Railway Association Committee on Weighing and on the Marking, Packing and Handling of Freight.

R. Walton Moore, of Washington, D. C., and Fairfax, Va., who for many years has been special counsel for most of the southern railway and steamship companies as their representative in matters before the Interstate Commerce Commission and in litigation growing out of commission proceedings, has been appointed assistant general counsel of the United States Railroad Administration in charge of affairs before the commission. Mr. Moore was born in Fairfax, Va., and graduated from the Episcopal High School of Alexandria, Va., and from the University of Virginia. He began the practice of law at Fairfax and is still nominally member of a firm in Fairfax which has a large practice. He has been one of the leading lawyers of Virginia, and had represented various steam and electric railways in northern Virginia in connection with his general practice, when in October, 1907, he was appointed assistant special counsel for the southern railway and steamship lines as assistant to Judge Edmund Baxter of Nashville. Six years ago, on the death of Judge Baxter, he was appointed special counsel, and his firm has been one of the most prominent in this class of work. Mr. Moore for a time was a member of the state senate of Virginia; was a presidential elector on one occasion, and was chairman of the legislative



George Hodges



R. W. Moore

committee of the state constitutional convention, which framed the constitution of Virginia in 1902. He served for several years as a member of the Board of Visitors of the University of Virginia, and of William & Mary College, and was for a time president of the Virginia State Bar Association.

G. H. Parker, assistant comptroller of the Philadelphia & Reading Railway, has been appointed assistant to **Walker D. Hines**, assistant director general of railroads, with office at Washington, D. C.

H. B. MacFarland, engineer of tests of the Atchison, Topeka & Santa, at Chicago, and **G. M. Davidson**, chemist and engineer of tests of the Chicago & North Western, at Chicago, have been appointed members of the inspection and test section of the United States Railroad Administration for the western railroad region. Mr. MacFarland has also been assigned to one of the 18 districts which have been created for the inspection and testing of materials which will be used in the construction of the car and locomotive equipment recently ordered by the Government. His district will comprise southern Ohio and the territory tributary to St. Louis. **F. Zeleny**, engineer of tests of the Chicago, Burlington & Quincy, has also been assigned to this work for the district comprising Chicago and surrounding territory.

Obituary

Charles E. Benton, formerly general attorney for the Missouri Pacific, at Ft. Scott, Kan., died at his home in Los Angeles, Cal., on February 23. Mr. Benton was born at Astoria, Ill., on December 12, 1857. After graduating from the high school at Lewiston, Ill., he studied law and later was admitted to the bar, after which he went to Iola, Kan., where he engaged in the general practice of law. There he served two years as county attorney. In 1884, he was appointed assistant attorney of the Missouri Pacific for southern Kansas, and in 1890 was transferred to Ft. Scott, Kan. He was later appointed general attorney, to succeed **J. H. Richards**, and served in that capacity until January 1, 1914, when he resigned on account of failing health. Since that time he resided at Los Angeles, Cal.

Col. Joseph Harvey Richards, formerly general attorney of the Missouri Pacific, at Ft. Scott, Kan., died in that city on April 17. Colonel Richards was born at Spencer, Kan., on April 7, 1844. He received his education at Wabash College and read law with Gen. Lew Wallace. In the early eighties Colonel Richards was appointed general attorney for the Missouri Pacific at Ft. Scott. He served that company in this capacity for a period of 26 years, and during that time he was also receiver of the St. Louis, Ft. Scott & Wichita, and directed the construction of the lines between Wichita, Kan., and Hutchinson, and between Eldorado, Kan., and McPherson. In addition, he was president of the construction company which built the Missouri Pacific branches from Ft. Scott to Rich Hill, Mo., and from Ft. Scott to Pittsburg, Kan. Several years ago Colonel Richards was forced to retire on account of failing health, and at that time was succeeded by Charles E. Benton, whose death is also announced in this issue.

OPERATION OF ALGERIAN RAILROADS.—Algeria has a total of 2,320 miles of railroad, of which 1,513 are State owned and 807 miles privately owned. The former are not only owned, but are operated and maintained by the Government and the profits are turned into the national treasury. With regard to the private lines, the Government guarantees the interest charges and controls the traffic. The total receipts of the State lines in 1916 amounted to \$6,228,755 and of the private lines \$5,302,557.—*Commerce Reports.*

TRAFFIC ON NEW ZEALAND RAILROADS IN 1917.—The New Zealand railways for 1917 carried 14,173,115 passengers, as compared with 14,201,506 for 1916, of whom 355,832 passengers traveled on season tickets, as compared with 330,622 for 1916. During the year there were 6,239,172 tons of freight carried, as compared with 6,370,946 tons for 1916. This was accomplished notwithstanding the considerable reduction in the number of trains run and the increased passenger and freight rates.—*Commerce Reports.*

EDITORIAL

Railway Age

EDITORIAL

The report of the standing committee on disbursement accounts of the Association of American Railway Accounting

Mechanical Office Devices

Officers, which is published in part elsewhere in this issue, is the most comprehensive discussion of the use of mechanical devices in disbursement accounting that has ever been put on record so far as we know. There were two other reports, one on the use of mechanical devices in passenger accounting and one on the use of mechanical devices in freight accounting, both of which are worthy of careful study, but are not printed in our report of the meeting because of a lack of space and of a certain amount of overlapping. A. P. Dishrow, auditor of disbursements of the Erie, is chairman of the committee on disbursement accounts; and the Erie has been one of the most progressive of the larger roads in adopting and adapting mechanical devices to audit office work. The committee has had, because of war conditions, an unusual opportunity to study the results of substituting girls and labor-saving devices for expert men. The report is, therefore, timely and might well be studied by executive officers as well as by accounting officers.

Under this caption, Collier's Weekly published in its issue for June 8 the following editorial:

"Our Railways Are Good— Why?"

"Those who know often speak our American railways as the best on earth. The underlying reason is fairly well shown in one recent issue of the 'Railway Age.' In glancing it over we noticed a summary of a 200-page report by a special committee organized over five years ago to investigate the stresses in railway tracks. They made over 250,000 observations on rail strains alone, and the work is continuing. In time we are going to know how a railway track ought to be built and why, instead of leaving the roadbed largely to the professional instinct of the section boss and his gang. Another group of practical men have been getting data as to the transverse fissures or splits in steel rails, and there will be fewer accidents in years to come because of their work. Another paper, bristling with tables and diagrams, tells how to reduce the 'dynamic augment' for heavy locomotives. It seems that the big locomotive pounds on the rails because some of its parts are relatively too heavy and that various modern (and lighter) alloys of steel will help cure that bad habit. A fourth paper points out the deep interest in education that railroaders must take if their forces are to have the right human training and intelligence. It appears that our railways ought to co-operate with our public schools. All this from one number of one technical paper, and we have indicated only the high points! Busy brains make good railroading, and the U. S. A. has 'em."

Collier's has indicated the main reason why the railways of the United States have been so efficiently managed. Their officers, although in reality only employees, have taken a keener interest in, and have worked harder to promote, efficiency than most men do in the case of businesses they them-

selves own. This has been mainly because promotion in the railway business has usually been based on merit because there has been plenty of room for individual initiative; and because the rewards in reputation, power and income which have been won by the most energetic and able men have been in proportion to their energy and ability. These incentives will make "busy brains" in any line of activity. Also, the destruction of these incentives, which would inevitably occur under government ownership, would soon produce idle instead of busy brains; and then inefficiency speedily would succeed efficiency. Did any paper ever publish an issue containing as many articles regarding work being done along different lines to increase efficiency in the postoffice department as the *Railway Age* published in the issue referred to (February 22, 1918) regarding work being done along various lines to increase efficiency on the railways?

The Railroad Administration is beginning to decentralize its organization. This is a gratifying tendency. Decentralization will contribute toward increased

Decentralizing Railroad Management

efficiency of operation, and at the same time render it practicable for the railways to deal more satisfactorily with local conditions. Since government operation was adopted the *Railway Age* has several times commented on the dangerous centralization of management which was occurring. We have also suggested a reorganization of the railways along regional lines after the war as having more prospective advantages and fewer prospective disadvantages than any other plan which could be adopted under private ownership and management (See editorial "The Future of the Railways," *Railway Age*, January 18, page 159; also "Lord Shaughnessy's Warning," same issue, and "Revolutionizing Railway Organizations," March 22, page 694). The Railroad Administration originally divided the country into three regions, eastern, southern and western, and put a regional director in charge of operation in each of them. The *Railway Age* contended that these regions were too large even for present operating purposes, and suggested that after the war, if the railways were reorganized along regional lines, there should be created not less than five and probably not more than ten regions. The Railroad Administration has now divided the eastern region into three regions, and it seems probable that it will find it expedient to subdivide the western and southern regions. If this is done it will place in charge of the regional directors men-ages of railway whose operation they can supervise more effectively. It will also give opportunity to compare the results gained on different railways in the same region, and on the railways of different regions, in a way that will be stimulating to operating efficiency generally. While the program of decentralization is being carried out it is to be hoped it will be made to include the department of purchases. This department has laid itself open to more just criticism than any other branch of the Railroad Administration. The delays which have occurred in the placing of orders for equipment, and for the specialities to be used on it, has seriously reduced the number of cars and locomotives it will be possible to make and deliver in time for the movement of the heavy business of next fall and winter. Some

severe criticisms can be and are being passed also on the way in which in many cases orders have been divided. There have been altogether too many instances in which the prices of the things bought apparently have been considered to the exclusion of quality. Developments up to the present time indicate that the concentration of the purchase of equipment, rail and coal, in the Washington office was a serious mistake. The sooner steps are taken to rectify this mistake in some way the better it will be for all concerned. The policy of decentralization which apparently is being entered upon is based on sound principles of organization. What seems to be required to get the best results from the railways, whether under government or private management, is *centralized control and decentralized management*. Centralized management of a railway system as large as ours would prove a failure whether attempted under government or under private control. But by dividing and operating the railways in such regional groups as are suggested by geographical and commercial conditions the Railroad Administration will get better results during the war than it would under a highly centralized plan, and may point the way to a satisfactory solution of the railroad problem after the war.

Continuous Truss Bridges

STEEL BRIDGE CONSTRUCTION has presented a most contradictory aspect since the beginning of the European War. The number and size of the bridge projects have been largely restricted by a lack of funds and the high price of steel; nevertheless probably greater progress has been made in the development of materials in new designs and in improved fabrication and erection methods than in any corresponding period in recent years. One marked departure from former practice, in this country at least, has been the use of superstructures continuous over more than two supports, a condition which has been studiously avoided even where continuity was a prime requisite of the process of erection. Thus in cantilever bridges it has been the general practice to cut away erection members so that a simple span was suspended between the projecting arms, while in cases where one simple span was erected by the cantilever process from an adjoining one, the two spans were cut apart as soon as the second span became self-supporting.

An example of a marked departure from this practice is to be found in the Kettle Rapids bridge on the Hudson's Bay Railway described on another page of this issue. The trusses for the three spans are continuous from end to end. This is one of three important railroad bridges under construction within the last 18 months which follow this practice. The Bessemer & Lake Erie over the Allegheny river has two groups of three continuous spans, and the Chesapeake & Ohio Northern bridge over the Ohio at Sciotoville has continuous trusses 1,500 ft. long, supported on three piers.

Considering this question from the theoretical standpoint there is nothing new in this idea; on the other hand practical considerations have discouraged this form of construction in the past. Girder bridges for track elevation subways having intermediate supports were at one time constructed with continuous plate girders, but this proved objectionable in these short spans because the reversal of reactions on the abutments with the passage of trains resulted in the rapid pounding of the bridge seats. This condition has been avoided in the Bessemer & Lake Erie bridge by the introduction of a counter weight at the end of one of the shorter spans.

The prime requirement, that of unyielding supports, was satisfied beyond any question at the site of all of the three bridges mentioned above. Each afforded rock bottom at a readily available depth. Beyond this, experience and marked improvement in the last three years in the handling of the

heavy bridge loads with high power jacks was probably the important factor in the adoption of these designs, since it assured success in obtaining the necessary adjustment of the bearing elevations to obtain the assumed distribution of stresses. While complications in the calculations of stresses once formed a formidable obstacle, they no longer constitute an argument against this form of design.

Importance of Yard

Projects Recognized

THE LARGEST ITEM in the classified statement of additions and betterments authorized by the Railroad Administration was that for additional yard tracks and sidings. This amounted to \$81,383,955 as compared to \$64,297,478 for shops, buildings and engine houses and \$51,207,704 for additional main tracks, the next largest items. The total of these three items, \$196,889,137, all of which will be applied to increasing the capacity of existing railway lines in this country, represents 44.6 per cent of the entire appropriation for additions and betterments. The most significant fact concerning these allotments is that they are based on a thorough study of the entire railway situation by men eminently equipped for the work and supplied with the most comprehensive array of data ever compiled on the physical needs of the American transportation system. It is true that the estimates submitted by the roads were based on their war needs and that they were judged very largely on that basis. Nevertheless, the work authorized represents to a large extent exactly what the roads would have done of their own volition in times of peace, had they been free to make adequate expenditures.

The proportion of the total allotted to terminal work corresponds to the prevailing knowledge of railway men as to the relative need of this important part of the railway plant. While the necessity for the extension of facilities of this class was not demonstrated in as spectacular a manner last winter as was the demand for better facilities for the repair and care of locomotives, the dire need for more yard and passing track capacity has been manifested indirectly in so many ways and presents a condition so well understood as to require no elaboration. Additional main tracks are necessary but not in the same degree as yard tracks and sidings. There are cases where main tracks are taxed absolutely to capacity and some large expenditures are authorized to overcome this condition. Thus the Cincinnati, New Orleans & Texas Pacific was granted \$3,960,000 and the Cleveland, Cincinnati, Chicago & St. Louis \$4,409,874 for this purpose. But while trains are delayed in getting through sections of single track on a busy road, it is far more common to see trains held out on the line awaiting opportunity to enter an overloaded terminal.

Much money will be spent for the improvement and extension of existing yards, with the object of relieving the stress as quickly as possible. It is but human to look for a "key log" with the hope that the jam may be relieved by proper attention at some critical point, but too often the layout is so hopelessly inadequate that alterations or enlargement can result only in impotent patch work. For this reason it is not surprising to find that the recently announced budget covers authority for not a few large new yards, some of them on sites entirely independent of existing developments.

It requires foresight and courage to spend a million dollars on a freight yard. The same amount spent for second track would look much more effective, and probably gives quicker returns, but from the number of million-dollar appropri-

tions in the list, it is evident that the need for yards is thoroughly appreciated. The size of the appropriation for yards and side tracks is one of the most hopeful things about the construction program, and this, together with the amount set aside for shop buildings, engine houses, etc., making, when the work is finished, go a long way toward making the American railroads a better transportation machine both in war and in peace.

The Vindication of the Railway Managers

GOVERNMENT OPERATION of the railways is vindicating private management. Many of the most important things it is doing are things which the management of the railway companies tried to do before government operation was adopted and which the government through regulation or otherwise prevented. It is showing that the railway situation under private management would have been made much better in some respects if the public authorities would have permitted it.

Many of the leading railway presidents will remain officers of the companies under the new regime, but almost all the men who are being appointed to important executive positions in the Railroad Administration are former railway officers and are being selected because they are the best men for the positions. The Hearst newspapers and other socialistic publications assert that inefficiency broke down private management. If private management was incompetent, how did it happen to develop and put in important places the men the government regards as the best fitted to operate the railways in the present crisis? The managements of the railways have been criticized and regulated by many men in both private and public life who have set themselves up as authorities on railway affairs. Why has none of these been put in charge of the operation of a railway? Justice Brandeis, Clifford Thorne, Commissioner Charles C. McClord, the editor of the Hearst newspapers, for example, have overflowed with criticism of the management of the railways in the past and with suggestions as to how it could be improved. The Hearst newspapers are now telling the director general in detail just what he ought to do. Why in this great emergency, when their knowledge of how to run a railway could be so usefully employed, do we not find the names of these men in the lists of those being appointed as regional directors and federal managers? Doubtless we would under government ownership in time of peace. Under government operation in time of war their qualifications do not commend them to the serious consideration of the government.

For many years before the adoption of government operation, railway managers endeavored to reduce wasteful competition. They tried to do this by making pools of traffic and earnings, by organizing traffic associations, by forming community of interest arrangements, by causing their companies to acquire stock interests in each other, and by actual consolidations. The companies and their managers were denounced, persecuted and prosecuted for these efforts. Law after law was passed, court decision after court decision was rendered to maintain absolutely unrestricted competition.

The railway managers contended that these laws and court decisions were unjust to the railways and harmful to the public, but legislatures, regulating authorities and courts were deaf to their arguments. On December 28, 1917, it was still contrary to our laws and public policy for parallel railways to co-operate in handling traffic or to co-ordinate their facilities. On December 29, 1917, however, the gov-

ernment had taken charge, and in this short interval of time had discovered that, contrary to its previous opinion, all competition or semblance of competition was wrong, and that the railways must not merely co-operate, but must be merged into and operated as a single system. Like most sudden converts, the government became a more zealous exponent of railroad monopoly than the railway owners and managers ever were. Furthermore, the general public endorsed the new policy unreservedly as it did the old, and apparently did not realize that the government had turned a somersault. The very people and publications who before egged the government on to compel the railways to compete, now heartily commend it because it has stopped the "wasteful competition." They consider it a great achievement for the government to have abolished the rivalries between the railways which until last December it forced them to continue.

For many years the railway companies had been complaining that they were subject to too many masters. They asked that exclusive federal regulation be substituted for regulation by both the state and national governments. State and federal regulation continued, however, to vie with each other in heaping burdens and restrictions upon them. But when operation by the federal government was adopted, it instantly became clear to the federal authorities that it would be impracticable for them to manage the railways efficiently, without discrimination and in the interest of the entire country, if the states were allowed to regulate operation, to impose taxes and to fix rates regardless of the policy followed by the federal government.

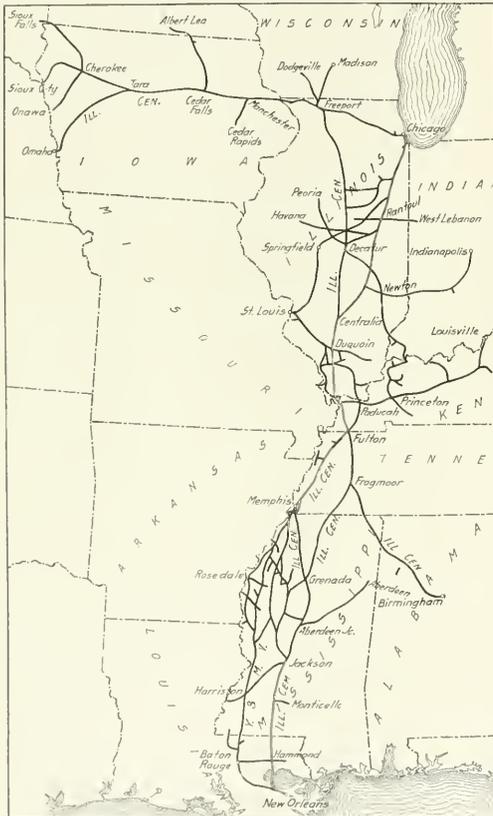
The railway managers began ten years ago to point out that wages and other expenses of operation were rapidly increasing, and that it would be necessary to advance rates to enable the roads to earn enough adequately to develop their facilities. While between 1906 and 1917 the average annual wage of railway employees increased 67 per cent, the average freight rate and the average passenger rate actually declined. In 1917, after the United States had entered the war, the representatives of the railways presented to the Interstate Commerce Commission data showing that an advance of 15 per cent in rates was needed then, and that further advances probably would be needed later on. The Interstate Commerce Commission granted only part of the advances asked for. On December 5 it sent a special report to Congress, in which it indicated that it could not advance rates enough to meet the situation. The enormous increases in expenses which were then occurring have continued, however, and what was unthinkable then has become easily thinkable under government operation. The Railroad Administration is making advances of approximately 25 per cent in both freight and passenger rates, and is bringing the state rates up to the level of the interstate.

The vindication of our former private management of railways is written large in these developments. The government is now refraining from doing many things which the managers of the railways under private operation tried to get it to desist from doing, because it has become manifest that they were unwise and contrary to the public interest. It is doing many things which the railway managers tried to get it to do because it has become clear that they are wise and in the public interest. However disagreeable some features of the existing situation may be to men like Frank Trumbull of the Chesapeake & Ohio, E. P. Ripley of the Santa Fe, Samuel Rea of the Pennsylvania, Daniel Willard of the Baltimore & Ohio and Fairfax Harrison of the Southern, who are remaining in the service of their companies and therefore ceasing to be managing railway executives, they can have the satisfaction of feeling that government operation is vindicating many of the most important public policies for which they have stood.

Illinois Central

THE ILLINOIS CENTRAL held its operating ratio in 1917 down to a slightly lower figure than 1916; in fact, it was lower in 1917 than in any year since 1907. It was 71.54 in 1917, 71.66 in 1916, and, prior to that, for a number of years, ranged around 76.

The most astonishing part of the 1917 performance, however, was the fact that with an increase of over 21 per cent in ton mileage of freight and of over 15 per cent in passenger mileage, there was an increase of only 17.97 per cent in operating expenses, notwithstanding the fact that there was an increase of 8.60 per cent in freight train miles and 5.14 per cent in passenger train mileage. Furthermore, there were substantial increases in maintenance expenses. The roads



The Illinois Central and the Yazoo & Mississippi Valley

whose reports have been reviewed so far this year in these columns which have been able to hold down the operating ratio in 1917 to anything comparable to that of 1916 did so either through a large reduction in train mileage, compared to business moved, or smaller maintenance expenses, or both. The Illinois Central did very well in increasing its freight train load; the average in 1917 for all freight being 700 tons as against an average in 1916 of 624 tons; but the fact that expenses per train mile did not go up in greater proportion than they did is the most remarkable part of the year's operations. It is true that transportation expenses—the out-

pocket cost of moving the business—increased nearly 30 per cent, but on some of the eastern roads transportation expenses increased to an even greater per cent with an actual reduction in passenger train mileage and only a very slight increase in freight train mileage; while the Illinois Central's passenger train mileage increased over 5 per cent and freight train mileage over 8 per cent.

The Illinois Central charged nearly 14 per cent more for maintenance of way and over 7 per cent more for maintenance of equipment in 1917 than in 1916. As a matter of fact, however, because of shortage of labor and materials, there was \$959,000 charged to maintenance of way expenses in 1917, which was carried over as a reserve into 1918. The amount charged was \$11,289,000; an increase over 1916 of \$1,368,000, but the amount spent was approximately \$10,300,000 or only a few hundred thousand dollars more than was spent in 1916. Similarly, in maintenance of equipment, while \$18,214,000 was charged, an increase of \$1,233,000, \$475,000 of this increase was additional charges for depreciation. This of course, is a bookkeeping charge only and, while the actual amount spent for repairs of locomotives was considerably larger in 1917 than in 1916, repairs of freight train cars cost considerably less.

Notwithstanding the scarcity of labor and high prices of materials, the Illinois Central spent \$15,643,000 for additions and betterments, which included \$6,047,000 for freight cars, \$601,000 for locomotives, and \$666,000 for passenger train cars. The largest items of additions to roadway were \$997,000 for station and office buildings, \$640,000 for grading, \$722,000 for bridges and culverts, and \$674,000 for other track material. The station and office building at Sixty-third street, Chicago, was completed, as was also the station at Mattoon, Illinois. Quite a number of stations at smaller towns and cities were enlarged and improved. There was \$549,000 spent for signals and interlocking plants. When two short sections, one between Vaughn, Miss., and Canton, and the other between Canton and Asylum, are completed, the entire line of the Illinois Central from Chicago to New Orleans will be completely block signalled. During the year there were installed 381 track miles of automatic block signals.

The only new locomotives which were put in service were 14 6-wheel switching locomotives; but 18 saturated steam locomotives were equipped with superheaters.

The character of traffic on the Illinois Central did not change greatly in 1917 as compared with 1916, with the exception of a larger proportion of coal being carried and a smaller proportion of products of agriculture. The following table shows the percentage of each class of commodity carried to the total freight tonnage handled:

	1917	1916
Products of agriculture.....	14.44	17.84
Products of animals.....	2.83	3.21
Products of mines.....	48.24	45.37
Products of forests.....	15.76	5.29
Manufactures.....	12.49	12.08
Merchandise.....	4.16	4.59
Miscellaneous.....	2.08	1.62

The average length of haul of freight was quite a little longer in 1917; being 264 miles. The average revenue per ton per mile was less by two-tenths of a mill; being 5.2 mills in 1917. There was a good gain in car loading; the average loading per loaded car was 26.94 tons in 1917 as against 24.09 tons in 1916.

The Illinois Central earned its dividends comfortably in 1917, even without taking into its income any payment on the part of the Yazoo & Mississippi Valley interest on the Louisville, New Orleans & Texas second mortgage income bonds, or dividends on the Dubuque & Sioux City stock owned. Railway operating income amounted to \$18,606,000; an increase of \$1,846,000. The two reductions in non-operating income just mentioned brought the amount down to \$8,009,000, as compared with \$13,016,000. After the pay-

ment of interest charges, rentals, etc., there was \$15,016,000 available for dividends in 1917 and \$17,466,000 in 1916. Dividends call for \$7,924,000.

The following table shows the principal figures for operation in 1917 compared with 1916:

	1917	1916
Average mileage operated	4,766	4,767
Freight revenue	\$58,443,367	\$49,437,830
Passenger Revenue	16,008,698	14,712,849
Total operating revenues	87,144,286	73,740,266
Maintenance of way and structures	11,289,315	9,921,656
Maintenance of equipment	18,214,178	16,980,995
Traffic	1,332,011	1,301,244
Transportation	9,076,858	22,551,004
General	2,083,163	1,848,339
Total operating expenses	61,339,834	52,843,149
Taxes	6,186,365	4,116,065
Operating Income	18,006,217	16,759,239
Gross Income	6,615,583	29,775,070
Net income	15,191,376	17,617,207

Chicago & North Western

INCREASES IN THE AMOUNTS PAID to employees, for fuel, for repairs to locomotives and rolling stock, and for maintenance of way and structures, were the principal factors preventing the Chicago & North Western from realizing on a 10 per cent increase in operating revenues in the year ended December 31, 1917.

The total operating revenues for the year were \$108,265,000, as compared with \$97,979,000 in 1916. Operating expenses, however, increased from \$65,121,000 in 1916 to \$78,759,000 in 1917. The increase of 20 per cent in expenses, comparing with 10 per cent increase in business, increased the operating ratio from 66.46 per cent in 1916 to

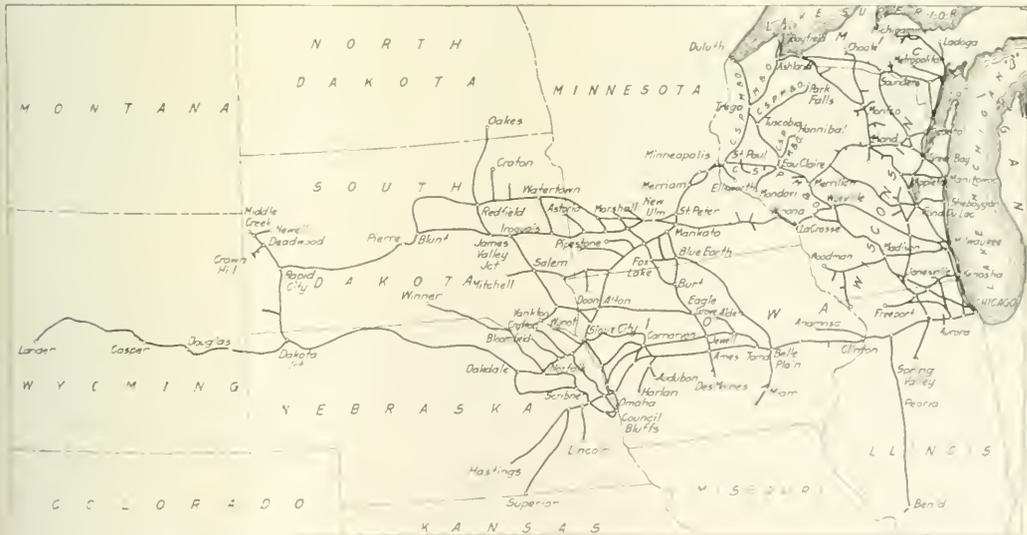
The increase in payments to labor for 1917 as against 1916 totaled nearly \$9,000,000 of which over \$5,000,000 was due to higher rates of compensation. The percentage of operating expenses paid to labor in 1917 was 60.12 as compared with 59.31 in 1916, or 58.27 in the calendar year ended December 31, 1915.

The increase in cost of fuel for locomotives is an old story, but it is interesting to observe that fuel for train locomotives alone showed an increase of more than \$2,000,000 and was 33 per cent over 1916. The total increase in costs of fuel for locomotives was \$2,651,800.

The increase in maintenance of way charges in 1917 over 1916 was \$1,563,000 and followed a similar increase of slightly more than that amount in 1916 over 1915. The increases, of course, were principally in track laying and surfacing, the expenditures for that purpose having increased about 25 per cent in each year. The increase in cost of repairs to locomotives and freight cars similarly represented something that was evident in 1916, but it is noteworthy that whereas in 1916 there was an increase in charges to maintenance of equipment of \$1,800,000 over 1915, in 1917 the total again increased \$2,800,000 over 1916, increases in successive years of about 14 and 19 per cent. These increases are especially emphasized by a comparison on the basis of units:

	1917	1916	1915
Maintenance of way per mile	1,652	1,459	1,261
Repairs per locomotive	3,392	2,748	2,281
Repairs per freight car	87	78	66
Repairs per passenger car	721	594	501

It should be added however that, even with these increases, so great were the increases in transportation expenses the



The Chicago & North Western

72.75 in 1917, and the net revenue from operation amounting to \$29,506,000 in 1917 was about \$1,000,000 less than in the previous year. Increases in taxes and decreases in non-operating income were partly compensated for by decreases in interest charges, so that the net income of \$17,125,000 in 1917, was likewise \$3,000,000 less than in 1916. The usual dividends of 7 per cent were paid, but for the second half of the year on a larger capitalization so that the balance for the year of \$5,265,000 was just over \$4,000,000 less than in 1916.

charges for maintenance of way in 1917 were 17 per cent of the total operating expenses as compared with 18 per cent in 1916, and the charges for maintenance of equipment were 22.7 per cent of total operating expenses as compared with 23 per cent in 1916. The percentage of total operating expenses chargeable to transportation increased from 52.9 in 1916 to 54.8 per cent in 1917.

The North Western's freight business in 1917 was 10.5 per cent greater than in 1916 on the basis of freight revenue, 7 per cent greater on the basis of tons of freight carried, but

13 per cent greater on the basis of ton mileage carried. The revenue per ton mile on the North Western is somewhat low compared with some of the other roads in its territory, but it is interesting to observe that whereas in 1915 the average revenue per ton mile was 8.3 mills; in 1916 it was 8.0 mills and in 1917 only 7.8 mills. The total tonnage was 60,288,000 as compared with 56,408,000 in 1916 and the ton mileage of revenue freight was 9,220,973,000 in 1917 as against 8,130,953,000 in 1916.

The tendency towards heavier train loads continued in 1917 assisted presumably by the energetic campaign for heavier car loading. The average train load increased during the year from 510 tons to 544 tons, nearly 7 per cent. The average load per loaded car increased nearly 9 per cent, from 23 to 25 tons. The amount of equipment on hand of all classes was greater on December 31, 1917, than on December 31, 1916, the number of locomotives being 128 greater and the number of freight cars 3,834 greater. The increases in each case were undoubtedly due as much to caution in retiring old equipment as to additions of new equipment.

During the year the North Western issued \$15,000,000 of common stock, equal to 10 per cent of its total preferred and common. It redeemed \$4,541,500 of funded debt, of which something over a million was equipment bonds and \$3,118,000 was 7 per cent first mortgage bonds of the North Western Union Railway maturing June 1, 1917. At the end of the year the company had \$5,722,000 cash, nearly \$5,000,000 less than on December 31, 1916. Loans and bills payable at the end of the year totaled \$2,295,000 as against no loans or bills payable on December 31, 1916.

The following table shows the principal figures for operation in 1917 as compared in 1916:

	1917.	1916.
Average mile operated.....	8,108	8,108
Freight revenue.....	\$72,264,461	\$65,380,165
Passenger revenue.....	24,516,358	22,329,509
Total operating revenue.....	108,264,963	97,978,844
Maintenance of way and structure.....	13,394,113	11,831,004
Maintenance of equipment.....	17,899,338	15,087,346
Traffic expenses.....	1,354,007	1,340,016
Transportation expenses.....	43,177,646	34,433,717
General expenses.....	2,306,507	1,982,639
Total operating expenses.....	78,958,989	65,120,827
Taxes.....	5,677,480	5,016,527
Operating income.....	23,815,406	27,835,731
Gross income.....	27,311,451	30,794,904
Net income.....	17,125,030	20,368,924

New Books

Poor's Manual of Industrials for 1918. 2,736 pages, bound in cloth. Published by Poor's Manual Company, 80 Lafayette Street. New York. Price \$10.

Poor's Manual now occupies somewhat the same position as regards industrials as Poor's Manual of Railroads occupied in the railroad field twenty-five or thirty years ago. It is the most complete source of information about industrials in one volume which we have. Now that the railroads are being operated under government control, and public utilities are finding it difficult to make both ends meet, industrials offer one of the only attractive fields for investments outside of government bonds. It is needless to say that accuracy and intelligence are used in the compilation of the figures which are included in Poor's Manual of Industrials. In most cases, there is an income account and general balance sheet given for each company, and a description of the stock and other securities outstanding. There is also, in most cases, a short description of the character of the business done by each particular company, but, if it were possible to enlarge any part of this already very comprehensive manual, additional space might be used to give further facts in regard to the character of the business. No matter how small a statistical library a banker or individual can afford, Poor's Manual of Industrials must of necessity be included in it.

Letters to the Editor

An Opportunity for the Railway Supply Manufacturers' Association

NEW YORK.

TO THE EDITOR:

As an ex-president of the Railway Supply Manufacturers' Association, I am naturally still interested in the present and future of that association, particularly because of the fact that ever since I started to work on its committees I have felt that the organization should be of a more permanent nature so as to work for the best interests of the railway supply fraternity at all times.

Since this world war has interfered with the holding of our annual conventions in conjunction with the M. C. B. and M. M. Associations, it appears that the R. S. M. A. has practically passed out of existence. To me the passing of this association, if such it be, is not a pleasant thought. I am addressing this letter to you in hopes that it will be published, and that sufficient interest will be created for us to get together and in some way perpetuate the old R. S. M. A.

Many other industries are fully organized, and have their duly authorized officers and committees who are co-operating with the government, with the idea of facilitating the big job in hand. The biggest burden of all has fallen to the railroads, and an industry which supplies the railroads with all kinds of equipment is essentially an important factor in such a crisis. In any crisis, the necessity of the right kind of organization and organized effort is essential. During the past weeks, when so many of us have had to spend our time in Washington, the lack of the proper organization has been brought home to us. Since the railroads have been taken over by the government, we have had to conform to the new conditions, and, I believe I may say without fear of contradiction, that no other body of men representing such tremendously big interests have gone to the capitol unorganized.

The ramifications of the railway supply industry are such that individual effort, while it is of service, oftime fails in accomplishing the best results, and necessarily means the loss of much time and energy, to say nothing of unnecessary waste of money. This is the time when we should not only talk conservation, but should organize our efforts along conservation lines, and act accordingly. Our President rightfully felt that the railroads could better serve the common cause by being brought under one head and operated as a unit during this crisis, and, I believe that the wisdom of his action has already been demonstrated. In dealing with this centralized authority, we should unite our efforts and organize in such a way that the administration could call upon representative and authorized officials of our organization for general information, which they could collect from its members. I do not mean to suggest the elimination of the individual interest, but such representatives could properly handle the preliminaries, and would save the government officials much time and energy.

As a fraternity, we have never gotten together to discuss our every-day business problems, for which there may have been good reason in the past, but I feel that we can best show our patriotism by getting together and offering Uncle Sam the services of a united railway supply fraternity. Let's get together and perpetuate the R. S. M. A., for which so many of us have worked in the past, and make it an organization of service of which we will all be proud.

OSCAR F. OSTBY.



General View of Bridge.

Difficult Bridge Construction in a Cold Country

Hudson Bay Railway Trusses Over Kettle Rapids Are
Continuous Over Four Supports

By W. Chase Thomson
Consulting Engineer, Montreal, Que.

THE HUDSON BAY RAILWAY extends from The Pas, the northern terminus of the Canadian Northern in Manitoba, to Port Nelson on Hudson Bay, a distance of 424 miles. Although primarily intended as a short route for the export of grain to Europe, the railway opens up a valuable territory, rich in minerals, fish and pulp-wood and of great agricultural possibilities. The grading has been completed throughout, and the rails have been laid to mile 332. The Kettle Rapids bridge is at the second crossing of

vention of Lake Winnipeg, which serves as a huge reservoir, the flow of water in this river throughout the year is remarkably uniform. At Kettle Rapids, the lowest water level recorded to date is 316.0, and the highest water level, with the river unobstructed by ice, 319.0, a difference of only 3 ft. But, with the freezing of the river and the consequent jamming of huge quantities of drift ice, the channel is greatly obstructed and the water rises suddenly. In the winter of 1916-17, a height of 338.5 was reached on February 3.

The highest ice peaks have always been found on the islands, where piers 2 and 3 are located. In the winter of 1916-17, when the water was at its maximum height of 338.5, there were ice peaks as high as 344.5, the same as had been observed during the winter of 1913-14, but, with the fall of the water, they settled to elevation 342.0, and remained there until melted.

The main channel at the bridge site is only 50 ft wide and it is estimated to be about 200 ft deep at the center; the current is very swift, and there is always a certain amount of open water. Directly above and below the bridge site, however, the river freezes all the way across, but only after the jamming of the ice and the consequent rising of the water. It is evident that there can never be any danger from ice, either to the superstructure or to the piers, for the steelwork is 15 ft. clear of the highest fixed ice peaks, and there is running ice only when the water level is much below its maximum elevation.

In locating the line, advantage was taken of two very conveniently placed islands, allowing a central span of 400 ft., with piers and abutments on the solid rock. This rock is of pre-cambrian origin and is a tough granitoid gneiss.

The bridge is a continuous structure 1,000 ft. long, having a channel span of 400 ft. and two side spans of 300 ft. each. The trusses or main girders are of the subdivided Warren type, 50 ft. deep throughout and 24 ft. apart center to center,



View from Top of Cableway Tower

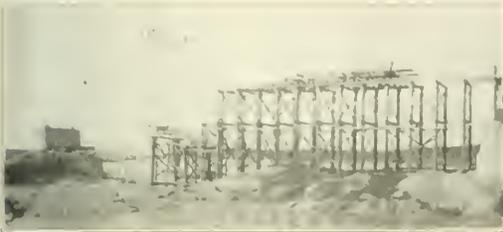
the Nelson river, or Kettle Rapids, mile 332, the present end of steel.

The Nelson is one of the great rivers of Canada, its drainage including the prairies of Alberta, Saskatchewan and Manitoba on the west, the Red River valley on the south and part of Ontario on the east, but owing to the inter-

*Abstract of a paper presented before the Canadian Society of Civil Engineers, April 11, 1918.

irregular webbing, besides, in order to obtain such economical proportions, it would have been necessary to locate the bottom chords as close to the base of rail as possible, thus largely increasing the quantity of concrete in the substructure.

The third type, as designed and built, is the most rigid of all, and the most economical; for it required no extra metal for erection stresses, except in the bottom chords of the channel span adjacent to the piers, where the increase of section was slight; the simplicity and uniformity of the framing reduced the cost of fabrication to a minimum; and the



Falsework Under Construction for the Northern Anchor Span

continuous horizontal chords, without adjustable joints, greatly facilitated the work of erection.

Details of Design

The structure was designed in accordance with the General Specification for Steel Bridges, issued by the Department of Railways and Canals in 1908, except for a slight modification in the impact formula, affecting alternating stresses only, and a change in the allowable unit-stresses for compression-members. Impact has been computed by the formula,

$$I = \frac{\text{range}^2}{\text{max}}$$

with the arbitrary stipulation that the *range* shall

be taken as the arithmetical sum of the live load stress of the greater kind and 0.4 of that of the lesser. When the live load stress is of one kind only, the formula reduces to

$$I = \frac{L^2}{L + D}$$

in which *L* = live load stress and *D* = dead load

Concerning the unit stresses for compression members, the Department's specification calls for 16,000 lb. per sq. in. reduced by Gordon's formula, using in the denominator the factor 18,000 for square ends, 12,000 for one square and one pin end, and 9,000 for pin ends. It is now quite generally recognized, however, that 16,000 lb. per sq. in. is entirely too high for short columns; and the Joint Committee on Columns and Struts in the United States, which has recently submitted its final report, recommends a maximum working unit stress of 12,000 lb. per sq. in. In this bridge, the compression members have been designed in accordance

$$\text{with the formula, } 12,000 \left(1 + \frac{(l/r)^2}{50,000} \right)$$

with that adopted by the Society for values of *l/r* up to 70, but gives somewhat higher unit stresses for greater working ratios.

The live load used in design is "Class Heavy" of the Department's specification above noted. The bottom laterals have been proportioned on the assumption that the whole of the specified wind loads, both during erection and afterwards, would be resisted thereby, and the wind load stresses in the bottom chords include the vertical effect of the wind loads, equal to their moment about the bottom chords divided by the horizontal distance center to center of chords. The

design includes provision for cantilever erection from piers 2 and 3 to the center of the channel span.

Provision for traction and braking forces has been made by horizontal trussing attached to the top flange of the stringers and to the floor beams at points *M0*, *M4*, *M8*, *M12*, etc., or 100 ft. apart, as shown in the diagram; which forces are transmitted to the main girders through the inclined struts *M0-M1*, *M3-M4*, *M4-M5*, *M7-M8*, etc.

The end floorbeams are provided with stiffeners and bearing-plates at points 16 ft. apart, for jacking up the bridge; and the floorbeams at *M12* have been specially designed for lifting the bridge, with unit stresses increased by 50 per cent and having stiffeners and bearing plates at points 14 ft. apart.

Latticing of main members has been avoided as far as practicable; but the open sides of compression chord members are double latticed with 5-in. by 3/8-in. flats, having two rivets at ends and at intersections; tension chord members are similarly latticed with 5-in. x 1/2-in. flats. All of the principal web members are provided with substantial longitudinal diaphragms, which are considered as part of the effective section thereof; and the heavy compression diagonals, *U6-U8*, *U10-U12*, *U12-U14* and *U16-U18*, are further stiffened by tie plates on their outstanding flanges. All joints and splices are fully riveted throughout.

Rocker bearings are provided throughout, having 8-in. bearing pins at the piers and 6-in. bearing pins at the abutments; and the shoes are steel castings. The bridge is fixed at Pier 3 and movable at Pier 2 as well as at the abutments. At Pier 2 the expansion rollers are 8 in. in diameter, and each set is provided with four 12-tooth cut pinions to prevent skewing. Substantial curtain plates are supplied for the protection of the gears and to keep out the dust; but they are removable for inspection and cleaning of the bearings. At the abutments the expansion rollers are 6 in. in diameter and similarly provided with alignment gears and curtain



Southern Anchor Span Erected, and the Beginning of Cantilever Erection Showing the Temporary Supports for Panel Points

plates. These expansion bearings are shown in one of the drawings. The fixed bearings at Pier 3 are similar to the expansion bearings at Pier 2, except for rollers and bed plates. The bridge seats are tool dressed perfectly level and to the exact elevations called for on the drawings, and sheet lead, 1/8 in. thick, is provided to equalize any minor irregularities of the surfaces.

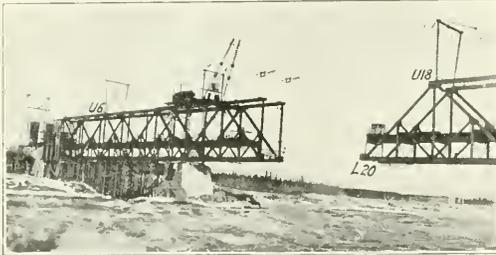
Owing to the small deflection of this bridge, which is only 3 in. at the center of the channel span, for dead load combined with the maximum effect of the live load, it was con-

sidered unnecessary to provide for a perfectly straight bottom chord under any particular condition of loading; so the trusses have been cambered, in accordance with the more usual method employed for simple spans of moderate length, by increasing the length of the top chord panels. Members *U10-U12* and *U12-U14* have been correspondingly shortened; and $\frac{3}{4}$ in. has been added to the verticals *U12-L12*, to obviate a slight kink at panel points *U12*. At panel points *L12* the ends of the abutting chord members have been bevelled to accommodate the form of the trusses when fully loaded. This method of cambering has greatly simplified the shop work; and the results are entirely satisfactory.

The total estimated weight of steel in the structure (including floor bolts), computed from the detail drawings before the contract had been awarded, was 4,424,000 lb.; and the actual shipping weight, as determined by the scales, was 4,415,000 lb.

Erection

Erection was started on June 6, the earliest date possible; for, before the falsework for the southern anchor span could be placed, it was necessary to blow up huge masses of ice with dynamite. This anchor span was then erected in the usual manner by a 75-ton derrick car, having trucks 35 ft. center to center and a single 50-ft. boom. At *L0*, bottom chords were set 10 in. low, by omitting the upper shoe castings and using flattened pins for bearings. This was to provide



Northern Anchor Span and 100 ft. of the Adjacent Cantilever

for the deflection of the channel span during erection, and to insure that the connections at *L20* could be effected before the chords at *U20* would meet. After the anchor span had been fully riveted, the southern half of the channel span was erected as a cantilever by the same derrick car, the riveting following closely behind the work of erection. Panel point *L14* was supported temporarily by wire cables from panel point *U12* until the connection had been made at *U14*; likewise, panel point *L18* was supported from panel point *U16*, until the connection had been made at *U18*. By August 18, or eleven weeks from the date of beginning, the first half of the bridge was fully erected; and the riveting on this portion of the structure was completed one week later.

The next, and perhaps the most difficult piece of work in connection with the entire erection, was the construction of a double cableway for transporting the materials for the northern half of the bridge to the opposite side of the river. The cables were supported on a rocker bent 40 ft. high, standing on the top chords of the southern cantilever at panel point *U18*, and on a timber tower 120 ft. high from the ground surface, located behind Abutment 4, with center line 60 ft. from panel point *L0*. The span of the cableway was 611 ft.; the sag, under maximum load, 36 ft.; and the horizontal distance of the anchorages, at both ends, from adjacent supports, 400 ft. A triangular equalizing girder, suspended at its ends from the cables and having a lifting hook

at the center, was provided for loading the cables equally. The cableway was designed for a live load of 14 tons, the weight of the heaviest piece to be transported. In addition to its principal function of transporting materials, in which service it gave entire satisfaction, the cableway was of great assistance in the erection of steelwork.

The falsework for the northern anchor span was then constructed, with extension bents reaching to the floor level, for the accommodation of the special traveler provided for the



The Cableway with Its Equalizing Girder

erection of the northern half of the bridge. As this traveler was to be used on the top chords as well as at the floor level, its four trucks (of two 24-in. double-flanged wheels each) were spaced 24 ft. center to center transversely, the same as the trusses, and 50 ft. center to center longitudinally, to coincide with the panel points; it was fitted with two 62-ft. booms and a hoisting engine; and its entire weight, including counterweight, was 60 tons, equally distributed on the four trucks. To provide for the weight of the traveler only, when moving, the top chord members were supported at their middle point by temporary timber posts, resting on special seats at panel points *M3*, *M5*, *M7*, *M9*, etc.

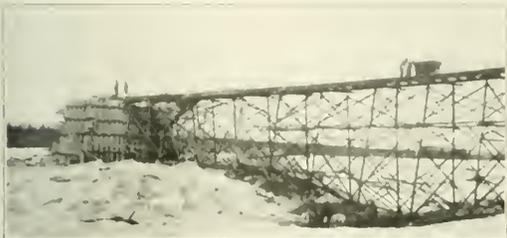
After the delay incident to the construction of the cableway, and the falsework for the northern anchor span, erection



Southern Half of the Bridge Erected

of steel for the northern half of the bridge commenced on September 17. Beginning at Pier 3 (with the traveler at the floor level and working toward Abutment 4) the floor system, bottom laterals and lower members of the trusses were placed, and the falsework extensions removed. The traveler was then blocked up to the height of the top chords, requiring a week for this operation; and the upper part of the steelwork for this anchor span was erected, working from Abutment 4

toward Pier 3. When the traveler had passed panel point *U*₆, an additional rocker bent, 40 ft. high, was set up there as an intermediate support for the cables, thereby reducing the span to 400 ft., the maximum sag to 22 ft., and providing ample working clearance above the top of the steelwork. The cantilever erection of the northern half of the channel span was accomplished in the same manner as for the southern half, except that the members were placed principally by



Pier 2 Under Construction

the special traveler, which required temporary timber supports at the center of the top chord panels, already mentioned.

From the time of placing the traveler on the top chords to within two days of the end of November, when the weather suddenly turned severely cold, rapid progress had been made; and it was confidently expected that the bridge would be entirely completed before the end of the first week in December.

On December 8 the center connections at *L*₂₀ had been made, and without the least difficulty; for, on meeting, the trusses had been in perfect alinement and the deflections of the cantilevered arms, exactly equal; thus it had only been necessary to jack forward on its rollers the southern half of the structure, which had purposely been set back 5 in. to facilitate the erection of the closing members. On the southern half of the bridge, the timber floor was practically complete; and the ties had been roughly distributed over the northern half, except at one panel adjacent to the center of the channel span, where the stringers had not at that date been placed; thus the structure was practically supporting its full dead load. Under



The Lower Members of the Portal Struts and Sway Bracing Were Omitted Temporarily for the Accommodation of the Derrick-Car

these conditions, careful levels were taken to ascertain the exact deflections of the trusses or main girders. The curves of the bottom chords were remarkably uniform; and the center ordinate was exactly the same as had been computed.

The weather having moderated slightly, although still very cold, work on the bridge was resumed December 16. On the 22d the ends were lifted 3 1/2 in., which was just sufficient to bring the ends of the top chords at *U*₂₀ to a firm bearing. Owing to frequent stoppages due to weather conditions, it was not until the last day of the month that the riveting of

the main members was completed, and jacking of the ends was resumed. This operation was again interrupted by New Year's day, but the ends had been raised sufficiently by January 2 to permit of placing the upper shoe castings, without shims. Although the ends were thus 1 3/8 in. below their normal position, the load at each of the four corners, as indicated by the gages on the hydraulic jacks, was exactly 118.5 tons, the amount of the computed dead load reaction. The bridge at the time, however, was covered with many tons of ice and snow; thus it was impossible to determine very accurately the reactions for the normal dead load.

It had by this time been decided to give up the attempt to complete the bridge during the winter of 1917-18, for the men could not work to advantage; a satisfactory job could not be made of the track work; the painting could not be done until the advent of mild weather; and the bridge was perfectly safe. A final adjustment will therefore be made under more favorable conditions, when it is expected that the ends will require to be raised about another inch. With the ends 1 3/8 in. low, levels were again taken on the bridge, with satisfactory results, for the camber at the center of the channel span was found to be 17 3/8 in., whereas the maximum computed deflection due to the specified live-load is 13 1/4 in.

The closing panel of stringers was placed January 4, which ended the work for the season. The remaining work



Beginning of Erection of the Northern Anchor Span, with the Traveler at the Floor Level

comprises a small amount of riveting for secondary parts, some minor adjustments, the completion of the timber deck, including the laying of the rails, and painting.

Substructure

The substructure is of concrete throughout, composed of pit gravel and cement in such proportions as were found by trial to give the best results. It had been intended to construct at least the abutment and pier on the southern side of the river during the autumn of 1916, but the track did not reach the bridge site until the end of October, cold weather set in shortly after, and there was barely time to construct the foundation for Abutment 1. Excavation for this foundation was carried to a depth of over 10 ft. through frozen clay and silt to the solid rock. The concrete was placed during the second week in December, and in very cold weather; but the materials had been heated, the mass was large, and the result was entirely satisfactory, as found from a careful inspection the following spring. The abutment was completed during the month of April, 1917.

Operations at Pier 2 were begun on April 10, and under very adverse circumstances; for the river was then at an elevation of 338.0, or 10 ft. above the average rock surface at this point; and the rock was covered with a solid mass of ice 25 ft. thick. However, it was necessary to get ahead with the work as rapidly as possible; so the ice was excavated, and the rock was bared by May 5, at which date the water had fallen to elevation 325.0. Although the ice walls of the excavated shaft appeared to be perfectly solid throughout, the water percolated through and stood at the same elevation

as that in the open river channel, but it was perfectly still, without current or surge. A timber caisson, conforming on the bottom to the irregularities of the rock surface, was then constructed; and all small openings therein were sealed by sheet piling, carefully scribed and driven so as to broom the ends. Every inch of the rock surface inside of the caisson was then picked with needle bars, to insure that it was entirely clear of ice; and heated concrete was deposited by deep-sea buckets. The rock surface at this pier had previously been carefully examined during low water, and found to be absolutely sound; thus every confidence may be placed in the foundation. The footing for this pier was completed on May 9; the construction of the main shaft thereof offered no difficulties, and was effected without incident.

The pit gravel, used throughout on this work, was invariably frozen and required to be thawed by steam; thus all of the concrete was placed warm, and with most gratifying results; for, on removal of the forms, not a single bad spot was discovered. The total quantity of concrete in the work is about 3,000 cu. yd., and of reinforcing steel in the wing walls 2,300 lb.

The laying out of the work was difficult and tedious, owing to the irregularity of the ground and to the necessity of locating Pier 3 by triangulation; but the instrument work was done with such care and precision that all important dimensions and distances were afterward found to be practically exact. In locating the center line of bed plates on Pier 2, and that of the shoe castings on Pier 3, where great accuracy was desired, the piano wire method of measurement was used, taking into account the pull on the ends of the wires and the corresponding sag, as determined on a level surface, and making the proper correction for temperature. The distance between centers of bearings on Piers 2 and 3 was afterward found to agree with the steel structure, as built within 5/16 in.

The entire work has been under the general supervision of W. A. Bowden, chief engineer, Department of Railways and Canals, Ottawa, and of J. W. Porter, chief engineer, Hudson Bay Railway, The Pas. It was designed in full by the writer, who has been retained throughout for consultation in connection therewith. The substructure was fabricated and erected by the Canadian Bridge Company, Limited, Walkerville, Ont. T. B. Campbell, bridge engineer, Hudson Bay Railway, was in charge of the bridge site; I. E. Mahon was the superintendent of erection for the bridge company; and James Carr, representative of the Canadian Inspection and Testing Laboratories, Limited, attended to the field inspection. The entire work has been carried out without loss of life or serious accident.

LOCOMOTIVE SITUATION IN SOUTH AFRICA.—The Minister of Railways in the South African Government, in presenting his railway budget, said that one of the greatest difficulties with which the administration had been faced was that of engine power. The maintenance of locomotives in good order was a problem that touched every country in the world. The British railways had had to send 700 engines overseas for military purposes, and they had 1,400 locomotives over the usual number awaiting repairs. The South African position had been slightly improved. There had been a considerable improvement in the water supply, and by resorting to various expedients, the Union had succeeded in keeping about 75 per cent of its engines in commission. In 1916, 26 per cent of the engines were out of repair, but in 1908 the Cape had 29 per cent of its locomotives in the shops, and Natal had 30 per cent. The greatest difficulty had been experienced in obtaining delivery of new engines. Last year 29 new standard gage engines had been placed in service, but 132 were still under order, and 28 ordered from America, were expected to be ready for shipment within a few weeks.

Orders of Southern Regional Director

B. L. WINCHELL, regional director of the Southern region, has issued the following circulars, among others:

Circular Letter No. 227 states that unless and until some different policy is determined upon, there are no objections to renewal of contracts with insurance companies, whereby the latter are permitted to solicit accident and health insurance among employees, and the railroad companies undertake to collect the premiums therefor by wage deductions with consent of the employee, retaining an agreed upon per cent of the deductions for their services; such contracts being non-exclusive, and assuming that the carrier has been advised by counsel that they do not conflict with any state statute as to payment of wages to employees.

Circular Letter No. 241 states that for the present there will be no change in the manner of issuing free transportation. Federal managers will issue transportation for their respective lines just as they have in the past.

Circular Letter No. 243 states that each shop repairing foreign line locomotives will be expected to give such work the same supervision, inspection and workmanship that is given their own locomotives. Therefore the practice of sending inspectors to supervise repairs to locomotives at foreign line shops will be discontinued. It has been found to be of practically no value, and in some instances has actually resulted in delaying the repairs. When a locomotive is sent to a foreign line shop for repair the road sending the locomotive will furnish all necessary material for repairs; and will also furnish to the railroad which will make the repairs a detailed report of the work to be done, and a complete list of the material which is being furnished. The material shall in all cases be forwarded with or in advance of the locomotive. Inspectors at foreign line shops should be recalled and assigned to their regular work. The foregoing is not intended to apply to locomotives undergoing repairs at contract shops, or at the plants of locomotive builders, nor is it intended to apply to men who are specially assigned to work of collecting and forwarding necessary materials for repairs.

Circular Letter No. 244 asks the railroads to send to the office of the regional director two copies of any circulars, general letters or bulletins issued by them with respect to allowing employees to retain seniority, or providing for reinstatement of employees returning from military or naval service and in order that the matter may be handled in a uniform manner the roads are directed not to issue further circulars of this kind until the matter has been determined.

George R. Loyall, assistant to the regional director, has issued Circular Letter No. 228, calling attention to the importance of storing fuel coal during the summer months so far as practicable, in order to conserve the car supply for commercial shipments during the winter months and asking the roads to report as to what progress is being made in this direction.

In another circular Mr. Loyall submits for consideration and an expression of views, a suggestion which had been made to him, that in these days of retrenchment and economy and shortage of labor it was wasteful to keep so many red cap porters and attendants at the various passenger stations and that this character of earning a livelihood should be classed as non-essential.

Circular Letter No. 226 states that the practice which was general a number of years ago for railroads to employ men known as car tracers who went on foreign lines and looked after home equipment, is useless under present conditions. The roads are asked to advise whether they employ any men for this purpose and, if so, the number and total expense per month.

Doings of the United States Railroad Administration

Railroad Administration Organization Near Completion: Railway Contract Negotiations

WASHINGTON, July 10.

WITH THE SELECTION of the federal managers, which are being announced by the regional directors after a conference last week with Director General McAdoo and members of his staff at White Sulphur Springs, to be followed by the extension of the policy of decentralization by the further sub-division of the western region into three or four regions, each under a regional director, the organization of the Railroad Administration may be said to be approaching completion. Director General McAdoo is planning to spend most of the summer at White Sulphur Springs, with frequent trips to Washington, leaving the detailed management of affairs in the hands of the staff he has built up, which now reports, in his absence, to Walker D. Hines, assistant director general of railroads. In the past two months he has been at his railroad office but two or three times, when he devoted himself to passing finally on important matters that had been made ready for his decision by his assistants; and when the finishing touches have been added to the machine he is expected to devote still less of his attention to railroad affairs and more to the important questions of financial policy involved in the revenue bill and other treasury matters.

His absence from his railroad office has included about three weeks, when he was touring the country making Liberty Loan speeches and three weeks during which he was confined to his home by illness, although he handled a great deal of business during that time and came downtown occasionally for an important conference. The balance of the time he has spent at White Sulphur Springs, where he has taken a cottage for the summer and where he has an office. Mr. McAdoo is still in poor health, and even though he leaves all possible detail to subordinates he will have enough big problems to settle.

For a time the principal developments in connection with the organization were in the direction of centralization of a mass of detail at the Washington offices, but many of the reports required were considered necessary information for the formulation of general policies. Now that the policies have been further developed the tendency is toward decentralization. While the Washington organization is a large one, it is small in proportion to that of a single large railroad, and it is now in a position to devote its attention mainly to large questions of policy, leaving the details to be settled locally.

The organization now consists of federal managers in charge of the operation of each property, reporting to the regional directors, each of whom has a departmental organization of his own, while the Eastern Region has a sub-district organization. The regional directors report both to the director general on general matters and to the departmental division directors in the central organization, each of whom has a staff of assistants and some of whom have subsidiary sections. Walker D. Hines, who was first appointed assistant to the director general, has recently had his title changed to assistant director general. He now has two assistants, and has recently considerably increased his office space, which indicates that he is taking over more of the executive detail.

The appointments of federal managers that have been announced thus far by the regional directors with the approval of the director general contain few surprises and are such as would be expected from Mr. McAdoo's announcement on the subject. Where the presidents are primarily operating officers they have been chosen, and in other cases

where the presidents have been more closely identified with matters of general policy than with operation, operating vice-presidents or general managers have been selected. In the south the railroad presidents who have been left are Fairfax Harrison of the Southern and Milton H. Smith of the Louisville & Nashville. In the East the appointments already announced leave as corporate officers Samuel Rea of the Pennsylvania, Daniel Willard of the Baltimore & Ohio, F. D. Underwood of the Erie, L. F. Loree of the Delaware & Hudson and several other presidents, but they also include several presidents, while others of the presidents have been appointed regional or district managers.

The appointment of federal managers as exclusive representatives of the government in charge of operation not only removes the corporate officers from any jurisdiction over operation but, it is understood, will displace them from their offices in the railroad office buildings, except as permission to remain may be extended to them by the government officers if sufficient space is available.

Appointments in Eastern Regional District

A. H. Smith, regional director of the eastern district, has announced a number of appointments, including district directors, federal managers and general managers.

James H. Hustis, president of the Boston & Maine and receiver in charge of the road under the United States court, was appointed district director in charge of the New England railroads with headquarters at Boston.

P. K. Todd, president of the Bangor & Aroostook was made assistant to the district director and general manager of the Bangor & Aroostook with office at Bangor, Me.

H. A. Worcester, vice-president and general manager of the Cleveland, Cincinnati, Chicago & St. Louis, was appointed district director in charge of the railroads in the Ohio-Indiana district.

P. E. Crowley, vice-president of the New York Central, was appointed federal manager of the New York Central and Lake Erie & Pittsburgh.

A. E. Stone, vice-president of the Erie, was appointed federal manager of that road.

F. P. Gutelius, vice-president and general manager of the Delaware & Hudson, was appointed general manager of that road.

F. L. Blendinger, vice-president of the Lehigh Valley, was appointed general manager of that road.

E. D. Bronner, vice-president and general manager of the Michigan Central, was appointed federal manager of the Michigan Central and Chicago, Kalamazoo & Saginaw with office at Detroit, Mich.

F. H. Alfred, president and general manager of the Pere Marquette, was appointed federal manager of that road with office at Detroit, Mich.

A. B. Newell, president and general manager of the Toledo Terminal, was appointed general manager of that road with office at Toledo, Ohio.

H. E. Whittenberger, general manager of the Western Lines of the Grand Trunk, was appointed general manager of these lines with office at Chicago, Ill.

NEW ENGLAND DISTRICT

B. R. Pollock, general manager of the Boston & Maine, has been appointed federal manager of that road with office at North Station, Boston, Mass.

District Directors, Federal and General Managers



J. H. Hustis
District Director of the New England
Railroads



H. A. Worcester
District Director of the Ohio-Indiana
District



P. R. Todd
Assistant to District Director New
England Roads.



P. E. Crowley
Federal Manager, New York Central



A. J. Stone
Federal Manager of the Erie



F. L. Blendinger
General Manager, Lehigh Valley



F. P. Gutelius
General Manager, Delaware & Hudson



E. D. Bronner
Federal Manager, Michigan Central



F. H. Alfred
Federal Manager, Pere Marquette



H. E. Whittenberger
General Manager, Grand Trunk
Western Lines

Federal Managers and General Managers



H. M. Biscoe
Federal Manager, Boston & Albany



E. J. Pearson
Federal Manager, New York, New
Haven & Hartford



G. L. Peck
Federal Manager, Pennsylvania Lines
West



C. W. Galloway
Federal Manager, Baltimore &
Ohio Lines West



J. A. Gordon
General Manager, Detroit,
Toledo & Ironton



G. T. Jarvis
General Manager, Rutland
Railroad



E. H. Coapman
Federal Manager, Southern
Railway



C. M. Kittle
Federal Manager, Illinois Central.



R. V. Taylor
Federal Manager, Mobile & Ohio



W. A. Winburn
Federal Manager, Central of Georgia

H. M. Biscoe, vice-president of the Boston & Albany, has been appointed federal manager of that road with office at South Station, Boston, Mass.

E. J. Pearson, president of the New York, New Haven & Hartford, has been appointed federal manager of the New York, New Haven & Hartford and Central New England with office at New Haven, Conn.

D. C. Douglass, general manager of the Maine Central, has been appointed general manager of that road with office at Portland, Me.

J. W. Wardlaw, assistant to president and purchasing agent of the Central Vermont Railway, has been appointed general manager of the same road, with office at St. Albans, Vt.

L. G. Coleman, superintendent of the Grand Trunk System, has been appointed general manager of the Grand Trunk Railway in New England, with office at Portland, Me.

G. T. Jarvis, vice-president and general manager of the Rutland Railroad, has been appointed general manager of that road, with office at Rutland, Vt.

OHIO-INDIANA DISTRICT

G. L. Peck, vice-president in charge of operation of the Pennsylvania Lines West, has been appointed federal manager of the Pennsylvania lines west of Erie and Pittsburgh; Cincinnati, Lebanon & Northern and Lorain, Ashland & Southern, with office at Pittsburgh, Pa.

C. W. Galloway, general manager of the Baltimore & Ohio Western Lines, has been appointed federal manager of the Baltimore & Ohio Railroad, west of Parkersburg and Pittsburgh, and Dayton & Union Railroad, with office at Cincinnati, Ohio.

E. M. Costin, general superintendent of the Cleveland, Cincinnati, Chicago & St. Louis, has been appointed federal manager of the Cleveland, Cincinnati, Chicago & St. Louis Railway, Cincinnati Northern Railroad, and Central Indiana Railway, with office at Indianapolis, Ind.

B. C. Stevenson, general traffic manager of the Toledo, St. Louis & Western Railroad, has been appointed general manager of that road, with office at Toledo, Ohio.

J. P. Main, general manager of the Detroit & Toledo Shore Line, has been appointed general manager of that road, with office at Detroit, Mich.

G. J. Derbyshire, division superintendent of the Chesapeake & Ohio Railway, has been appointed general manager of that road, with office at Peru, Indiana.

J. A. Gordon, general manager of the Detroit, Toledo & Ironton Railroad, has been appointed general manager of that road, with office at Detroit, Mich.

M. S. Connors, general manager of the Hocking Valley Railway, has been appointed general manager of that road, with office at Columbus, Ohio.

H. A. Boomer, general manager of the Lake Erie & Western Railroad, has been appointed general manager of that road, with office at Indianapolis, Ind.

Federal Managers for Southern Roads

B. L. Winchell, regional director of the Southern region, on June 7 announced the appointment of federal managers for most of the principal roads in the Southern region, to have jurisdiction over all departments of their respective railroads, reporting to the regional director, effective on June 8, as follows:

E. H. Coapman, vice-president in charge of operation of the Southern Railway System, was appointed federal manager of the Southern Railway System, the Georgia Southern & Florida, the Alabama & Vicksburg, the Carolina, Clinchfield & Ohio, and Carolina, Clinchfield & Ohio of South Carolina, with office at Washington, D. C.

C. M. Kittle, vice-president of the Illinois Central, was appointed federal manager of the Illinois Central, the Yazoo

& Mississippi Valley and the Gulf & Ship Island, with office at Chicago, Ill.

W. L. Mapother, first vice-president of the Louisville & Nashville, was appointed federal manager of the Louisville & Nashville and the Louisville, Henderson & St. Louis, with office at Louisville, Ky.

R. V. Taylor, vice-president and general manager of the Mobile & Ohio, was appointed federal manager of that road and the Gulf, Mobile & Northern, with office at Mobile, Ala.

W. A. Winburn, president of the Central of Georgia, was appointed federal manager of that road, with office at Savannah, Ga.

J. H. Young, president of the Norfolk Southern, and federal manager of the Virginian, was appointed federal manager of the Norfolk Southern, with office at Norfolk, Va.

Appointments by Western Regional Director

S. G. Strickland, general manager of the Lines East of the Chicago & North Western was appointed federal manager of that road with office at Chicago. F. Walters, general manager of the Lines West of the Chicago & North Western, was appointed general manager of the whole system with headquarters at Chicago. W. J. Towne, assistant general manager of the Lines East of the Chicago & North Western, was appointed assistant general manager of all lines with headquarters at Chicago. E. E. Nash, assistant general superintendent of the Chicago & North Western at Boone, Ia., was appointed assistant to the federal manager of that road with office at Chicago.

Increased Rates

The increased passenger fares went into effect on June 10 with comparatively little protest. There was one complaint because the Long Island Railroad announced its intention of applying a rate of 3 cents a mile on its Atlantic avenue division running into Brooklyn, but it was decided at Washington that this was a commutation service and that the rates could be increased only by 10 per cent.

An advance in the fares of the Hudson & Manhattan Railroad, including an increase from 5 to 10 cents in the tunnels, also brought a storm of protest, and an effort was made to have the Long Island ruling applied, but it was stated that the increase in tube fares had been personally approved by Mr. McAdoo. On Saturday, however, it was ordered that there should be no increase pending an investigation, and a similar order was made as to the fares on railroad ferry boats between New Jersey and Manhattan points.

Some complications were caused by the fact that the new tariffs covering the passenger fares were not ready until shortly before they took effect. For example, a Washington man who was going to New York on a train at 12:10 a. m. Monday, tried to buy his ticket and reserve his berth on Friday. This is an advisable and sometimes necessary precaution in these days. But he was told that the agent could not sell him a ticket for that train until midnight Sunday, and that he could not sell him a prepaid order because he did not know what the rate would be. Contemplating the difficulty of purchasing a ticket in ten minutes, the man decided to take a train leaving Sunday afternoon.

A conference of the regional passenger traffic committees has been called to meet in Chicago on June 17, with Gerrit Fort, assistant to the director of traffic in charge of passenger matters, to discuss modifications of the rates for tourist and excursion fares.

Division of Operation

Circular No. 32, issued by Director General McAdoo, announces that the name "Division of Transportation" is changed to "Division of Operation," and Carl R. Gray, heretofore director of the Division of Transportation, is appointed director of the Division of Operation.

Railroad Contract Negotiations

Negotiations between the committees representing the railroads and the Railroad Administration over the standard form of contract for the compensation to be paid the railroad companies by the government are proceeding slowly with little prospect of an agreement on the terms much before July 1, when the government wishes to have the matter settled, because by that time it will have to make its decisions as to which of the short lines are to be retained under federal control or relinquished. Another conference between the committees was held on Monday and three more were to be held later in the week. The railroad committees, headed by Alfred P. Thom, counsel for the Railway Executives' Advisory Committee, is apparently proceeding in an effort to maintain the negotiations on an amicable plane, while the special committees representing the National Association of Owners of Railroad Securities have apparently delayed a settlement by a more belligerent attitude of insistence in behalf of the security owners. These committees were represented at the conference by S. Davies Warfield, president of the association, and Samuel Untermeyer, counsel, who recently gave out statements to correct an impression that a satisfactory agreement was in sight, following the meeting of railway executives in New York last week, at which the law committee made its report on the progress of the negotiations.

Both sides are reticent regarding the details of the points in controversy but it is understood that the principal points on which there has been difficulty in reaching an agreement involve the extent to which there shall be departures from the so-called "standard return," the average of the net operating income for 1915, 1916 and 1917, and the extent to which the government may control the disposition of the money paid to the railroad as compensation. The government proposes to deduct from the compensation an amount to represent expenditures for maintenance in excess of the average for the three years and also to order a railroad to make improvements at its own expense regardless of their value to the railroad after the war and the extent to which these points are to be determined by the government or by the railroad have consumed much of the time of the negotiations.

A sub-committee of the law committee of the Railway Executives' Advisory Committee, which has been handling the negotiations for the railroads, made a report to a meeting of the executives at New York on June 5 and there was a protracted discussion of the position of the railroads with reference to the contract. It is understood that the executives adopted a resolution of approval of the work of the law committee, but that a difference of opinion developed between the railway executives and representatives of the National Association of Owners of Railroad Securities, who were represented by a sub-committee and a special committee headed by S. Davies Warfield, president of the association, as chairman, and represented by Samuel Untermeyer and B. H. Inness Brown as counsel. After a meeting of the sub-committee held on the following day a statement was given out by Mr. Warfield, which gives some indication of the present status of the negotiations, which have been given little publicity, as follows:

"If the published reports of the proceedings of Wednesday's meeting of the Railway Executives' Advisory Committee called to consider the contract between the government and the railroads have given the impression that there is a satisfactory agreement in sight between the contracting parties upon the fundamental points involved, that impression should be promptly corrected in the interest of and in justice to the security holders of the roads as well as the government

"The two committees have been constantly following the

proceedings, one the sub-committee of the National Association of Owners of Railroad Securities, the other, a special committee, representing owners of railroad securities, through meetings held in Washington and elsewhere.

"After weeks of negotiations and careful study of the agreement in its present state of negotiation, the committees have reached the conclusion that it is acceptable in many vital particulars, but are hoping that through further negotiation a document will be evolved which will reasonably protect security holders of these vast properties. We believe that the procuring of a reasonable contract in accordance with the spirit of the President's proclamation, under which these roads were taken over by the government is essential to the stabilizing of the credit situation of the country and to the winning of the war. The billions of dollars for which the government must rely largely on the millions of holders of railroad securities can best be made available to the government by a just treatment of these most important interests. It is in that spirit and with the determination that no false step shall be taken at this critical time that might impair the stability of our financial structure in its direct bearing on the winning of the war, that these committees will endeavor to procure substantial modifications in the tentative draft of contract, so far as the negotiations have progressed with the government officials. It is proper to say that in the negotiations none of the representatives of the security holders have as yet come into close contact with Director General McAdoo in the discussion of the questionable features of the contract.

"At the meeting of the railway executives yesterday the committees addressed a communication to Chairman T. DeWitt Cuyler, of that meeting. This letter contained a copy of an opinion given to the security holders' committee, by Samuel Untermeyer, of counsel, concurred in by associate counsel, in which Mr. Untermeyer takes serious exception to a number of the fundamental features of the proposed contract in its present form, which the security holders' committee unanimously endorsed. The committee's letter to Mr. Cuyler is in part as follows:

"During the earlier part of the negotiations for the contract, its formulation appeared to these committees a comparatively simple matter and they accordingly refrained from intervening, contenting themselves with keeping advised of the negotiations, but it gradually became evident that the contract was developing upon lines that involve a far-reaching departure from the spirit and principles of the President's proclamation and embodying conditions that these committees regard as imperiling the integrity of the properties and the fundamental rights of the security holders.

"When by reason of the constantly increasing demands of the government representatives, this conclusion appeared irresistible, the committee asked and received permission, through counsel, to take part in the negotiations that had been for months proceeding without their presence or participation. It was felt that the association and the special committee could no longer consistently with the purposes of their organizations, escape this responsibility in the crisis that is now confronting the security holders, especially in view of the facts (1) that the contract expressly requires ratification by the stockholders of railroads, (2) that if it is recommended for execution in its present substance of form (which to these committees is unthinkable), the values of railroad bonds and stocks will be gravely imperilled, and (3) that the officers and directors who are now acting for their respective roads were elected by the shareholders under normal conditions of private operation, to perform the current duties of management, and that no such vast power as is now proposed to be exercised by them in tentatively committing their respective companies to this contract, was contemplated. The committees respectfully insist that no

such power should be attempted to be exercised by the executives beyond a mere recommendation to the shareholders for or against the adoption of a contract.

"The views of the committees upon the leading feature of the contract in its present stage of negotiations, so far as its terms have been permitted to become known to the committees or their counsel, Samuel Untermyer and B. H. Inness Brown, are set forth in the accompanying report of counsel, which has been adopted by the committees in its entirety, and which we will ask you to be good enough to read in full at your tomorrow's meeting in conjunction with this letter.

"In our judgment, the contract should be redrafted in its main features.

"It is, however, their earnest hope and expectation that by the exercise even at this late date of a fair amount of firmness in the association and maintenance of the just rights of the security holders, a reasonable, workable agreement may yet be possible through further negotiations. Our right to be active in these proceedings has been questioned. We represent vast interests in railroad ownership. We were organized to protect that ownership. These committees shall, therefore, continue their efforts to secure a contract which will be fair alike to the owners of railroad securities and to the government. To that end, the undersigned committees will gladly co-operate with your representatives.

"We are facing the imminent peril of the destruction of great property values.

"If and when your body shall conclude upon recommending any action upon the proposed contract we hereby request (1) that action upon the proposed contract be made the subject of special meetings of directors of each railroad. (2) that copies of the proposed contract be sent to each director in advance of the meeting at which action is to be asked, (3) that action upon the contract at the stockholders' meeting be likewise made the subject of a special meeting, and (4) that the stockholders be fully advised of the terms of the proposed contract."

The sub-committee representing the railways consists of Alfred P. Thom, general counsel for the Railway Executives' Advisory Committee; A. H. Harris, vice-president of the New York Central; Burton Hanson, general counsel of the Chicago, Milwaukee & St. Paul; J. P. Blair, general counsel of the Southern Pacific; C. W. Bunn, general counsel of the Northern Pacific; F. I. Gowen, general counsel of the Pennsylvania Railroad, and S. T. Bledsoe, general counsel of the Atchison, Topeka & Santa Fe.

Safety Committees

C. R. Gray, director of the Division of Transportation, has issued Circular No. 5, ordering the organization of safety committees, as follows:

"In order to promote the safety of employees and travelers upon railroads, establish uniformity in the important principles of safety work, and carry out the purpose of the director general's Circular No. 7 of February 19 creating the Safety Section of the Division of Transportation, safety committees, composed of officers and employees, shall be organized on all railroads under federal control.

Each Class I railroad having more than one superintendent shall have a general or central safety committee, composed of the active heads of each department. In addition there shall be formed in each superintendent's territory, and at the principal shops and terminals, with the ranking officer as chairman, division, shop and terminal committees, which shall consist of the heads of departments and one employee representative from each class of service.

"On Class I railroads having but one superintendent it will be satisfactory to have one general committee, composed of department heads and employees representing each class

of service, and such other shop or terminal committees as are found necessary.

"Each carrier shall designate an officer or employee, who will be responsible for the safety work on his road. His name and address, together with detailed information concerning the safety organization perfected, should be furnished the manager of the safety section not later than August 1."

Ghost of Sherman Law Postpones Express Contract

Signature of the contract with the express companies providing for their consolidation was postponed for a time, although it was approved by Director General McAdoo over two weeks ago, because someone objected to the President about a provision in the agreement that seems to project the merger into the period after the war by providing that the express company shall conduct express business for the railroads after the termination of federal control at their request. The idea seems to be that the consolidation of competing companies during the war is all right but that the Sherman law will be in effect afterward. It is understood that the President asked that the contract be held up until this difficulty was ironed out but that it was corrected after Mr. McAdoo had had an opportunity to discuss the matter with the President on Monday. A plan has also been agreed upon which the three express companies owned by railroads will lease their property to the new express company, the rental thus received to go into their outside income.

Agricultural and Industrial Development Work

Industrial department work, of the kind that has resulted in the past from the competition between railroads for the location of industrial plants, is to be discontinued, according to a circular issued by B. L. Winchell, regional director for the Southern District, outlining the policy of the Railroad Administration towards the establishment of new industries and the development of natural resources. The circular says that increase in agricultural production is a very necessary effort at this time; the development of certain natural resources is also very desirable; new industries in the Southern section which will contribute to the production of essentials are very desirable and should be encouraged; but offers of rate adjustments which discriminate against similar industries already in operation in the same or other sections as an inducement to locate on a given line as against another line, and the like, should not be made. The supervision of the activities relating to the promotion of agriculture and industry, the circular directs, should be placed under the jurisdiction of the freight traffic department, because there is a certain amount of consideration or investigation which must be given by freight traffic officers to every industrial or agricultural proposition. The agricultural work, hereafter, should be directed to increase the production, better the quality, better the preparation for market, teach the use of safer containers, proper loading of cars, heavier car loading, and in other ways aid and encourage the producers.

Car Thieves Indicted

The Section for the Protection of Railroad Property, which is conducting a campaign to prevent pilfering from railroad freight cars, has announced the indictment by a federal grand jury at Toledo, Ohio, of 89 persons, including a yardmaster and several railroad employees, in connection with a series of systematic car robberies extending over a period of years. Arrests have also been made at other large switching centers, including Chicago, St. Louis, Pittsburgh, Detroit and Jersey City.

In order that freight cars may be utilized to the maximum by loading in one car when possible two or more shipments each subject to published minima and rates the

same as if loaded separately, the following rules governing the double and triple loading of cars have been adopted by the car service section after careful consideration; and railroads are instructed in Circular CS-12 to issue the necessary instructions in accordance therewith, effective June 1, 1918, so that instructions may be uniform on all railroads.

1. Consignments may be of the same or of separate destinations. If for two or more destinations, intervening consignments must be to agency stations directly en route to the final destination.

2. Each consignment must be plainly marked, showing consignee and destination, and also in material form, so arranged to facilitate the marking of each consignment with the ease, possibility of confusion, error, loss or damage.

3. Bills of lading and separate waybills must be made so as to distinguish each consignment as if loaded in a separate car. Waybills must plainly indicate that car contains two or more separate shipments and should be plainly endorsed "Car contains more than one load, stop at _____ for partial unloading."

4. No diversion or change of destination or reconsigning in transit will be allowed, except where, under published rules, it may be in the same direction and over the same route as in the initial shipments after previous shipments have been unloaded. Movement to final destination will not be considered a reconsignment.

5. Switching or lighterage charges, if any, will be assessed for delivery at each destination, according to current switching tariffs. No switching or lighterage charge will be made against shipper or consignee for return of car to carrier at one destination for its continued journey beyond. The inbound carrier will absorb such charge if any.

6. Agent must supervise unloading and make careful check on quantity and condition of consignment for his station. He must see to it that load remaining in car is retransferred, if necessary, to protect it from damage. He must note on waybill that part of load, for his station, has been removed. He must see that car is promptly reported for movement to next destination.

7. When shipments are for the same destination, notice of arrival and demurrage will be handled as follows:

(A) Where two or more consignments take bulk track delivery, all consignees will be promptly notified of arrival of car, that simultaneous unloading may be accomplished.

Consignee responsible for detaining car beyond free period must pay the demurrage charge. In the event that more than one consignee fails to remove contents within free period, demurrage will be collected pro rata.

(B) Where one consignee takes bulk track delivery and another private track delivery, each transaction will be independent of the other, and demurrage will be charged accordingly.

8. Double or triple loading of consignments billed "shipper's order" will not be permitted unless the name and address of the party or firm to be notified is shown on the original shipping instructions and the location of such party or firm is at the billed destination of the consignment.

The Car Service Section, in Circular No. C. S. 13, has promulgated the following rules for the guidance of all carriers in distributing open top cars:

1. Open top cars, suitable for such traffic, should be furnished preferentially for the transportation of coal, coke, ore, and raw materials used in blast furnace operation.

2. Available open top cars, not suitable for the transportation of coal, coke, ore, or raw materials used in blast furnace operation, may be furnished for the transportation of stone, sand and gravel, and when so furnished shall be used preferentially for highway maintenance materials.

3. Open top cars, suitable for the transportation of coal, coke, ore, or raw materials used in blast furnace operation and available on roads producing the same in excess of the demand of such commodities, may be furnished for the transportation of stone, sand and gravel, and when so furnished shall be used preferentially for highway maintenance materials. The return movement to mines or ovens should be utilized wherever practicable in furnishing car supply for stone, sand and gravel. Every endeavor should be made, consistent with keeping up the production of coal, coke, ore and raw materials used in blast furnace operation, to furnish shippers of stone, sand and gravel with a minimum of forty per cent of their normal weekly transportation requirements.

4. Roads which are not producers of coal, coke or ore must not use foreign open top equipment for stone, sand or gravel shipments, except for one load in the course of the return movement to mines or ovens.

5. Where the transportation needs of essential road construction or maintenance projects cannot be met by car supply furnished in accordance with the above rules, the state, county, or municipal officials in charge of the work, should, through their proper state highway department, apply to the director of the Bureau of Public Roads, United States Department of Agriculture, Washington, D. C., for assistance. Such applications will be considered by representatives of the Department of Agriculture, the War Department, the War Industries Board, the Fuel Administration and the Railroad Administration, and in accordance with the recommendations of such representatives, the Car Service Section will endeavor to furnish car supply necessary for approved essential road construction or maintenance.

"It must be understood that car supply for stone, sand and gravel must not be permitted to jeopardize the essential production of coal, coke or ore. If at any time such a result is apparent on individual roads, or generally, orders will im-

mediately issue to curtail the car supply for stone, sand and gravel."

State Commissions Ask Suspension of Rate Order

Members of the state railroad commissions, acting through the National Association of Railway and Utilities Commissioners, have been exerting themselves strenuously to rescue the prerogatives of the state commissions from the state of oblivion which Director General McAdoo's General Order No. 28 would create as far as their control over rates is concerned. The efforts of the state commissions included a conference in Washington on June 4 and 5, attended by commissioners from 21 states, including the executive and special war committees of the association, which was described in a statement issued by C. E. Elmquist, their Washington representative, as "for the purpose of considering plans looking towards effective co-operation between the states and the federal government in the operation of the railroads," and a pilgrimage on June 6 to White Sulphur Springs for a conference with Director General McAdoo, after which they returned to Washington and discussed their troubles further with C. A. Prouty, director of the Division of Public Service and Accounting.

At the meeting at Washington resolutions were adopted covering four specific points as follows:

1. That the states should continue to exercise their lawful police powers over such shipments as stone, gravel, railroad crossings, safety appliances, traffic, unbusinesslike station facilities, and the ordinary questions which are essentially of local concern.

2. That the states continue to exercise control over local rates, either according to the laws of several states, or acting as agencies to be appointed by the director general under the provisions of section 8 of the Railroad Act; and that all intrastate rates, as well as interstate rates affecting the same, be filed with the state commissions according to law.

3. That unless the war emergency is controlling, General Order No. 28, increasing freight and passenger rates should be suspended for a reasonable time to permit readjustments to be made in relationships as well as in class and commodity rates.

4. That additional public representation should be made in the director general's official family.

At the conference at White Sulphur Springs, requested by Mr. McAdoo, these resolutions, as well as arguments and a petition were presented to him. A statement regarding the conference given out from Mr. Elmquist's office said:

"Attention was called to the fact that General Order No. 28 does not prescribe a uniform increase, that class rates are increased from 25 per cent to 350 per cent, commodity rates from 25 per cent to 300 per cent, and passenger fares from 10 per cent to 300 per cent.

"Generally speaking the commissioners are of the opinion that increased rates should be made so far as necessary to take care of the higher operating cost of the railroads during the war, but insist that this increase should be applied to the existing state and interstate rates and classifications. They argued that there is nothing in the present situation which justifies the complete emasulation of the rate schedules which are the result of years of thought and experience and emphasized the fact that the rate order will result in innumerable injustices and discriminations to shippers and communities and that irreparable injury will fall upon thousands of people and industries.

"In their opinion investigations should proceed upon two lines: First, to immediately take care of necessary rate relationships and those increases which will cause undue hardships to shippers, and also the effect of the elimination of state rates. No radical changes in rate structure should be incorporated in an order intended to meet a definite emergency. If any other changes are desirable they should be made only after careful investigation and the hearing of all interested parties. They also believe that a very complete investigation should be made by the Interstate Commerce Commission as to the reasonableness of the increased rates as provided in General Order No. 28.

"The director general gave assurance that reasonable ad-

justments especially in those cases where grievous injury would be done, might be taken care of before June 25 and that Judge Prouty was authorized to deal with those matters."

Not entirely satisfied with the newspaper accounts of the conference obtained from the state commission's side, Mr. McAdoo had an account of the meeting telegraphed from White Sulphur Springs on the following day. From this it appears that the state commissioners explained to him that they did not come to criticize or to complain but simply to seek a basis of co-operation between the state commissions and federal control of railroads. They emphasized the patriotic purpose of their visit, and assured the director general that they were ready to stand back of him to the limit and co-operate with him in every possible way to make the railroads of the country function at the highest notch of efficiency in the support of the war purpose of the nation.

The director general assured them of his appreciation of their support, and told them that he welcomed their co-operation. He expressed regret that he had not been able to confer with the state commissions before determining upon the increased railroad rates but that immediate action was vitally necessary, and months would have elapsed necessarily before each commission could have submitted its suggestions, while, in the meantime, the railroad deficit would have been steadily mounting. It was imperative for rates to be raised on account of the heavy increases in wages, in materials, in fuel, etc.

If it is found that these rates are more than sufficient to cover the necessary expenses of the railroads, then, of course, rates will be reduced. He said to the commissioners that he would be glad to consider any readjustments of rates to fit conditions as they develop. The American people, who are the consumers and must bear the increases of rates in the last analysis, the director general pointed out, are ready to make every sacrifice demanded of them to win this war.

As to the exact definition of the relationship of the state commissions to federal control, the director general stated that this was impossible to make in a general order. This relationship can only be defined as we go along. It would be an evolutionary process. The director general requested the commissioners to appoint a committee to see whether any way could be devised by which a proper synchronization of effort, a proper co-ordination of resources, could be obtained. He assured them that he would welcome such a report and would give it his most earnest consideration. But, in the meantime, the state commissions can render a very great service to the country by advising him regarding matters within their jurisdiction.

Important modifications are likely to be made in Director General McAdoo's order prescribing increases in freight rates before it becomes effective on June 25. The most important change is to be made to meet the objections of the state railroad commissions who complained, not only because their authority was completely ignored by an order to first raise state rates to the level of interstate rates in the same territory, and then to apply increases to rates thus raised, but because this plan would result in advances ranging as high as 300 per cent in some cases. After consideration of the state commissioner's protest, it has been decided to apply the percentage and specific advances directly to existing state rates and classifications, without a preliminary advance; other modifications to be made are elimination of the \$15 minimum rate per car on some commodities, the application of rate increases to purely switching movements which are not in connection with a line haul, and the application of only one increase in the case of a rate made up of the combination of two or more rates, except where the advance is a percentage; some consideration has also been given to a modification of the order eliminating export and import rates.

Board to Adjust Controversies with Shop Employees

Director General McAdoo has issued General Order No. 29 putting into effect as of May 31 an understanding between the regional directors, representing the railways in their respective regions and the officers of the Railway Employees' Department of the American Federation of Labor, the International Association of Machinists, the International Brotherhood of Boiler Makers, Iron Shipbuilders and Helpers of America, the International Brotherhood of Blacksmiths and Helpers, the Brotherhood of Railway Carmen, the Amalgamated Sheet Metal Workers' International Alliance, and the International Brotherhood of Electrical Workers, providing for the adjustment of all controversies growing out of the interpretation or application of the provisions of wage schedules or agreements which are not promptly adjusted by the officials and employees on any of the railroads operated by the government.

The memorandum of agreement is similar to that between the regional directors and the brotherhoods of train employees, which provided for reference of controversies to Board of Adjustment No. 1.

Classification of Budgets for Capital Expenditures

The Railroad Administration on Wednesday announced the classification of budgets of capital expenditures for all railroad and terminal companies for 1918 as approved by the Division of Capital Expenditures with some additions, bringing the previously announced total up to \$946,000,000. The classification of work is as follows:

Capital Expenditures.	Class of Work.
Widening cuts and fills, filling trestles, etc.	\$4,969,000
Ballasting	9,524,000
Rails and other track material	31,556,000
Bridges, trestles and culverts	38,035,000
Tunnel and subway improvements	2,195,000
Track elevators or depressions	6,691,000
Elimination of grade crossings	7,784,000
Grade crossings and crossing signals	640,000
Additional main tracks	47,471,000
Additional yard tracks, sidings and industry tracks	98,661,000
Changes of grade or alignment	6,863,000
Signals of interlocking plants	11,147,000
Telegraph and telephone lines	5,031,000
Roadway machinery and tools	954,000
Section houses and other roadway buildings	1,510,000
Fences and snow sheds, right-of-way snow or sand fences	817,000
Freight and passenger stations, office buildings, etc.	22,940,000
Hotels and restaurants	199,000
Fuel stations and appliances	6,164,000
Water stations and appurtenances	13,447,000
Shop building, engine houses	61,979,000
Shop machinery and tools	10,544,000
Electric power and substations, transmission lines, etc.	10,771,000
Wharves and docks	3,236,000
Coal and ore wharves	7,024,000
Grain elevators and storage warehouses	2,954,000
Real estate	3,357,000
Assessments for public improvements	1,171,000
All other improvements	28,491,000
Total (excluding equipment)	\$445,639,000
Locomotives	\$199,075,000
Freight-train cars	206,994,000
Passenger-train cars	28,340,000
All other equipment	12,963,000
Improvements to existing equipment	35,043,000
Total equipment	\$482,417,000
Construction of extensions, branches and other new lines	18,237,000
Total	\$946,293,000

Payment of Freight Charges

Director General McAdoo on Wednesday, postponed the accepted date of General Order No. 25, which provides for taking the collection of transportation charges on a cash basis, from July 1 to August 1. The rule, however, will not apply to transportation service rendered through the departments or bureaus of the United States government to the Allies, to the states, counties and municipalities, to the District of Columbia, Alaska and the American Red Cross.

On Wednesday, Director General McAdoo announced the creation of three new Regional Districts in the West. Complete details concerning these new regions and their directors and other late news of the doings of the railroad administration will be found on page 1439.

Standardization of Indian Railways' Locomotives

Developed by British Engineering Standards Committee
for the Secretary of State for India

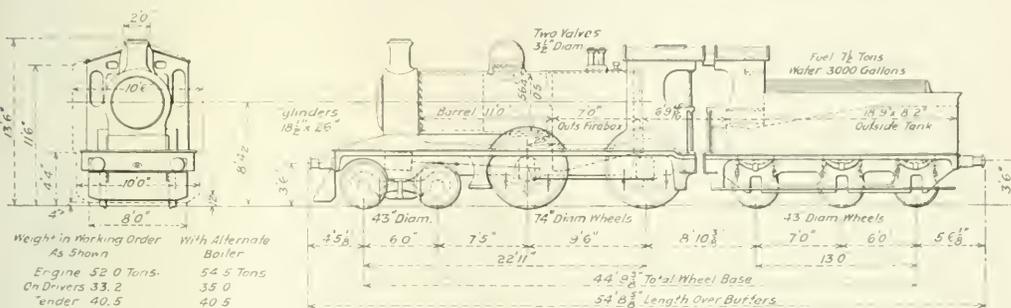
By E. C. Poultney

M. Am. Soc. M. E., A. M. Inst. Mech. E.

THE ADVANTAGES TO BE ENJOINED in establishing a standard design of locomotive may be divided under three headings. One would be first cost, as makers having once obtained all the necessary fixtures for machining the details, and the required flanging blocks and other equipment for making the boilers, would be able to manufacture at a minimum cost; in the second place, operating costs would be lower, due to less costly repair parts and owing

to the fact that the maintenance of the locomotive department is vested keep an open mind. Improvement in detail should always be kept in view and advantage taken of any real improvement when such can be suggested. If this is done, keeping in mind that modifications decided on should be such that they are applicable to as many engines as possible, standards will not be sacrificed.

The railways in India are supplied almost entirely with

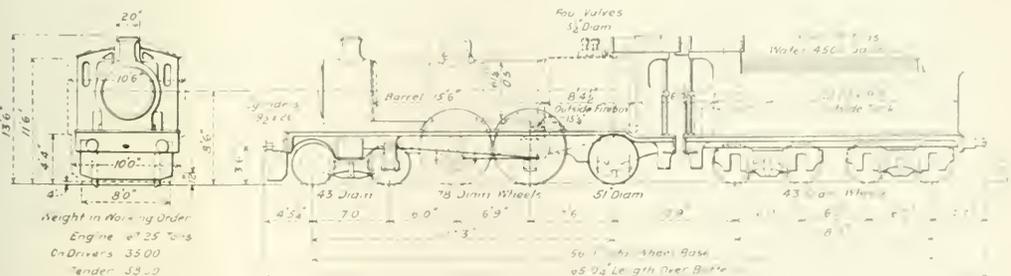


Standard 4-4-0 Type Passenger Locomotive with Alternate Boilers, 5-ft. 6-in. Gage, Tractive Effort, 19,480 lb.

to the less variety of such parts to be kept in stock, less quantities of each article would be required and the outlay in the value of repair parts would be less. From the point of view of the operating department, advantage is gained from the fact that the wheels and motion of one engine may be used for another engine should occasion arise. In this connection also the value of standard boilers for engines for both passenger and freight service cannot be over-estimated,

equipment made in Great Britain, constructed under the supervision of the consulting engineers acting for the particular railway company ordering the locomotives, and the standard engines now under review were designed at the request of the Secretary of State for India by the Engineering Standards Committee, which was inaugurated in 1901 under the auspices of the leading engineering institutions.

A conference of locomotive superintendents was held in



Standard 4-4-2 Type Passenger Locomotive, 5-ft. 6-in. Gage, Tractive Effort, 20,533 lb. Six-Wheel Tenders May Be Used as Alternate

as using the boiler of one engine to replace the boiler of another often makes it possible to get an engine out of the shops much sooner than would otherwise be possible.

To set against these advantages there is the certain fact that standardization is likely to retard progress in design and development, unless those in whose hands the admin-

istration of the locomotive department is vested keep an open mind. Improvement in detail should always be kept in view and advantage taken of any real improvement when such can be suggested. If this is done, keeping in mind that modifications decided on should be such that they are applicable to as many engines as possible, standards will not be sacrificed.

turers, British railways locomotive engineers, Calcutta Locomotive Conference. The committee meets yearly and discusses improvements in design, and the reports received from India submitted by the various locomotive superintendents.

It will be seen that the committee formed represented all the interests connected with the locomotive building industry, and might be considered well able to come to decisions on this important subject.

In general the aim of the Locomotive Standards Committee was to design locomotives, the principal features of which should be standard both in regard to design and dimensions and to the materials used in construction. The boilers and their details, wheels, tires, axles, bogies, frames and frame details, cylinders and motion are the same for each type of engine, and in many instances, such as in the case of the

Commencing in 1903, the first standard locomotives were designed, consisting of two types—one for passenger and the other for freight service, for use on the 5-ft. 6-in. gage lines, and two classes of 4-6-0 engines with six-wheeled tenders and one type of 4-8-0 engine with six-wheeled tender for use on the metre gage lines.

Considering first the broad gage engines, the passenger locomotives were of the 4-4-0 type fitted with six-wheel tenders, and the engines for goods or freight traffic were of the 0-6-0 type, also having six-wheel tenders.

Three chief features were first of all decided, namely, that the working steam pressure should be 180 lb., that inside cylinders should be employed, and that the boilers should be of the Belpaire pattern. This type of boiler was decided on for the reason as stated by the committee, that "it

TABLE I—DIMENSIONS OF 5 FT. 6 IN. GAGE STANDARD LOCOMOTIVES

Type	Cylinders	Coupled wheels, diameter	Heating surfaces, sq. ft.			Grate area, sq. ft.	Weight on coupled axles, tons	Total weight, tons
			Tubes	Firebox	Total			
4-4-0	18½ in. by 26 in.	6 ft. 2 in.	1,230 1,453	128 150	1,358 1,603	23.3 27.0	33.2 35.0	52.0 54.5
0-6-0	18½ in. by 26 in.	5 ft. 1½ in.	1,230 1,453	128 150	1,358 1,603	25.3 27.0	49.0 51.5	49.0 51.5
2-6-4	18½ in. by 26 in.	5 ft. 1½ in.	1,230 1,453	128 150	1,358 1,603	25.3 27.0	45.0 46.3	76.5 79.3
Tank								
4-4-2	19½ in. by 26 in.	6 ft. 6 in.	1,833	157	1,990	32.0	35.0	67.25
4-6-0	19 in. by 26 in.	6 ft. 2 in.	1,833	157	1,990	32.0	50.5	69.0
2-8-0	20 in. by 26 in.	6 ft. 8½ in.	1,914	173	2,087	32.0	63.5	71.5

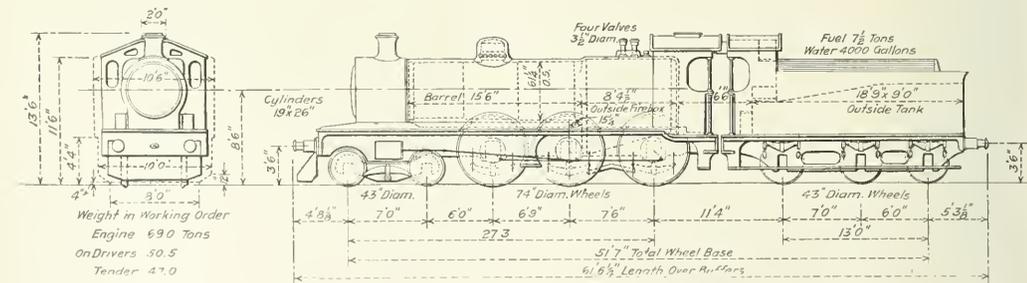
* Alternative boiler with barrel 5 ft. 1½ in. dia. outside smallest course, 11 ft. long. Steam pressure 180 lb. in all instances.

broad gage 4-4-0 and 0-6-0 types, the 4-4-2 and 4-6-0 types, and the metre gage 4-6-0 type engines for passenger and mixed traffic, the boilers interchangeable.

Owing to the different conditions met with on the various roads, certain details are left to the discretion of the locomotive superintendents of the railways concerned, such details being the design of the chimney and spark arrester device, if any be fitted, also the arrangement of the ash-pan and fire-bars and other details of a similar nature.

The materials used and the design of such parts as are intended to be retained to the specified standards are included in the comprehensive lists drawn up by the committee and known as "Instructions to Designers." These lists de-

gives more steam and water capacity than the usual arrangement with semi-circular outside shell and girder stays for the inside firebox, and with increasing pressures and larger fireboxes the length and weight of girders become excessive and direct staying has to be resorted to." The cylinders had their valve chests on the top, and Stephenson motion operated the valves through the medium of rockers. The valves were of the semi-balanced type. The coupled wheels of the passenger engine were 6 ft. 2 in. in diameter, in conformity with Indian practice at the time, so that tires of a size already in extensive use could be employed. In like manner the wheels of the freight engine were made 5 ft. 1½ in. in diameter. Details such as axles, axle boxes, horn-



Standard 4-6-0 Type Passenger Locomotive for 5-ft. 6-in. Gage Lines, Tractive Effort 23,440 Lb. The Same Boiler Is Used on 4-4-2 Type Passenger Locomotive

tail the construction desired and specify the materials. The engines are all built strictly to the specifications, and their construction and the manufacture of the material used are carried out under the supervision of the consulting engineers.

Having reviewed the various types of engines working on the Indian railways, their chief features could be noted and also those characteristics either of design or in the dimensions of the important parts, which should be modified as experience indicated. In that way a starting point was attained.

blocks, cylinders, valves and pistons, valve motion and motion details were identical in each type, and the boilers were also interchangeable. Certain details were left to the individual requirements of the railway authorities, such as the kind of springs employed; helical springs were permitted for the driving axles in lieu of the laminated springs specified.

Latitude was also allowed regarding the brake equipment used, which could consist of either a steam brake acting on the engine and tender simultaneously with the va-

vacuum brake on the train,* or the vacuum brake apparatus could be fitted to the engines and tender and the steam gear dispensed with.

The two classes of engine had six-wheel tenders of identical dimensions, having a fuel space for 7½ tons of coal (16,800 lb.) and a water capacity of 3,000 Imperial gallons.

All the engines were required to have boilers with not less than 2,000 sq. ft. of heating surface, a grate area of not less than 50 sq. ft. and a steam pressure of 180 lb. per sq. in.

In addition, another goods engine was designed similar to the one just mentioned, but having coupled wheels 56½ in. diameter, it being noted that there were in service many en-

TABLE 11—DIMENSIONS OF METRE GAGE ENGINES
Heating surfaces, sq. ft.

Type	Cylinders	Driving wheel, diameter	Heating surfaces, sq. ft.			Grate area, sq. ft.	Weight on coupled axles, tons	Total weight, tons
			Tubes	Firebox	Total			
4-6-0	15½ in. by 22 in.	4 ft. 9 in.	954	108	1,062	16	34.3	57.8
4-6-0	15 in. by 22 in.	4 ft. 9 in.	954	108	1,062	16	26.4	34.0
4-8-0	16 in. by 22 in.	3 ft. 7 in.	1,166	100	1,266	17.5	32.5	40.5
2-6-2 (Tank)	15 in. by 22 in.	3 ft. 7 in.	1,031	100	1,131	13.4	28.5	43.7

The tender engines have six-wheel tenders, all same weight and design, having a capacity of 2,000 Imperial gallons of water and space for 4 tons of coal.

The tank engine carries 800 gallons of water and 1½ tons of coal. Cylinders are all outside, and Walschaert valve motion is used in all cases. Steam pressure—180 lb. in each case.

Coming to the metre gage engines, the first standard engines were classified as follows:

- (1) A passenger engine of the 4-6-0 type, with a six-wheel tender.
- (2) A mixed traffic engine of the 4-6-0 type, with a six-wheel tender.
- (3) A heavy goods engine of the 4-8-0 type, also with a six-wheel tender.

All the engines have outside cylinders with Walschaert

engines having the same approximate wheel dimensions. The smaller wheels enabled the fixed wheelbase to be reduced from 17 ft. to 16 ft. Engines of this type have been supplied in considerable numbers, and those having the smaller wheel have been adopted as the standard.

The Belpaire type of boiler is used on all these engines,

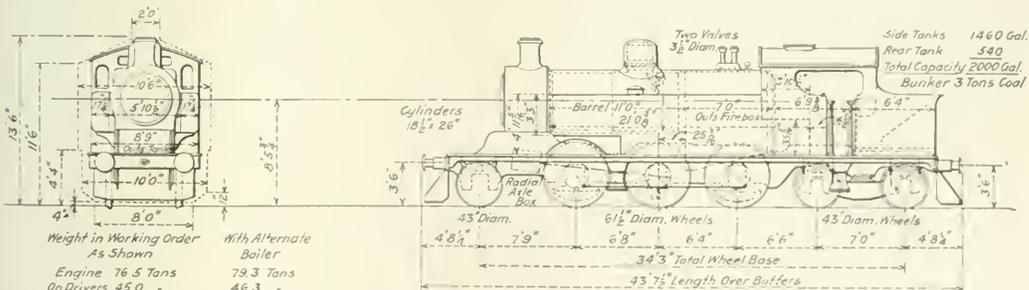
TABLE 111—DIMENSIONS OF SUPERHEATED 5 FT. 6 IN. AND METRE GAGE ENGINES

Type	Cylinders	Driving wheel, diameter	Heating surfaces, sq. ft.			Grate area, sq. ft.	Weight on coupled axles, tons	Total weight, tons
			Tubes	Firebox	Super.			
4-4-0	20 in. by 26 in.	6 ft. 2 in.	958.77	128	218.4	25.3	33.7	43.15
0-6-0	20 in. by 26 in.	5 ft. 1½ in.	958.77	128	218.4	25.3	49.6	49.6
4-6-0	16½ in. by 22 in.	4 ft. 9 in.	Metre Gage 710.61	108	194.6	16.0	26.97	35.30

The 5 ft. 6 in. gage engines work at 180 lb. steam pressure. The metre gage engines work at 160 lb. steam pressure.

valve motion. The framing is inside the wheels and not outside as had been previously much used on the narrow gage engines in India, it being pointed out that the inside location of the framing obviated the use of fly cranks and only restricted the width of the firebox very slightly. Belpaire type boilers, similar in design to those used on the wide

and all have outside cylinders. The position of the valve chests and type of valve gear used are optional, but most of the recent engines constructed have Walschaert motion with the valves on the top of the cylinders.† The motion, axles, axle boxes, engine trucks and the details of the framing are the same in both the 4-6-0 and 4-4-2 type engines,



Standard 2-6-4 Type Tank Locomotive for 5-ft. 6-in. Gage Lines, Tractive Effort 23,440 Lb. Boilers Are Same as Those Used on 4-4-0 Type Passenger and 0-6-0 Type Freight Engines

gage engines are used, and the steam pressure is the same, namely, 180 lb.

The next engines to be considered are those dealt with in the second report issued in 1907. These engines were all designed for heavy main line service and called for:

- (1) An engine of the 4-4-2 type, having coupled wheels 78 in. diameter, with an axle load of 17 to 17½ tons (39,000 lb. to 39,200 lb.).
- (2) An engine of the 4-6-0 type with coupled wheels 74 in. diameter, with axle loads of 16 tons (35,840 lb.).
- (3) An engine for goods traffic of the 2-8-0 type, having coupled wheels 61½ in. diameter, with axle loads of 16 tons (35,840 lb.).

*The vacuum brake is the standard continuous brake used in India, all passenger stock being so fitted and also a large percentage of the goods wagons.

and as far as possible parts of the 2-8-0 engines are the same as similar parts of the 4-6-0 and 4-4-2 engines.

Each of the four different classes of engines mentioned may have three different sizes of tender, as follows:

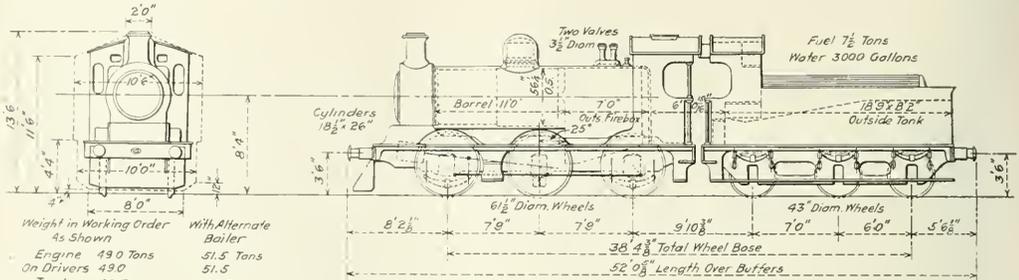
- (1) A light six-wheel tender similar to those used with the 4-4-0 and 0-6-0 type engines designed for the 5 ft. 6 in. gage lines in 1903, having a water capacity of 3,000 Imperial gallons, and fuel space for 7½ tons (of 2,240 lb.) of coal. Weight, loaded, 4½ tons.
- (2) An intermediate type of tender also running on six wheels, having a capacity of 4,000 gal. of water and 7½ tons of coal. Weight, loaded, 47 tons.

†Originally the 4-6-0 and 4-8-0 engines had 21-in. and 23-in. cylinders, respectively, but the latter cylinders were removed from India, subsequent engines supplied have 19-in. and 20-in. cylinders.

(3) A large double bogie eight-wheel tender, with space for 4,500 gal. of water and 10 tons of coal. Weight loaded, 58.5 tons.

The second report, besides the engines mentioned, described a side tank engine for local service, having the 2-6-4 wheel arrangement. In general, these engines follow closely

the one previously specified, when desired. The total heating surface was thereby increased from 1,358 sq. ft. to 1,603 sq. ft. and the grate area from 25.3 to 27.0 sq. ft. The weight of the 4-4-0 engine was increased from 52 tons to 54.5 tons and that of the 0-6-0 engine from 49 to 51.5

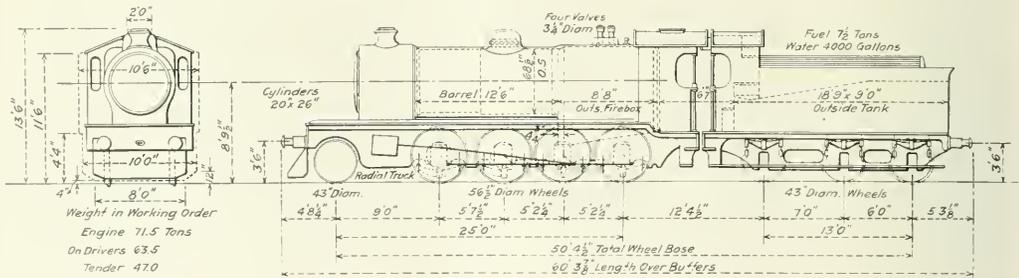


Standard 0-6-0 Freight Locomotive, 5-ft. 6-in. Gage. Tractive Effort, 23,440 Lb.

the 0-6-0 type goods engines, the cylinders, wheels and motion being identical.

These engines are allowed to have two different sizes of boiler: † (1) the standard boiler as fitted to the 0-6-0 goods

engines. More recently the engines of this type have been fitted with the larger type of boiler and have fire tube superheaters of the Schmidt type. The larger engines mentioned have also been superheated, and on this subject the Railways

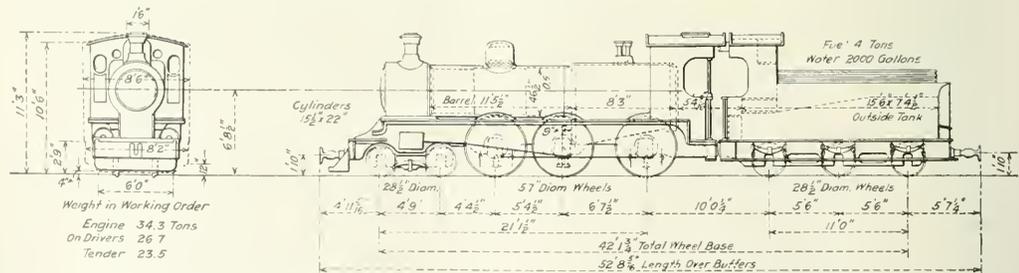


Standard 2-8-0 Type Freight Locomotive for 5-ft. 6-in. Gage Lines, Tractive Effort, 29,819 Lb.

engines, and (2) a larger boiler, 5 ft 1 1/4 in. outside diameter at the largest course of the barrel.

Experience with the 4-4-0 and 0-6-0 type 5 ft. 6 in. gage engines showed that it might be advantageous to increase

in India Administration Report of 1915 states that "superheated engines fully justify the decision come to by many railway administrations, that all engines for main line work should be fitted with superheaters."



Standard 4-6-0 Type Passenger Locomotive for Meter Gage Lines, Tractive Effort, 15,022 Lb. A Similar Locomotive with Drivers 48 in. in Diameter and 16,706 Lb. Tractive Effort Is Used in Freight Service

the boiler capacity, and in 1910 a standard boiler 5 ft. 1 1/4 in. diameter was designed to be used as an alternative to

As will have been noticed, the first standard engines for the 5-ft. 6-in. gage lines had inside cylinders. while later, when the Ten-wheel heavy type engines were introduced, outside cylinders were adopted. This is explained by the fact that when the first engines were designed it was desired

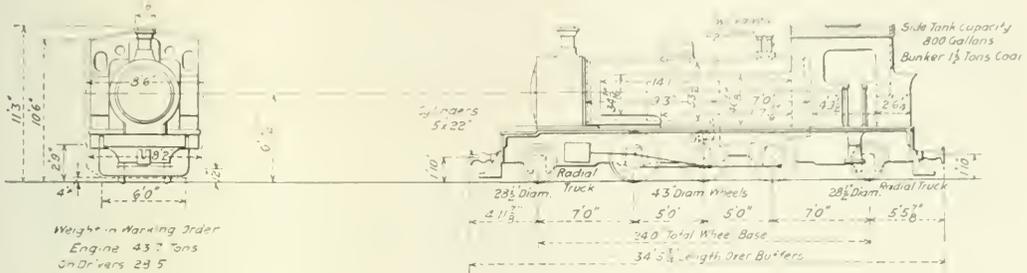
†The larger boiler was designed in 1910 as an alternative for the 4-4-0 and 0-6-0 engines, and was subsequently adopted as an alternative boiler for the 2-6-4 tank engines.

to make them approximate as closely as possible to existing engines of the same type already in service, which had inside cylinders. The new engines were designed on the same general lines, opportunity being taken to improve the details of construction and bring them into line with the best practice obtaining at that time. On the other hand, when the Ten-wheel engines were designed, they represented a new departure in Indian locomotive practice and were designed to follow closely successful Ten-wheel engines of similar dimensions then operating in England, which engines had outside cylinders.

In construction the engines and tenders are all made from materials which comply with the requirements of the British

duced in diameter for a short length at the firebox end, and swelled for a short distance at the smokebox end. The domes are all built up, the section next the boiler being short in length, thus bringing the joint low down, an arrangement which facilitates the examination and repair of the "regulator" or throttle valve.

The framing is all of open hearth steel, the frame braces and motion plates being steel castings. The axle box guides are also steel castings and have adjusting wedges placed in front. Engine axle boxes are made of either bronze with white metalled bearings, or are either steel castings, steel forgings or wrought iron, in which cases they are fitted with bronze crown bearings, white metalled. Motion details are



Standard 2-6-2 Type Tank Locomotive for Meter Gage Lines, Tractive Effort, 18,648 Lb.

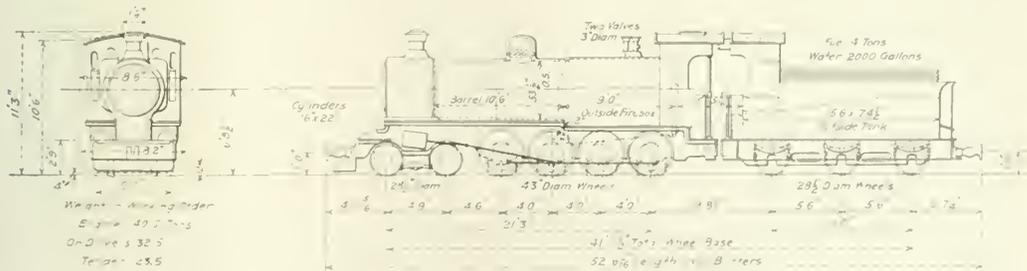
Standard Specification, wherever specifications have been drawn up to cover the particular requirement, and where such standard specifications do not exist the Indian State Railways Specifications, introduced by the late Sir A. M. Rendel, are used.

Generally, steel is used in preference to iron, and steel details are made without weld and all steel used is required to be made by the open hearth process. Exception to the above is to be found in the construction of the foundation, or mud rings and in the draw gear, which details are made of iron in all instances. The steel employed in the construction of the boilers, is all made by the open hearth acid

made of steel, those parts which are case hardened being lower in tensile strength than those not so treated. Coupling rods and connecting rods are milled out to an I-section.

Inside cylinder engines have four-bar guides, outside cylinder engines have two-bar guides and the guide bars on the metre gage engines are of the Laird type. Cylinders are, as usual, iron castings, as are also the pistons. The slide valves are of bronze.

The tenders for both the 5-ft. 6-in. and metre gage lines have outside framing, and the wheels and axles are of the same material as those used on the engines. Axle boxes and their guides are of cast iron. Bearings are of gun metal



Standard 4-8-0 Type Freight Locomotive for Meter Gage Lines, Tractive Effort, 21,218 Lb.

process. All the holes are drilled and steel rivets are used, all riveting being done by hydraulic pressure. Internal fireboxes are of copper with either copper or bronze stays in the water spaces. Copper rivets are used for the inside firebox and the riveting is specified to be done by hand. All boiler barrels are telescopic, the smallest course being next the smoke-box. Direct stays are used to support the crown sheet and those adjacent to the tube sheet are arranged to allow for upward expansion of the firebox. Tubes are either of brass or solid drawn steel. When brass tubes are used they are ferruled at the firebox end. In all cases tubes are re-

white-metalled. The centre axle of six wheel tenders is permitted a certain amount of lateral motion by allowing side-play between the axle boxes and guides. In all instances a hand brake is fitted, acting on the tender wheels only. The tenders also have a cab made to correspond to that on the engine, and constructed and arranged in a similar manner. The materials employed in the construction of the engines and tenders comply with the requirements set out in Table IV.

The tables of dimensions give the principal particulars of the different locomotives which have been mentioned. All

weights are expressed in the English ton of 2,240 lb., and water capacities mentioned are all Imperial gallons.

In respect to results obtained in service, these engines seem to have met with a measure of success. In some instances, however, the large engines have been found to be rather heavy for the track. On the other hand, the 4-4-0 type passenger and the 0-6-0 type goods engines in general have been quite successful.

TABLE IV—BRITISH STANDARD SPECIFICATIONS

	Ultimate tensile strength, tons per sq. in.	Elong. per cent
Crank axles (oil toughened).....	30	25 min.
Straight axles (yield point 50 per cent of ultimate).....	35	20 min.
Tires.....	35-40	25-20 min.
Steel forgings (case hardened).....	56-62	10-8 min.
Other steel forgings for boiler, etc.....	27 max.	25 min.
Connecting rods, straps, bolts, coupling rods, crossheads, crank pins, eccentric cranks, etc.....	25-32	27-20 min.
Slide bars, piston rods, cotters for cross heads, etc.; axle box guide wedges, gudgeon pins, reversing screws, etc.....	32-27	25-20 min.
Boiler plates, sections and bars.....	40-45	20-15 min.
Plates 3/8 in. thick and over, sections and bars 5/16 in. and over, except for boilers.....	26-32	22 min.
Rivets (bars).....	28-32	20 min. for plates under 3/8 in.
Steel casting (wearing surfaces).....	26-30	25 min.
Steel casting (wheels).....	35 min.	10 min.
Copper firebox plates.....	26 min.	15 min.
Copper rods for stays.....	14 min.	35 min.
	14 min.	40 min.

Note.—Test pieces used are to British standard sizes, having cross section areas proportional to the length on which the elongation is measured.

Orders of Western Regional Director

R. H. AISHTON, regional director of western railroads, Chicago, has issued the following circulars during the last week:

In Supplement No. 2 to Circular No. 50, dated June 4, it was ordered that all lettered signs on the rear of passenger trains be discontinued.

Circular 121, dated June 6, orders that no contracts for repair of cars be placed at outside shops without first securing the approval of the regional director. The Car Repair Section is making an extensive inquiry and will be prepared to undertake necessary car repair work which cannot be done in the railroads' own shops.

In a communication to western railroads on June 4, the regional director announces that railroads which have subscribed in the past to publications for the benefit of employees may continue in the same general policy but shall not radically increase or decrease number of subscriptions.

Supplement No. 4 to Circular No. 65, dated June 6, states that, until otherwise ordered, contributions in reasonable amounts by railroads to Railroad Y. M. C. A.'s are authorized by the railroad administration.

Circular 119, dated June 6, announces that no posters soliciting labor for private industries shall be placed in railroad stations, except when expressly authorized by a proper officer of the railroad company with the distinct understanding that he has authority of the railroad administration.

In a letter dated June 4, the regional director announces that the household goods of an employee of a government-controlled railroad may be transported free of charge over any railroad under federal control in case of his transfer from one place to another. Cartage to and from stations will not be allowed.

Circular No. 123, dated June 6, reads: Where witnesses or others are summoned to Washington by either of the railroad boards of adjustment, round trip transportation shall be furnished by the line on which the individual is employed. Notice from either of the boards requiring the attendance shall be considered sufficient authority for issuance of trans-

portation and it shall be promptly issued and the notice filed with the pass records at office of issuance.

In a letter to western roads, dated June 6, the regional director directs that no sale of locomotives or cars be made without authority from his office. Lines having equipment for sale or wishing to lease or buy equipment will report such wants so that it may be determined if a transfer can be made between lines within the regional territory.

Cost of Second Hand Rail to Industries

In Supplement No. 1 to Circular No. 56, dated June 8, the regional director announces that until further notice the price for second-hand rail will be from \$55 to \$65 per gross ton, depending upon quality and location, i. e. b. carrier's tracks nearest to delivery point. In general, he says, the price per gross ton for good quality of second hand rail for sidings and spur tracks should be \$60 east, and \$65 west, of the Rocky mountains, except that light inferior rail may be sold for \$55 to \$60 per gross ton. Authority must be requested from his office in each instance for the sale of rail.

War Department Needs Transits

In a letter to western railroads, dated June 7, Mr. Aishton calls attention to the fact that the engineer corps of the war department is in the most urgent need of a large number of high grade transits with full verticle circle, erect image, and complete with tripods, similar to C. L. Berger & Sons' No. 4 1/2 mountain and mining transit, Buff & Buff Mfg. Co.'s No. 3-C transit, and W. & L. E. Gurley's No. 27-A transit. According to S. M. Felton, director-general of military railroads, manufacturers in this country are unable to furnish the present and urgent need of transits required by engineer troops now in France. It is necessary therefore to secure from other sources all the high grade transits not in urgent use to secure the number needed. Western lines are asked to report in detail the number and quality of transits that can be spared, together with a statement of their physical condition and their price.

Orders for Southern Pine

In supplement No. 1 of Circular R. P. C. 8, dated June 8, the Western regional purchasing committee announces the creation of a government bureau for the handling of orders of yellow pine lumber. Purchasing agents of railroads will place orders for lumber directly with the manufacturers as previously, but they are not authorized to pay above government prices except in cases of extreme emergency. If purchasing agents are unable to secure lumber directly from the producers they are instructed to advise the regional purchasing committee of their needs; and that body will handle their orders through the director of lumber of the new government bureau mentioned above. On account of the varied methods of describing lumber the regional purchasing committee will soon send to western railroads a form showing lumber lists and prices in usual railroad grades and in such a manner that requisitions can properly be checked back with them and needless confusion can be avoided.

The regional purchasing committee also asks the railroads to notify it of old orders which have been unfilled so that it can take steps to secure action upon them. In this connection the committee points out that there is at present a lull in the demand for the immediate shipment of yellow pine, and therefore an opportunity for the railroads to secure proper attention to their orders. Western railroads are asked to notify the committee if any bridges are badly in need of repairs or if equipment is held up on account of the lack of lumber, as such information can be used to advantage in insisting on delivery.

Conservation of Tin

In Circular R. P. C. 14, dated June 8, the regional purchasing committee calls attention to the scarcity of tin and

the necessity for conserving it to the fullest extent. The letter shows how less tin can be satisfactorily used in babbitt and solder for railroad uses. The regional purchasing committee asks western railroads to observe the strictest economy in the use of tin and to report any experiments that may further conservation.

Interplant Switching

In a communication to western railroads on June 4, the regional director asks for detailed information on interplant switching, giving the names of the industries served, the nature of the switching done, the number of engine hours consumed per day, the charges exacted, whether the charges are established by tariff or whether the railroad is compensated in some other manner through a switching contract; the extent of weighing and reweighing of cars, the movement of cars from one point to another in the plant to finish loading or unloading, the spotting of empties for interplant loading and the movement of loaded cars to the point of

unloading, and whether it is practicable for the industry to provide its own service.

Circular No. 118, dated June 1 says: "It is the desire of the railroad administration that reasonable rules be adopted governing the settlement of claims growing out of the transportation of grain, fruit and vegetables, livestock, fresh meats and packing house products and coal, coke and ore, and that uniformity of action in this matter between the several railroads be established."

For the purpose of formulating rules to be adopted by the interested railroads subject to approval of the federal administration, I have appointed a committee of freight and general claim agents, composed as follows: M. E. McKirahan, F. C. A., S. P. Co.; H. C. Pribble, G. C. A., A., T. & S. F.; J. B. Shields, F. C. A., C., B. & Q.; W. O. Bunker, G. S. F. C., C., R. I. & P.; Charles Dietrich, F. C. A., C., M. & St. P.; W. F. Every, G. C. A., N. P.; T. S. Walton, G. C. A., M. P.; E. C. Howe, F. C. A., C. & N. W. and W. H. Hancock, F. C. A., U. P.

The Reasons for Steam Railroad Electrification

The Density of Traffic Has Increased Greatly, Even Under Normal or Pre-War Conditions

By Q. W. Hershey*

THE PERIOD FROM 1895 to 1902 covers the most rapid expansion of American railroad building. A record of consecutive annual increases in miles of track constructed was made during this time. The rate of construction reached a maximum during the year 1902, when 6,020 miles of new line were laid. From the record of this

the average miles laid each year was approximately 1,000. Most significant, also, is the fact that during the year 1917 there were more miles of track abandoned than built.

The expansion during the period 1895-1902 represented the necessity of meeting the country's development of new territory. Following this period, beginning about 1905, the



Pennsylvania Railroad Just Outside of Broad Street Terminal

maximum year there has been a gradual average decline in building new lines until it reached the low maximum of 933 miles in 1915. From this date, 1915, to the close of 1917

*Heavy Traction-Railway Department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

problem has been one of expansion to take care of the increasing traffic of existing communities, rather than that of supplying transportation facilities to new communities. In this the problem became one of developing greater operating facilities such as heavier motive power and intensifying traf-

fic movements through high tonnage, faster speeds, greater trainloads, heavier carloading, etc., all contributing to the expansion of facilities for increased transportation. It was a problem of caring for increasing transportation densities.

About 1903 the electrical art had developed satisfactory locomotives which were efficient and of considerable capacity, and because they were clean and practically noiseless their adoption in certain terminal and tunnel districts was compelled through legislation. For these same reasons, and the showing of reliability which was soon demonstrated, they were voluntarily adopted for numerous main line operations.

It is a striking commentary on the material fitness of electrified operation that we find the electrical installation being turned to in order to supply the method of meeting the requirements of intensified operation. As mileage extension development of the railroads decreased, the application of electrified operation was increased to meet the rising problems of dense traffic. From the start, the application has been continuous and increasing in capacity of equipment and the amount of mileage electrified, until today electrified installations make use of the very heaviest high-speed, heavy-tonnage equipment in the world, and the extent of trackage under electric operation measures a number of thousand miles. All electrifications naturally occupy points in the transportation systems where the density of traffic is very much greater, and the operating requirements more difficult than that of the average mileage.

The following roads now have electrified operations on sections of their main line, or more important auxiliary lines: Baltimore & Ohio; Boston & Maine; Butte, Anaconda & Pacific; Chicago, Milwaukee & St. Paul; Erie; Grand Trunk; Great Northern; Michigan Central; New York Central; New York, New Haven & Hartford; Norfolk & Western; Pennsylvania and Southern Pacific.

The unquestioned reliability of this form of motive power has been proved in the severest service.

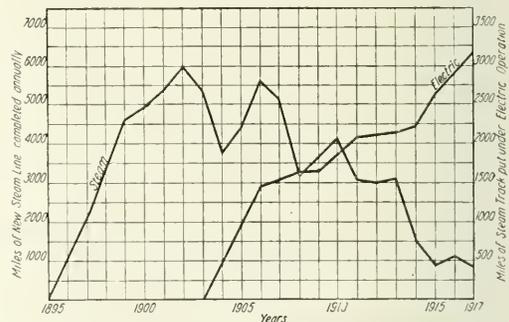
A virtually new system of economies becomes the basis of the factors involved in the operation of the newer systems of motive power under electrification. It has been amply demonstrated that one electric locomotive will, ordinarily, do three times as much service as can be done by a steam locomotive. Schedules are speeded up materially. Track transportation capacity is increased, in certain instances, by 100 per cent. The difficulty of mountain grades is virtually overcome. Where formerly it was necessary to maintain three locomotives, now there is but one, and at a lower cost. "Inspection" becomes one of the more important items rather than the "overhaul" item of expense. Where under steam operation, 30 to 40 per cent only of the total hours have been spent on the road, now 90 per cent of each 24-hour period may be given in service on the road. Under emergency requirements, much greater engine mileage may be made between "shippings." Efficiency of engine performance decreases very slowly over extended continuous periods of operation. Track destruction is lessened, better working conditions are found for the health and comfort of the employees, this improvement making for more efficient man-effort, and greater safety therefrom in the operation of the trains. Regenerative braking adds an additional train safety factor and tends considerably to lower the wear and tear on all equipment. There is an expansion of facilities arising from the release of much equipment and labor, through the elimination of hauling of non-revenue producing coal. Greater daily mileage is obtained from freight cars. There is a toning up of the whole operation where the burden of inefficiency imposed through the use of the steam engine is removed, by substituting the electric engine in which the engineer's part is power control, rather than power creation. Lengths of engine runs are materially increased with a consequent elimination of intermediate terminals and repair shops. There is secured a material advantage in the haulage effect

through being freed from the conditions set by the physical limitations of the steam locomotive. Capacity limitations in the electric locomotive are elastic—severe cold weather conditions actually increase its capacity.

In general, the maintenance of high operating efficiency is less complex, and an effort toward continued improvement of this efficiency may be more effectually exerted through concentration at fewer points.

Electric operation secures a marked conservation of natural resources. One pound of coal, or equivalent oil, fuel fed into the power house, may be transmitted and transformed to more effective power at the drawbar than is possible with the steam locomotive. There can be conserved the labor and equipment necessary for transporting coal from the mine to the railroad by the substitution of electrical transmission. Not only is there a great part of the fuel saved through the efficiency of the newer method of utilizing the latent energy of the fuel, but by electrified operation a new scheme of economics is brought into action through the ability to turn to efficient use the great volume of heretofore unreclaimed and unharnessed water power, with a consequent conservation of primal resources. Our ideals of proper stewardship will have been approximated when the raw materials in the great storehouse of natural resources will have been accredited proper value, and whose worth will not be measured entirely by the cost of their present utilization and destruction.

Never in history has our country been confronted with a



Curves Showing Miles of New Steam Line Completed and Miles of Steam Track Put Under Electric Operation During the Past 22 Years

greater transportation problem. Traffic has increased to abnormal proportions. So grave has become the transportation situation that its solution is seriously regarded as the prime element to determine our success in the war. In this connection, it would not be surprising were our railroad electrification problems to fall within the category of other problems legislated as war measures.

There must be safety in railroad operation as nearly perfect as human skill can produce. There must be reliability and non-interruption of service, as perfect as can be secured by the use of the highest class of equipment which has been adequately proved in actual service. Under the immediate war prohibitions and restrictions, the public will uncomplainingly forego luxurious comfort, but when normal times again prevail there will be demanded an improved order of elegance of appointments and means of comfort. What with its peculiar fitness, the additional safety it brings, its record of reliability established, the comfort it dispenses, the high order of efficiency it institutes, the integrity of the trust to future generations which it binds for us in the conservation of primal resources, together with its well founded economies of operation and capacity expansion, all spell electrification.

Mechanical Devices for Disbursement Accounting

Comprehensive Report of the Committee on Disbursement Accounts of the Railway Accounting Officers

THE FOLLOWING is the complete report of the committee on disbursement accounts, A. P. Disbrow (Eric) chairman, of the Railway Accounting Officers' Association presented at the annual meeting held in St. Louis on May 29-30, 1918, and reported in last week's *Railway Age*, page 1389.

Use of Mechanical Devices in Disbursement Accounting

The special committee of five, appointed by the president to prepare recommendations as to how accounting officers may best meet the conditions confronting them with respect to clerical labor and the compilation of accounting and statistical data, particularly with respect to the use of mechanical devices as a means of solving the shortage in experienced clerical labor, in its report dated December 20, 1917, suggested "that each of the Standing Committees make a supplemental report to those already existing in the proceedings of the Association of American Railway Accounting Officers on June 26 and 27, 1912, at Quebec, with regard to the use of mechanical devices."

The subjoined information—regarding the use of mechanical devices in disbursement accounting work—is the result of data obtained by your committee from fifty-three roads.

On request, the secretary of the association will furnish the name of each road indicating that it was using any particular device. This will permit direct inquiry by accounting officers interested in installing similar devices or methods.

In this report, names of devices have been omitted, except in cases where a clear description could not be given without indicating the name of the device.

Non-listing Computing Machines.—Operated by hand pressure on keys, the figures being recorded on dials when keys are depressed. Machines used for multiplication, addition, subtraction and division. Best results are obtained by assigning permanent female operators and training them to operate by touch system.

Making and verifying extensions and footings on vouchers, bills, payrolls and statements.

Prorating common operating expenses between operating divisions, accounting districts, States and classes of service.

Compiling gross ton miles in division accounting offices from wheel reports.

Arriving at totals of paychecks and drafts.

Totaling requisitions and invoices as a check against adding machine tapes, when list is necessary, to avoid calling items back against tape.

Cross footing and balancing monthly statistical sheets to arrive at total for year, avoiding necessity of drawing items off on a work sheet.

Compiling "Employees and their Compensation" statement by classes of employees for Interstate Commerce Commission annual report. Twelve-column machine used, permitting drawing off hours and compensation at same time.

Charts Used in Connection with Non-listing Computing Machines.—Pay roll table, decimal equivalent of days for 24 to 31 day month.

Rate per minute for each hourly rate.

Reciprocal table where constant divisor is used.

Discount table, showing net of \$1.00 after discounts are taken off.

Table of values of freight cars and yearly and monthly depreciated value of \$1.00 at 5 and 6 per cent. Used in ascertaining value to bill for on cars destroyed on foreign lines.

Central Bureau Non-listing Machines.—Non-listing machine work centralized in one department in which none but women operators are employed. Practically all computing machine work for entire Disbursement office done in this central bureau. Permits training operators on all classes of work and reduces waste time to a minimum.

Training Operators for Non-listing Computing Machines.—Central computing machine bureau equipped with a number of listing adding machines. Girls, with no previous experience, started on listing machines and after having become proficient are rotated between the listing and non-listing machines; that is, listing machine operator will spend one week at the listing machine and the next week at the non-listing.

Due to difficulty in securing operators, a student course was established. Girls from 16 to 19 years of age with good fundamental education employed and allowed ten dollars a month while learning, which is not considered as a salary, but merely as lunch money and car fare. As students develop, allowance is increased until they are rated as regular salaried operators. Plan is beneficial to carrier as well as to employee by providing some compensation while learning instead of being obliged to pay a tuition fee.

Adding and Listing Machines.—Operated by depressing keys and pulling a handle or pressing a bar, if motor driven. Records the figures on paper tape or sheets of paper and is used when necessary to have a permanent record of items.

Listing open items in proving balances in ledger accounts (reconcilements). Avoids drawing off on work sheets and footing work sheets. By using wide machine, voucher bill, paycheck, etc., numbers and amounts can be drawn off at same time.

Compile car repair bills. Use specially designed machine, which gives a greater output per day than typewriter, but has disadvantage in not being adaptable to other than straight routine billing.

Purchase invoices posted daily on voucher form in duplicate, the duplicate serving as a voucher ledger. At same time an accumulated total is arrived at to balance against Division Accountants' and Storekeepers' weekly statements of material.

Listing material requisitions by classes, accounts and Accounting Divisions for charge and credit and for statistical purposes.

Listing pay checks, time checks, vouchers, etc.

Prepare pay and time voucher registers.

Post individual equipment cards showing original cost, changes in value, etc.

Adding and Listing Machine, with Shuttle Carriage.—Registering, indexing and abstract work.

Machines Especially Adapted for Multiplication and Division.—Operated by placing levers, representing multiplicand or dividend, in position and turning a crank required number of times, according to numbers in each unit in multiplier or divisor, shifting carriage for each unit. Cannot be used to advantage for addition, but is valuable and a time-saver in arriving at percentages for apportionment of operating expenses and in prorating expenses between States, divisions, etc. Non-listing, both product or quotient and multiplier or divisor being recorded on dials. (Brunsviga and Marchant).

Non-listing and operated in same manner as above and for same purposes, except that numbered keys are used instead of levers for multiplicand or dividend. Can be used for addition, but not with any degree of speed (Monroe.)

Non-listing motor driven, operated by depressing keys for

multiplacand, multiplier, dividend and divisor, results recorded on dials. Carriage is automatically shifted for each unit. Can be used with a fair degree of speed for addition, used to best advantage in arriving at percentages and in prorating expenses. (Ensign.)

Non-listing, motor or crank driven. Operated by setting markers for divisor, dividend, multiplier or multiplacand and turning crank or, if motor driven, pressing bar. Requires but one operation for each unit. Cannot be used to advantage for addition, but time-saver in prorating and arriving at percentages. Figures recorded in dials. (Millionaire.)

Operators for Multiplying and Dividing Machines.—Require no previous experience and can be successfully operated by girls.

Non-listing Adding Machine.—Operated by setting keys and pulling lever. Inexpensive machine used for general purposes and shifted from desk to desk as needs require. Operated by inexperienced clerks. Non-listing and used for addition only, figures being recorded in dials.

Cylindrical Slide Rule.—Consists of a cylindrical slide having both rotary and longitudinal movement within an open frame-work of equi-distant bars. Slide contains two logarithmic scales, one on each side of center. On bars are two other scales arranged in same manner as on the slide.

Used principally for proving averages in statistics and arriving at and verifying percentages and pro-rating revenues and expenses by States, divisions, etc., and in apportioning charges for locomotive repairs to classes of service. Does same class of work as multiplying and dividing machines with greater speed, but results are not so accurate beyond four figures.

Typewriters.—For correspondence, statement work and general use. For statement work equipped with tabulators.

Posting index of audited vouchers and bills in loose leaf records. (Rapid fire index.)

Car repair bills and voucher checks made with one writing by means of carbon. Original being voucher check and carbon serving as original bill. Same method in effect in purchasing department to cover purchases of material and supplies.

Equipped with two kinds of type, one plain and one pin-point for drawing drafts and vouchers. Name and address is written using plain type, amount is written using pin-point type to guard against manipulation. Combines typewriter with check protector.

Typewriter With Adding Machine Attachment.—For statement, bookkeeping and other general work where necessary to foot typed figures. Does away with separate operation of footing completed statement after typing.

Transcribing and adding record of bills and vouchers.

Posting bills collectible in loose leaf ledger (Rapid fire index) from bill register, also posting cash and balancing individuals and companies bills collectible ledger for miscellaneous bills, car repair bills and foreign roads overcharge bills.

Prepare car repair bills.

Writing and balancing pay rolls and pay roll registers.

Writing pay rolls and pay checks and totaling pay rolls in one operation. Time books and time sheets audited before pay rolls are written. One line protected check used.

List vouchers to treasurer and prepare voucher register in one operation.

Combined Typewriter and Computing Machine.—(Moon-Hopkins.) An electrically operated combined typewriter and computing machine with four accumulators, adds, subtracts, multiplies and divides and is especially adapted to bookkeeping, statement work and the rendering of bills.

Specially built machine for use in compiling information in connection with U. S. war tax.

Compiling by lines, record of gross earnings, passengers

carried and miles run by each car in various lines and balancing daily with receiving cashier's record.

Compile car repair bills, claim greater output per day obtained than by use of typewriter with adding machine attachment.

Typewriter—Flat Writing.—Machines used where statement or record sheets are too large for ordinary wide carriage machine, where inadvisable or impossible to roll sheets through machine, or where posting to bound books.

Posting ledger charges to primary road and equipment accounts by authorities for expenditures from tabulating machine-punched cards.

Statement and abstract work.

Freight claim draft sheets.

Typewriter Cyclometer.—Attached to typewriter to record output and determine efficiency of individual operators. Records number of key and space bar strokes.

Line-a-Time.—Attached to desk of typist directly behind typewriter and facing operator. Equipped with a lever operated guide for following the line, eliminating the necessity of using a ruler or other flat instrument to follow line and guard against errors when transcribing.

Electric Sorting and Tabulating Machines and Card-Punching Machines.—Operated by punching specially printed cards, figures being used to indicate information. Cards are sorted mechanically and run through tabulator to obtain totals. A number of totals may be obtained in one operation. Operated successfully by assigned women operators.

Condensing charges to operating, road and equipment and other accounts from departmental distributions of labor, material, supplies, fuel and stationery and distribution from bills, vouchers and journal entries.

Condensing revenue by accounts and by states and classes of service.

Condensing charges to operating accounts by operating divisions, accounting districts, states and class of service for statistical purposes.

Condensing charges to Road and Equipment accounts by A. F. E.'s for preparation of statement of charges by authorities and for posting by machine in ledger as a basis for check of completion reports required under Federal Valuation, order No. 3.

Condensing wage statistics for annual reports to Interstate commerce and state railroad commissions.

Compiling basic statistics covering train, locomotive and gross ton miles, special statements of train tonnage performance, tonnage and fuel performance by individual engine-men and classes of engines.

Equipment record statistics.

Assemble by classes of traffic and states, loss and damage and overcharge claim payments and analyze personal injury accounts.

Individual yard operation reports.

Assemble time of engine-men and trainmen and prepare pay rolls, also compile wage statistics for this class of employees.

Prepare mechanical department pay rolls and distribute the charges. Compile statistics showing cost of repairing individual parts of individual locomotives. Abstracting of distribution by states and divisions; and for Interstate Commerce Commission accounting requirements. (Central Bureau.)

Comparative analysis of overcharge and loss and damage claims paid, divided to show commodities and classes or causes.

Comparative statement of labor or pay roll cost by departments.

Statement of material purchases during month.

Phonographs, Dictating, Transcribing and Cylinder Shaving Machines.—For general correspondence purposes. Letters dictated into machine and recorded on wax cylinders. Cylinder given to operator, who transcribes, using a machine

equipped with transcribing department. Illuminates time lost by stenographer when taking dictation direct from correspondent.

After having transcribed letter, cylinder is shaved and used over again.

Central Bureau for Transcribing.—All transcribing done in central bureau. Cylinders are collected at stated periods and delivered to transcribing department.

Letters transcribed on piece work basis at a fixed price per letter. Telegrams and mailgrams dictated on separate cylinders to permit preferred attention and expedite transcription.

Mimeograph Duplicator.—For obtaining a number of copies of circulars, statements, etc., by means of stencils cut on typewriter.

Permatype Stencils.—Used when an unusually large number of copies are required. Stencils can be cleaned and filed away and additional copies may be struck off when desired.

Cutting Stencils.—Carbon copy made at time stencil is cut to facilitate comparison with original draft.

Gelatine Duplicator.—For preparing a small number of copies of circulars, statements, etc. Statement or circular to be duplicated is prepared either by hand or on typewriter with specially prepared ink or ribbon and applied to gelatine surface. Copies are then obtained by applying blank sheets to impression left by original or master sheet. Duplicating surface comes in rolls and after one surface has been used a new one may be obtained by turning a handle.

Clay Duplicator.—Clay composition contained in a tray. Can obtain from 5 to 50 copies. Copies obtained in same manner as on Gelatine duplicator.

Multigraph.—For getting out printed matter. Requires setting of type.

Photography.—Reproducing camera for obtaining photographic reproductions of statistical sheets, vouchers, bills, waybills, etc. Will permit of reduction in size at time of reproduction.

Addressing Machines (Motor Driven).—For rapid addressing of envelopes, printing names on time slips, time rolls, etc.

Preparing time slips, time rolls, pay rolls and inserting names on pay checks.

Addressing envelopes.

Rapid Mail Opener.—For opening incoming mail.

Numbering Machines.—For numbering consecutively drafts, vouchers, bills, etc.

Combination Dating and Numbering Machine.—Dating and numbering consecutively, vouchers in one operation.

Clock Time Daters.—For stamping date and time received on correspondence, statements, etc.

Radial Distributor.—A fan-shaped device with receptacles into which papers are dropped when sorting either in alphabetical or numerical order.

Signagraph.—Used largely by paymasters for signing pay checks. Device permits signing a number of checks at one operation.

Check Protectors.—For inserting amounts on pay checks, drafts and vouchers to guard against manipulation.

Cancelling Machines.—Motor-driven for cancelling, by small perforations, paid pay checks, drafts, vouchers, voucher attachments, etc. Dies can be set to show date of payment.

Hand-operated, cuts a round or square hole.

Air Tubes.—For transmitting telegrams by means of carriers through tubes to and from telegraph office, also for sending special letters (relayed through telegraph office) to other offices in building.

Automatic Electric Elevator.—For transmitting mail, vouchers and other items between offices of the accounting department and between offices of the accounting department and the treasury department. Operated by pressing a button. Car is controlled from and may be stopped at any floor.

Electric Mail Elevator.—Operated between central mail room and all floors in general office building. Used for delivering large quantities of mail to and from mail room. Car is controlled from mail room.

Mail Chute.—Leading to central mail room. Letter drop on each floor and small quantities of outgoing mail are sent to mail room through chute.

Applying United States Stamps.—Stamps applied on outgoing United States mail for entire general office in central mail room by means of machines. Each office encloses its own mail, using a special envelope for United States mail.

Machines used for sealing letters and applying stamps to outgoing mail. Capacity from 6,000 to 9,000 envelopes per hour.

Electric sealing wax pot.

Postal scales for weighing mail.

Pencil Sharpeners.—Placed at convenient points in office.

Spool-o-Wire Paper Fastener.—For fastening papers together. Makes staples from length of wire wound on cylinder inside machine.

Automatic feed paper fastener for files containing few sheets. Makes long narrow clip. (Hotchkiss.)

Rubber Stamps.—Rubber stamps are very generally used to save time of writing. Principal uses: Addressing envelopes in advance of use when addressing machine is not available, stamping date received on inbound mail, reports, vouchers, etc., captions of accounts frequently used, instructions as to prorating on sheets sent to computing machines.

Time Clock Recorders.—For recording on cards time of arrival and departure of clerks employed in office.

For obtaining record of time work was started and completed in connection with output of non-listing machines and determining efficiency of individual operators.

Trucks.—Used to collect books, pay rolls, vouchers, etc., requiring vault protection at close of day. Truck boy makes round of departments, avoiding necessity of clerks from each department making trip. Books distributed by truck boy each morning.

Paper Punch.—Hand power, adjustable, for perforating papers for filing purposes.

Binders.—For binding pay rolls, vouchers, etc., using heavy, hinged cardboard binding sides. Holes for binding purposes cut in records by drills, either hand or motor driven.

Buzzers and Call Bells.—Very generally used for calling clerks and department heads to office or desk of auditor, assistant auditor and chief clerk.

Intercommunicating Telephone System.—Connecting chief and head clerks' desks with auditor and with each other. Operates independently of main telephone exchange, but connected with it for outside calls.

Dictagraph interconversing system, master station in comptroller's office to the several branches of the accounting department and in the individual office, the auditor of disbursements with his assistant, the chief and various head clerks.

Each bureau head equipped with a telephone permitting connection with any other department in general office building or outside. Supplemented by an automatic intercommunicating system permitting communication direct between auditor of expenditures and each bureau head or bureau heads with each other. Permits calling each individually or collectively.

Mail Carriers.—Used in transmitting mail between disbursement office and offices of division storekeepers and division master mechanics. Mail is placed flat in carrier without enclosing in envelopes. Carrier is made of heavy cardboard covered with canvas and has a double flap, on one of which is printed Disbursement Office address, and on other address of storekeeper or master mechanic.

Payroll Cists.—Locked boxes with reversible cover on which addresses are painted, used for transmitting pay and

time rolls between maker of roll and disbursement office.

Visible Card Index File.—Used to post time of transportation department employees. Posted daily to cards, name of employee in plain sight at all times. (Can be adapted to other card systems such as employees' rate cards, contract and lease cards, etc.)

Wage Tables.—Hourly, daily and monthly rates, for computing earnings of employees and for verifying extensions of rates on payrolls.

Train and enginemen's rate sheet. Earnings computed from 1 to 100 minutes for each train, engine and yard rate. Used in figuring overtime.

Hourly rates for each monthly rate for a 24 to 31 day month. Used for computing overtime earned by trainmen who are paid at a monthly rate.

Time after which overtime accrues on train runs 100 to 199 miles in length on speed basis of 12½ miles per hour.

Chart showing number of trips made in passenger and way freight service in 28, 30 and 31 day month and earnings per full month for each number of train crew. Used largely to determine earnings when less than full month is worked on monthly paid runs.

Calculating Tables.—For rapid computation of mileage, per cents, etc., principally used in application of fuel prices, applying rates to number of tons of coal issued during the month to arrive at value chargeable to expenses by lines and states.

Lumber calculator. For computing and verifying board measure.

Freight tax computer. Showing amounts to be collected under the war revenue tax for transportation of shipments.

Charts used in connection with statistics showing amounts chargeable through construction and for record of A. F. E.'s. 12-year graphic chart.

1-year statistical chart.

For computation of rail tonnage showing tonnage of rail from 1 to 100 feet on rail ranging from 56 pounds to 90 pounds per yard.

Numbers Assigned to Indicate Class of Service.—Voucher, pay roll, etc., charges assigned to service, i. e., freight, passenger, common, etc., class of service being indicated by a number following the account number. Charges to account 201, for example, are shown 2011-2012-2013, last figure indicating class of service.

Numbers Assigned to Regular Train Runs.—To avoid writing points between which trains run, on time rolls, a number is assigned to regular scheduled runs and number only is shown on roll.

Numbering Bills and Vouchers.—Series started first of each year and vouchers numbered consecutively, beginning with Number 1. Allowance made each month for overlapping numbers. Prevents misfiling and reduces work of filing to a minimum.

Series started first of each month and vouchers numbered consecutively, beginning with number one. The month and year are indicated as such.

Consecutive numbers started first of each year, odd numbers used for January and even numbers for February, etc. Prefix number used to indicate year.

Bills and Vouchers.—Material and supplies and car repair bills and vouchers prepared by shop accountant. Before transmitting to auditor, items are listed on loose leaf bill and voucher register sheets which accompany bills and vouchers to auditor and form part of auditor's record, requiring no further writing. Bill and voucher numbers assigned to shop accountant by auditor who uses same numbers as his own. Car repair bills not sent to auditor, but forwarded direct to foreign lines by shop accountant, list only being sent to auditor.

Preparation of Pay Rolls.—Time posted to time sheet by

foremen in transportation department, all details being shown. Extensions made on time rolls and pay rolls compiled from time rolls, no details of time, rate, etc., being shown on pay rolls. Time and pay rolls sent to auditor's office for verification.

Same method for train and engine rolls.

Semi-Monthly Pay Rolls.—Duplex form used, names of employees being entered on pay roll once a month. Amount earned in second period entered on carbon copy of first period roll.

Station Expense Roll.—To reduce number of vouchers in connection with public utility companies' bills, such as light, water, etc., and to insure quick payment in order to obtain discount, agents are authorized to pay bills as presented and list them on an expense roll which is forwarded to auditor. Auditor issues non-negotiable draft to agent for total amount of payments, agent remits as cash to clear his accounts. Same method is applied to other authorized station expenses.

Employees' Expense Accounts.—To expedite payment of amount due employees for money expended in company service and reduce number of vouchers. Expense accounts, for all men under his jurisdiction, are sent to department head direct and recapped on a special form in triplicate. One voucher drawn in favor of treasurer for total of all expense accounts. Copy of recap and original expense account statements sent to disbursement officer; original and duplicate of recap sent to treasurer, who issues checks for amount due each employee.

Payment of expense accounts made by check. Checks drawn by department heads and forwarded, together with expense statements, to auditor, who, after audit, forwards checks to payee. Treasurer relieved by blanket voucher drawn by each department head.

Quick Payment Ticket.—For immediate daily payment of laborers, especially large bodies of men employed temporarily for special purposes. Ticket is issued to men when they start work, and timekeeper indicates by a special die punch work done, total hours worked and rate paid. Ticket cashed upon presentation to paymaster, amount earned being entered on ticket by paymaster's clerks.

Rail and Ties in Transit.—Cards are prepared, one set for forwarded and another set for received rail and ties. The two sets are matched and unmatched cards represent in-transit items which are followed up.

Skeletonized Blanks.—Bills collectible, vouchers and department bills and invoices covering regularly recurring items, are skeletonized on duplicating machine, leaving blank spaces for date, amount, percentages, etc., and a year supply struck off. Produces standard results, reduces possibility of error and avoids considerable work of preparing pencil drafts and checking and rechecking data monthly.

Form Letters.—Standard printed forms with numbered questions and answers. Used to avoid writing letters. Clerk inserts name and address and pencil checks proper item. Used largely in bill and voucher departments.

Mimeographed standard letter forms. Used to avoid dictating letters. Special blank is prepared by correspondent as instructions to typist indicating form to use and data to insert.

Care of Records.—Voucher papers filed in all steel cabinets of the vertical type. Claim less expensive than old-style binder and prevents mutilation and turned edges.

Central Filing Bureau.—All correspondence, leases and contracts filed in a central bureau. Insures uniformity in filing, complete files and avoids having each sub-department maintain separate files. Files are obtained by request slips signed by sub-department head.

Central "Bring-Up" File.—Papers which employee wishes brought to his attention at some future date for action, sent to central filing bureau, where they are filed in a special "bring-up" file in proper date order.

Organization of the United States Railroad Administration

Supplement to the

Railway Age

June 14, 1918

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G. P. Robinson, Assistant Manager.
P. P. Flahler, Mechanical Engineer.

Locomotive Consulting Board
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Car Service Section
10th Floor, I. C. C. Bldg.
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W. L. Butler, E. N. De Groot, Jr., A. G. Guthrie, C. B. Phelps, G. F. Richardson, J. A. Somerville.

Car Repair Section
701 Southern Bldg. Bldg.
J. J. TATUM, Manager.

Tramp Movement Section
Honor Bldg.
GEORGE HOOPER, Manager.

Marine Section
704 Southern Bldg. Bldg.
W. H. PLEASANTS, Manager.
J. Henry Armstrong, G. A. Tomblason General Manager.
New York Canal Section.

Division of Finance and Purchases
304 I. C. C. Bldg.
JOHN SKELTON WILLIAMS, Director.
D. C. Porteous, Assistant.
A. D. McDonald, Acting Treasurer.

Purchasing Section Advisory Committee
305 I. C. C. Bldg.
HENRY B. SPENCER, Chairman.
Samuel Porcher, George C. Yorman.

Finance Section—Advisory Committee
FRANKLIN Q. BROWN, Chairman.
Paulus J. Wade, Frederick W. Scott.

Division of Labor
606 I. C. C. Bldg.
W. S. CARTER, Director.
J. A. Franklin, Assistant.

Board of Adjustment No. 1
713 Southern Bldg. Bldg.
C. P. NEILL, Chairman.
L. E. Sheppard, Vice-Chairman.
G. E. Walker, F. A. Burgess.
W. H. Higgins, Albert Phillips.
R. T. Whiter, W. R. Doss.

Division of Traffic
1013 I. C. C. Bldg.
EDWARD CHAMBERS, Director.
C. B. BOSTON, Assistant.
C. E. Wright, Freight.
Gerrit Kueby, Passenger.
J. P. Holden.

Committee on Mail Transportation
406 Southern Bldg. Bldg.
GUY ADAMS, Chairman.
Knudolph Bauer, J. C. McCahan, Jr., G. P. Conrad, H. T. Mason.
H. L. Fairbank.

Committee on Uniform Classification
Transportation Bldg., Chicago.
R. M. COLLIER, Chairman.
R. C. Pyle, J. E. Williams.
J. E. Colquhoun.

Advertising Committee
A. L. CRAIG, Chairman.

Traffic Representatives in Government Departments
H. M. Adams, Manager Inland Traffic, War Dept.
H. P. Annual, Manager Inland Traffic, Navy Dept.
L. L. Gray, Manager Inland Traffic, Shipping Dept.
C. E. Spurr, Manager Inland Traffic, Food Administration.
F. M. Whitaker, Manager Inland Traffic, Fuel Administration.
J. A. Middleton, Manager Inland Traffic, Petroleum Section, Fuel Ad. Administration.
T. C. Powell, Manager Inland Traffic, War Industries Board.

Allegheny Regional District
C. M. MARKHAM, Regional Director.
Philadelphia, Pa.

Eastern Freight Committee
B. CAMPBELL, Chairman.
L. M. Knudford, W. C. Maxwell, N. C. Hamilton, Wm. Hodgdon, W. S. Kallman, C. C. McCoin, Secretary.

Coal and Coke Rate Committee
Eastern District, E. B. Croley, Chairman.
Central District, J. C. Yanning, Chairman.

North Atlantic Ports Freight Traffic Committee
241 Broadway, New York.
GEORGE D. DODD, Chairman.
Francis La Bau, Vice-Chairman.
Richard Van Umerson, Elmore D. Hutchins, Robert H. Bassett, Joseph R. Ruffin.

Marine Department
W. B. Pollock, Deputy Marine Director, New York Harbor.
C. A. Tomblason, General Manager, New York Canal Section.
A. K. Morris, Director, Tidewater Coal Traffic.

Southern Regional District
B. L. WINCHELL, Regional Director.
Hensley Bldg., Atlanta, Ga.
G. E. Loggell, Operating Assistant.
Charles R. Capps, Traffic Assistant.
F. P. Gaines, S. S. Roberts.

Southern Export Committee
CHARLES T. AIREY, Chairman.
Hensley Bldg., Atlanta, Ga.
W. M. Short, resident representative, New Orleans, La.
J. W. Daley, resident representative, Galveston, Texas.

Regional Purchasing Committee
P. H. FECHTIG, Chairman.
Albert C. Vian.

Charles Barham,
Regional Traffic Representative of U. S. Food Administration.

Inter-regional Committees
J. M. HERBERT, Inter-regional committee in charge of railway operations at St. Louis and East St. Louis.
W. G. BIEBED, Chairman, Chicago committee.
C. E. EVANS, Chairman, Louisville committee.

Regional Administration

Eastern Regional District
A. H. SMITH, Regional Director.
Grand Central Terminal, New York.
A. J. Stone, Operating Assistant.
G. F. Randolph, Traffic Assistant.
H. W. Burnham, Secretary.

Regional Purchasing Committee
E. H. BARBARD, Chairman.
S. B. Wight, E. T. Burnett.

Eastern District Freight Committee
B. CAMPBELL, Chairman.
L. M. Knudford, W. C. Maxwell, N. C. Hamilton, Wm. Hodgdon, W. S. Kallman, C. C. McCoin, Secretary.

Coal and Coke Rate Committee
Eastern District, E. B. Croley, Chairman.
Central District, J. C. Yanning, Chairman.

North Atlantic Ports Freight Traffic Committee
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Marine Department
W. B. Pollock, Deputy Marine Director, New York Harbor.
C. A. Tomblason, General Manager, New York Canal Section.
A. K. Morris, Director, Tidewater Coal Traffic.

Non-Duke
Regional Traffic Representative of U. S. Food Administration.

Regional Purchasing Committee
CHARLES A. HOW, Chairman.
L. S. Carrell, P. A. Bushnell.

Southern Export Committee
(Reporting to Both Regional Director of Western and Eastern Roads)
CHAS T. AIREY, Chairman, Atlanta, Ga.
J. W. Daley, Galveston, Tex.
W. M. Reed, New Orleans, La.

Regional Purchasing Committee
P. H. FECHTIG, Chairman.
Albert C. Vian.

Charles Barham,
Regional Traffic Representative of U. S. Food Administration.

Inter-regional Committees
J. M. HERBERT, Inter-regional committee in charge of railway operations at St. Louis and East St. Louis.
W. G. BIEBED, Chairman, Chicago committee.
C. E. EVANS, Chairman, Louisville committee.

Poehontan Regional District
N. D. MAHER, Regional Director.
Roanoke, Va.
T. S. DAVANT, Traffic Assistant.
D. E. Spanglin, Transportation Assistant.

Budget Committee
New York City.
FRANCIS LEE STUART, Chairman.
A. T. Haddon, H. A. Lane, A. C. Stand.

Passenger Traffic Committee
J. P. Anderson, J. O. McManer, R. H. Wallace, C. L. Hunter, Secretary.
J. W. Daley.

Coal and Coke Rate Committee
Eastern District, E. B. Croley, Chairman.
Central District, J. C. Yanning, Chairman.

North Atlantic Ports Freight Traffic Committee
241 Broadway, New York.
GEORGE D. DODD, Chairman.
Francis La Bau, Vice-Chairman.
Richard Van Umerson, Elmore D. Hutchins, Robert H. Bassett, Joseph R. Ruffin.

Marine Department
W. B. Pollock, Deputy Marine Director, New York Harbor.
C. A. Tomblason, General Manager, New York Canal Section.
A. K. Morris, Director, Tidewater Coal Traffic.

Western Regional District
R. H. AUSTON, Regional Director.
226 W. Jackson Blvd., Chicago.
Ralph Boyd, Capital Expenditures.
W. R. Wood, M. J. Gormley, Operating.
J. G. Woodworth, Traffic.

Regional Purchasing Committee
CHARLES A. HOW, Chairman.
L. S. Carrell, P. A. Bushnell.

Southern Export Committee
(Reporting to Both Regional Director of Western and Eastern Roads)
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Regional Traffic Representative of U. S. Food Administration.

Inter-regional Committees
J. M. HERBERT, Inter-regional committee in charge of railway operations at St. Louis and East St. Louis.
W. G. BIEBED, Chairman, Chicago committee.
C. E. EVANS, Chairman, Louisville committee.

Passenger Traffic Committee
P. S. EUGENIS, Chairman.
L. M. Allen, A. H. C. S. Fre, W. J.

Freight Traffic Committee
A. C. JOHNSON, Chairman.
F. B. Noughdon, George Waldo, S. H. Johnson, J. H. Baird.

Regional Purchasing Committee
P. H. FECHTIG, Chairman.
Albert C. Vian.

Charles Barham,
Regional Traffic Representative of U. S. Food Administration.

Inter-regional Committees
J. M. HERBERT, Inter-regional committee in charge of railway operations at St. Louis and East St. Louis.
W. G. BIEBED, Chairman, Chicago committee.
C. E. EVANS, Chairman, Louisville committee.

George B. Harris

GEORGE B. HARRIS, chairman of the board of directors of the Chicago, Burlington & Quincy, died at his home in Chicago, on June 10, following an illness of about a month. Mr. Harris was in his seventieth year, and belonged to the same generation of railroad executives as Hughitt, Ripley, Cassatt and Earling. He was of the old school of railway executives who carried on their duties quietly and conscientiously and rarely took the public into their confidence. Mr. Harris was indefatigable in his efforts to build up the property which he served and thoroughly mastered every problem presented to him. Although he was rather gruff in manner, he possessed a keen and sympathetic appreciation of the trials and difficulties of his subordinates, and was ever ready to lend a helping hand to the unfortunate. As a result he won the love of the employes of his road as few railroad executives have succeeded in doing. He was a good judge of men and surrounded himself with a capable staff. While he exacted a full measure of effort from subordinate officers, he was quick to recognize and commend ability.

When he became president of the Chicago, Burlington & Quincy in February, 1901, the financial policy of the company was cautious and its operating methods conservative. These policies to which the railroad owed its high standing at that time were carried on by Mr. Harris until James J. Hill secured control. With marked adaptability Mr. Harris applied the Hill methods to the operation of the Burlington with success, and in this he was ably assisted by Darius Miller and Daniel Willard, later presidents of the Burlington and Baltimore & Ohio respectively.

Mr. Harris was born in Brookline, Mass., on December 20, 1848, and moved to Hannibal, Mo., with his parents when a boy of 16. His father was at that time appointed land commissioner of the Hannibal & St. Joseph, then a line across Missouri and subsidiary to the Burlington. Mr. Harris became an office boy for the road which employed his father and later became a clerk in the office of the treasurer and paymaster of the same line. From 1870 to 1875 he was cashier in the land department of the Burlington & Missouri River in Nebraska, with headquarters at Lincoln, Neb. From 1876 to 1877 he was secretary of the South Platte Land Company in the same city. In 1878 he returned to the Burlington & Missouri River as purchasing agent, and in the following year went to the Atchison & Nebraska, at Atchison, Kan., as superintendent and general agent. In 1880 he was again employed by the Burlington & Missouri River as assistant general freight agent, with headquarters at Omaha, Neb. Two years later he went to Chicago as purchasing agent of the Chicago, Burlington & Quincy. In 1883 he was ap-

pointed assistant to the general manager of the Atchison, Topeka & Santa Fe, at Topeka, Kan., and in 1884 went to St. Paul, Minn., as general manager of the Chicago, Burlington & Northern. He was elected president of that road, with headquarters at St. Paul, in 1889. In 1890 he became second vice president of the Chicago, Burlington & Quincy, with office at Chicago, and continued in that position until February 20, 1901, when he was elected president in place of Charles J. Perkins, resigned. On January 15, 1911, the directors finally yielded to his demand that he be replaced by a younger man. He was succeeded by Darius Miller, who died some years later, and in turn was succeeded by Hale Holden, the present president. From 1911 up to the time of his death, Mr. Harris was chairman of the board of directors, and in that capacity gave the younger executives of the road the benefit of his long experience and his thorough knowledge of the property.

Clean Coal

MORE VIGOROUS REGULATIONS than those heretofore issued to insure the production of clean bituminous coal have been made public by the United States Fuel Administration. These regulations will become effective at 7 A. M., June 1, 1918, and supersede all prior orders on this subject.

No bituminous coal will be permitted to be sold, shipped, or distributed, if the same contains such quantity of rock, slate, bone, sulphur, fire clay, shale, or other impurities, that it would not have been considered merchantable prior to January 1, 1916.

Shipments from bituminous coal mines in which the coal is naturally of such character as to be unfit for market may be prohibited by the Fuel Administration. Operators also of bituminous mines whose products are capable of being made merchantable by complying with the requirements of the Fuel Administration in regard to the removal of impurities, and who fail to comply with those requirements, will be required either to unload and clean such coal, if it has been loaded into cars or bins, or to deduct 50 cents per ton from the government price. In the event of repeated violations on the part of such operators, such further action will be taken by the Fuel Administration as it may deem advisable.

The Fuel Administration statement says that the enormous increase in the demand for bituminous coal incident to the entrance of the United States into the war, encouraged the opening of numerous so-called coal mines, a large percentage of the output of which resembled coal solely in color. This product brought the same price on the market as clean coal. The inevitable result was a general deterioration in the quality of all bituminous coal put on the market, and a consequent proportionate decrease in the heat generated in the furnaces of the country.



George B. Harris

The Administration also made public an order under which operators of bituminous coal mines may receive a special allowance for coal mechanically washed or extraordinarily cleaned or picked in such manner that the fuel value of the coal will be substantially increased by the removal of waste and impurities. No special allowance, however, will be made for the ordinary method of cleaning or picking coal.

Canada's Big Railway Year

A GENERAL REVIEW of railway operations in Canada for the calendar year 1917 was presented in the *Railway Age* of January 4, 1918, page 36 and some of the more important problems confronting the Canadian railways were considered in an article in the issue of April 5, page 849. In dealing now with the official figures for the statistical year ended June 30 last the task is reduced to more or less simple proportions. There was an unavoidable element of speculation in the general groundwork of the article in the issue of January 4. The definite and established facts, however, are bigger, better and more inspiring than were the assumptions made at that time. That is to say, when all the accounts had been worked out, and details woven into a fixed fabric, the showing makes 1917 stand out more conspicuously as a year of unprecedented railway activity than was assumed from incomplete data.

It is fashionable to start all reviews with gross earnings. They are regarded as pivotal in their relationship to other results, and properly so; but it is quite possible to exaggerate their essential value. It is only when other things are equal that total receipts become basically important. In this instance, the balance is preserved. The gross earnings had a total of \$310,771,479. When the earnings of such units as the Pullman Company and the tunnel and bridge companies are included the final aggregate rises to \$313,492,949. The betterment over 1916 was \$49,965,792. The full meaning of this growth is not grasped until the eye helps the mind by glancing at such a comparative statement of gross earnings as the following:

1887	.....	\$38,841,609
1897	.....	52,353,276
1907	.....	146,738,214
1917	.....	310,771,479

The advance of gross earnings must be measured, of course, in the light of increased mileage, and by that test the foregoing results do not lose their inspiring value. Taking the same ten-year periods, the facts with respect to earnings per mile of line are as follows:

1887	.....	\$3.188
1897	.....	3.163
1907	.....	6.536
1917	.....	8.051

Rail line in 1917 produced \$295,550,030, water line \$4,397,311, incidental \$10,407,099 and joint facilities \$417,039. These totals included \$220,032,565 from freight, and \$63,131,647 from passengers.

Operating expenses aggregated \$222,890,637, or \$42,348,378 more than for the preceding year. An analysis of this sum shows a fair proportion charged to maintenance. The figures for the various divisions of accounts are as follows:

		Per Cent
Way and structures	\$41,154,193	18.46
Equipment	46,371,178	20.80
Traffic	6,236,811	2.79
Transportation—rail	114,327,344	51.29
Transportation—water	3,271,893	1.47
Miscellaneous operations	3,962,544	3.40
Transportation for investment—Cr.	18,207	0.01
Total	\$222,890,637	

The traffic out of which earnings grew was represented in the moving of 121,916,272 tons of freight and 53,749,680 passengers. The growth in public service was in the same ratio as increased earnings.

Facts collateral to earnings, operating expenses and public service, might be epitomized as follows:

Operating mileage	.....	38,604
Passengers carried one mile	.....	3,150,127,428
Tons, carried one mile	.....	31,186,707,851
Receipts per passenger per mile, cents	.....	13.25
Receipts per ton per mile	.....	.690
Passengers per train	.....	59
Tons per train	.....	436
Average passenger journey, miles	.....	37
Average freight haul	.....	256
Passengers per mile	.....	1.362
Tons per mile	.....	3,159
Passengers density	.....	79,829
Freight density	.....	807,946
Passengers per car	.....	16
Tons per car	.....	22.24

The salient fact in the foregoing tabular statement is the average trainload. It has made most gratifying gains during recent years, and particularly since the stress of war conditions, in the face of shortage of equipment, led to intensive loading. It had crept up from 260 tons in 1907 to 342 tons in 1913. Then it began to move in real earnest, and passed quickly to 411 tons in 1916 and on to 436 tons last year. The so-called Railway War Board helped in the valuable work, as well as in the betterment of the carload as was shown in the above mentioned articles.

The effect of war conditions is seen in train mileage. In 1914, when 46,702,280 passengers were carried, the mileage of passenger trains was 45,219,048; in 1917, with 53,749,680 passengers, the mileage was 44,083,575. In 1916 it was nearly two millions less. Freight train mileage is a direct matter of tonnage to be moved, and in the face of a large increase in that regard the total ran up from 55,343,193 in 1914 to 62,863,724 in 1917. Nevertheless, heavier carloads and trainloads kept down the aggregate quite materially.

For the first time, in 1917, the hour unit for the measurement of compensation to railway employees was given effect. This was done wholly for the sake of preserving uniformity with the prescription of the Interstate Commerce Commission. It is too early to say whether or not the new method will yield results which can be regarded as a countervail to the loss of all bases of comparison for preceding years. It is very difficult indeed to prescribe a schedule and a classification which will be satisfactory, owing to the confusion created by the plan in vogue of having not only three or four scales for employees of the same class, but of having this mixed system applicable to such employees on the same road. In this connection, it may be said that the salaries and wages bill in Canada for 1917 amounted to \$129,626,187.

Ten months of the current statistical year have passed, and it seems comparatively safe to predict that, notwithstanding the trying conditions which developed last winter, gross earnings will not fall behind those for 1917. The railways have had four months under the increased traffic rates, and the effect is appreciable. Of course, this estimate can only be based on the results revealed in the weekly returns of the larger roads; but it may be said that nothing has thus far occurred to indicate otherwise than a gain for the year ending June 30. That this will carry with it a corresponding gain in net earnings seems more or less doubtful, in view of the rising cost of operation. Railways are not immune from the higher cost of living, so keenly felt at the present time by individuals. Those which are sufficiently prosperous find the collector of special taxes at their doors to take away a considerable proportion of betterments realized; so that it seems almost inevitable the total of net earnings for all railways in Canada will show a decline for the current year.

Within the past few weeks the prime minister has foreshadowed the extension of public ownership by the addition of the Grand Trunk and Grand Trunk Pacific, as well as a batch of independent branch lines in the Maritime Provinces, to the system now operated by government. This

movement has been forecast ever since the Draxton-Aworth report was made more than a year ago, and is the sequence to the taking over of the Canadian Northern. These roads had fallen into financial difficulties, and it was obvious, moreover, that much duplication of mileage could be eliminated, and economy of operation brought about by a comprehensive scheme of consolidation. This leaves only a score of roads of even local importance, apart from the Canadian Pacific, outside the sweep of expropriation by government. The discussion which has taken place in parliament points to the conclusion that the steps thus far

taken, momentary and extensive as they undoubtedly are, do not entirely dispose of what we have come to call the Railway Problem in Canada. Whether or not it will end in the establishment of a single system depends very much on the turn of events and the development of public judgment.

Conservation has extended its long arm to official publications. All government reports are this year reduced to mere skeletons of their former bulk, and railway reports are among those which have been much abridged. All details omitted are, however, kept available for inquirers.

Three New Regional Directors Appointed

Hale Holden Becomes Director of Central Western Region
and B. F. Bush Director of Southwestern Region

DIRECTOR GENERAL McADOO on Wednesday announced the division of the Western railroads into three regions instead of one region as heretofore.

R. H. Aishton, hitherto regional director of the Western Region is appointed regional director of the Northwestern Region with office at Chicago, with jurisdiction over the railroads from Chicago to the North Pacific coast.

regional directors will have jurisdiction are given in the tables below on this and the following page

The New Regional Districts

NORTHWESTERN REGION

The Northwestern Regional Director will have jurisdiction over the following roads:

- Chicago & Northwest
- Chicago, St. Paul, Minneapolis & Omaha
- Chicago Great Western
- Chicago, Milwaukee & St. Paul
- Great Northern
- Minneapolis & St. Louis
- Minneapolis, St. Paul & Salt Lake City
- Northern Pacific
- Oregon Washington R. R. & Astoria



Hale Holden

Hale Holden is appointed director of the Central Western Region with office at Chicago with jurisdiction over the railroads in the territory from Chicago to the Pacific coast.

B. F. Bush, president of the Missouri Pacific, is appointed regional director of the Southwestern Region with office at St. Louis and with jurisdiction over the railroads running from St. Louis to the southwest.

There will also be a Pacific coast sub-district under Mr. Holden, but the appointment of the district director has not yet been announced.

The roads and lines over which the three newly appointed



B. F. Bush

St. Louis, Kansas City, Denver, Omaha, Chicago, St. Paul, Minneapolis & Omaha
St. Louis, Kansas City, Denver, Omaha, Chicago, St. Paul, Minneapolis & Omaha
St. Louis, Kansas City, Denver, Omaha, Chicago, St. Paul, Minneapolis & Omaha

CENTRAL WESTERN REGION.

The Central Western Region will comprise the following lines:

- Atchison, Topeka & Santa Fe.
- Chicago, Rock Island & Pacific, except the line St. Louis to Kansas City, the line east of El Reno, the line from El Reno to Memphis, and branches south of Chickasaw, Okla.
- Chicago, Peoria & St. Louis.
- Chicago & Alton.
- Chicago & Eastern Illinois.
- Chicago, Terre Haute & South-eastern.
- Chicago, Burlington & Quincy.
- Colorado & Southern.
- Denver & Rio Grande.
- El Paso & Southwestern.
- Illinois Central, line south of Cairo, & Paducah.
- Los Angeles & Salt Lake.
- Northwestern Pacific.
- Oregon Short Line.
- Quincy, Omaha & Kansas Cit.
- Southern Pacific Lines west of El Paso and Ogden, except those north of Ashland, Mo.
- St. Joseph & Grand Island.
- Union Pacific.
- Western Pacific.

SOUTHWESTERN REGION.

The Director of the Southwestern Region will have jurisdiction over the following roads:

- Fort Worth & Denver.
- Fort Worth & Rio Grande.
- Gulf Coast & Santa Fe.
- Gulf Coast Lines.
- Galveston, Harrisburg & San Antonio.
- Houston & Texas Central.
- Houston, East & West Texas.
- International & Great Northern.
- Kansas City Southern.
- Louisiana & Arkansas.
- Louisiana Ry. & Navigation Co.
- Louisiana Western.
- Midland Valley.
- Missouri Pacific.
- Missouri, Kansas & Texas.
- Morgan's Louisiana & Texas.
- Rock Island, lines south of Chickasaw, Okla.; El Reno to Memphis and branches, and St. Louis to Kansas City.
- St. Louis & San Francisco.
- St. Louis Southwestern.
- San Antonio & Aransas Pass.
- Texas & Pacific.
- Texas & New Orleans.
- Wabash (St. Louis to Kansas City and Omaha).
- Wichita Falls & South Western.
- Texas Midland.
- Wichita Valley.

Price Assistant to the Director General

A. Price, heretofore private secretary to the director general, has been appointed assistant to the director general, and M. Brice Clagett has been appointed private secretary to the director general; J. W. Roberts has been appointed auditor of the Railroad Administration, reporting to the Division of Public Service and Accounts.

HUCE COFFEE POT FOR SOLDIERS.—What is believed to be the largest coffee pot in the world has just been completed at the power house of the Pennsylvania Railroad at Front and Third streets, Long Island City. In the pot 418 gallons of coffee may be made every half hour. It is for the use of the Canteen Section of the Long Island City Branch of the Red Cross, which has taken upon itself the task of serving coffee and sandwiches to the soldiers entraining and detraining there every day.

FRANCE HONORS RAIL WORKERS.—Premier Clemenceau has signed an order praising the railroad workers for the endurance and energy they have shown in moving troops to the present battle-front. According to despatches from Paris dated April 21, two high railroad officials have been made Commanders of the Legion of Honor, two others have been made officers of the order, and seventeen have been made Chevaliers. Twenty railroad men have received military medals.

Train Accidents in April¹

THE FOLLOWING IS A LIST of the most notable train accidents that occurred on the railways of the United States in the month of April, 1918:

Collisions			Kind of Accident	Kind of Train	Kil'd	Inj'd
10.	N. Y. N. H. & H.	Pomfret	rc	F. & F.	4	3
25.	Chicago, B. & O.	Bayard.	bc	F. & F.	6	3
427.	N. Y. C. & St. L.	Moorheads	bc	F. & F.	1	7
28.	Macon & B.	Odessadale.	bc	F. & F.	0	2
29.	Louisville & N.	Cave City	rc	F. & F.	1	2
Derailments			Cause of Derailment	Kind of Train	Kil'd	Inj'd
5.	St. Louis-S. F.	Hamden.	d. bridge	P.	1	32
8.	N. Y. Central.	Amsterdam.	d. truck	P. & F.	1	23
8.	Texas & N. O.	Colmesneil.	d. eq.	P.	0	3
13.	Pennsylvania.	Dix.	b. rail	P.	0	1
14.	Texas & Pac.	Baird.	tornado	F.	0	1
115.	Long Island.	Central Islip.	b. rail	P.	3	37
17.	Atlantic C. L.	Cross Bayou	fire	P.	0	9
18.	Nashville, C. & St. L.	Vinings.	.....	P.	0	3
*19.	Chicago, M. & S. P.	Freeport.	b. wheel	F.	0	0
21.	Southern.	Athens, Tenn.	.....	F.	2	0
29.	Erie.	Corning.	b. journal	F.	0	3
30.	Northern Pacific.	Casselton.	malice	F.	..	..

The trains in collision near Pomfret, Conn., on the 10th were eastbound freights. The leading train had been nearly stopped and the following train struck it at about 15 miles an hour, damaging the engine, caboose and ten cars. One conductor and two brakemen were killed, and four other trainmen were injured, one of them fatally. The second train was running in disregard of a caution card, requiring the speed to be kept under control.

The trains in collision at Moorheads, Pa., on the 27th were a westbound passenger and an eastbound freight. The freight was standing on a side track and the passenger train ran over a misplaced switch and into the head of the freight. Both engines, three cars on the passenger train and six cars on the freight, were badly damaged. One passenger was killed and three passengers and four employees were injured.

The trains in collision on the Chicago, Burlington & Quincy at Bayard, Nev., on the 25th were an eastbound through freight and a westbound work train. Both engines and six cars were badly damaged. Two trainmen and four laborers were killed and three employees were injured. There was a blinding snowstorm at the time and the work train approached the station not under complete control.

The trains in collision at Odessadale, Ga., on the 28th were a westbound passenger and an eastbound freight. The conductor of the passenger train and one passenger were injured. The collision was due to confusion in flagging.

The trains in collision at Cave City, Ky., on the 29th were southbound freight No. 71, second section, and freight No. 13, third section, following it. The leading train was standing at a water station. One brakeman was killed, and two other trainmen were injured. The engineman of the approaching train had fallen asleep.

The train derailed near Hamden, Okla., on the fifth was northbound passenger No. 716. The train, running at 30 miles an hour, broke through a bridge which had been weakened by a flood, and the engine, baggage car and first two coaches fell through and were partly submerged in a stream. The baggageman was killed and 28 passengers and 4 trainmen were injured.

The trains involved in the derailment on the New York Central about one mile west of Amsterdam, N. Y., on the 8th were an eastbound freight, a westbound passenger train, (the Empire State express No. 51) and eastbound express

¹Abbreviations and marks used in Accident List: rc, Rear collision—bc, butting collision—sc, Other collisions—b, Broken—d, Defective—unf, Unforeseen obstruction—unx, Unexplained—derail Open derailing switch—ms, Misplaced switch—acc, obst., Accidental obstruction—malice, Malicious obstruction of track, etc.—boiler, Explosion of locomotive on road—fire, Cars burned while running—P, or Pass, Passenger train—F, or Fr., Freight train (including empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly destroyed by fire—Dagger, One or more passengers killed.

No. 16. The freight train, on track No. 4, was derailed by the breaking of an arch bar of a truck of a loaded freight car, and several cars fell across tracks 3 and 2. The Empire State express, on track No. 2 was derailed by the obstruction. The engine was overturned and the engine-man was killed. A part of the wreckage fouled track No. 1, and train 16 ran into it: its engine was partly overturned and the engine-man was injured. The fireman of No. 51 was also injured, and the newspapers printed the names of 20 or more passengers said to have been injured, but not seriously. This accident was reported in the *Railway Age* of April 12, page 968.

The train derailed near Colmesneil, Tex., on the 8th was northbound passenger No. 155. The locomotive was overturned and three employees were injured. The derailment was due to the wheels of the engine truck becoming locked, which resulted in the left front wheel climbing the rail. Truck inspectors had failed to notice that the brake shoes were not in place and that the truck had been running to the left.

The train derailed at Dix, Pa., on the 13th was eastbound express No. 510. One coach and one parlor car were thrown off the track by a broken rail. Sixteen passengers were injured, all except one of the injuries being classed as slight.

The train involved in the accident on the Texas & Pacific, near Baird, Tex., on the 14th of April, was a westbound freight. The train was struck by a tornado, and five loaded cars in the middle of the train were overturned and fell in a wreck in the ditch. One trainman was injured.

The train derailed on the Long Island Railroad near Central Islip, L. I., N. Y., on the morning of the 15th of April, about 4 o'clock, was a westbound special passenger, carrying 700 soldiers from Camp Upton to Long Island City. Six cars were overturned and ditched. Three soldiers were killed and 37 were injured. The cause of the derailment is believed to have been a broken rail. An officer of the road writes that the cars, all of which were steel, came through the wreck with very little injury. The damage was confined almost entirely to the trucks. The train consisted of a locomotive and 12 cars, and is said to have been running at about 30 miles an hour. The broken rail was of 80 lb., A. S. C. E., section, rolled by the Lackawanna Iron & Steel Company in 1898.

The train derailed at Cross Bayou, Fla., on the evening of the 17th, was southbound passenger No. 39. The train was derailed by the weakening of a trestle which had been damaged by a forest fire which occurred a short time before the train arrived. Nine passengers were injured slightly. The engine passed over the weakened portion of the bridge. No car was overturned.

The train derailed at Vinings, Ga., on the morning of April 18, about 4 o'clock, was the southbound Dixie Flyer. The engine was overturned, and the fireman was fatally scalped. Three other trainmen were injured.

The train derailed near Freeport, Ill., on the 19th was an eastbound freight. The wreck took fire from friction of metals when the cars were wrecked and 14 loaded cars were burnt up. Estimated loss \$30,000. The cause of the derailment was a broken wheel.

The train derailed near Athens, Tenn., on the 21st was freight train No. 53, third section. Fourteen loaded cars were thrown off the track and wrecked by the sudden stopping of the train when the brakes were applied by the cutting of the hose. Of five trespassers riding on the train, two were killed. One of the trespassers had cut the hose with a view to stopping the train at Athens, the speed of the train preventing them from carrying out their original purpose of jumping off while it was in motion. The road was blocked for about twelve hours.

The train derailed near Corning, N. Y., on the 29th was a westbound freight. Six cars of coal and a number of

empty cars were piled up in a bad wreck blocking both main tracks. Three trespassers riding in a freight car were injured. The derailment was caused by a broken journal.

The train derailed on the Northern Pacific near Casselton, N. D., on the 30th was the westbound North Coast Limited. The locomotive and first four cars were ditched, but there were few injuries to persons, and all were reported slight. The derailment was due to the misplacement of a switch by mischievous boys, 12 and 13 years old, with the avowed intention of seeing a wreck. They were taken before a court and were sent to the State Reform School.

Electric Car Accidents.—Serious accidents to street cars were reported in the newspapers in the month of April at Tompkinsville, N. Y., on the 19th; Texarkana, Tex., on the 27th and at Birmingham, Ala., on the 25th. In the last-named accident a car was overturned on a curve and four passengers were killed.

An English View of Government Ownership

(From the *Railway Gazette*, London)

A RECENT ISSUE of the *Railway Review* (the organ of the British railway labor unions) contains a rather disingenuous plea for railway nationalization after the war. By way of introduction, the writer admits that:—

"To the man in the street the question of railway nationalization may not be enticing today as it was before the war . . . passenger fares have gone up 50 per cent, excursion trains abolished, no certainty in the delivery of goods and parcels, so that in many cases he may be thinking that state ownership is not an unmixed blessing. Railway men, however . . . know that never since the inception of railways have they been worked so efficiently or so much traffic handled in relation to staff employed . . . The steady stream of munitions . . . the flow to the docks of all the paraphernalia of war . . . a most smashing argument for public ownership of railways, for under the old competitive system of handling traffic and running railways such work would have been impossible."

We are familiar with this sort of argument in the columns of the lay press, but the *Railway Review* ought to—and does—know better. Our railways are being efficiently worked in war time precisely because from the outset of war the government has very wisely left their operation in the hand of the experts responsible for administration and operation during times of peace. Anyone with any knowledge of the results of direct industrial control by the state at present will realize how much the country has gained, and how the prosecution of the war has been aided, as the result of not having state railways.

THE GRAND TRUNK EMPLOYEES' PATRIOTIC ASSOCIATION of Toronto has contributed for patriotic purposes \$30,989.31. The association was organized in August 1915, and the financial statement is from that date to December 31, 1917. To the Toronto and York Patriotic Fund was donated \$15,000; to the British Red Cross, \$2,750; British Soldiers' Relief, \$1,000; motor ambulances, \$3,093.20 and Christmas boxes to enlisted men, \$910.50. These are some of the larger items of disbursement.

245 AMERICAN LOCOMOTIVES are now in operation on railway lines in France according to press despatches. They were brought to France in parts and set up in the army machine shops. Likewise 514 American freight cars of thirty-ton capacity each have been set up, and 700 more are in process of being assembled, while another 700 are on the way. The regular freight car of France is of the ten-ton type.

General News Department

For the Alaska railway, the appropriations committee of the House of Representatives has decided to approve for the next fiscal year an appropriation of \$5,250,000. This would keep at work the present force of 5,000 men.

Repairs of locomotives are now being rushed. Frank McManamy, manager of the locomotive section of the Railroad Administration, says that on the government-controlled roads about 4,800 engines are passing through the shops each week, or 700 more than a year ago.

Camp Upton, on the Long Island Railroad, 65 miles east of New York city, was visited on Sunday last, by about 17,000 people. Most of them traveled from New York by the Long Island Railroad, but every road leading to the camp was congested by automobile traffic.

Car Seals are to be investigated by a committee of customs officers which has just been appointed. The committee will meet at Buffalo. It will be particularly interested in seals of the self-locking type and a suitable seal for use with cord or other material for securing packages.

Freight congestion, east of the Mississippi River, is now virtually ended, or nearly so, according to a review compiled by the Railroad Administration. Only about 11,000 cars above normal were this week reported on Eastern lines, as compared with 160,000 above normal last January.

An appropriation of \$3,500,000 for the continuation of the railroad valuation work for the fiscal year ending June 30, 1919, is included in the sundry civil appropriation bill, reported to the House on June 10. Other appropriations for the Interstate Commerce Commission amount to \$2,045,000.

Stockyards at railroad terminals are the subject of a resolution, adopted by the Senate on June 6, directed to the director general of railroads, calling for information as to what, if any, action is contemplated in regard to taking over such yards as a part of the railroad system; and as to what, if any, additional legislation is necessary. The resolution was introduced by Senator Norris of Nebraska.

A senior inspector of motive power is wanted by the United States Civil Service Commission, for a position in the Division of Valuation, of the Interstate Commerce Commission, Eastern district; salary \$1,800 a year. Applications will be received up to July 16. Applicants must be between 25 and 60 years old and the examination will cover the qualifications for all grades in this department up to \$3,600 a year.

The airplane mail service has somewhat improved its performance during the past week. On June 7, the flyer from New York to Philadelphia, and the one from Philadelphia to New York, both decided not to start because of unfavorable weather; and the same condition was reported on June 11. A flight was made from New York to Boston on June 6, and it was the intention to return the next day, but the actual start from Boston was not made until June 11. Lieut. T. H. Webb, on that day, came through in three hours, carrying with him, as passenger, Postmaster W. F. Murray, of Boston. Also on board was the aviator's mechanic, and the mail weighed 20 lb. The airplane mail service between London and Paris is reported as very successful, the third day's round trip having been made in five hours, fifteen minutes.

Complete control of iron—that is, of the distribution of all manufactured steel products and pig iron, has been taken over by the War Industries Board. An agreement has been entered into with a committee of the American Iron & Steel Institute under which the board will pass upon all applications for steel products and pig iron. With certain exceptions, pig iron or steel manufactured products are to be shipped only on priority certificates issued by the Priorities

division of the board. Reports are to be made weekly of shipments made not covered by priority certificates and if there is still any surplus it may be disposed of to other customers if approved by the director of steel supply, J. L. Replogle. It is understood that there will be little or no steel for non-essential industries.

Secrecy as to troop movement is called for by the committee on Public Information, in a circular addressed to editors and correspondents. Following the publication recently of a notice of a troop train movement due to occur in eastern Illinois, the track was tampered with. Enemy sympathizers evidently learned of the troop train movement because of the premature newspaper publication of the fact, and removed rails from the track of the Wabash road. A trackwalker luckily discovered the break in time to repair the damage before the troop train passed.

New Railway Units Organized

The War Department announces that the organization of five new regiments and nineteen battalions of railway engineers is being completed by S. M. Felton, Director General of Military Railways. The work has been done in conjunction with the Engineer Corps. When the new forces are put on duty, there will be 50,000 Americans engaged in railroad construction and operation in France. A total of \$160,000,000 has been spent on railway materials alone, this sum not including supplies provided and used by the Engineer Corps proper. All the nine regiments now in service have been in France since August, 1917. Six of them have been engaged in construction work, building and rebuilding railways, building docks, rearranging terminal facilities in the line of efficiency and generally providing for the heavy shipments of Americans and American supplies. The other three regiments have been engaged in operation. Some of the railway troops have been engaged in the actual fighting line. The new troops will be used part for construction and maintenance, and part for operation. They also will do their part with the rifle and the bayonet should necessity arise. The \$160,000,000 used for railway supplies has gone for such items as 1,727 engines, 22,630 freight cars, and 359,000 tons of steel rails. Much of the work thus far has had to do with terminal facilities, including wharves, docks and lighterage at the water front, switching facilities at inland points, shops, round-houses, etc.

Washouts in Iowa

Exceptionally heavy rains inundated railway tracks in central Iowa and caused a suspension of train movement on a number of lines the latter part of last week. On June 3, the Chicago-Omaha line of the Rock Island was washed out at points near Grinnell, Malcolm, Brooklyn, Carnforth and Victor. The line between Des Moines and St. Paul was also washed out between Cambridge and Buckeye.

The Chicago & North Western encountered its greatest trouble near Tama, Iowa. The Chicago-Omaha line was flooded between that point and Montour and the branch running northwest from Tama was washed out at Eldora, Gifford and Gladbrook. The Chicago-Omaha line was also washed out between Dunlap and Dow City, and at Boone.

The Chicago, Milwaukee & St. Paul suffered its most severe washout between Amana and North English on its Cedar Rapids line. On Chicago Great Western there were washouts between Carroll and Harlan, and between Ira and Baxter. The Lehigh branch was also flooded. Other Iowa railways also suffered considerable damage from high water. For several days passenger trains were delayed on account of floods, and trains had to be detoured at many places.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL, 1918.

Name of road	Operating revenues			Maintenance of way and structures			Operating expenses			Total	Operating ratio	Net from railway operation	Railway tax accruals	Operating income (or loss)	Increase comp. with last year
	Freight	Passenger	Total	Way and structures	Equip-ment	Traffic	Trans-portion	General							
Alabama & Vicksburg	141	\$137,988	\$49,972	\$193,317	\$19,333	\$30,914	\$6,606	\$64,133	\$6,606	\$123,848	63.92	\$69,892	\$1,573	\$1,616	63.171
Alabama Great Southern	312	384,929	178,522	563,451	50,306	148,556	13,452	217,155	13,452	330,207	89.44	44,059	1,104	1,215	69.822
Alabama Northern	377	598,872	51,888	650,760	59,939	47,346	2,382	78,228	15,883	207,753	55.48	117,474	1,606	1,606	48.822
Atchafalpa, Topka & Santa Fe	8,646	9,184,725	2,669,008	12,832,147	1,467,073	1,911,150	147,321	3,939,634	1,08,670	7,649,209	50.57	7,477,115	5,679	4,660	1,317.2
Atlanta & West Point	93	107,023	18,338	125,361	18,930	33,979	3,752	59,258	5,846	133,248	62.23	137,515	7,707	17,609	4,149
Atlanta, Birmingham & Atlantic	309	256,539	51,509	333,046	74,066	75,347	10,999	167,622	12,596	309,104	113.13	309,104	1,934	1,934	61.1
Atlantic & St. Lawrence	616	115,660	12,127	137,787	17,519	33,359	1,695	131,183	5,713	108,811	73.66	10,974	1,100	1,100	6
Atlantic Coast Line	4,784	9,740,177	1,153,186	4,397,989	641,221	861,221	18,261	1,664,300	85,228	3,894,616	65.81	1,946,761	1,934	1,934	4
Baltimore & Ohio	9,615,505	12,699,042	1,456,546	23,970,093	3,219,396	40,169	808	134,347	8,935	18,733	1,309.63	11,411	17,171	17,171	4
Baltimore, Chesapeake & Atlantic	7	69,465	34,722	107,611	7,532	21,228	3,435	136,905	11,850	98,516	64.59	117,411	17,171	17,171	4
Bangor & Aroostook	632	361,480	68,358	455,149	56,970	49,938	2,844	187,079	7,435	91,648	74.37	1,070	1,070	1,070	4
Birmingham & Nashville	36	76,764	23,674	100,438	15,863	198,212	12,412	311,872	20,761	64,830	74.37	1,070	1,070	1,070	4
Birmingham Southern	41	89,584	11,161	111,587	45,320	33,690	834	36,692	5,874	137,610	50.81	1,070	1,070	1,070	4
Boston & Maine	2,805	3,561,855	1,460,349	5,662,894	614,028	935,432	33,844	1,856,682	4,071	4,581,594	84.14	1,070	1,070	1,070	4
Buffalo & Rochester	1,018	1,083,541	1,366,747	155,394	155,394	155,394	16,064	233,184	33,583	1,238,465	90.61	1,070	1,070	1,070	4
Buffalo, Susq. R. Co. & Erie	552	148,409	19,905	155,255	40,118	61,217	2,222	177,455	2,222	21,383	95.1	1,070	1,070	1,070	4
Carolina, Chesapeake & Ohio	1,018	1,083,541	1,366,747	155,394	155,394	155,394	16,064	233,184	33,583	1,238,465	90.61	1,070	1,070	1,070	4
Central of Georgia	8,964	6,301,562	1,889,016	8,190,578	1,166,684	1,166,684	105,562	3,899,015	231,438	8,333,779	100.98	1,070	1,070	1,070	4
Central of New Jersey	6,487	6,092,272	1,551,000	7,643,272	1,551,000	1,551,000	15,510	1,872,231	7,751	3,166,155	69.45	1,070	1,070	1,070	4
Central of New England	301	1,551,068	252,764	1,803,832	194,152	241,172	334,026	449,228	10,921	1,603,306	80.43	1,070	1,070	1,070	4
Chesapeake & Ohio	1,131	1,551,068	252,764	1,803,832	194,152	241,172	334,026	449,228	10,921	1,603,306	80.43	1,070	1,070	1,070	4
Chesapeake & Western	1,131	1,551,068	252,764	1,803,832	194,152	241,172	334,026	449,228	10,921	1,603,306	80.43	1,070	1,070	1,070	4
Chicago & North Western	1,131	1,551,068	252,764	1,803,832	194,152	241,172	334,026	449,228	10,921	1,603,306	80.43	1,070	1,070	1,070	4
Chicago & Western	1,131	1,551,068	252,764	1,803,832	194,152	241,172	334,026	449,228	10,921	1,603,306	80.43	1,070	1,070	1,070	4
Chicago, Burlington & Quincy	8,964	6,301,562	1,889,016	8,190,578	1,166,684	1,166,684	105,562	3,899,015	231,438	8,333,779	100.98	1,070	1,070	1,070	4
Chicago, Detroit & Can. Genl. Trg. Co.	9,723	8,461,088	1,919,684	11,666,499	1,780,676	1,988,284	105,562	3,899,015	231,438	8,333,779	100.98	1,070	1,070	1,070	4
Chicago & Alton	1,370	1,295,905	800,526	2,096,431	1,818,207	2,311,520	26,835	762,331	58,592	1,621,359	83.18	3,140	2,611	1,313	4
Chicago & Eastern Illinois	1,370	1,295,905	800,526	2,096,431	1,818,207	2,311,520	26,835	762,331	58,592	1,621,359	83.18	3,140	2,611	1,313	4
Chicago & Great Western	1,370	1,295,905	800,526	2,096,431	1,818,207	2,311,520	26,835	762,331	58,592	1,621,359	83.18	3,140	2,611	1,313	4
Chicago, Indianapolis & Louisville	1,370	1,295,905	800,526	2,096,431	1,818,207	2,311,520	26,835	762,331	58,592	1,621,359	83.18	3,140	2,611	1,313	4
Chicago, Milwaukee & St. Paul	1,370	1,295,905	800,526	2,096,431	1,818,207	2,311,520	26,835	762,331	58,592	1,621,359	83.18	3,140	2,611	1,313	4
Chicago, Peoria & St. Louis	1,370	1,295,905	800,526	2,096,431	1,818,207	2,311,520	26,835	762,331	58,592	1,621,359	83.18	3,140	2,611	1,313	4
Chicago, Rock Island & Pacific	1,370	1,295,905	800,526	2,096,431	1,818,207	2,311,520	26,835	762,331	58,592	1,621,359	83.18	3,140	2,611	1,313	4
Chicago, St. Louis, Minn. & North Western	1,370	1,295,905	800,526	2,096,431	1,818,207	2,311,520	26,835	762,331	58,592	1,621,359	83.18	3,140	2,611	1,313	4
Chicago, St. Paul, Minn. & North Western	1,370	1,295,905	800,526	2,096,431	1,818,207	2,311,520	26,835	762,331	58,592	1,621,359	83.18	3,140	2,611	1,313	4
Cincinnati, New Orleans & Texas Pacific	437	839,051	249,715	1,233,340	34,291	297,048	22,355	413,151	27,616	842,558	78.76	3,140	3,140	3,140	4
Cincinnati Northern	317	94,258	11,533	115,791	48,219	37,923	3,933	1,010,511	93,957	3,755,622	68.38	3,140	3,140	3,140	4
Cleveland, Cincinnati, Col. & St. Louis	1,170	1,005,405	295,811	1,561,216	35,369	51,400	5,318	153,188	113,400	1,138,669	97.61	1,070	1,070	1,070	4
Cleveland, Cincinnati, Col. & St. Louis	1,170	1,005,405	295,811	1,561,216	35,369	51,400	5,318	153,188	113,400	1,138,669	97.61	1,070	1,070	1,070	4
Cleveland, Cincinnati, Col. & St. Louis	1,170	1,005,405	295,811	1,561,216	35,369	51,400	5,318	153,188	113,400	1,138,669	97.61	1,070	1,070	1,070	4
Colorado & Southern	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
Colorado & Wyoming	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
Coltle Creek & Col. Rail. System	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
Delaware & Hudson Co. R. Road	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
Denver & Rio Grande	5,959	3,921,651	714,520	5,177,270	91,501	91,501	61,650	2,076,437	91,671	3,558,831	67.90	1,070	1,070	1,070	4
Denver & Salt Lake	5,959	3,921,651	714,520	5,177,270	91,501	91,501	61,650	2,076,437	91,671	3,558,831	67.90	1,070	1,070	1,070	4
Denver & North Platte	5,959	3,921,651	714,520	5,177,270	91,501	91,501	61,650	2,076,437	91,671	3,558,831	67.90	1,070	1,070	1,070	4
Denver & Toledo	5,959	3,921,651	714,520	5,177,270	91,501	91,501	61,650	2,076,437	91,671	3,558,831	67.90	1,070	1,070	1,070	4
Detroit, Toledo & Grand Haven	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
Detroit, Toledo & Grand Haven	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
Duluth & Iron Range	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
Duluth, St. Louis & Atlantic	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
Duluth, St. Louis & Atlantic	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
Duluth, Wm. & W. Ry.	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
East St. Louis & North Western	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
East St. Louis & North Western	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
Elm, Tolet & Eastern	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
Elm, Tolet & Eastern	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
Elm, Tolet & Eastern	1,170	756,874	157,524	969,485	11,073	208,578	9,244	376,335	33,412	604,432	71.53	1,070	1,070	1,070	4
Elm, Tolet & Eastern	1,170	756,874	157,5												

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL, 1918 (CONTINUED)

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Total operating revenues, Maintenance of way and structures, Equip., Traffic, Trans-portion, General, Total, Operating ratio, Net from way operation, Railway tax accruals, Operating (or loss), Increase (or decrease) comp. with last year.

I. C. C. Employees Liable to Military Service

In response to a House resolution, the Interstate Commerce Commission has submitted a report, giving a list of 164 of its employees of draft age, for whom requests for exemption from military duty or deferred classification have been asked by the commission and allowed. The report states that the civil, structural and electrical engineers, and a number of other employees for whom exemption was requested are members of the commission's organization for valuing the railroads, and that 571 men, out of a total of 2,240 employees, have left the service of the commission to enter the military service.

Headlight Order Effective July 1

The Interstate Commerce Commission's order of October 11, 1915, requiring locomotives to be equipped with high-power electric headlights, which has been three times extended, becomes effective on July 1. It applies to all new locomotives and all locomotives sent to the shop for general or heavy repairs after that date; and all locomotives must be equipped by July 1, 1920. About 40,000 engines are now equipped with high-power lights, which leaves about 26,000 more to be equipped. The new standard locomotives recently contracted for by the Railroad Administration are to be equipped with lights ordered from the Pyle-National Electric Headlight Company, but on other locomotives the roads may use any light they desire, if it complies with the commission's order. This requires for road locomotives a light "which shall afford sufficient illumination to enable a person in the cab who possesses the usual visual capacity required of locomotive enginemen, to see in a clear atmosphere, a dark object as large as a man of average size standing erect at a distance of at least 800 feet ahead and in front of such headlight." For yard locomotives the distance is 300 feet.

Regulation of All War Industries

The War Industries Board announced, at Washington, on June 11, that measures would at once be taken to prevent further increase in the volume of war orders and the number of establishments handling them in the area known as the congested manufacturing and transportation district: The New England States, Eastern and Southern New York, Pennsylvania as far west as Williamsport and Altoona, all of New Jersey and Delaware, and Eastern Maryland, not including Baltimore. Exceptions to this policy will be made only if necessary to provide for war needs. The increased industrial activity in the Eastern states has created a requirement for coal which exceeds the limit of possible transportation of coal, plus necessary materials for manufacture. A map of the congested and restricted districts has been issued to all government departments. The new policy will be made effective by the allocating of new contracts whenever possible in Western Pennsylvania, Ohio, Indiana, Illinois, Mississippi Valley regions and the South. The demand for war materials is actually greater at present than the capacity of manufacturing plants, and, consequently, a continual expansion is in progress.

Increased Employment of Women

The Pennsylvania Railroad reports that in the ten-day period from May 27 to June 5 inclusive, on the lines east, 4,477 employees left the service and 5,122 new ones were hired. The net gain of 645 occurred entirely in the last two days of the period and was apparently sporadic. The figures do not include the forces in the general offices. There was a rapid increase in the number of women employes, accompanied by a decrease in the number of men. On May 27 there were 5,682 women, and on June 5, this number had increased to 7,227. As the total number of both men and women hired exceeded by 645 the number who were lost, it appears that there had been a loss of exactly 900 male employes as against a gain of 1,545 females.

As the total divisional forces (excluding the general office forces) have recently been averaging between 148,000 and

150,000, the rate of "turn over" indicated by the ten-day test is approximately 100 per cent per year. Comparatively few changes took place among the enginemen, conductors and other employes holding positions which are only reached after a considerable length of previous service. Trainmen in other grades, however, were coming and going constantly, and this was true also of shop men, trackmen, etc. There is at present a serious scarcity of firemen, brakemen, car repairmen, trackmen and engine repairmen. There are currently about 14,000 "bad order" cars on the Pennsylvania, or about 4,000 above normal; all due to lack of men.

Railway Business Association and Government Purchasing Policies

Alba B. Johnson, president of the Railway Business Association, has sent a letter to the members of that organization asking for suggestions as to co-operation of the railway supply industry with the Railway Administration. The letter, in part, follows:

"Government purchase of rolling stock and specialties has now progressed to a point where it is possible to appraise some of the policies which the Railroad Administration is pursuing. It is assumed and in some instances has been announced that none of these policies is to be regarded as a rigid precedent but that suggestions are invited for improvement affecting the future. Many aspects can be effectively dealt with only in a representative way. It is for the Railway Business Association to frame recommendations and urge them upon the authorities. In order that the general executive committee may proceed in the matter with intelligence it is essential that members give us the benefit of their experience and ideas. Statements whether written or oral will, if so desired, be regarded as confidential. The Railway Business Association is the counsellor of each of its members and the advocate of their united purposes. No industrial group has served or can serve the country more vitally. No one can with greater propriety than our members be accorded consideration by the government. We are not mere petitioners for business. We are citizens, making sacrifices like all other citizens, and equipped to aid in the momentous enterprise which engages the nation's energies.

"We are organized to help our members give the fullest co-operation to the Railroad Administration. We are also organized to assure that the Railroad Administration has the fullest understanding of our dignity and potentiality as a guild, as well as of the particular limitations and perplexities under which our establishments are doing their part in the nation's supreme business."

Hudson Bay Railway

A recent debate in the senate of the Canadian parliament brought out a discussion of the present status of the Hudson Bay Railway, in which it developed that no construction on the road itself has been done during the past year. A bridge, however, was completed at the second crossing of the Nelson river. Up to date, a length of 332 miles of the line has been finished, and track is yet to be laid on 92 miles. Trains are being operated on 214 miles, on a part of which there is daily train service. The part of the line operated has paid expenses. The last year in which any considerable amount of construction material was transported by water to Port Nelson, the terminus of the line, was 1914. In the summer of that year, 36 voyages were successfully made through Hudson strait and Hudson bay, and large quantities of freight were carried by ordinary tramp steamers without hazards or difficulty. With specially constructed ships the season, it is believed, could be considerably prolonged. During six weeks of the summer, engineers and navigators reported that the navigation of the bay was safer than the navigation of the St. Lawrence river to Quebec, and during the remaining six weeks, the navigation of Hudson strait was as safe as the route to Quebec.

Up to March of this year, \$20,161,000 had been expended on the Hudson Bay Railway, of which \$13,814,000 had been

spent directly on the construction of the road and \$6,347,000 on terminals and harbor improvements at Port Nelson. The latter sum also includes the cost of steamships, which are now in general service throughout the year.

The north and south arms of the bridge across the Nelson river at Kettle Rapids were connected in December, 1917, so that track laying can be continued this season. Grading between Kettle Rapids and Port Nelson has been fully completed, and filling and ballasting has been done as far as Kettle Rapids. Owing to the shortage of ocean tonnage, no further shipments of supplies have been made to Hudson Bay this season. A limited program is being carried out at Port Nelson in which materials and supplies on hand are being utilized. The island crib work at that point has been extended and dredging has been continued.

Chicago Car Thieves Captured

Secret service officers of the Chicago railroads arrested six private railroad watchmen and one ten-cent-store dealer in Chicago on June 8 in a roundup of railway thieves. Three of the men are charged with larceny and three others are held on burglary charges. Rosario di Giacomo, the store keeper, is being held on two charges, receiving stolen goods and bribery, having offered Michael Mulvey and Timothy Buttiner, detective sergeants, \$100 each when they arrested him, after they had discovered in his possession more than \$15,000 of loot taken from box cars, and other railroad property. His store, the police declare, has been used as a headquarters for the thieves. When Giacomo offered them the bribe, the detectives took the money for evidence and placed him under arrest. The men will be prosecuted under Section 11 of the Railroad Control Bill, which provides a maximum penalty upon conviction of 10 years' imprisonment or a \$5,000 fine or both for stealing railroad property, or tampering with or knowingly impeding the operation, use or possession of railroad property.

The campaign against stealing from Chicago railroads is being carried on by the Chicago railroad police commission, consisting of T. E. Pratt, special agent of the Chicago, Burlington & Quincy; William Briggs, captain of police of the Pennsylvania lines, and H. H. Germain, superintendent of special service of the Rock Island lines. G. M. Bryan has been appointed chief inspector for the new commission, and Martin Quinn, captain. An office has been opened in Room 646 Transportation building, Chicago, and railroad men are urged as a patriotic duty to report to it any thefts from their companies. While the unification of secret service work on Chicago railroads was first initiated by the committee of Chicago railroad presidents, the commission has received the approval of Director-General McAdoo; and it is a part of the property-protection section of the railroad administration, of which Philip J. Dolerty is manager. The scope of the work of this section was outlined in the *Railway Age* of May 10, page 1168.

That the Chicago switching district is a fertile field for more intensive policing is indicated by estimates which place the stolen merchandise in that territory at \$1,000,000 annually. The Chicago railroad police commission will have immediate charge of all railroad premises, including passenger stations, shops, yards, elevators and also of equipment, and will have a force of about 1,000 operatives. In addition, individual railroads will maintain their own special police who can be called on for assistance by the commission when the occasion arises.

The Roadmasters' Convention

At a meeting of the Executive Committee of the Roadmasters' Association, held in Buffalo on June 1, and attended by about 40 members of that Association, it was decided to proceed with the arrangements for the annual convention of the association, which will be held at the Auditorium Hotel, Chicago, on September 17-19. The program will have particular reference to the problems now confronting the men in the track department. The Track Supply Association will also present an exhibit. It was decided to eliminate all entertainment features.

Traffic News

The Washington, Baltimore & Annapolis Electric Railway has applied to the Public Service Commission of Maryland for authority to increase passenger fares to correspond with the rates now in effect on government controlled roads.

Coal Production

The observance of Memorial Day in the mines in the northern states caused the production of bituminous coal during the week ended June 1 to decrease 1,025,000 tons, or 8.7 per cent, according to the report of the Geological Survey. The total production was 10,774,000 net tons. Anthracite shipments during the week decreased 8,832 cars or 22 per cent. For the country as a whole, improvement is reported in the car situation for the week ended May 25.

Westbound Fuel Restrictions

Because of the increasing demand for fuel for war purposes in the East, the Fuel Administration, beginning June 20, will prohibit the movement of bituminous coal, westbound, from coal operations on the line of the Chesapeake & Ohio in the Kanawha district, east of and including St. Albans, W. Va. By-product coal and coal intended for the manufacture of gas or for other special purposes may, however, be moved when the consumers have obtained a permit from the Coal Zone Permit Bureau. Public utilities and similar plants, which now have contracts with operators in these producing fields, must also secure permits for the westbound shipment of such coal. When coal from these fields is to be shipped to Toledo and Sandusky, for lake trans-shipment or vessel fuel, the trans-shipper or dock operator must secure the necessary permit.

Similar orders will be at once promulgated, prohibiting the movement of any high volatile coal from the Kanawha and Kenova-Thacker districts of West Virginia and the Big Sandy district of Kentucky to any Indiana consumers.

Passenger Fares Around New York

The one-way passenger fare between New York city and Newark, N. J., nine miles, has been fixed at 27 cents. From Church street, New York, to Park place, Newark, the passenger trains are run jointly by the Hudson & Manhattan and the Pennsylvania railroads, and for a few days after the new tariffs went into effect, the price for single and round-trip tickets was lower at New York than at Newark, the Hudson & Manhattan having been ordered to postpone its advances; but on June 13, the 27-cent rate was prescribed for both roads; the round-trip rate being 54 cents. Street-car lines between Jersey City and Newark are demanding authority to make advances in their rates to correspond with those of the standard railroads. The ferries between Manhattan and Jersey City are moving to increase their fares from three cents each to five cents, and it is understood that the approval of the Interstate Commerce Commission is assured.

The Hudson River Day Line of steamboats has been authorized by the Interstate Commerce Commission to make its fare between New York and Albany three dollars; distance 143 miles.

The abolition of excursion fares and special rates for soldiers has given rise to loud complaints in many places. Between Camp Upton, L. I., and New York city, 65 miles, soldiers have been carried at one cent a mile, when on short furloughs, and for one half cent a mile during certain hours of the night, but now, except on formal furloughs of 48 hours or more, and when provided with a special certificate, they must pay the regular rate, which including the tax, is for a round-trip, \$4.21. Between New York city terminals and Pelham Bay park, the site of a large car park, there has been a radical increase in fares for daily travel, especially

Commission and Court News

Interstate Commerce Commission

In a tentative report to the Commission, Examiner Thurtell approves the application of the Illinois Traction System for an order establishing through routes and joint rates between points on its line and points on the New York Central.

Court News

Order to Furnish Separate Freight and Passenger Trains Held Unreasonable

An order of the Nebraska Railway Commission required the Missouri Pacific to furnish separate trains for freight and passenger service. The Nebraska Supreme Court holds that it is not *prima facie* unreasonable, but if it is shown that the installation of a separate passenger train would make the operation of the branch line unremunerative, and it is conceded that both passenger and freight business within the state are carried on at a loss, and that the whole interstate system is in the hands of a receiver on account of inability to pay fixed charges, such order may violate the due process clause of the Constitution.—*Marshall v. Bush* (Neb.), 167 N. W., 59. Decided April 12, 1918.

Discretion of Directors as to Eminent Domain

The Pennsylvania Superior Court holds that there is nothing in the Public Service Act which authorizes the Public Service Commission to order a railroad company to exercise its power of eminent domain for the purpose of constructing a siding from its tracks to the plant of a light, heat and power company. The discretionary right to exercise such power has always been lodged in the board of directors of the railroad company, and the act does not substitute the discretion of the public Service Commission for that of the board of directors.—*Lycoming Edison Co. v. Commission*, 67 Pa. Superior Ct., 608. Decided July 13, 1917.

Abolition of Grade Crossings

The Pennsylvania Public Service Commission approved the plans of a railroad company to change a portion of the road system of a township so as to substitute one overhead crossing for two dangerous grade crossings. No objection was made either by the railroad company or abutting property owners. On appeal by the township from the order the Pennsylvania Superior Court held that the township had no standing to object to the order because it failed to direct the railroad company to maintain the roads changed or to award to the township a lump sum of money for an alleged increased burden thrown on the township.—*Great Bend Tp. v. D. L. & W.*, 67 Pa. Superior Ct., 95. Decided July 13, 1917.

Discrimination by Expediting—Consequential Damage

The New York Appellate Division holds that an agreement with a shipper to expedite a shipment at regular rates, no special rate having been published for expediting, is a discrimination, in violation of the Interstate Commerce Act, and relief on such unlawful contract will be denied. It also holds that where there is no other contract between the shipper and the delivery carrier, the rights of the parties are to be measured solely by the bill of lading issued by the initial carrier. Under a provision that the amount of the carrier's liability shall be computed on the value of the goods at the time and place of shipment, the shipper is not entitled to damages for delayed delivery or for inability to use the goods for a certain time from their damaged condition.—*Grossman Mfg. Co. v. N. Y. C.*, 169 N. Y. Supp., 213. Decided February 21, 1918.

Equipment and Supplies

Additional Locomotive Orders

The United States Railroad Administration is expected to place shortly orders for 390 locomotives in addition to the 1,025 ordered some time ago; 245 from the American Locomotive Company, 100 from the Baldwin Locomotive Works, and 45 from the Lima Locomotive Corporation. The orders, it is understood, will be divided about as follows: From the American Locomotive Company, 130 light Mikados, 100 6-wheel switching and 15 heavy Santa Fe. From the Baldwin Locomotive Works, 57 heavy Mikado, 13 light Pacific and 30 Consolidation for anthracite burning. From the Lima Locomotive Works, 45 light Mikados. This distribution, however, may be changed, that depending upon the ability of the Lima Locomotive Works to handle its order. When the order is placed it will bring the total of orders placed with the three companies up to 800 to the American Locomotive Company, 570 to the Baldwin Locomotive Works, and 45 to the Lima Locomotive Corporation.

Car and Locomotive Specialties Ordered

The Central Advisory Purchasing Committee of the Railroad Administration has ordered the principal specialties to be used for the equipment of the 1,025 locomotives and the 100,000 freight cars, for which orders were placed about May 1. In some cases the equipment is to be furnished or purchased by the builders, and in all cases formal orders will be placed by the car and locomotive builders with the specialty manufacturers. Some of the orders for specialties have not yet been definitely settled. The list of those already ordered is as follows:

Locomotives

Tender truck bolsters.....	All engines, Pittsburgh Steel Foundry Co.
Journal box for tenders.....	To be purchased by builders.
Air brakes	773 Westinghouse Air Brake Co. 251 New York Air Brake Co.
Brick arches	To be purchased by builders.
Radial buffers	Franklin Railway Supply Co.
Pilot bumpers	To be purchased by builders.
Cradle castings	To be purchased by builders.
Blow-off cocks	725 Everlasting, Scully Steel & Iron Co. 300 Southern, So. Loco. Valve Gear Co.
Boiler covering	To be purchased by builders.
Uncoupling devices	All engines, Imperial, Imp. Appliance Co.
Automatic fire doors.....	590 Shoemaker, Nat. Ry. Devices Co. 335 Franklin.
Friction draft gear.....	All engine tenders, Westinghouse Air Brake Co.
Valve gear	500 Walsechaert. 340 Baker. 185 Southern.
Reverse gear	745 Ragonnet. 200 Lewis, 50 Brown, 30 Mellin.
Headlight turbines and generators	All engines, Pyle Nat. Elec. Head. Co.
Side frames for freight engine tenders	American Steel Foundries. Buckeye Steel Castings Co.
Steam gages	310 Ashcroft Manufacturing Co. 315 Ashton Valve Co.
Steam heat gases for passenger engines	90 Ashton Valve Co.
Water gages	All engines, Sargent Co.
Injectors	480 Nathan Manufacturing Co. 395 Hancock Inspirator Co. 150 Ohio Injector Co.
Check valves and stops.....	All engines, Nathan Manufacturing Co.
Lubricators	600 Nathan Manufacturing Co. 423 Detroit Lubricator Co.
Driving box lubricators.....	All engines, Franklin Railway Supply Co.
Metallic packing	555 Paxton-Mitchell Co. 470 United States Metallic Packing Co.
Coal pushers	250 Locomotive Stoker Co.
Regulators for passenger locomotives	65 Vapor, 23 Leslie.
Bellringers	All engines, Harry Vissering & Co.

Sanders	161	United States Metallic Packing Co.
	220	Hanlon Locomotive Sander Co.
	470	Harry Vassinger & Co.
Coal sprinklers	46	William Sellers & Co.
	481	Hannack Inspirator Co.
Stokers	179	Duplex Locomotive Stoker Co.
	17	Standard Stoker Co.
	35	Hanna Locomotive Stoker Co.
Swinging or Planché (types take coal pushers.)		
Blower valves	11	Engines Sargent Company.
Safety valves	640	Consolidated Safety Valve Co.
	330	White
	75	Adrian Valve Co.
Brake shoes	11	All engines American Brake Shoe & Foundry Co.
Grate shakers	11	All engines Franklin Railway Supply Co.
Boiler tubes	11	To be purchased by builders.
Unit safety draw bars	11	All engines Franklin Railway Supply Co.

Freight Cars

Truck bolsters	46,000	American Steel Foundries.
	21,000	Buckeye Steel Castings Co.
	21,500	Scullin Steel Co.
	8,000	Gould Coupler Co.
	5,000	Bettendorf Co.
Couplers	25,000	American Steel Foundries.
	15,500	Buckeye Steel Castings Co.
	7,500	Gould Coupler Co.
	8,000	McConway & Torley Co.
	46,000	National Malleable Castings Co.
Side frames, cast steel	35,000	American Steel Foundries.
	14,500	Buckeye Steel Castings Co.
	16,000	Scullin Steel Co.
	6,500	Gould Coupler Co.
	8,000	Bettendorf Co.
Uncoupling device for couplers	All cars	Imperial Appliance Co.
Pressed steel ends	50,000	Pressed Steel Manufacturing Co.
Friction draft gear	50,000	Sessions, Standard Coupler Co.
	25,000	Westinghouse Air Brake Co.
	19,000	Cardwell, Union Draft Gear Co.
	6,000	Murray, Keyoke Railway Equip. Co.
Dust guards	All cars	Wm. N. Thornbergh Co.
Air brake bases	To be furnished with air brake equipment.	
Brake shoes	All cars	American Brake Shoe & Fdy. Co.
Draw bar yokes	50,000	Buckeye Steel Castings Co.
Air brakes	75,000	Westinghouse Air Brake Co.
	25,000	New York Air Brake Co.

(The number in each case represents the number of cars or locomotives where two or three of a device is used in a single car or locomotive.)

The final apportionment of the order for 100,000 cars has been changed somewhat since the figures were originally announced. The list was published in the *Railway Age* of May 10, page 1169. The changes are as follows:

REVISED APPORTIONMENT OF CARS

Company	50-ton S. S. Box	40-ton D S. Box	30-ton Composite Gondola	Hop	Flat S Gondola	Totals
American Car & Foundry Co.	9,000	11,000	5,000	4,000	1,000	31,000
Bettendorf Company	3,000	.....	.....	.....	.....	3,000
Cambria Steel Company	.....	.....	.....	.....	.....	1,000
Haskell & Barker Car Co.	6,000	.....	2,000	.....	.....	8,000
Keith Car & Manufacturing Co.	.....	1,500	.....	.....	.....	1,500
Laconia Car Company	.....	1,000	.....	.....	.....	1,000
Lenoir Car Works	.....	2,000	.....	.....	.....	2,000
Liberty Car & Equipment Co.	.....	1,000	.....	.....	.....	1,000
Magor Car Corporation	.....	.....	1,000	.....	.....	1,000
Mt. Vernon Car Manufacturing Co.	.....	.....	4,000	.....	.....	4,000
Pacific Car & Foundry Co.	.....	2,000	.....	.....	.....	2,000
Pressed Steel Car Co.	.....	.....	5,500	2,000	2,500	14,000
Pullman Co.	6,000	.....	.....	2,000	.....	8,000
Ralston Steel Car Co.	.....	.....	.....	4,000	.....	4,000
St. Louis Car Co.	1,000	.....	.....	.....	.....	1,000
Standard Steel Car Co.	.....	2,000	2,000	.....	2,500	15,000
McGuire-Cummings Manufacturing Co.	.....	500	.....	.....	.....	500
Totals	25,000	24,500	29,000	14,000	10,000	100,000

The proposed order for 2,000 40-ton box cars to the Barney & Smith Car Company was not placed, and 1,000 of these cars were added to the order of the American Car & Foundry Company, 500 to that of the Keith Car & Manufacturing Company, and 500 were ordered from the McGuire-Cummings Manufacturing Company.

The proposal which was tentatively advanced at the beginning of the negotiations with the specialty manufacturers that they forego royalties on their patents or pool patents so that various companies could manufacture the same patented device was dropped.

Freight Cars

THE Loyal Trading Company, New York, is inquiring for one steel derrick car.

THE AMERICAN SMELTER SLAGATE COMPANY, New York, is inquiring for 8 gravity tank cars with a capacity of 82 cu. ft.

THE ILLINOIS CENTRAL contemplates the purchase of 7 10,000-gal. steel tank cars for the handling of kerosene oil to be and timber treating plant and fuel oil used in the operation of speed burners on southern lines.

Signaling

THE CENTRAL OF GEORGIA is to install an electric interlocking at Boundary street adjacent to the Union passenger station at Macon, Ga. This station is used by the Central of Georgia the Southern, and the Georgia Southern & Florida. The machine will have 85 working levers. The contract for the apparatus and for installation has been given to the General Railway Signal Company.

THE ILLINOIS CENTRAL is to erect automatic block signals between Springfield, Ill., and Marine, 73 miles, at a cost of about \$155,000, and between Princeton, Ky., and Hsley, 18 miles at a cost of about \$51,000. A telephone circuit will be installed in the Grenada district of the Mississippi division between the division and general offices and the principal stations, at a cost of about \$30,000.

THE BALTIMORE & OHIO is to install automatic block signals on its line, double track, between Laughlin Junction, Pa., about three miles east of Pittsburgh, and Goehring, Pa., about 35 miles west of Pittsburgh, and near Callery. Plans for this signaling were made some time ago, but their execution has been deferred until now. The signals will be three-position, and DC circuits will be used throughout, with low-voltage machines.

The Baltimore & Ohio is making extensive additions to its tracks at Gray's Ferry, Philadelphia, Pa., and has asked for bids for the construction of a large electric interlocking plant. This interlocking is to control the switches and signals at the east end of the Eastside Yard, near Wharton street. Between the extremes of this interlocking there are four main tracks, all of which will be signaled for the operation of trains in both directions.

AUSTRIAN FOOD TRAINS—Press despatches state that trainloads of food are being continually loaded in Austria. One train of 100 trucks destined for the relief of Vienna reached the capital with only four trucks.

WAR-SAVING SERVICE—The government wishes to enlist every man, woman and child of the nation in war-savings service. When an individual buys war-savings stamps he enlists in the production division of the nation, thereby supporting and backing up the fighting division before it goes overseas and in the seas.

Supply Trade News

David T. Hallberg, sales representative of the P & M Company, with headquarters at Chicago, has been promoted to district sales agent, with the same headquarters.

Henry Fischer, general sales manager of the Verona Tool Works, with headquarters at Pittsburgh, Pa., has resigned from that company to go with the Proctor & Gamble Soap Company at Cincinnati, Ohio.

George M. Coale, formerly of the Continental Lumber Company at Houston, Tex., has been elected vice-president of the Duncane Lumber Company, with headquarters at Chicago. Mr. Coale will have charge of railway sales.

Stanley W. Midgley, general sales manager of the Acme Supply Company, Chicago, has been appointed western representative of the railroad sales department, in the newly-created western office of the Liberty Steel Products Company, Chicago.

The new accessory plant of the **American Locomotive Company** at Richmond, Va., where piston valves, flexible staybolts, reverse gears and the other accessories are to be manufactured, has been placed under the charge of **Ross Anderson** as manager.

At the first annual meeting of the directors of the United States Switch Company, located at Eau Claire, Wis., **F. E. Nicoles**, division superintendent of the Chicago, St. Paul, Minneapolis & Omaha, at Eau Claire, was elected vice-president; **Charles McArthur**, secretary and treasurer, and **Lee T. Pond**, assistant secretary and treasurer. **James W. Hubbard** was re-elected president and general manager.

C. E. Smith & Co., consulting engineers, St. Louis, Mo., announce that in the absence of **C. E. Smith**, who has received a commission in the national army, their business will be conducted under the direction of **W. S. Dawley**, formerly chief engineer of the Chicago & Eastern Illinois, who for several years past has been out of railway service, and has been engaged in consulting engineering work.

The **Bird-Archer Company**, manufacturer of locomotive boiler chemicals, has moved its Chicago offices to 1105 Peoples Gas building, the change having been necessitated by larger space requirements. This company has recently increased its manufacturing facilities by opening a new factory in Chicago, and a new factory at Cobourg, Ontario, besides materially increasing the output of its Philadelphia factory.

Walter H. Allen, of the staff of the William Wharton, Jr., & Co., Inc., with office at New York, has been transferred to the Pittsburgh office of this company in the capacity of sales engineer in charge of track work in the Pittsburgh and Cleveland district. Mr. Allen was formerly division engineer of the Pennsylvania Steel Company, with headquarters at Steelton, Pa., and was later attached to the sales organization of the Maxwell Motor Company of Detroit, Mich.

The officers of the Chicago Malleable Casting Company, the Universal Draft Gear Attachment Company, and the Union Draft Gear Company, of Chicago, have formed a new corporation called the Allied Steel Casting Company of Chicago, and have purchased the Harvey, Ill., plant, Whiting Foundry Equipment Company. The officers of the new company are: **J. T. Llewellyn**, vice-president of the Chicago Malleable, president; **C. J. Nash**, president of the Universal Draft Gear, vice-president; **J. S. Llewellyn**, secretary-treasurer and general manager of the Chicago Malleable, secretary-treasurer and general manager; **C. H. Tobias**, secretary and treasurer of the Union Draft Gear, assistant secretary-treasurer. The officers and organizations of the Chicago Malleable Casting Company and the Union Draft Gear are not changed, and the companies continue business as before.

Railway Construction

ALASKAN RAILROAD.—The Alaskan Engineering Commission is surveying a branch line between Moose Creek and Baxter, about five miles. **T. W. Secrest**, locating engineer, is in charge of the work.

CANADIAN NORTHERN.—This company has authorized the extension of its Elrose branch in Saskatchewan easterly 25 miles to Alsack and grading is now under way. A contract has also been let for the grading on an extension from Gravelburg, Sask., northwest 14 miles towards Swift Current. Another extension will be built from Hanna, Alta., southeast 47 miles towards Medicine Hat. Contracts for the grading of this line have also been let.

ILLINOIS CENTRAL.—**M. L. Windham**, Centralia, Ill., has been awarded a contract for the grading work for additional yard tracks to be constructed at that point at a total estimated cost of \$171,000. The work involves about 30,000 cu. yd. of grading; the track work will be done by the Illinois Central's own forces. (May 17, page 1257.)

The Illinois Central has received bids on the construction of mechanical facilities at **Fulton, Ky., Amboy, Ill., and Mounds, Ill.** The work at **Fulton** will include the removal of the old roundhouse and other buildings on the site, the construction of a 12-stall roundhouse, a machine shop and boiler room; a concrete stack 5 ft. by 150 ft.; a standard office, store and oil house; a toilet building; 2 Robertson cinder conveyor pits; an engine-men's tool equipment building; a standard brick sand drying house; a standard wet sand bin 77 ft. by 9 ft. 4 in.; a standard dry sand storage bin; sanding equipment, including sand drum, air reservoir, piping and sand delivery spouts; sewers and water works. The work at **Amboy** involves the clearing of the site by the removal of the present buildings, the construction of a 12-stall roundhouse; a 100-ft. turntable; a machine shop and boiler room; a concrete stack 5 ft. by 150 ft.; a standard office, store and oil house; a toilet building; two Robertson cinder pits; engine-men's tool equipment building; a standard brick sand drying house; a standard wet sand bin 84 ft. by 9 ft. 4 in.; a standard dry sand storage bin; sanding equipment, including sand drum, air reservoir, piping and sand delivery spouts; sewers and water works. The work at **Mounds, Ill.**, will involve the construction of practically the same facilities as at **Fulton** and **Amboy**; the roundhouse, however, will have 24 stalls and the turntable will have a diameter of 85 ft. The Illinois Central is asking for bids on a 500-ton frame coal chute at **Gwin, Miss.**, and a 600-ton frame coal chute at **Fulton, Ky.**

This company's program for 1918 includes considerable track construction. Six additional yard tracks will be built at the **Wildwood yard, Chicago**, at a cost of about \$75,000 and side track will be laid between Eighteenth and Twenty-eighth streets, Chicago, which with a rearrangement of existing facilities to provide a switching lead, will cost about \$35,000. Second main track will be extended between **Belleville, Ill.**, and **Wilderman** at a cost of about \$55,000; 21 tracks will be extended in **Nonconah yard** at **Memphis, Tenn.**, at a cost of about \$209,000 and a new northbound departure yard consisting of six tracks will be built at that point, at a cost of \$120,000. At **Champaign, Ill.**, a new six-track northbound yard will be constructed costing \$118,000 and at **East St. Louis** a new yard containing five additional 60-car tracks will be built and the old yard will be enlarged to include five additional 50-car tracks at a cost of \$96,000.

Water purifying plants will be installed at four points in **Iowa** on the **Albert Lea** district of the **Minnesota** division at a cost of \$33,000 and five plants will be installed on the **Cherokee** district of the **Iowa** division at a cost of \$45,000. Additional water facilities at **Gilman, Ill.**, will cost \$26,500 and new water facilities at **Pesotum, Ill.**, will cost \$33,000.

At **La Salle, Ill.**, a new freight house with a second-story office, necessary track changes and a conversion of the present freight house into an engine house will cost approximately \$50,000.

Joseph E. Nelson & Sons, Chicago, have been awarded a contract for the construction of new mechanical facilities at **Paducah, Ky.** (May 17, page 1257.)

Railway Financial News

CHICAGO & NORTH WESTERN.—See editorial comments elsewhere in this issue.

CHICAGO, ROCK ISLAND & PACIFIC.—Action of the semi-annual dividends on the preferred stock has been deferred pending receipt of 90 per cent of its estimated standard returns, application for which has been made to the government.

DENVER & RIO GRANDE.—Securities to the value of \$10,418,700 belonging to this company have been seized to satisfy the judgment recently obtained by the Equitable Trust Company in behalf of the Western Pacific bondholders. It is understood, also, that 100,000 shares of stock of the Utah Fuel Company of a par value of \$10,000,000, owned by the Denver & Rio Grande, will be sold on June 20 in further satisfaction of the judgment.

HAWKINSVILLE & WESTERN.—This company, which recently suspended operation of its 23 mile line between Hawkinsville, Ga., and Perry, was ordered by the Georgia Railroad Commission to resume operation not later than June 20. This road has been operated by the Ocella Southern under lease.

ILLINOIS CENTRAL.—See editorial comments elsewhere in this issue.

NEW YORK CENTRAL.—The directors have declared the regular quarterly dividend of 1 3/4 per cent.

NEW YORK, NEW HAVEN & HARTFORD.—J. P. Morgan & Co. and other bankers have made arrangements for the sale of \$3,420,000 6 per cent equipment trust certificates which will provide the bulk of the required funds for the purchase of equipment costing \$4,756,000.

SIDELL & OLNEY.—The petition of this company, which is owned by the Cincinnati, Indianapolis & Western, to dismantle its 85 miles of line between Sidell, Ill., and Olney, was denied by the Illinois Public Utilities Commission.

URUGUAY BUYS RAILWAY.—The Uruguayan Government has decided to buy the British-owned Central Uruguay Railway. Payment will be made with the proceeds of an internal bond issue. The original concession for the Central Uruguay Railway was granted in 1865. It was to extend from Montevideo to the Rio Negro, 168 miles due north. In 1868 the concession was transferred to a British company. Ten years later the company was reorganized and the terms of the concession were rearranged, the company undertaking to construct a line beyond the northern bank of the Yi River. Since that time three extensions have been built. They are known as the Western, Northern and Eastern extensions. Besides these extensions the Central Uruguay also operates the North Eastern Railway. The total mileage under control is about 980.

WAR GARDENS OF AN ENGLISH RAILWAY.—The London, Brighton & South Coast Railway has now 4,000 allotments cultivated by its employees or by the wives and children of men who are serving the colors.

"PUBLIC ROADS" MAGAZINE ISSUE.—May saw the birth of a new monthly periodical in the Department of Agriculture, "Public Roads," issued by the Office of Public Roads and Rural Engineering. Its 48 pages, some of them illustrated, contain material intended primarily for state and county highway officials actively engaged in the construction and maintenance of highways. The principal object of the publication is to act as a medium of exchange of knowledge and experience between highway departments of the 48 states. The magazine is designed to be a permanent and complete record of activities and construction under the Federal aid road act. Because of the limited allotment for printing expenses the circulation has been restricted to federal, state and county officials actively engaged in road work.—*Official Bulletin*

Railway Officers

Executive, Financial, Legal and Accounting

A. C. Needles, federal manager of the Norfolk & Western, announces that the title of **J. W. Coxe**, controller, has been changed to general auditor, with office at Roanoke, Va.

James B. Wright, district attorney of the Louisville & Nashville at Knoxville, Tenn., has been appointed an assistant in the legal department of the Railroad Administration at Washington, D. C.

James H. Hustis, having resigned as president and director of the Boston & Maine and its subsidiaries, **Woodward Hudson**, general counsel, with office at Boston, Mass., has been elected as his successor in those capacities.

W. E. Eppler, chief of bureau department of accounts of the Quebec, Montreal & Southern and the Nipissing Railway, has been appointed controller, with office at New York, and **H. D. Chamberlain**, freight claim agent, has been appointed auditor, with office at Albany, N. Y.

L. K. Luff, auditor of revenue of the Delaware & Hudson, has been appointed general auditor; **W. J. Daller** has been appointed auditor of revenue; **A. J. Gies**, auditor of miscellaneous accounts, has been appointed auditor of expenditures, and **W. L. Schneider** has been appointed freight claim agent, all with offices at Albany, N. Y.

W. H. Finley, chief engineer of the Chicago & North Western with headquarters at Chicago, Ill., has been elected president to succeed **R. H. Vishton**, who has resigned to serve



W. H. Finley

under the United States Railroad Administration. Mr. Finley was born in New Castle county, Del., and was educated in the public schools at Wilmington, Del., and by private instruction in engineering. He entered the service of the Edgemor Iron Company at Wilmington in 1881, remaining with that company until 1887, when he began railway work in the bridge and building department of the Chicago, Milwaukee & St. Paul. He left the employ of that road in 1892 to go to the Chicago & North Western as engineer of bridges. Since then he has been successively principal assistant engineer and assistant chief engineer, being promoted to chief engineer in June, 1914. He now becomes president of the same road with headquarters at Chicago, as above noted.

M. M. Joyce, general attorney for the Minneapolis & St. Louis has been promoted to general auditor in charge of the law department of that road. **Donald Evans** has been appointed general attorney to succeed Mr. Joyce. Both Mr. Joyce and Mr. Evans will continue to have headquarters at Minneapolis, Minn. **F. M. Miner**, general counsel, has left the service of the company and that position will not be filled for the present.

Frank Trumbull, chairman of the board of the Chesapeake & Ohio, with headquarters at New York, has been elected also president to succeed **George W. Stevens**, who has been appointed federal manager of the road; **H. T. Wickham**, **F. M. Whitaker** and **G. B. Wall**, vice-presidents, all with headquarters at Richmond, Va., have resigned their position with the company, but will continue in charge of their re-

spective departments under the federal administration as assistants to the federal manager; **M. J. Caples** has resigned as resident vice-president of the Chesapeake & Ohio, at Columbus, Ohio, but remains as vice-president of the Hocking Valley. **F. H. Davis** and **C. E. Graham** have been elected vice-presidents of the Chesapeake & Ohio.

Operating

Marvin Hughitt, Jr., vice-president of the Chicago & North Western at Chicago, has resigned.

A. C. Needles, federal manager of the Norfolk & Portsmouth Belt Line, announces the appointment of **George S. Shafer** as general manager. Mr. Shafer's title heretofore was president and general manager, with headquarters at Norfolk, Va.

S. M. Braden, general superintendent of the Chicago & North Western, at Norfolk, Neb., was appointed general superintendent of that road in charge of the Western lines, with headquarters at Omaha; **C. T. Dike**, general superintendent at Huron, S. D., was appointed assistant general superintendent at Boone, Ia.; **G. W. Dailey**, superintendent of the Wisconsin division at Chicago, was appointed assistant general superintendent at Huron, S. D.; **C. H. Reynolds**, superintendent at South Norfolk, Neb., was appointed assistant general superintendent at Norfolk, Neb.

District Directors and Assistant District Directors

James H. Hustis, president of the Boston & Maine, and receiver in charge of the road under the United States court, with headquarters at Boston, Mass., has been appointed district director of the United States Railroad Administration, in charge of New England railroads, with headquarters at Boston. Mr. Hustis was born in New York city in 1864, and began railroad work as office boy in the general manager's office of the New York Central & Hudson River. In 1891, he was appointed trainmaster on the Harlem division, and two years later was made assistant superintendent. In 1900, he was appointed superintendent of the Harlem division, and later was made superintendent of the River division (the West Shore), and served as superintendent of the Rome, Watertown & Ogdensburg, of the Hudson division, and of the Putnam division. In 1907, he was made general superintendent of the Western district, and in October of the same year was given charge of the Boston & Albany, with the title of assistant general manager. In June, 1911, he was given the title of vice-president, and the operation of the Boston & Albany was put entirely in his charge. In November, 1913, he was elected president of the New York, New Haven & Hartford, and in August, 1914, he resigned as president of the New Haven to become president of the Boston & Maine.

Percy R. Todd, president of the Bangor & Aroostook, with headquarters at Bangor, Maine, has been appointed assistant to district director of the United States Railroad Administration and general manager of the Bangor & Aroostook, with office at Bangor. Mr. Todd was born on December 4, 1859, at Toronto, Ont., and was educated in the Collegiate Institute at Ottawa. He began railway work as clerk and telegraph operator in the general office of the St. Lawrence & Ottawa, now a part of the Canadian Pacific, at Ottawa, which positions he held until 1875. He served until 1882 as Canadian agent of the Ogdensburg & Lake Champlain, then as general traveling agent of the National Despatch Line, at Chicago, until 1885; and from July to December of the same year, he was commercial agent of the New York, West Shore & Buffalo, at Albany, N. Y. Later he was chief clerk in the general freight department of the same road at New York, leaving in October, 1886, to become general freight and passenger agent of the Canada Atlantic, at Ottawa, Ont. He served in that capacity until December, 1889, when he went to the West Shore Road as general freight agent. Three years later he was appointed traffic manager of that road. From February, 1901, to November, 1903, he was second vice-president of the New York, New Haven & Hartford; then for two years, first vice-president of the same road. From January, 1907, to January 1913, he was vice-president of the Bangor & Aroostook, and then became president, which position he held to the time of his present appointment.

H. A. Worcester, who has been appointed district director of the United States Railroad Administration in charge of the railroads in the Ohio-Indiana district, with headquarters at Cincinnati, Ohio, was born November 18, 1862, at Albany, N. Y. He is a graduate of Yale University, and entered railway service in December, 1885, as assistant stationmaster of the New York Central & Hudson River at the Grand Central station, New York City. In August, 1891, he went to Buffalo, N. Y., where he did clerical work for the Lake Shore & Michigan Southern. A year later he was appointed assistant trainmaster of the Franklin division and in February, 1893, was promoted to superintendent of the Lansing division. He was transferred to the superintendency of the Detroit division in June, 1896, where he remained until November, 1902, when he was appointed superintendent of the Eastern division. In February, 1905, he became superintendent of the Western division, but remained in that position only three months, at the expiration of which time he entered the service of the Michigan Central as assistant general superintendent. In November of the same year he was promoted to general superintendent. In February, 1906, he returned to the Lake Shore as general superintendent, and in the following October was appointed assistant general manager of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Cincinnati. He was appointed general manager of this road in July 10, 1913, and since January 1, 1916, he has served as vice-president and general manager of the same road.

Traffic

F. H. Hill, traveling freight agent of the Atlanta, Birmingham & Atlantic, has been appointed division freight agent, with office at Fitzgerald, Ga., vice **C. I. Allen**, who has been appointed general agent, with office at Birmingham, Ala., vice **V. E. Whitaker**, promoted.

Engineering and Rolling Stock

Don C. Bowman, assistant engineer, in charge of the construction of new yards and other improvements on the Wabash, at Granite City, Ill., has been promoted to division engineer maintenance of way, with headquarters at St. Louis, Mo.

W. M. Punter, Canadian manager of Saxby & Farmer, Ltd., with headquarters at Montreal, Que., has been appointed signal engineer of the Canadian Northern, eastern lines, with headquarters at Toronto, Ont. **W. Adams** has been appointed signal inspector at Port Arthur, succeeding **H. E. McDonald**, who has been transferred to the Duluth, Winnipeg & Pacific, succeeding **K. Lafferty**, resigned. **J. J. Crowe** has been appointed acting signal inspector, at Edmonton, Alb., in the place of **R. C. Gardner**, who has enlisted in the United States army.

Railway Officers in Government Service

G. W. W. Hanger, assistant commissioner of the United States Board of Mediation and Conciliation, has been appointed assistant director, Division of Labor, of the United States Railroad Administration.

Obituary

H. G. Sexton, superintendent of the Eureka Nevada Railway, with office at Palisade, Nev., died at Colfax, Cal., on May 23, 1918, at the age of 50. Mr. Sexton had been in the railroad work in the construction and operation departments for about 25 years.

Robert Dunlap, western solicitor of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, died at his home in that city on June 10. Mr. Dunlap was born at Cincinnati, Ohio, on October 4, 1853. He was educated at Cincinnati University, and entered the railway service of the Santa Fe in 1883 as assistant attorney, since which he has been consecutively, from 1895 to 1897, assistant to the general solicitor for the receivers of that road; from 1897 to 1915, general attorney of the reorganized road, and from 1915, western solicitor. His railroad career has been entirely with the Santa Fe, he having served that road in a legal capacity continuously for a period of 35 years.

EDITORIAL

Railway Age

EDITORIAL

The reports of railway earnings and expenses gradually are growing better.

Railway Earnings and Expenses

Statistics for the first four months in 1918 show an increase in total earnings of \$9,340,000; but owing to more largely increased expenses and taxes, a decline in net operating income of \$98,100,000. Nor is this the whole story.

When the retroactive advances in wages have been included the net operating income for these four months will really be reduced over \$100,000,000 more, making the decline in operating income as compared with last year for these four months almost \$200,000,000. But April makes a better showing than preceding months. With an increase of \$45,000,000 in total revenues, there was a decline in net operating income of only \$2,300,000. In the absence of the increase of wages, it might be said that conditions in April were approaching normal. But the advance in wages will convert a nominal loss of \$2,300,000 in April into an actual loss of about \$28,000,000. It is evident that steps toward largely advancing the rates were not made any too soon to save the Railroad Administration from incurring a huge deficit this year; and present indications are it will have some deficit in spite of the advance.

The Railroad Administration has authorized the expenditure by the railroads during 1918 of nearly \$450,000,000

One Way to Get Work Done

for additions and betterments and in excess of \$18,000,000 for extensions of branches and for new lines. The classified addition and betterment items include \$98,661,000 for yard tracks and sidings; \$61,979,000 for shop buildings, engine houses and auxiliary facilities; \$47,471,000 for main tracks; \$38,035,000 for bridges, trestles and culverts, and \$31,556,000 for rails and other track materials. To obtain the full measure of value from this construction program the work must be completed before the difficulties of winter operation are encountered. To complete a program of this magnitude in the few months remaining before cold weather sets in is a large order that will tax the ingenuity of the roads to the limit. A considerable portion of this work must be done in localities remote from cities or other sources of labor, adding materially to the difficulties of the situation. Even under normal conditions it would be difficult to complete this program by the usual methods, and with the scarcity of labor and the great demand for contractors of ability to carry on essential government work, the problem becomes more complicated. Certain important eastern roads are meeting the situation by utilizing their own forces, detailing men from the engineering department to take entire charge of a project and holding them responsible for the completion of the work in a reasonable period. These men recruit their own organizations, place orders for materials and, in fact, perform practically all of the functions of a contractor. The roads profit by the plan, both by avoiding the necessity of paying a contractor's percentage and by the savings effected in accounting and inspection, while the engineers in charge have the advantage of utilizing men from other departments, when necessary, and railway equipment for the work without the necessity of detailed accounting to arrive at the distribution

of expense. This plan has been followed on a number of roads for several years. It would appear to warrant further extension this year.

The recent order of the Railroad Administration requiring the prompt payment

Freight Bill Order a Boon to Roads

of freight charges, will doubtless prove unpopular with shippers and likewise will meet with favor among railway officers. One of its effects is to force the public instead of the carrier, to wait for its money in case of errors in billing. Under former conditions credit was generally extended to consignees for a period of a week and, in the event of inaccuracies in the freight bills, until corrected bills were rendered. In the case of large firms, however, bills passed through so many departments that they were rarely settled within the time limit. It was not unusual for bills to be checked by the manufacturing plant receiving or forwarding the freight, by the traffic department of the industry, the accounting department and the treasury department before payment of freight charges was authorized. In addition, an assiduous search for errors in billing by both shippers and consignees really developed into an abuse in the case of many large firms, which deferred payment on freight bills in their entirety when one insignificant entry proved to be inaccurate.

There seem to be no records indicating the extent to which freight charges were settled under credit arrangements. Railroad officers familiar with the subject, however, estimate that considerably more than 50 per cent of all freight charges are settled through credit transactions. In view of this condition the losses in uncollectible freight charges are relatively small in relation to the operating revenues of the carriers. In the year ended December 31, 1916, uncollectible freight revenues for all the railroads in the United States amounted to \$818,422, or 0.022 per cent of the total operating revenues of \$3,691,065,217. Under the new order, however, even this small loss will be prevented.

The granting of credit is not absolutely prohibited under the new plan but is limited to 48 hours after shipment or delivery at destination, and is granted for that period only when a surety bond in an amount satisfactory to the treasurer of the carrier is filed. In a circular explaining the order, the Railroad Administration states that the new rule must be interpreted in a practical business way. If, for example, a consignee who is financially responsible is accustomed to send for his freight in the morning and the collection of the freight charge is effected in the afternoon, that arrangement will be treated as a cash transaction so long as the consignee continues to pay his freight bills promptly upon presentation. Similar application of the rule will be made in the collection of a prepaid charge from a shipper. Perhaps the greatest objection which shippers have raised to the new plan is that it gives them no opportunity to check bills for inaccuracies. The director general, however, promises prompt and fair settlement of overcharges and claims for loss and damage. Furthermore, he authorizes agents to make corrections in bills before exacting payment in cases wherein a mistake is obvious or it is plainly indicated upon the face of the bill.

As previously suggested, a distinct advantage of the new

plan is that it eliminates delay in the settlement of freight charges, thereby saving the carriers much time and expense as well as giving them the benefit of the interest which formerly accrued between the performance of service and the settlement therefor. From the standpoint of the various classes of shippers and consignees the order is likewise beneficial as it prevents discrimination. As the director general points out, the extension of credit in the payment of transportation charges to one person while it is denied to another results in a preference in favor of the person to whom credit is given.

Selling Mechanical Supplies Under Government Operation

THE CONDITIONS under which cars and locomotives and the specialties on them are sold under government operation of the railways are radically different from those under which they were sold when the railways were operated by the different companies.

Under private operation there was not only competition between the concerns selling the materials but also between the railway companies buying them. Each supply company had a large number of actual or prospective customers, and failure to get certain large prospective customers or the loss of some large customers a concern already had, while a matter of importance, was not a matter which was vital. Under government operation, on the other hand, the purchase of all equipment and of all specialties used on new equipment has been placed in the hands of a single committee, and therefore a supply concern's success or failure in negotiating with this committee is a matter of almost vital importance.

A list of the car and locomotive specialties bought by the Central Purchasing Committee to be used on the 1025 locomotives and 100,000 freight cars recently ordered by the Railroad Administration was published in the *Railway Age* for June 14, page 1448. A comparison of the distribution of orders shown by this list with the way in which orders for car and locomotive specialties have been distributed in the past sufficiently explains why the managers of some supply companies express great satisfaction with the way in which the Central Purchasing Committee has distributed the orders while others express only mild satisfaction, and others very great dissatisfaction. Some concerns which have had the largest business in their lines in the past have secured an even larger part of the total business in those lines than heretofore. Other concerns, some having large, some having small, parts of the total business in the past, have received about their usual proportions. Some concerns which have had very large parts of the business in their lines heretofore have received very small parts of the orders, or none at all. Some concerns which under the old conditions secured only a small part of the orders in their fields have under government operation secured the lion's share of the business.

It is very difficult after studying the list of orders to conclude that any particular principle governed in their distribution. In many instances it would appear that the factor of price was controlling, but in not a few cases it is evident that this was not the case. One of the notable consequences of the new method of buying is that it has resulted, in many branches of the railway supply field, in a reduction of the number of concerns which have succeeded in getting orders. A good many concerns which have done a large business in the railway supply field were given no business at all, or so little as to be equivalent to almost nothing. In other cases concerns which were just beginning to get a foothold were disappointed in receiving no orders. In still other cases, however, comparatively unknown concerns got a large amount

of business, and likewise in some cases large orders were placed for comparatively unknown devices.

On the whole, we should say that the two most characteristic features of the centralized buying of car and locomotive specialties have been, first, to put relatively greater stress on prices and less on quality than was done when railways bought separately; and, second, to reduce the number of concerns from which purchases are made. We believe both these tendencies are largely due to the fact that under the present system the technical officers of the railways, who are the best judges of the goods, have less influence and a committee of purchasing officers more influence in determining the things that shall be bought than was the case under separate management of the various railways.

Obviously, both price and quality should be given due consideration, and if the former is given greater weight than the latter the effect will be to cause deterioration of the physical properties of the railways. Likewise, it would appear that a narrow rather than a wide distribution of orders is undesirable, not only from the standpoint of railway supply concerns as a whole, but also from the standpoint of the railways. The giving of orders to a comparatively small number of concerns will tend to reduce the number of concerns in the supply business. This will tend to create monopolies; to increase the difficulty of holding down prices; and to reduce the amount of competition in improving and developing specialties for the railway market.

The Railway Business Association has asked its members to report to it their experiences in dealing with the purchasing department of the Railroad Administration and to offer it their suggestions as to how the railway supply industry can co-operate with the Railroad Administration. No doubt some good suggestions will result from this canvass of the situation. In our opinion, one of the main things needed to insure that purchases shall be made on a sound basis is that the mechanical, engineering and other technical officers of the railways shall be advised with more freely by those doing the buying and that their recommendations shall be given very much more weight. They are the men who know best the merits of the various articles the railway supply companies have to sell and who are, therefore, best able, having in mind both quality and price, to say how orders can most advantageously be distributed.

Government Operation vs. Private Management and Profit Sharing

OPPORTUNITY FOR a comparison of the results of government operation, with a guarantee of net income to the private owners, and private ownership and operation under a plan of profit-sharing between the corporation and the government, will be afforded by the plan which has just been adopted for handling the express business of the country.

The four principal express companies have now been merged and, subject to the competition of the parcel post, will be given virtually a monopoly of the express business, although under strict government supervision and control. The railroads, although they are officially said to be under "federal control," will be actually under the exclusive management of the government when the new federal managers are appointed, and the corporations that own the property, having for some time been considered as agencies of the government, are now transferred to the role of landlords whose principal function is to collect their rent, pay their interest, dividends and taxes, see that the tenant does not injure the property and make such improvements to it as the tenant desires and is willing to pay the interest on—although there has been some contention from the government side that some of the aforesaid improvements must be

made regardless of interest considerations. The railroad corporations will also continue to look after their outside investments but these are aside from the question of transportation. The comparison is at least an interesting one in spite of the disparity in the magnitude of the operations and the character of the business.

In the plan adopted for dealing with the express companies, an attempt has been made to avoid what many have considered a defect in the plan under which the government is operating the railroads. It has been argued that much of the incentive to efficiency and economy on the part of railroad officers has been removed by the guarantee of earnings. Perhaps that argument no longer applies since the corporations, whose earnings are guaranteed, are no longer to have anything to do with operation, which is to be under the direction of federal managers responsible solely to the Railroad Administration in the same way that they formerly were to their directors. At any rate the incentive afforded under private management by the desire to earn a profit and the necessity for making both ends meet no longer applies to the management of any particular unit of the railroad system.

When it was proposed to adopt a similar plan for the express companies the government declined and instead it has worked out an arrangement by which there is an incentive to earn a profit, yet the amount of the profit that goes to private capital is to be limited by the plan of division with the government on a sliding scale. The scaling down of the capitalization of the four great express companies from a total of \$57,000,000 to about \$35,000,000 and the possibilities for economy afforded by unified operations should insure a greater opportunity for the payment of dividends, particularly if the application for a 10 per cent advance in rates now pending before the Interstate Commerce Commission should be granted, whereas the express companies recently have been in a serious financial condition. The Interstate Commerce Commission's report of express revenues and expenses for the calendar year 1917 just issued, shows that the eight companies covered in the report had a deficit for the year of \$184,305 as compared with operating income for the previous year of \$8,926,075 and this was in spite of an increase in gross revenue from \$190,000,000 to \$222,000,000.

The percentage of the gross earnings which is to go to the government, 50 $\frac{1}{4}$ per cent, was arrived at by taking the average for 10 years of the payments by the express companies to the railroads for express privileges, but that part of the bargain is more favorable to the companies than the former arrangement because they will have a single contract with the government, instead of separate contracts with the individual railroads, and will thus be saved a large amount of accounting which has formed so large a proportion of their expenses.

While it is apparent that the government has driven a close bargain with the express companies, limiting their profits to a modest return on a greatly reduced capitalization, the condition into which the express business had fallen had become so precarious that the new plan undoubtedly will be regarded as a great measure of relief. Harassed on all sides with increased expenses, subject to a competition with the parcel post under conditions which gave every advantage to the latter, overwhelmed with a large volume of traffic that formerly went to the railroads while they were dependent upon the railroads for cars in which to handle the business, the express companies saw no way out except the plan which had been followed in the case of the railroads, particularly as their affairs were so closely bound up with those of the latter.

The arrangement adopted at least gives them an opportunity to stay in business, while the railroad corporations are practically shelved for an indefinite period, and will

also give the express company a large opportunity to demonstrate its capacity for public service.

Wage Awards and the Shortage of Labor

THE LONG HERALDED WAGE ADVANCE, which was approved by the director general on May 25, has resulted in very general dissatisfaction in many quarters. This is due primarily to the computation of the increases on the basis of the rates paid on December 31, 1915, two and one-half years ago. While the wage commission followed a logical course in computing the increased costs of living and the increases in wages necessary to compensate therefor on a pre-war basis, the roads in many cases had already given their employees, individually or collectively, increases equal to or greater than those awarded by the wage commission with the result that many employees now receive no increases whatever. This in itself, while disappointing to those employees, would not have been so serious if the employees had not been led to build up hopes of universal increases. When these hopes were shattered, as they were in the cases of thousands of employees, the disappointment and dissatisfaction were keen. This was made evident at once by threatened strikes among organized employees in the shop crafts and a deluge of formal protests. This dissatisfaction will also be reflected among the unorganized employees by their exodus into other industries.

The situation is particularly acute in those branches of railway service employing unskilled or semi-skilled labor for which only a limited amount of training is required, as in the track and car repair departments. Here the wages are the lowest, the competition with other industries the most severe and the turnover the highest. As an indication of the present high turnover, the Pennsylvania Railroad kept a special record for the ten-day period from May 27 to June 5, in which interval 4,477 employees left the service and 5,122 were hired (exclusive of general office employees), the net gain of 645 occurring entirely in the last two days. As the railroad on which this comparison was made employs approximately 150,000 men, this is equivalent to an annual turnover of approximately 100 per cent. When it is considered that comparatively few changes occur among engineers, conductors and other employees, who secure their positions only after a considerable length of service, the high rate of turnover in the other branches becomes more evident. Even this high rate is going to be greatly increased within the next few weeks. A provision in the wage award stipulates that no increase shall be paid to an employee who leaves the service voluntarily. Owing to this fact many men who receive relatively small increases are waiting to receive their back pay before leaving the roads and as soon as they get this they will go to other industries.

The greatest competition for labor which the railways are meeting at the present time is that from industries engaged in war work, such as the manufacture of munitions and the building of ships. In these industries wages have risen out of all proportion to the advances on the railroads. It is therefore not surprising that many men are leaving the roads for these industries, especially as the plea that those employed by them are engaged in patriotic service can be made as forcibly by the ship yards and munition plants as by the railroads.

The adequate maintenance of locomotives and the prompt repair of cars are essential to the successful handling of the heavy business now being offered to the roads and which will be greatly augmented when the grain begins to move

in a few weeks. The Railroad Administration has shown its realization of the necessity for a larger plant by authorizing the expenditure of nearly \$500,000,000 for addition and betterment work on the roadway this year. The demands for the current maintenance of tracks and structures are equally pressing. At the same time progress on all of this work is being greatly impeded by the lack of men, a condition which is becoming more severe as the season advances. Since the railways are unable to secure the men that are needed to keep the roads in proper condition, some method must be devised and, devised promptly to secure sufficient men, either by the removal of the restrictions on the importation of labor from Mexico and other sources, or by the fixing of relations between the wages and working conditions offered by industries and contractors on government work in comparison with those which the roads are permitted to offer in a way to remove the adverse competition which now exists.

Boston & Maine

THE INCREASE IN THE COST of fuel on the Boston & Maine in 1917 as compared with 1916 would have left the company with almost no margin over interest charges, even if there had been no other increases in unit costs of materials and of labor. As it was, the Boston & Maine earned \$59,451,000 in the calendar year, 1917, or over 7 per cent more than was earned in 1916; but operating expenses amounted to \$47,165,000, an increase of 23 per cent over the previous year, notwithstanding the fact that charges for maintenance of way were no higher in 1917 than in 1916. It is pretty safe to say that the Boston & Maine will be unique among the larger roads in the small increase in taxes. Taxes amounted to \$2,157,000 or only a few thousand dollars more than the 1916 taxes. Gross income available for interest charges amounted to \$11,358,000, or \$4,884,000 less than the 1916 gross income. Interest charges call for \$11,778,000, leaving a deficit in 1917 of \$419,000. All of the interest charges, however, were not paid and there is now \$3,228,000 interest matured which has not been paid. The higher unit cost of fuel alone increased expenses by \$4,600,000.

The following table shows the percentage of each class of operating expenses to operating revenues:

	1917.	1916.
Maintenance of way and structures.....	10.4	11.1
Maintenance of equipment.....	14.8	12.8
Traffic.....	7	8
Transportation.....	50.4	41.7
Miscellaneous.....	5	4
General.....	2.5	2.3
Total.....	79.2	69.1

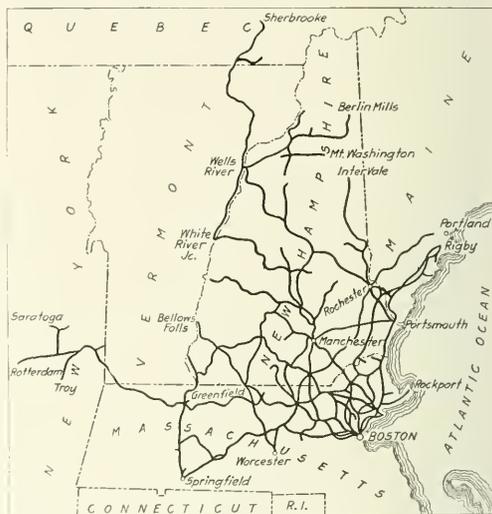
In so far as better operation is concerned, the Boston & Maine is making steady progress. The ton mileage carried in 1917 was 3,342,000,000; an increase over 1916 of 4.7 per cent. The average revenue train load was 383 tons, an increase of 4 per cent over the previous year. The average carload per loaded car was 19.42 tons, an increase of 9.9 per cent over the previous year. The increased train loading was particularly good because traffic conditions were such that there was a greater proportion of empty car mileage in 1917 than in 1916; and there were only four new locomotives taken into service, so that the gain of over 15 tons per train was due largely to the efforts of officers and employees.

The principal changes in character of traffic were a decrease in tonnage of products of agriculture and the tonnage of manufactures carried with a large increase both in tonnage of anthracite coal and of bituminous coal carried. In 1917, 2,805,000 tons of anthracite was carried, or over

1,000,000 tons more than in 1916; and 4,162,000 tons of bituminous coal was carried, an increase of 752,000 tons over 1916. The total tonnage of manufactures was 6,016,000, or 623,000 tons less than in 1916.

There was a substantial increase in passenger business, the total number of passengers carried one mile being 927,000,000, or over 9 per cent more than in 1916. In June, 1917, Camp Devens—the cantonment which the war department built near Ayer, Mass.—was opened and this presumably added largely to the passenger business of the two divisions of the Boston & Maine serving this section of Massachusetts.

James H. Hustis, who was, up to the time of the receiver-



The Boston & Maine

ship, president of the Boston & Maine, and who was appointed by the court temporary receiver, has been appointed district federal manager of railroads in New England by the Railroad Administration. He retains, however, his duties as an officer of the court in charge of the Boston & Maine. During the year \$2,344,000 was spent for additions and betterments. The work of physical rehabilitation of the Boston & Maine is going on, but, of course, not on as large a scale probably as would be the case were conditions normal. It would appear to a student of the Boston & Maine situation, without long continued intimate knowledge of the physical condition of the whole property, that the installation of modern, scientific principles of railroading, and the carrying out of the physical betterments such a program would necessitate, and the readjustment of the rental situation are more important for the return of the Boston & Maine to solvency than large expenditures for additions. It may be a recognition of the importance of carrying on the program which Mr. Hustis has inaugurated of improved operating methods, improved relations between employees and officers and between the public served and the railroad personnel that the court, Mr. Hustis himself, and the Railroad Administration came to the agreement to have Mr. Hustis continue to act both as receiver and as district federal manager.

Under the federal control act, it would be possible to use a part of the so-called revolving fund created by the act to purchase securities of a reorganized Boston & Maine;

and efforts are now being made to carry out a reorganization under federal supervision and approval.

The following table shows the principal figures for operation in 1917 as compared with 1916:

	1917.	1916
Average mileage operated.....	2,305	2,305
Freight revenue.....	\$35,080,737	\$33,640,587
Passenger revenue.....	17,814,738	16,052,106
Total operating revenue.....	59,450,779	55,341,545
Maintenance of way and structures.....	6,197,311	6,132,045
Maintenance of equipment.....	8,786,745	7,088,573
Traffic expenses.....	446,565	430,298
Transportation expenses.....	9,957,651	23,078,034
General expenses.....	1,473,770	1,263,188
Total operating expenses.....	47,164,941	38,251,176
Taxes.....	2,156,649	2,091,089
Gross income.....	11,359,313	16,242,791
Net income.....	419,384*	4,790,874

*Deficit

Chicago, St. Paul, Minneapolis & Omaha

LIKE ITS PARENT COMPANY—the Chicago & North Western—the Chicago, St. Paul, Minneapolis & Omaha had to meet in the year ended December 31, 1917, greatly increased charges for labor, for fuel, for repairs to locomotives and rolling stock and to a lesser extent for maintenance of way and structures. Unlike the North Western it did not increase its operating revenues greatly, the increase in total operating revenues being only \$622,000 or about 3/4 per cent, and the increase in freight revenues only one-third of one per cent.

The total operating revenues for the road during 1917 were \$21,477,000 as compared with \$20,855,000 in 1916. The increase was chiefly in passenger revenues, which were 6 per cent greater in 1917 than 1916. Operating expenses increased from \$13,609,000 to \$15,841,000, bringing the operating ratio from 65 up to 74 per cent; the net revenue from operations was \$5,635,000, or \$1,611,000 less than in 1916. The net income was \$2,119,000. The usual dividend of 7 per cent on the preferred stock was paid but only 5 per cent on the common instead of 7 per cent as in 1916; the balance for the year was \$403,000, as compared with \$1,628,000 in 1916.

The freight revenue earned during the year totaled \$13,885,000, representing an increase of 0.34 per cent over the high figures of 1916. This increase was due, however, not to an increase in tons carried or even in the total ton-mileage but to an increase in the revenue per ton-mile from 8.1 mills to 8.3 mills. There was in fact a decrease in the total ton mileage of 2.11 per cent. With this decrease in ton mileage there was a 5 per cent decrease in freight train mileage, the average load per loaded car having been increased from 22 to 23 tons and the average train load from 414 tons to 429 tons. With this almost stationary level of freight traffic on the high basis of 1916, there was an increase of 6 per cent in passenger revenues. The number of passengers carried showed a slight decrease, but the average distance each passenger was carried and similarly the average revenue per passenger, showed increases.

The total increase in operating expenses for the year as compared with 1916 amounted to \$2,233,000. The increase in charges for maintenance of way was not considerable, being only \$121,000. Increases in the cost of labor and other items were partly balanced by decreases in the amounts spent for rail and ballast, these latter decreases being the result presumably of the difficulty of securing steel for the usual program.

Charges for maintenance of equipment increased \$482,000 in 1917 over 1916, these increases being represented almost entirely by more expensive repairs to locomotives and freight cars.

It was, of course, in transportation expenses that the great-

est increases in costs were shown, because of the higher compensation for labor and for fuel. The total increase in transportation expenses was \$1,599,000 of which increase \$534,000 was in labor and \$998,000 in fuel. The cost of fuel for train locomotives alone was over 40 per cent greater in 1917 than in 1916.

During the year \$884,000 was spent for additions and betterments exclusive of additional equipment. Of this

At the end of the year the company had cash on hand \$473,000 as compared with \$2,519,000 at the close of business in 1916. The company had on hand also \$3,176,000 worth of materials and supplies, over twice as much as at the end of 1916. On December 31, 1917, there were \$500,000 in loans and notes payable as against none in December 31, 1916, and miscellaneous accounts payable had increased from \$149,000 to \$343,000.

The following table shows the principal figures for operation in 1917 as compared with 1916:

	1917.	1916.
Average mileage operated.....	1,749	1,753
Freight revenue.....	\$13,884,710	\$13,837,306
Passenger revenue.....	5,741,038	5,414,952
Total operating revenue.....	21,476,509	20,855,266
Maintenance of way and structures.....	2,481,820	2,360,323
Maintenance of equipment.....	3,016,674	2,534,794
Traffic expenses.....	344,105	356,121
Transportation expenses.....	9,279,431	7,680,387
General expenses.....	544,356	498,883
Total operating expenses.....	15,841,318	13,609,879
Taxes.....	1,327,995	1,053,393
Operating income.....	4,298,538	6,185,981
Gross income.....	4,837,725	6,664,051
Net income.....	2,118,589	3,714,975
Dividends.....	1,715,986	2,087,222
Surplus.....	402,603	1,627,754

New Books

War Adjustments in Railroad Regulation. Edited by C. H. Crennan. 6 in. by 9 in. bound in cloth, 334 pages, non-illustrated. Published by the American Academy of Political and Social Science, Philadelphia, Pa. Price, paper, \$1, cloth, \$1.50.

This volume of the Annals of the American Academy of Political and Social Science deals exclusively with the problems of railway regulation. It contains 23 papers on this subject including the following: Principles and Practices of Car Service Regulation by H. E. Byram; Federal Control of Railroads in War Time by Max Thelen; Regulation of Car Service Under Government Control of Operation by John J. Esch; Reconstituting Railroad Regulation by George A. Post; Government Operation of American Railroads by Clifford Thorne; Physical Needs of the Railways Under Government Control, by Julius H. Parmelee and Adjustment of Labor's Demands During Federal Control of Railroad Operation by Gleen E. Plumb.

Reports of Committees of the American Association of Railroad Superintendents. Edited by the Secretary. 188 pages. Illustrated. 6 in. by 9 in. Bound in Paper. Published by the Association. J. Rothchild, Secretary, Union Station, St. Louis, Mo.

Owing to the fact that the thirteenth annual meeting of this Association which was scheduled to be held in Minneapolis, Minn., on August 8-10, 1917, was indefinitely postponed, the reports of the committees which were to have been presented at that meeting have been published in a volume which also contains a number of valuable papers on transportation problems. These include papers by W. G. Besler, president and general manager, C. R. K. of N. J.; L. F. Loree, president, D. & H.; L. F. Johnson, president, N. & W.; E. Raymond, general superintendent, A. T. & S. F.; W. S. Williams, general superintendent, Illinois Central, and others. Reports are also presented on a large number of subjects of immediate interest to transportation men.

Construction Progress on the Alaskan Railroad*

The Main Track Has Been Laid to Mile Post 211 on This
471-Mile Government Project

By Col. Frederick Mears, U. S. A.

Formerly Member of the Alaskan Engineering Commission

IN THE SPRING OF 1914, President Wilson appointed the Alaskan Engineering Commission, with William C. Edes designated as chairman and chief engineer; which commission was thereby directed and empowered to make the field surveys, detailed examinations and reports under the general direction of Franklin K. Lane, secretary of the interior. The results of the season's work were embodied in a report by the Alaskan Engineering Commission, and formed the basis for the President's action in the selection of what is commonly called "The Western Route" for the government railroad, running from Seward on the Kenai peninsula to Fairbanks, the head of navigation on the Tanana river, a distance of 471 miles.

The first link in the chain to connect tidewater with the interior of Alaska and the coal fields was the single-track, standard-gage railroad, starting at the town of Seward, at the head of Resurrection Bay. This railroad, originally called the Alaska Central and later changed to Alaska Northern, was first conceived by certain Seattle capitalists in 1903 for the purpose of securing a more direct route from the Pacific Ocean to the interior of Alaska. The ultimate intention was to extend the line northeasterly to Circle City, about 130 miles from Fairbanks. Later it was hoped to open extensive coal deposits known to exist on the Matanuska river.

Actual construction began at Seward in 1904, and grading was finished and track laid to Kern creek, mile 71, and some work was done along Turnagain Arm north of Kern creek, but in 1909 all construction work was suspended.

Purchased by United States Government

In April, 1915, a formal contract was entered into by which this road was to be acquired for the sum of \$1,150,000, much less than its original cost, and a sum within the value of the physical properties as computed by our engineers. In June, 1915, when the season opened, control of the road was taken over by the government, but it was not until August 25, 1915, that litigation over the title ceased and an initial installment of \$500,000 was paid.

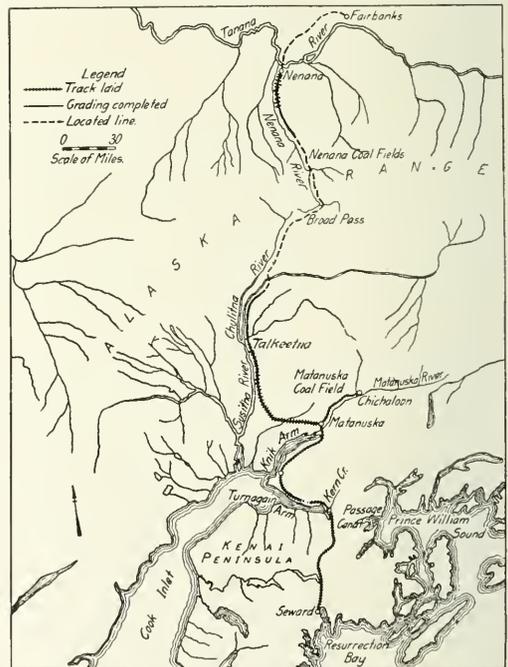
The Alaskan Engineering Commission began the repair of the Alaska Northern in the early summer of 1916, about the time that the final payment of \$650,000 was made (June 30, 1916), and the United States Government came into full possession of the property. During the summer, about 500 or 600 men were employed in various branches of construction work.

For the greater part of the distance along the line of the railroad the right-of-way had never been cleared for more than a few feet on either side of the track. During 1916, the right-of-way was cleared to a width of 100 feet for a distance of 35 miles. Other forces were used to rebuild the grade and repair the roadbed and track. In the original construction of the road, in order to save expense, much curvature had been introduced. Many wooden trestles were built to save the cost of embankments, and these, in many instances, were placed on sharp curves. A number of these structures were badly decayed and needed renewing. A re-

location of parts of the line was made and it was found feasible to replace a number of the structures by embankments, and at the same time greatly improve the alignment. Considerable work of this nature was done by station men during the season, and the line was vastly improved, especially between miles 7 and 12, and between miles 18 and 20. About 12 miles of track was raised on its original alignment, it having been built too low to allow proper drainage, principally between Seward and mile 4, and between mile 33 and 40.

Bridges and Trestles

A new bridge, consisting of five pony truss spans of 56 ft. each, was built across the Resurrection river at mile 3, to



Progress Map of the Alaskan Railway

replace an old trestle, badly decayed, which originally was built too low. A total of 2,172 ft. of entirely new trestle bridges was built at different points, where needed, to replace abandoned structures, and about five miles of bridging was thoroughly inspected and repaired. The superstructures, generally speaking, were found to be in good condition for light traffic.

From the south end of the Seward yard, north for about five miles, the old 56-lb. steel was replaced with new 65-lb.

*Abstracted from an article in the Alaska Railroad Record. A description of this line appeared in *Railway Age Gazette* of April 20, 1917, page 828.

steel, obtained from the stock bought with the railroad, and enough 70-lb. steel was received and distributed to complete the line to mile 12. There were placed under the track 30,000 cu. yd. of gravel ballast and about 80,000 cross ties. Considerable work was done in the terminal yard at Seward, and about a mile of new sidings was laid, and a wye put in. An industrial spur was laid, following along the water front on the south boundary of the town, affording rail facilities for warehouses and industries.

The rolling stock bought with the railroad, consisting of 3 engines, 3 box cars, 2 cabooses and 17 flat cars, was put in serviceable condition, and to them have been added 2 box cars, 6 flat cars, 2 cabooses, 10 12-cu. yd. Western side-dump cars, and 2 passenger coaches. The repairs to the property during the summer made it possible to operate a train consisting of a 60-ton engine, caboose and several cars, from Seward to Kern creek, on October 2, 1916.

Season of 1917

The work of rehabilitation continued steadily during 1917. The number of men employed varied from 300 in January to 700 in August, with a corresponding reduction in the late fall. About 400,000 cu. yd. of material were moved in this process, resulting in the complete repair of the track and roadbed for standard traffic from Seward to the first summit, mile 12, and the partial repair of roadbed, track and bridges, from mile 12 to Kern creek.

The road was operated from Seward to Kern creek during the summer, whenever the train movement did not interfere with the repairs or changes to track and roadbed. Operation was continued in this manner until January, 1918, when traffic north of mile 40 was interrupted by the deep snow.

TABLE OF YARDAGE
REHABILITATION ALASKA NORTHERN

	Common	Loose rock	Frozen	Solid rock	Total
Excavation during 1916 (miles)					
1-71)	180,105	14,153		72,016	266,174
Excavation during 1917 (miles)					
1-71)	188,453	8,390	10,467	220,992	428,304
Total	368,558	22,543	10,467	293,008	694,578
<i>Cost to December 31, 1917</i>					
Purchase of Alaska Northern					\$1,157,839.49
Rehabilitation, Alaska Northern, including repairs and maintenance, but not including equipment or supplies on hand or in transit, to December 31, 1916					774,277.51
January 1, to December 31, 1917					845,660.95
Total					\$2,777,777.95
Equipment					181,255.44
Supplies on hand and in transit					369,393.01
Total					\$3,328,426.40

Average cost of road to December 31, 1917, 70.8 miles, not including equipment or supplies on hand, about \$39,000 per mile.

Work on the New Line

On March 4, 1915, Congress passed an act appropriating \$2,000,000 for the beginning of construction on the Alaska railroad. The work which was contemplated with the initial appropriation was to build from Anchorage to the Matanuska river, a distance of 35 miles, covering about one-half the distance from tidewater to the Matanuska coal fields. In addition to the building of the railroad grade, certain terminal facilities of a temporary nature were planned at Anchorage.

The first work began in May, 1915, when clearing of the right of way commenced, followed by grading forces who were placed upon the work as rapidly as the engineers could stake it out. Construction camps were established at various points along the line, and these camps, as far as possible, were supplied by barges working along the east shore of Knik Arm. A considerable outfit of freight teams was also required to move supplies from the points along the Arm to the grading camps.

At the end of 1915, the right-of-way had been cleared

towards the coal fields for a distance of 40 miles. The grading had been completed ready for track for about 35 miles, and track had been laid to Eagle river, a distance of 13 miles. About three miles of yard track had been laid at Anchorage in the material yard and dock approach.

Continuing Construction During 1916

Eagle river is crossed in mile 127.6 by a long wooden bridge with a 60 ft. truss span over the main river channel. The erection of this bridge consumed two or three months after track had reached the bridge. As soon as the structure was complete, track gangs started laying steel towards Peters creek, mile 156.5, eight miles distant, at which point the railroad comes very close to the east shore of Knik Arm, both as to location and grade elevation. The track was laid during a severe winter under trying conditions, and was put down solely for the purpose of pushing material and supplies to Peters creek, which point could profitably be used as a winter shipping base for all construction materials and supplies needed for the Matanuska branch line.

During the spring and summer of 1916, work was actively continued on the branch line, with the result that by November the track was pushed out to King river, a point 61 miles from Anchorage, 23 miles from the junction, and 14 miles from Chickaloon, the end of the line to the coal fields. A large winter construction camp was established at the end of steel, from which to continue work towards Chickaloon.

In the month of March, 1916, several station gangs were given contracts for clearing right-of-way on the main line north of Matanuska, leading toward the Susitna valley, as it was desirable to have this right-of-way cleared of timber and undergrowth as early as possible to make way for grading. Under this plan the right-of-way was cleared for a distance of 10 miles north of Matanuska Junction early in the year. At the beginning of 1916, the available funds for the prosecution of the construction work were insufficient to meet all demands, and it was accordingly decided to favor the work on the branch line toward the coal fields. This caused an unavoidable delay in the beginning of active operations on the main line. About July 1, when money was available for the purpose, grading gangs started work north of the Junction, and early in the summer the first 10-mile section was completely covered.

Revision of Line

The size, rapid growth, and general importance of the town of Anchorage made it desirable in 1916 to put the main line of the railroad through the town, instead of passing four miles to the eastward as originally surveyed. The new line swings around the town on a low grade elevation, and crosses Ship creek immediately at the west end of the freight yards, connecting with the line formerly known as the Ship creek spur. The so-called Ship creek spur line, which had been built the previous season, was utilized and became a part of the new main line.

The right-of-way was cleared on the new line south of Anchorage before the snow was off the ground, and grading commenced in this district in the month of May. The work was pressed during the summer and in the early fall the grade was made ready for the track, which was laid southward from Anchorage for a distance of 10 1/2 miles. While this work was in progress materials and supplies were shipped around by water into Turnagain Arm, and distributed at various camps along the Arm as far south as Rainbow creek (mile 94).

Work Started on Upper Susitna River

The adopted location for the new railroad closely follows the Susitna river for a distance of 75 miles, and advantage was taken of this situation to attack the railroad line along the upper river. While it is necessary to stretch the imagi-

nation a little to say that the Susitna river is a navigable stream, still it was found possible to operate a steam-driven, stern-wheel river boat, capable of carrying a cargo of 100 tons on its own bottom, from the construction base at Anchorage to the old Indian village of Croto, a point about 50 miles above the mouth of the river. The Commission purchased the river steamer "Omineca" for this work (which had been used for similar purposes for the Grand Trunk Pacific in the construction of its line in Canada), and used it continuously during the 1916 season, between the points named, a distance of about 70 miles.

Light draft boats were operated on the upper river. They carried all of the materials and supplies used during the season to the amount of 2,685 tons. They also transferred the various superintendents, civil engineers, construction men, and station gangs to the new work, to the number of 1,019 persons.

The headquarters for the Talkeetna district was established at a point called Talkeetna, at the confluence of the Talkeetna and Susitna rivers. During the season the right-of-way along the adopted location was cleared from Sheep creek (mile 203) to Indian river (mile 265), and the road-bed was graded in various disconnected sections over a total distance of 22.8 miles. At the same time additional construction materials and supplies were delivered at a point on the upper river, near some heavy rock work, where they were available to use the following season, before the river opened to summer navigation.

Terminal District

Although a good camp had been established at Anchorage during the 1915 season, there still remained a large amount of work to be done in order properly to equip this important point as a construction base. Accordingly, during the 1916 summer season a number of buildings were erected. The completed track, which was extended from Peters creek (mile 136½) to Matanuska Junction (mile 151), was also taken over by the Terminal district, and maintained and operated as a revenue-producing line. On January 1, 1916, the commission started to collect fares from all persons desiring to take advantage of the construction trains, on the basis of 6 cents per passenger mile, and during the winter and spring of 1916 a complete set of blank forms for railroad operation were prepared and put into use, in accordance with the Interstate Commerce Commission's requirements.

Comparatively large construction forces were continued at work during the winter of 1916-17. At the close of the 1916 season there remained about 14 miles of heavy grade to complete along the Matanuska branch line, near the coal fields, and this part of the line (almost entirely solid rock), was entirely covered by the month of February. Station gangs were established at such intervals as to insure completion of the line during the early summer. About 320 men were employed on this district through the winter, and by August 15 the line was completely graded. Track was laid ahead from King quite rapidly, using a Roberts track-laying machine to put down the steel and ties. The end of the line reached Chickaloon on October 20, 1917.

The construction department worked a good many men along Turnagain Arm, south of Anchorage during 1917. About 1,000 men, divided into approximately 50 station gangs, were employed throughout the winter and early summer, and at the time of the present writing (March, 1918) the grade has been practically completed between Anchorage (mile 115) and Bird Point (mile 81). Track has been laid southward from Anchorage for 24 miles, reaching a point known locally as Falls creek, or mile 91. The remaining interval between Bird Point (mile 82) and Kern creek (mile 71) will be completed in August, 1918.

The line from Kern creek (mile 71), (the end of the Alaska Northern Railroad), to Potter creek, mile 101, along

the north shore of Turnagain Arm, is the heaviest continuous construction on the whole railroad. Occasionally, for a short distance, a bench occurs, on which the line can be placed with easy construction; but for the greater part of the distance, the line has to be benched in on heavy transverse slopes. The contour of the country is very irregular, making it impossible to secure light work even by the introduction of very sharp curvature. In many cases deep embankments and gulches occur, and in order to save expensive cuts in the precipitous rock bluffs it was necessary to make heavy fills, the slopes extending into the waters of Turnagain Arm, where they are affected by the heavy tides. The rock encountered is mostly of a hard slate, with some quartzite dikes.

Character of Work Along Turnagain Arm

Many timber culverts and small trestle openings were required along Turnagain Arm, and at several points tress bridges were necessary over the larger streams. It is estimated that about 8,000 lin. ft. of snowsheds will eventually be required in this district; and these sheds will have to be of very substantial character to withstand the shock from the slides which frequently start from long distances up the cleared mountainside.

About 2,250,000 cu. yd. of excavation has been accomplished along Turnagain Arm at the present writing, about half of which (or a little more than 1,000,000 cu. yd.) was solid rock. There remained to complete this section only 170,000 cu. yd. on January 1, 1918.

Work in the Talkeetna district was somewhat handicapped during 1917 on account of shortage of funds, but nevertheless a small force worked during the summer, with the result that track was pushed northward to Montana creek, mile 211, and with the exception of a few disconnected sections, grade was made ready for track between Montana creek (mile 211) and Dead Horse hill (mile 249).

Some of the important items of work accomplished in the Anchorage division between May 1, 1915, and December 31, 1917, are the following:

Excavation	7,530,697 cu. yd.
Permanent bridges	18,031 lin. ft.
Track, main line, including Matanuska branch.....	158 miles
Completed line from Anchorage to Matanuska coal fields (74.9 miles), original estimate.....	\$3,352,243.00
Cost to December, 1917:	
Main line, as far as Matanuska Junction.....	1,479,587.68
Matanuska branch	2,183,776.13
	\$3,663,363.81

THE GIBRALTAR STRAITS TUNNEL.—Interest has lately revived in the scheme for a tunnel beneath the Straits of Gibraltar, which has, like that for a railway link between England and France, made an appeal to engineers for a generation or more. Some of the technical aspects of the project have been under discussion before the French Society of Civil Engineers, and it does not appear to be thought that there are any abnormal difficulties on the engineering side. Owing to the depth of water and character of the sea bed and the underlying strata, it would be necessary to construct such a tunnel at a depth, it is believed, of some 840 meters (2,756 ft.); and the length between Tarifa, the suggested point of departure on the Spanish side of the Straits, and either of the alternative points of emergence on the Morocco coast, would be about 15½ miles. The London Times points out that it is assumed by the advocates of the scheme that the cost of construction would not exceed £10,000,000 (\$50,000,000), but necessary port improvements would call for the expenditure of an additional £4,000,000 (\$20,000,000). There can be no doubt that the linking of the European and African railway systems would give a great stimulus to French and Spanish trade, and on the assumption that the tunnel beneath the Straits of Dover is constructed, the tunnel would provide over the Trans-African railway a through route between England and South Africa.

Doings of the United States Railroad Administration

Director General McAdoo Gives Out a Statement as to the Policy of Federal Control

WASHINGTON, D. C.

DIRECTOR GENERAL McADOO on June 15 gave out the following signed statement of the policy of the Railroad Administration:

"The policy of the United States Railroad Administration has been informed and shaped by a desire to accomplish the following purposes which are named in what I conceive to be the order of their importance:

"*First*, the winning of the war, which includes the prompt movement of the men and the material that the government requires. To this everything else must be subordinated.

"*Second*, the service of the public, which is the purpose for which the railways were built and given the privileges accorded them. This implies the maintenance and improvement of the railroad properties so that adequate transportation facilities will be provided at the lowest cost, the object of the government being to furnish service rather than to make money.

"*Third*, the promotion of a spirit of sympathy and a better understanding as between the administration of the railways and their two million employees, as well as their one hundred million patrons, which latter class includes every individual in the nation, since transportation has become a prime and universal necessity of civilized existence.

"*Fourth*, the application of sound economies, including:

- (a) The elimination of superfluous expenditures.
- (b) The payment of a fair and living wage for services rendered and a just and prompt compensation for injuries received.
- (c) The purchase of material and equipment at the lowest prices consistent with a reasonable but not an excessive profit to the producer.
- (d) The adoption of standardized equipment and the introduction of approved devices that will save life and labor.
- (e) The routing of freight and passenger traffic with due regard to the fact that a straight line is the shortest distance between two points.
- (f) The intensive employment of all equipment and a careful record and scientific study of the results obtained, with a view to determining the comparative efficiency secured.

"The development of this policy will, of course, require time. The task to which the Railroad Administration has addressed itself is an immense one. It is as yet too early to judge of the results obtained, but I believe that great progress has been made toward the goal of our ideals. All those who have had a share in this great work, including especially the members of my staff and the officers and employees of the railways, have shown intelligence, public spirit, loyalty and enthusiasm in dealing with problems that have already been solved and attacking those that still await solution.

"With their continued co-operation, I feel assured of a future in which the lessons of our accumulating experience will be effectively employed to humanize the science of railroading and negate the idea that corporations have no souls."

Operating Statistics Section

The organization of the Operating Statistics Section of the Division of Operation, with W. J. Cunningham as manager, was noted in a recent issue. Circular No. 8, issued by

the Division of Operation, announces the functions of the section as follows:

The Operating Statistics Section will arrange for, and supervise, the making of standardized reports and statistics pertaining to the maintenance and operation of railroads under federal control; and will make such compilations of statistics as may be required.

The monthly report of freight operations, heretofore compiled and issued by the Bureau of Railway Economics, will be compiled and issued by the Operating Statistics Section. Railroads will send their individual reports (American Railway Association Form FO 2) for the months of April, May, June and July to the Operating Statistics Section instead of to the Bureau of Railway Economics. Reports for April which have already been sent to the Bureau will be turned over to the Operating Statistics Section.

Effective with the month of August, 1918, statistics relating to maintenance and operation will be required on standardized forms. These forms, and instructions as to their use, will be sent out within the next two weeks.

Uniform Methods of Organizing and Conducting Safety Work

H. W. Belpap, manager of the safety section of the Division of Operation of the Railroad Administration, has issued the following outline of the organization of safety committees, which is recommended to the railroads to be followed in perfecting safety organizations on all Class I railroads, as ordered by Circular No. 5 issued by C. R. Gray, director of the division of operation. The recommended outline is for the purpose of establishing uniformity in methods of organizing safety committees, as well as to stimulate an interest in accident prevention and measures intended to reduce the hazards of railroad employment. The recommended form of organization is as follows:

A committee to be known as the General Safety Committee shall be organized, composed of general and division officers of the road, chosen in such a manner that all the different departments of service shall be represented on that committee. The chief operating officer, or such other general officer as he shall designate, shall act as chairman. This committee shall have general supervision of the safety organization.

On each division shall be formed a Division Safety Committee, composed of division officers, with the superintendent as chairman, and one or more representatives of each of the different classes of service.

In each large shop shall be formed a Shop Safety Committee, composed of the principal officers of the shop, with the ranking officer as chairman, and one or more representatives of each of the different classes of service. If the shop is under the jurisdiction of the division superintendent, the committee shall report to the Division Safety Committee, otherwise to the General Safety Committee.

In each large terminal shall be formed a Terminal Safety Committee, composed of the officers in charge, with the superintendent or ranking officer as chairman and one or more representatives of each of the different classes of service. If the terminal is under the jurisdiction of the division superintendent, the committee shall report to the Division Safety Committee, otherwise to the General Safety Committee.

Where conditions require, local committees may be organized in yards, roundhouses, smaller shops, large freight houses, etc.

The General Safety Committee shall meet at least quarterly. Other safety committees shall meet monthly and report proceedings on proper form to the General Safety Committee.

The principal officers of the division, shop or terminal shall be permanent members of the committees. Other members shall serve for a period of six months or a year at the discretion of the chairman, but it is inadvisable to change all the members at one time.

The employee members of the various committees attending meetings shall be paid their regular wages and such expenses as they necessarily incur in going to and from committee meetings.

The safety organization should invite the fullest co-operation of every employee in calling to the attention of the various committees, practices and conditions which are not conducive to safety, but such information communicated by any one to these safety committees shall not be used as a basis of disciplinary action.

On each railroad there shall be an officer in charge of safety work. The amount of time which it will be necessary for him to devote to the work should be governed entirely by local conditions. He should compile statistics for the information and guidance of safety committees, issue bulletins, attend all meetings of General Safety Committee; also such division, shop and terminal committees as he feels require his presence in order to maintain the proper degree of interest. He should carefully review minutes of all committee meetings.

The circular states that it is manifestly impossible to formulate suggestions which are universally applicable. In perfecting this committee form of organization, it is realized that local conditions must in every case govern the personnel of each committee. Official titles vary with the individual railroads and in some cases the duties of more than one of the positions indicated may be vested in one person. Committees may, therefore, be enlarged or decreased, as conditions require. The details of the organization of committees is properly left to the managers of the various properties, but it is desired that they adhere as closely as practicable to the outline suggested, which is as follows:

GENERAL SAFETY COMMITTEE

- | | |
|---|---|
| Vice-president or General Manager,
General Superintendent,
Chief Engineer,
Engineer Maintenance of Way,
Signal Engineer,
Superintendent of Motive Power,
Superintendent of Rolling Stock,
Mechanical Engineer,
Superintendent Freight Transportation, | Superintendent Passenger Transportation,
General Claim Agent or Claims Attorney,
Chief Surgeon,
General Storekeeper,
General Safety Agent or Supervisor,
Secretary (of Committee),
Such other officers as are deemed advisable. |
|---|---|

DIVISION SAFETY COMMITTEE

- | | |
|---|---|
| Division Engineer,
Trainmaster,
Master Mechanic,
Road Foreman of Engines or Traveling Engineer,
Signal Supervisor,
Division Storekeeper,
Claim Agent or Adjustor,
District or Division Safety Agent (if any),
(a) Yardmaster,
(a) Agent or Operator,
(a) Roadmaster or Supervisor of Track, | (a) Track Foreman,
(a) Bridge and Building Department Employee,
(a) Engineman,
(a) Fireman,
(a) Conductor,
(a) Brakeman,
(a) Switchman,
(a) Car Repairer or Inspector,
(a) Signalman,
(a) Shopman, etc.,
Secretary. |
|---|---|

SHOP COMMITTEES

- | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|-----------------------|------------|--------------------------------|------------------|------------------|---------------------|----------------|----------------|--------------------------------|------------------|-----------------|-----------------|-----------------|-------------------------|-----------------------|-----------------------|--------------|------------------|------------------|-----------------|------------------|--------------|------------|-----------------------------------|--|--|
| Superintendent of Shops or Master Mechanic, Chairman | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="0"> <tr> <td> <table border="0"> <tr> <td>Locomotive department</td> <td rowspan="12">} or {</td> <td>Car department</td> </tr> <tr> <td>General Foreman,</td> <td>General Foreman,</td> </tr> <tr> <td>Roundhouse Foreman,</td> <td>(a) Carpenter,</td> </tr> <tr> <td>(a) Machinist,</td> <td>(a) Car Repairer or Inspector,</td> </tr> <tr> <td>(a) Boilermaker,</td> <td>(a) Woodworker,</td> </tr> <tr> <td>(a) Blacksmith,</td> <td>(a) Millwright,</td> </tr> <tr> <td>(a) Sheet Metal Worker,</td> <td>(a) Machine Operator,</td> </tr> <tr> <td>(a) Shop Storekeeper,</td> <td>(a) Painter,</td> </tr> <tr> <td>(a) Electrician,</td> <td>(a) Electrician,</td> </tr> <tr> <td>(a) Foundryman,</td> <td>(a) Storekeeper,</td> </tr> <tr> <td>(a) Hostler,</td> <td>Secretary.</td> </tr> <tr> <td>(a) Crane Operator,
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Secretary, | | |
| Locomotive department | } or { | | | Car department | | | | | | | | | | | | | | | | | | | | | | | |
| General Foreman, | | | | General Foreman, | | | | | | | | | | | | | | | | | | | | | | | |
| Roundhouse Foreman, | | | | (a) Carpenter, | | | | | | | | | | | | | | | | | | | | | | | |
| (a) Machinist, | | | | (a) Car Repairer or Inspector, | | | | | | | | | | | | | | | | | | | | | | | |
| (a) Boilermaker, | | | | (a) Woodworker, | | | | | | | | | | | | | | | | | | | | | | | |
| (a) Blacksmith, | | | | (a) Millwright, | | | | | | | | | | | | | | | | | | | | | | | |
| (a) Sheet Metal Worker, | | | | (a) Machine Operator, | | | | | | | | | | | | | | | | | | | | | | | |
| (a) Shop Storekeeper, | | | | (a) Painter, | | | | | | | | | | | | | | | | | | | | | | | |
| (a) Electrician, | | | | (a) Electrician, | | | | | | | | | | | | | | | | | | | | | | | |
| (a) Foundryman, | | | | (a) Storekeeper, | | | | | | | | | | | | | | | | | | | | | | | |
| (a) Hostler, | | | Secretary. | | | | | | | | | | | | | | | | | | | | | | | | |
| (a) Crane Operator,
Secretary, | | | | | | | | | | | | | | | | | | | | | | | | | | | |

NOTE.—In some instances it may be advisable to have separate committees in the car and locomotive departments—in others a joint committee is preferable.

TERMINAL SAFETY COMMITTEE.

- | | |
|---|--|
| Superintendent, Trainmaster or General Yardmaster, Chairman,
Lay Yardmaster,
Night Yardmaster,
(a) Switch Foreman or Yard Conductor,
(a) Switchman,
(a) Engineman, | (a) Fireman,
(a) Section Foreman,
(a) Station Employee,
(a) Car Department Employee,
(a) Car Clerk, Checker or Sealer,
Secretary. |
|---|--|
- Members marked (a) should serve for a period of six months or a year at the discretion of the chairman.

This form of organization follows closely that recommended by a committee of the American Railway Association in 1913 (Circular No. 1333.)

W. P. Borland, assistant chief inspector of safety appliances of the Interstate Commerce Commission, has been appointed assistant manager of the Safety Section, and Charles W. Gregg of the New York Central has been added to the staff of regional supervisors, with office at Washington.

Supplement to the Wage Order

The Director General has issued the following Supplement No. 1 to General Order No. 27:

"The following will be added as general rules to Section F, Article II:

"(14) For positions created since December, 1915, the salaries will be readjusted so as to conform to the basis established in General Order No. 27, for positions of similar scope or responsibility.

"(15) Where wages were increased through arbitration or other general negotiations, which cases were definitely closed out prior to December 1, 1915, but which for any reason were not put into effect until after January 1, 1916, the increases fixed by General Order No. 27 will be applied to such basis of wages as if they were in effect in December, 1915."

Interchange Inspection

To the end that interchange inspection work may not be duplicated under government operation of railroads, so that more repair work and less unnecessary inspection will result, the Division of Operation has ordered, in Circular No. 7:

1. That joint arrangements shall be made to prevent such duplication in inspection by arranging all inspection forces at interchange points with a head or chief joint inspector as conditions require, to supervise the forces and see that inspection and repairs are properly made to car equipment.

2. Present M. C. B. Rule No. 2 is modified as follows:

(a) Loaded cars offered in interchange (except those having defective safety appliances) must be accepted by the receiving line, which may either run, repair or transfer lading from car.

(b) The repairs to car or transfer of lading is to be done by the railroad having facilities nearest available. If facilities are equally available by both railroads, the car will be moved to facilities located in the direction car is moving.

3. If car is shopped for repairs due to:

- (a) Old defects that existed before car was loaded—
- (b) Lading requiring transfer or readjustment on account of not being in accordance with M. C. B. Loading Rules—
- (c) Overload requiring transfer of lading—
- (d) Not being within clearance dimensions over route it is to pass—
- (e) Not meeting A. R. A. third rail clearance—

The facilities nearest to car will be used in making repairs to car or transfer of lading.

4. Should the location of facilities require a receiving line to make transfer, the delivering line will not be billed for transfer or readjustment of lading, but the chief joint or head inspector will make report and forward to the head of the mechanical department of both railroads. The railroad responsible for conditions making necessary the shopping of car for old defects or transfer of lading, will impose discipline for willful and inexcusable violation of M. C. B.

Federal Managers and General Managers



B. R. Pollock
Federal Manager, Boston & Maine



S. G. Strickland
Federal Manager, Chicago & North
Western



C. H. Ewins
Federal Manager, Philadelphia & Reading
and Central of New Jersey



Ralph Peters
Federal Manager, Long Island



H. W. McMaster
General Manager, Wheeling &
Lake Erie



B. A. Worthington
General Manager, Cincinnati, Indianapolis & Western



M. S. Connors
General Manager, Hocking
Valley



B. C. Stevenson
General Manager, Toledo, St. Louis &
Western



H. A. Boomer
General Manager, Lake Erie & Western



L. G. Coleman
General Manager, Grand Trunk Rail-
way in New England

Rules of Interchange and Loading, and A. R. A Rules, the same as instructed in director general's Order No. 8, for violation of safety appliance law.

5. Cars whether loaded or empty having safety appliance defects will have such defects repaired immediately upon discovery and will not be offered in interchange. If necessary to move a car to shops for repairs of safety appliance defects, it must be moved to shops of the company upon whose line it became defective.

6. Empty cars offered in interchange, if in safe and serviceable condition, must be accepted.

7. Bad order cars which previously had been delivered in bad order under load must be repaired by the road making transfer, if it has facilities and material; if not, the nearest repair point on any line, having material and facilities, should make the repairs.

8. With these modifications, owners must receive their own cars when offered home for repairs at any point on their lines where repair facilities and material are available.

9. Such inspectors as are now engaged on duplicate work will be assigned to repair work so as to insure maximum safety of operation and prompt movement of traffic.

Changes in Rate Order

The first break in Director General McAdoo's rate order in response to the many complaints that have been made came on June 12 in the form of a supplement to General Order No. 28 making changes demanded by the state railway commissioners to apply the proposed percentage and specific increases directly to the existing intrastate rates instead of first advancing those rates to the level of corresponding interstate rates and then advancing them again. The state commissioners had asked either that this be done or that they be given further recognition by allowing them to order the advances. The changes which were later announced in the supplement were briefly mentioned in last week's issue. The state commissioners were reinforced in their demand by a large number of congressmen who had been induced to bestir themselves on behalf of shippers and state commissions. A group of southern senators who thought their states were peculiarly affected by the order held a conference in the office of Senator Smith of South Carolina, chairman of the Committee on Interstate Commerce, and joined in a protest to Mr. McAdoo, asking him to confer with them on the subject. Mr. McAdoo designated Director Prouty of the Division of Public Service and Accounting as his representative and Mr. Prouty conferred with the senators. Whether or not Mr. Prouty so understood it, the senators took it that he had power to act in the matter, and they announced after the conference that the state rates, classifications and minimum weights would be taken as the basis for the advance. However, the matter was discussed at a staff meeting of the Railroad Administration before the supplement was issued.

The Director General's statement of the changes made by the supplement was as follows:

The supplement eliminates from General Order No. 28 the provisions to the effect that state rates be cancelled where in conflict with interstate rates and provides instead that the increases on both class and commodity rates prescribed by the order as amended, shall apply to both interstate and intrastate rates; except that between points in the state of Oklahoma the class rates for both single and joint lines shall be as prescribed by the Interstate Commerce Commission in the last Shreveport decision, plus 25 per cent.

The increased class rates are to be governed by the several classifications, both interstate and intrastate, including exceptions thereto and minimum weights that govern the existing rates; except that the minimum 25 per cent class rate scales are subject to the four standard classifications named in the original order.

No change is made in the specific increases provided on commodities except that the increase of 15 per cent on cotton is to apply to any quantity instead of carloads and the provisions on sugar in carloads have been amended to more clearly provide for maintenance of existing relationships.

Intrastate rates and rates for transportation by water not now on file with Interstate Commerce Commission are to be filed, but where now restricted to intrastate traffic, the tariffs are to continue such restrictions.

The minimum charge of \$15 per car will apply only to line haul shipments and not to brick, cement, coal, coke, logs, ore, sand and gravel and stone (broken, crushed or ground), on which the existing rates as increased under section 2 of the order shall apply.

Section 20 is amended to provide specifically that the rates to be increased are those existing on May 25, 1918, including changes previously published but not then effective and not under suspension, except that the increases will apply to rates authorized or ordered by the Interstate Commerce Commission prior to May 25, 1918, and published between May 25, 1918, and June 15, and that where rates so authorized or ordered are not published before June 15, they may be increased as provided in the order by subsequent revision.

Section 21 provides the proper legend to be used on the tariffs to provide interstate or intrastate application as authorized by the amended order.

Instructions have also been issued to the railroads to make modifications in the export and import rates as they would be affected by the general order. The order provides for the cancellation of the special import and export rates for the purpose of leaving in effect the domestic rates, but it has been discovered that many of the domestic rates are merely paper rates which have not moved any business and, therefore, have not been kept in line so that the application of these rates would result in very large and disproportionate increases. Therefore, specific advances in import and export rates have been worked out which are to be applied as tentatively reasonable and to go into effect on June 26; after which they may be given further consideration.

Simplified Accounting Practices

Director General McAdoo on June 12 issued two general orders for the purpose of effecting a simplification in the accounting practices of the railroads under federal control, in recognition of the fact that they are being operated as a single system and that their revenues are in effect the revenues of the government.

SETTLEMENT OF INTER-ROAD BILLS AND ACCOUNTS

General Order No. 30 provides that, effective July 1, 1918, the following regulations shall govern the settlement of all inter-road bills, statements, and accounts rendered by one carrier under federal control against or for account of another carrier under such control.

(1) Settlements by vouchers and the drawing of drafts in settlement of individual inter-road bills, statements, and accounts rendered by one carrier under federal control against another carrier under such control, except as provided for in paragraph (2) hereof, shall be discontinued.

(2) The regulations herein prescribed shall not include:

(a) Settlement of accounts between a carrier under federal control and a carrier not under such control.

(b) Settlement of accounts between carriers under federal control for the transactions which do not properly belong on the federal books of either carrier interested.

(3) Each bill, statement, or account made and rendered by one carrier under federal control against or in favor of

another carrier under such control, and forwarded on and after July 1, 1918, shall be plainly stamped on the face thereof, as follows: "Included in settlement, month of _____ 191 ____." Such stamp shall indicate the month in which the amount represented by the account will be included for settlement by the carrier rendering the account, and it shall be included in the same month's settlement account by the receiving carrier. No such bill, statement, or account made and rendered in one month shall be back-dated for a prior month.

(4) On the first of each month each carrier shall prepare and render each other carrier with which it has inter-road transactions, as a basis for a settlement for the month just ended, a statement of debits and credits, in abstract, showing the nature and total of each bill, statement, or account forwarded by it to each other carrier during the preceding month.

(5) There shall be opened as of July 1, 1918, on the federal books of each carrier, a clearance or settlement account with each other carrier under federal control with which it has inter-road transactions.

(6) As inter-road bills, statements, or accounts are made and rendered they shall be charged or credited as the case may be, through the clearance or settlement account prescribed in the preceding paragraph.

(7) As inter-road bills, statements or accounts are received they shall be:

(a) Examined as to correctness, as prescribed in General Order No. 20:

(b) Charged or credited to the appropriate operating or other account:

(c) Credited or charged (as the case may be) by the receiving carrier to the carrier originating the account through the appropriate clearance or settlement account prescribed in paragraph 5 hereof.

(8) The total of each statement for a given month shall be accepted as rendered, and on or before the fifteenth day of each month subsequent to that for which such statement was rendered the creditor carrier shall draw upon the debtor carrier for the balance between the two statements exchanged by them.

(9) In the event the statement referred to in paragraph 4 indicates that the originating carrier has charged or credited the other carrier with a bill, statement, or account which has not been received, the carrier to which the statement is rendered shall accept the account and credit or debit the originating carrier therewith to the debit or credit of a suspense account. Such receiving carrier shall immediately take the matter up with the originating carrier for the purpose of locating the missing bill, statement, or account. If it be found that such amount was included in the statement in error, adjustment shall be made therefor in a subsequent statement. If manifest errors be found in such statements by a receiving carrier, the attention of the originating carrier shall be called thereto and such error or errors shall be adjusted in the statement for the subsequent month.

EQUIPMENT AND FACILITIES ACCOUNTS

General Order No. 31 provides that, effective July 1, 1918, the following rules and regulations shall govern the accounting for the use of equipment or facilities of one carrier under federal control by or for the account of another carrier under such control, provided, nothing herein contained shall be construed to warrant the discontinuance of the keeping, rendition and settlement of such accounts by a carrier under federal control in favor of or against a carrier not under federal control, in the same manner as heretofore.

1. Hire of Freight and Passenger Train Equipment.

1. The practice of recording, computing and paying per diem, mileage, or rental for the use of freight and passenger

train cars of one carrier under federal control by or for account of another carrier under federal control, and the adjustment of differences, claims, etc., between such carriers which clearly relate to transactions incurred on or after January 1, 1918, shall be discontinued.

2. Junction cards, interchange reports, location records, and all other records and reports necessary to determine the location of equipment shall be kept, rendered, and compiled as heretofore.

11. Joint Facilities—Bills for Use of.

3. Effective with costs incurred on and after July 1, 1918 bills rendered by one carrier under federal control against another carrier under such control for maintaining and operating (including taxes and rental) tracks, yards, terminals and other facilities, including costs to operate equipment used therein, shall be computed, rendered, charged and paid on the following bases:

(a) In cases where the tenancy is not changed under government operations: The total cost of maintenance, operation, taxes and rental, as provided for under existing agreements, and the amounts thereof borne by each user, for a period not less than six months ended December 31, 1917, shall be determined by the owning or operating carrier. From such costs, the percentage of the total borne by each user to the total costs shall be determined. The percentages thus determined shall be applied monthly to the total costs incurred on and after July 1, 1918, and bills shall be rendered and paid on the results thus obtained.

(b) In cases where tenants or users are admitted to facilities not heretofore jointly used: Federal managers of the facilities to be jointly used shall determine, as between themselves, a fair and equitable arbitrary basis for the apportionment of the total costs of maintenance, operation, taxes and rental which should be paid by each tenant. Such basis shall thereafter during the period of federal control be used by the owning carrier as a basis for preparation and rendition of bills against the tenants or users, and such tenants or users shall pay such bills as rendered.

(c) In cases where the number of tenants or users of facilities now used by tenants under agreements with owners is increased or decreased: The literal compliance with the terms of such agreements shall be temporarily suspended, for the period of federal control, and a fair and equitable basis of use shall be determined as prescribed in paragraph b preceding, except that due regard shall be given to the terms of existing agreements in fixing such arbitrary basis.

(d) In cases where a lump sum charge has been made by an owning or operating carrier which is under federal control for the use of a facility used by another carrier which is under such control, such bills for the lump sum charge shall be rendered and paid during federal control as heretofore; provided, however, if there be a change in such tenancy by the admittance of other tenants or otherwise, and the contractual basis upon which the lump sum charge is made be disturbed thereby, an arbitrary basis of charge by the owner against the tenant or tenants shall be determined as prescribed in paragraph b hereof.

4. Details heretofore required in support of joint facilities, bills, statements and accounts shall be discontinued, except that such bills shall show the totals chargeable and creditable, to the primary operating revenue, expense, tax and rental accounts prescribed by the Interstate Commerce Commission, or which may hereafter be prescribed.

5. If materials and supplies, the value of which is carried in the accounts of one carrier under federal control, be used by another carrier under such control for maintaining or operating equipment or facilities jointly used, the value at which such materials and supplies are carried in the accounts of the carrier furnishing them shall be billed against and paid for by the carrier using them as heretofore,

except that percentages for overhead and other carrying expenses shall not be added to the cost thereof.

Traffic Committee Abolished

The Interregional Traffic Committee, appointed by Director General McAdoo on February 9 to make a study of the larger traffic movements with a view to seeing what steps could be taken to shift traffic from the more seriously congested ports, has completed its work and has been abolished. The committee, which consisted of B. L. Winchell, chairman, George F. Randolph and T. C. Powell, has submitted various advisory reports to Mr. McAdoo and the Division of Traffic, regarding changes which could be made in the routing of traffic now that the railroads are being operated as a single system and it is understood that some of its recommendations have already been put into effect.

Cincinnati Freight Control Committee

The Division of Operation has formed a Committee of Freight Traffic Control, composed of F. B. Mitchell, chairman; G. Krause, B. Arnold and J. B. Ford, with office at Cincinnati, Ohio, to secure all necessary reports covering freight traffic passing Ohio river gateways at Cincinnati, Ohio, Louisville, Ky., Cairo, Ill., Evansville, Ind., Paducah, Ky., and Portsmouth, Ohio, and to require reports covering traffic which is routed through either of these gateways, or which may be held for either of them on account of congestion. They will give particular attention to the handling of freight for the government, recommending any measures which will facilitate its movement. The committee will decide upon all embargoes affecting traffic passing through these gateways, their extent and duration, placing same through the regional directors, and keeping the Car Service Section constantly and fully advised. They are expected to study the traffic passing these gateways, with the view of detecting and remedying any movements which are out of line or proper route, conferring freely with the Divisions of Traffic and Operation, including the Car Service Section.

Pocahontas Regional Purchasing Committee

N. D. Maher, regional director of the Pocahontas district, has announced the appointment of a Regional Purchasing Committee, consisting of E. T. Burnett, purchasing agent of the Norfolk & Western, as chairman, and B. T. Jellison, purchasing agent of the Chesapeake & Ohio. The committee will have its office at Roanoke, Va.

Board of Adjustment No. 2

In conformity with the provisions of General Order No. 29, Railway Board of Adjustment No. 2 has been constituted as follows: W. H. Penrith, assistant general manager, Chicago & Alton; E. F. Potter, assistant to general manager, Soo Line; A. C. Adams, superintendent of shops, New York, New Haven & Hartford; E. A. Sweeley, master car builder, Seaboard Air Line; W. F. Kaderly, general superintendent, Georgia Southern & Florida; Robt. J. Turnbull, inspector of transportation, Atlantic Coast Line; H. J. Carr, International Association of Machinists; George W. Pring, International Brotherhood of Boiler Makers, Iron Ship Builders & Helpers of America; G. C. Van Dornes, International Brotherhood of Blacksmiths & Helpers; F. H. Knight, Brotherhood Railway Carmen of America; Otto E. Hoard, Sheet Metal Workers' International Alliance; and F. J. McNulty, International Brotherhood of Electrical Workers.

The board will meet shortly to elect a chairman and vice-chairman and organize for business as provided in General Order No. 29. A circular will be issued giving notice when the board is ready to perform the duties entrusted to it.

Express Contract Held Up

The proposed contract between the Railroad Administration and the express companies has struck several snags in the office of the attorney general, where it has been under consideration for several days, although it is understood that the snags were discovered by the postmaster general before the document was referred to the Department of Justice. The postmaster general, possibly mindful of the competition which his department might experience at the hands of a unified express company after the war, is said to have raised a question at a cabinet meeting as to whether the proposed merger of the express companies if allowed to continue after the war, would not constitute a violation of the Sherman law. The attorney general, to whom the contract was then referred, insisted that it be rewritten to remove what he held to be a guarantee against prosecution under the anti-trust law and to provide for the complete unscrambling of the merger after the war by the return of the property to the owning express companies. A conference on the subject was held on Tuesday between Director Prouty of the division of public service and accounting and General Counsel Payne, representing the Railroad Administration, and Attorney General Gregory and his assistant G. C. Todd, after which Messrs. Payne and Prouty held a further conference with the representatives of the express companies.

Transportation Conditions in Eastern Territory

The Railroad Administration has given out a report submitted to Director General McAdoo on May 29 by A. H. Smith, eastern regional director, regarding transportation conditions in his territory since January. The report in part follows:

The chaotic conditions into which the railroads in this territory got during the severe winter months have been straightened out with promptness and the recovery is at this time such as to enable me to report to you an almost normal situation in the movement of traffic, and also the fact that the railroads in this territory are now in such order as to make possible the movement of considerable additional tonnage if offered. Perhaps the greatest congestion existed in the territory of Pennsylvania, Maryland, and West Virginia, served more particularly by the Pennsylvania, Baltimore & Ohio, and Philadelphia & Reading. On February 6 the Pennsylvania reported 27,588 cars above normal for movement; today the number so reported is 3,532, and these are held because consignees are unable to accept. The Baltimore & Ohio at its worst on February 6 had 21,415 cars above normal; today there are 1,348. In the entire territory of the Eastern District there were on February 6, 161,000 cars above normal; today the total is 16,891 and these are widely distributed. An acute car shortage prevailed all during the winter. At the present there is no shortage of closed cars and practically a full supply of open cars. With the better weather the physical condition of motive power has been improved and passenger trains are operating more punctually.

The factors which impaired railroad operation so seriously during the winter months were: First, the unusually severe weather; low temperature, and storms, one following another so closely as to make it impossible to recover in the interim. Second, the shortage of motive power due to failure to receive locomotives ordered in 1916 and 1917 for use during the past winter. The necessity for these locomotives was anticipated and the orders placed with builders, but the priority which it was necessary to exercise in building locomotives for service abroad made it impossible to deliver. Third, the acute labor shortage.

Since January 1 there have been many measures adopted for efficient operation, among which may be mentioned:

1. The elimination of approximately 2,200,000 miles per month of unessential passenger train mileage.

2. The assignment to the eastern railroads of 122 locomotives constructed for the United States military railways in France; also 125 locomotives constructed for the Russian government, as well as 118 locomotives under order for the southern and western roads.

3. The transfer of power from one road to another to relieve congestion or shortage of power. All roads are required to report surplus equipment and it is distributed wherever the need for it appears. On May 21, 215 locomotives belonging to eastern railroads were rented on this basis to other roads in the eastern territory.

4. Diversion of traffic to less congested routes and the expedited movement of empty box, refrigerator and stock cars westbound and empty coal cars to mines via most available routes, regardless of loaded haul.

5. Handling company fuel and material by most direct routes, saving unnecessary haulage, which under private

11. Institution of "airling" days in the handling of l. c. l. freight. In a very large number of instances regular cars previously loaded daily are now forwarded but three times a week, which is resulting in a decrease of 50 per cent in the number of cars used and a consequent increase of 100 per cent in the tonnage per car handled.

12. The routing of freight to tidewater via the delivering line at destination has resulted in a very great relief to the seaboard terminal facilities. All freight for Staten Island now being routed so far as possible Baltimore & Ohio; freight for the Bronx, New York Central; freight for Bayonne and Constatle Hook via the Delugh Valley, etc. Furthermore, arrangements were made for the loading of freight to steamers direct from the piers, the freight being routed via the line reaching the pier, which resulted in great economy in the use of terminal and marine facilities. There has also been a considerable volume of freight diverted to other ports to relieve the New York export situation.

13. The saving in power account diversion of traffic to



Map Showing the Three New Regions in the West

control was sometimes done to give the greatest proportion of a through rate to the receiving line.

6. The common use of terminal facilities at large commercial centers.

7. The interchange of labor to eliminate accumulations of l. c. l. freight.

8. Restriction on available equipment for certain classes of loading, which has been possible under unified control, permitting the urgently required traffic to be loaded and moved to the exclusion of less necessary commodities.

9. The classification of freight by the originating railroads to permit trains to be run through to Western termini without re-switching.

10. The co-ordination of harbor facilities at New York, in order that the greatest possible service could be obtained from the floating equipment and facilities; including the breaking of ice in the bays, rivers and slips during the periods of low temperature, to permit the operation of marine equipment.

roads with most favorable grades, resulting in saving of engine efficiency.

14. The facilities of the eastern railroads' locomotive and car repair shops are being constantly scrutinized in an endeavor to find space for repairing locomotives of other eastern railroads not so well situated, and to date 98 eastern railroad locomotives have been repaired and 28 additional are undergoing repairs at shops other than those of the owning lines. In addition, arrangements have been made with the western railroads for the repair of 66 eastern lines' locomotives, 22 of which are at present in western shops undergoing repairs.

15. The running of locomotives through over more than one road in connection with troop and freight movement to save power and the delay to traffic.

16. The movement of anthracite coal and empty equipment through the Pennsylvania tubes.

17. The placing of coal on team tracks, New York City, for unloading to relieve the coal shortage.

18. The diversion of bituminous coal to piers of New York harbor where it could be dumped most expeditiously to relieve the need of bunker coal for ships waiting in New York harbor.

On February 1 blast furnace production was 57 per cent of capacity, and by-product coke 67 per cent. At that time 113 out of 290 blast furnaces were out of blast. At the present time the blast furnace situation is practically normal, there being no furnaces out of blast because of lack of transportation, those which are not in operation being out for repairs. The American Iron & Steel Institute report furnaces now in operation which have been out of blast during the past three or four years so that it may be said that steel and iron production is at this time not impaired because of lack of transportation service.

The movement of coal via the Great Lakes is progressing satisfactorily, there being an increase of 26 per cent in cars dumped in vessels so far this season. The ore movement from the Lakes is also ahead of last year to the extent of four per cent in cars shipped.

During the winter months steel tonnage piled at the plants awaiting shipment continued to increase, and reached the peak about March 1, at which time there were approximately 500,000 tons awaiting movement due to embargoes and lack of cars. This tonnage has been moved with the exception of about 40,000 tons which is held account of embargo.

With the improvement of the weather and the coal car supply, there has come an increase in the bituminous coal loaded; the average figures for January showing 15,639 cars loaded per day, and for the first 25 days of May, an average of 19,726 cars. In January an average of 5,713 cars of anthracite coal were loaded per working day, which has increased to 6,583 cars in May.

The average anthracite coal dumped at tidewater ports in January per calendar day was 820 cars; in May 1,109. Bituminous coal dumped in January, all ports, was 1,403 cars per day, and in May 2,236. The average daily movement of anthracite coal into New England in February was 463 cars per working day; in May 617; while the bituminous movement into New England in February was 331 cars per day; and in May 492.

On January 1 there were on hand at North Atlantic ports approximately 41,000 cars of export freight in cars, on piers, and on the ground. This has been reduced to approximately 28,000 cars. This improvement has been brought about by the permit system of control based upon steamship requirements, or what is known as the consignee basis of regulation of shipments. It has resulted in eliminating all complaint of delay to ships awaiting cargo.

The discontinuance of fast freight service made it necessary to establish continuous movement service for handling export traffic from the Central West and West to the East. The export delivered steamships shows a progressive increase. In March it averaged 940 cars per calendar day; while in May the average is 1,172 cars per day.

The overseas tonnage of United States government freight is increasing by leaps and bounds, due to the heavy troop movement, and, with the mutually co-operative measures being taken with the war department for its regulation, is moving without interruption and on an entirely satisfactory basis.

Director General McAdoo has telegraphed a reply, saying in part: "It is a record of railroad achievement of the highest order in the face of difficulties of unprecedented character. I congratulate you and the officers and men under you for the loyal and effective service they have rendered to their country in bringing the railroads in the eastern territory up to such a high standard of operation in so short a time. We railroad men have been given a big part of the responsibility for lick-

ing something spelled with four letters out of the Kaiser and his military gang. It is a rare privilege and what you have already done shows that we are going to do our share of the job to Uncle Sam's taste. Keep up the good work."

More Time Wanted to Decide Status of Short Lines

At the request of Director General McAdoo, a joint resolution has been introduced in the House and Senate to extend the time within which the President may relinquish control of any railroad, as provided in section 14 of the railroad control act, from July 1 to January 1, 1919. John Barton Payne, general counsel for the Railroad Administration, who transmitted the request, said that a plan for dealing with the short lines would be agreed upon eventually but that it had been found impossible to do so within the time allowed by the act.

Answering a Senate resolution introduced by Senator Cummins directing him to furnish information as to the contracts between the government and the railroads for compensation, Director General McAdoo has sent a communication saying that no contract has yet been executed with any carrier, and none has refused to execute a contract. Upon the approval of the federal control act, the question of agreeing upon a standard form of contract between the government and the carriers was taken up, the government being represented by Messrs. Clark, Meyer, Hall, and Anderson, members of the Interstate Commerce Commission; Judge Prouty, director of public service and accounting of the Railroad Administration; Nathan Matthews, of Boston, employed as special assistant to the general counsel; and John Barton Payne, general counsel; and the carriers being represented by their counsel. No conclusion of these discussions has yet been reached.

Representatives of the short lines at a hearing before the House Committee on Interstate Commerce, held to consider the resolution on June 15 and 17, urged that the resolution be amended to provide that no short line shall be released unless competing roads are released at the same time. John Barton Payne represented the administration in urging the passage of the resolution.

Negotiations in the form of contract are still progressing but with every indication that it will be a long time before any agreement will be reached.

Director General McAdoo Away for a Rest

Director General McAdoo, who left Washington June 12 for White Sulphur Springs, where it was announced he would spend a large part of the summer, left again on Saturday, without his destination being announced, to rest and recuperate, at the orders of his physician, in some place where he will not be disturbed by callers, telegrams or telephone calls. Mr. McAdoo has been under a heavy burden and needs a rest. It is given out that his poor health is solely the result of his recent attack of laryngitis, which has affected his vocal cords and made it difficult for him to speak and has caused him difficulty for some time.

Waterway Advocates Busy

A large delegation of waterway advocates from St. Louis and the Mississippi valley, including a number of congressmen, held a conference at Washington on June 17 with Director Prouty of the Division of Public Service and Accounting, as Mr. McAdoo's representative, to urge the Railroad Administration to inaugurate a barge service on the Mississippi river from St. Louis to New Orleans at an expenditure of between \$7,000,000 and \$8,000,000. The arrival of the committee in Washington was heralded by the insertion in the Washington papers of an advertisement directed to Director General McAdoo in the form of a two-column editorial from the St. Louis Post-Dispatch, charging that the railroad officers on the director general's staff and others on whom he has called for advice have "smothered" a recommendation of the

Inland and Coastwise Waterways Committee in favor of the establishment of the barge service. It was stated that the committee appointed by Mr. McAdoo to investigate the use of waterways has recommended a barge service which could be provided at an expenditure of \$7,350,000 to carry 1,080,000 tons of freight per year and return net earnings of \$1,526,000, or 18 per cent on the investment, and that the committee had also recommended the establishment of a barge service on the New York State Barge Canal, which has been put into effect, but that the report of the committee as to the Mississippi river was referred by Mr. McAdoo's railroad assistants to a committee consisting of John Howe Peyton, president of the Nashville, Chattanooga & St. Louis; Frank B. Bowes, vice-president of the Illinois Central, and F. C. Reilly, freight traffic manager of the St. Louis-San Francisco, who rejected the recommendation for the use of the Mississippi river.

At the office of the Railroad Administration it was stated that the reports both of the waterways committee and of the railroad committee were merely advisory reports for the benefit of the director general and that no decision had been reached.

Interpretations of Wage Order

At the request of the executive officers of the four brotherhoods of train service employees, who conferred with Mr. McAdoo on June 12, the director general has issued two formal interpretations of General Order No. 27 increasing the wages of railroad employees. Interpretation No. 1 approved a recommendation of Railroad Board of Adjustment No. 1, to which had been referred a communication from the brotherhood executives asking for a construction of the order in so far as it relates to the bases of pay for yard engineers, firemen, conductors or foremen and brakemen or helpers. The board's recommendation states that as these classes of employees had a guaranteed minimum day's pay, irrespective of how expressed in schedules, the increases granted by the order should be applied to such employees upon the guaranteed minimum day's pay of December, 1915, and that, therefore, their increases should be computed upon the table given in Section B of Article 2 of the order, which is a scale of wages for employees paid upon a daily basis.

Interpretation No. 2 states that the following bases will be observed in the application of rates of pay in General Order No. 27:

All persons employed in any capacity, and receiving less than \$250 per month in salary, will receive the increases named in the director general's General Order No. 27, unless specifically excluded therein.

Passenger Service.—All conductors, baggagemen, flagmen and brakemen paid on the mileage basis and performing more than the minimum daily mileage will be paid under the provisions of Section E, Article 2.

All conductors, assistant conductors, ticket collectors, baggagemen, flagmen and brakemen paid under the monthly guarantee of the Eastern and Southeastern Territory, will be paid under the provisions of Section A, Article 2, and the daily rate will be 1/30 of the monthly rate.

All conductors, baggagemen, flagmen and brakemen paid on the monthly basis will be paid under the provisions of Section A, Article 2.

Local Freight Service.—All conductors, engineers, firemen, flagmen and brakemen paid on the mileage basis will be paid under the provisions of Section E, Article 2.

Local freight conductors, engineers, firemen, flagmen and brakemen paid on the monthly basis will be paid under the provisions of Section A, Article 2.

Through Freight Service.—Conductors, engineers, firemen, flagmen and brakemen paid on the mileage basis will be paid under the provisions of Section E, Article 2.

Conductors, engineers, firemen, flagmen and brakemen paid

on the monthly basis will be paid under the provisions of Section A, Article 2.

Work Trains.—Conductors, engineers, firemen, flagmen and brakemen paid on the mileage basis will be paid under the provisions of Section E, Article 2.

Conductors, engineers, firemen, flagmen and brakemen paid on the monthly basis will be paid under the provisions of Section A, Article 2.

Specified Trip Rates.—In passenger, through freight or local freight, the increases in trip rates shall take the percentages applicable to each class of service respectively.

Special Allowances.—All arbitrary or special allowances, previously paid on the hourly basis, will be paid at the new hourly rate.

Arbitrariness or special allowances, previously paid on the basis of mileage, will be paid on the new mileage rates.

If the schedule amount bears no relation to miles or hours, such arbitrary or special allowances will be increased in accordance with the percentage shown under Section E, Article 2.

Engines which have come into the service since 1915, on which rates have been applied—for the purpose of computation under General Order No. 27, consider such rates as being applicable December 31, 1915, and apply appropriate increases from January 1, 1918.

The negotiated rate since the Arbitration of the Engineers and Firemen in the East and West, for transfer service—for example, the \$4.50 rate for engineers and the \$3 rate for firemen in the Western territory shall be increased under Section B of Article 2. Where through freight rates apply to transfer service, the increases under Section E, Article 2, will apply.

Where the guaranteed daily minimum is an arbitrary rate, and is not based on hours or miles, engineers and firemen will be paid the rate under the provisions of Section B, Article 2. Where the guaranteed minimum is based on mileage, engineers and firemen shall be paid the rate under the provisions of Section E, Article 2.

Hostlers.—The rates in Section B, Article 2, shall apply to hostlers, based upon rates in effect December, 1915.

Auditor for the Railroad Administration

J. W. Roberts, who has been appointed auditor of the Railroad Administration, as reported in last week's issue, has been auditor for the Bureau of Valuation of the Interstate Commerce Commission. His duties are to audit the accounts of the Railroad Administration and those between the administration and outside enterprises, such as the express companies, and the railroad and steamship corporations. It is expected that after the question of the railroads' compensation is settled he will have a large force of field assistants.

Car Service Section Has Chicago Office

W. L. Barnes, assistant manager of the Car Service Section, has been transferred to Chicago, where he will have charge of matters pertaining to the use of tank and refrigerator cars.

REMEMBER THAT NATIONAL WAR SAVINGS DAY IS JUNE 28.—Pledge yourself on or before that day to save to the utmost of your ability and to buy War Savings Stamps that there may be more money, labor and materials to back up those who fight and die for you

TO AID RUSSIAN RAILWAYS—Press despatches from Moscow, dated May 17, state that Col. George H. Emerson, with eight members of the Railroad Mission headed by John F. Stevens, which has been in Russia for the last year, is on his way to Bologda from Vladivostok at the request of David R. Francis, American Ambassador to Russia. The purpose is a conference on the possibilities of an improvement in the railway situation in Russia

Officers Required for Railway Troops Orders of the Southern

Regional Director

S. M. FELTON, director-general of military railways has issued a new call for railway men for service on the American lines of communication overseas.

With the growth of our armies in France many additional officers for railroad troops that are now forming and which will be formed in the near future will be required. The director general military railways realizes the necessity of retaining American railroad officers in their present positions and that the operation of the American railroads must be maintained, but there is such necessity for officers for railway troops in France that he is calling for *experienced railroad men who are now employed in other active pursuits*. He has requested that railroad officers send to him the names of their acquaintances who would be possible candidates under this ruling.

The following statement gives an outline of the qualifications required; the official rank for which commissions will be issued, with their several rates of pay; the commutation for quarters being allowed when officers are maintaining their families in this country:

Qualification	Rank	Rate of pay		Commutation of quarters	Total	
		U. S.	Foreign		U. S.	Foreign
Asst. general manager.....	Major	\$3,000	\$3,300	\$720	\$3,720	\$4,020
General superintendents.....	Major	3,000	3,300	720	3,720	4,020
Superintendents—Motive power.....	Major	3,000	3,300	720	3,720	4,020
Division superintendents.....	Captain	2,400	2,640	576	2,976	3,216
Master mechanics.....	Captain	2,400	2,640	576	2,976	3,216
Engrs. maintenance of way.....	Captain	2,400	2,640	576	2,976	3,216
Trainmasters.....	1st Lt.	2,000	2,200	432	2,432	2,632
Div. engrs.—maintenance of way.....	1st Lt.	2,000	2,200	432	2,432	2,632
Chief dispatchers.....	1st Lt.	2,000	2,200	432	2,432	2,632
Road foremen of engines.....	1st Lt.	2,000	2,200	432	2,432	2,632
General yardmasters.....	1st Lt.	2,000	2,200	432	2,432	2,632
Enginehouse and shop foreman.....	1st Lt.	2,000	2,200	432	2,432	2,632
Asst. division engineers.....	2nd Lt.	1,700	1,870	288	1,988	2,158
Yardmasters.....	2nd Lt.	1,700	1,870	288	1,988	2,158
Supervisors and roadmasters.....	2nd Lt.	1,700	1,870	288	1,988	2,158
Asst. enginehouse and shop foremen.....	2nd Lt.	1,700	1,870	288	1,988	2,158

In addition to the above there is a small allowance made for heat and light which varies according to the location of station and season of the year.

It is desired that as many men as possible communicate with the Director General Military Railways' office, 6th & B streets, N. W., Washington, D. C., and that in these communications they give in detail their railroad experience and their references. The call for these men is pressing and it is hoped that there will be a hearty response.

IN CIRCULAR LETTER No. 252 issued by B. L. Winchell, regional director for the Southern lines, the jurisdiction of the Southern Passenger Committee is extended over union depot ticket offices and it is instructed to determine whether the ticket selling force and the Information Bureau in any union depot ticket office is adequate and competent satisfactorily to conduct the business of the office and serve the public; to determine whether the salaries paid the ticket agents and other employees in said offices are sufficient to secure and retain competent men and to fix said salaries; and to determine whether the physical facilities at such offices are sufficient or are best arranged for prompt and satisfactory service to the public, and to suggest to the carriers operating the office such changes and alterations as are deemed necessary to improve conditions.

Circular No. 252 issued by G. R. Loyall, assistant regional director, states that the Railroad Administration does not approve the practice of permitting persons known as "live tracers" to accompany shipments of freight, including government freight, and, unless specifically provided for in published tariffs, no person shall be permitted to accompany freight shipments in transit or to have access to railroad yards and property for so-called purpose of locating and expediting movement of a particular class or individual cars of freight. Similar instructions have been issued by other regional directors.

Circular No. 256, issued by Regional Director B. L. Winchell, asks the railroads to advise what measures have been taken to deal with the embargo situation to the end that all shippers may readily procure accurate information and as to what plan is being pursued whereby the various headquarters and division officers keep themselves informed of prospective shipments with a view of getting them forwarded as soon as embargoes against given destinations or sections may be lifted. The regional director particularly wants to know how the railroads deal with the situation as concerns shippers at points at which the railroads have no resident officers or traffic department representatives.

Freight Operations of Steam

Railways for 1915, 1916 and 1917

THE BUREAU OF RAILWAY ECONOMICS has made the following compilations for the American Railway Association, giving the comparative summary of freight operations for the calendar years 1915, 1916 and 1917:

Item	UNITED STATES			Per cent of inc. or dec. 1917 compared with—	
	Year ended December 31—			1916	1915
	1917	1916	1915		
Freight tram-miles.....	653,932,568	641,202,142	572,305,829	2.0	14.3
Loaded freight car-miles.....	15,765,509,155	15,732,077,674	13,649,285,729	0.2	15.5
Empty freight car-miles.....	6,691,111,173	6,694,542,195	6,696,582,974	d 0.1	d 0.1
Total freight car-miles—loaded and empty.....	22,456,719,268	22,426,619,869	20,345,868,703	0.1	10.4
Freight locomotive-miles.....	751,820,895	732,837,255	662,526,273	2.6	13.5
Revenue ton-miles.....	89,168,754,904	357,620,566,671	298,184,700,418	8.8	30.5
Non-revenue ton-miles.....	15,250,206,588	33,374,423,961	30,319,094,371	5.6	16.3
Average number of freight locomotives in service.....	30,805	30,555	29,834	0.8	3.3
Average number of freight locomotives in shop or awaiting shop.....	4,385	4,726	5,096	d 7.2	d 14.0
Average number of freight cars in service.....	2,330,000	2,275,092	2,283,986	2.4	2.0
Average number of freight cars in shop or awaiting shop.....	131,750	139,747	204,556	d 5.7	d 35.6
Home.....	99,874	111,942	186,105	d 10.2	d 46.3
Foreign.....	31,886	27,805	18,451	14.7	72.8
Tons per train.....	649	610	574	6.4	13.1
Tons per loaded car.....	26.9	24.9	24.1	8.0	11.6
Average miles per locomotive per day.....	66.9	65.5	60.8	2.1	10.0
Average miles per car per day.....	26.4	26.9	24.4	d 1.9	8.2
Per cent of empty car-miles.....	29.8	29.9	32.9	d 0.3	d 9.4
Per cent of freight locomotives in shop or awaiting shop.....	14.2	15.5	17.1	d 8.4	d 17.0
Per cent of freight cars in shop or awaiting shop.....	5.7	6.1	9.0	d 6.6	d 36.7
Revenue ton-miles:					
Per freight locomotive.....	12,636,545	11,705,795	9,994,795	8.0	26.4
Per freight car.....	167,068	157,211	130,555	6.3	28.0
Average miles operated—single track.....	227,566.98	227,687.93	225,627.08	d 0.6	0.9

EASTERN DISTRICT

Item	Year ended December 31			Per cent of inc or dec 1917 compared with	
	1917	1916	1915	1916	1915
Freight train-miles	9,142,600	8,848,800	4,011,164	d 2.2	9.4
Loaded freight car-miles	1,764,411	1,680,400	814,441	d 3.1	d 9.8
Empty freight car-miles	41,117	46,400	41,117	d 5.8	d 6.5
Total freight car-miles—loaded and empty	1,805,528	1,726,800	855,558	d 4.1	d 4.2
Freight locomotive-miles	8,711,400	8,400,400	3,700,000	d 1.1	9.1
Revenue ton-miles	30,840,100	29,000,000	13,440,000	5.7	13.9
Non-revenue ton-miles	3,180,000	3,000,000	1,300,000	6.7	16.2
Average number of freight locomotives in service	1,100	1,100	400	d 1.1	6.0
Average number of freight cars in shop or awaiting shop	4,100	4,100	1,400	d 4.3	d 13.3
Average number of freight cars in service	4,100	4,100	1,400	d 4.1	7.6
Average number of freight cars in shop or awaiting shop	4,100	4,100	1,400	d 4.1	8.6
Home	3,700	3,700	1,300	d 3.2	d 48.6
Foreign	400	400	100	1.6	19.4
Tons per train	17,200	17,200	8,000	8.2	11.8
Tons per loaded car	20,000	20,000	9,000	9.1	12.9
Average miles per locomotive per day	20.3	20.3	9.4	16.9	21.9
Average miles per car-miles	20.3	20.3	9.4	d 5.5	d 13.6
Per cent of empty car-miles	2.4	2.4	1.4	d 1.9	d 10.6
Per cent of freight locomotives in shop or awaiting shop	3.7	3.7	1.4	d 4.4	d 17.9
Per cent of freight cars in shop or awaiting shop	3.7	3.7	1.4	d 6.3	d 14.6
Revenue ton-miles	30,840,100	29,000,000	13,440,000	5.6	15.9
Per freight locomotive	4,410	4,410	1,610	13.1	14.8
Per freight car	1,764	1,764	5,710	10.3	d 0.8
Average miles operated—single track	17,861	17,861	5,311		

SOUTHERN DISTRICT

Item	Year ended December 31			Per cent of inc or dec 1917 compared with	
	1917	1916	1915	1916	1915
Freight train-miles	119,048,767	111,891,174	104,171,345	6.4	14.3
Loaded freight car-miles	674,861,865	5,596,566	2,008,491,537	3.0	16.9
Empty freight car-miles	1,349,999,678	1,165,921,614	1,170,259,191	5.9	5.5
Total freight car-miles—loaded and empty	3,909,841,543	3,762,518,180	3,178,750,728	3.9	13.0
Freight locomotive-miles	131,422,559	1,317,4335	115,653,728	6.2	13.6
Revenue ton-miles	67,740,363,608	61,730,697,994	71,408,086,775	10.8	31.8
Non-revenue ton-miles	6,452,998,863	5,890,853,337	5,183,703,641	9.5	24.5
Average number of freight locomotives in service	5,440	5,367	2,081	1.5	2.2
Average number of freight locomotives in shop or awaiting shop	683	698	668	d 2.2	d 11.1
Average number of freight cars in service	319,156	319,113	363,975	0.1	d 12.3
Average number of freight cars in shop or awaiting shop	16,541	19,903	33,894	d 16.9	d 49.7
Home	1,675	16,440	30,414	d 12.8	d 13.3
Foreign	3,866	3,263	2,480	18.5	55.9
Tons per train	633	599	544	4.0	14.5
Tons per loaded car	27.7	35.8	34.7	7.4	12.1
Average miles per locomotive per day	66.1	63.0	59.5	4.9	11.1
Average miles per car per day	33.6	32.2	26.0	4.3	29.2
Per cent of empty car-miles	31.6	31.0	33.8	1.9	d 6.5
Per cent of freight locomotives in shop or awaiting shop	12.5	13.0	14.4	d 3.8	d 13.2
Per cent of freight cars in shop or awaiting shop	5.2	6.2	9.0	d 16.1	d 42.2
Revenue ton-miles	67,740,363,608	61,730,697,994	71,408,086,775	9.3	29.0
Per freight locomotive	12,450,058	11,390,106	9,648,665	11.0	50.5
Per freight car	21,562	191,564	141,241	11.0	50.5
Average miles operated—single track	42,221	4,076,40	41,704,98	0.3	1.2

WESTERN DISTRICT

Item	Year ended December 31			Per cent of inc or dec 1917 compared with	
	1917	1916	1915	1916	1915
Freight train-miles	271,863,939	260,404,132	27,869,880	4.4	19.3
Loaded freight car-miles	6,291,673,188	6,106,428,73	5,170,039,731	3.0	21.7
Empty freight car-miles	24,568,404	2,312,633,096	2,284,734,477	4.9	6.2
Total freight car-miles—loaded and empty	8,712,353,502	8,419,065,069	7,454,774,195	3.5	16.9
Freight locomotive-miles	300,002,901	285,104,443	353,161,848	5.2	18.5
Revenue ton-miles	135,744,198,320	120,871,314,804	95,631,700,815	12.5	41.9
Non-revenue ton-miles	17,658,330,249	17,236,064,866	15,550,167,499	2.4	13.6
Average number of freight locomotives in service	12,502	12,343	12,379	1.3	1.0
Average number of freight locomotives in shop or awaiting shop	1,259	1,095	2,098	d 11.8	d 16.2
Average number of freight cars in service	796,706	767,022	785,193	4.4	1.5
Average number of freight cars in shop or awaiting shop	43,405	44,958	57,809	d 3.5	d 24.9
Home	33,151	35,781	50,537	d 7.4	d 34.4
Foreign	10,254	9,172	7,272	11.7	41.0
Tons per train	564	520	487	6.4	15.6
Tons per loaded car	74.4	75.1	71.5	8.0	13.5
Average miles per locomotive per day	65.7	63.1	56.0	4.1	17.3
Average miles per car per day	30.0	30.1	26.0	d 0.3	15.4
Per cent of empty car-miles	27.8	27.5	30.6	1.1	d 9.2
Per cent of freight locomotives in shop or awaiting shop	14.1	16.3	16.9	d 13.0	d 16.6
Per cent of freight cars in shop or awaiting shop	5.4	5.9	7.4	d 8.5	d 27.0
Revenue ton-miles	135,744,198,320	120,871,314,804	95,631,700,815	10.9	40.5
Per freight locomotive	10,857,200	9,770,701	7,725,349	7.6	39.9
Per freight car	170,382	158,111	121,994	7.6	39.9
Average miles operated—single track	1,747,635	1,275,449	1,356,400	1.1	1.5

d Decrease

ASK POOR TO QUIT PARIS—Press despatches state that measures have been taken by the French Ministry of Public Works to facilitate the departure of poor families from Paris. This step is not taken because it is considered imminent danger is threatening the capital but from the wish to aid people of modest means to avoid the difficulties due to the crowded conditions at the railroad stations recently. Beginning with Sunday, June 23, family tickets for third class passage will be delivered by all railroads. The first member of a family paying full rate and the others half fare. The minimum distance for a new destination is 160 miles. The

tickets will only be delivered to families whose annual rent does not exceed \$120 with 20 more for each member of a family consisting of more than two persons.

THE LONDON, BRIGHTON & SOUTH COAST has issued the 17th edition of its Roll of Honor containing the names of men who have died on active service, and the number and percentage of men enlisted. The total number of men enlisted is 4,896, which is 30 per cent of the total employed, while 355 of this number have died on active service, which is 7.25 per cent of the men enlisted.

Storage Battery Trucks, Tractors and Locomotives

THERE ARE FOUR DISTINCT TYPES of machines made by the Industrial Truck Co., Holyoke, Mass. These are a tractor, two types of load-carrying trucks, an elevating platform type truck and a locomotive with flanged wheels for running on rails. The first four types mentioned are equipped with hard rubber tires. A distinguishing feature of this line of equipment is that the greater number of parts in any one machine are interchangeable with the corresponding parts in any other.

The tractors are manufactured in two types, namely, an end control and a center control tractor. A tractor with end control is shown in the illustration. The difference in arrangement on the center control truck is that the operator sits in the center and can by changing seats operate in either direction without having to turn his tractor around. In congested or narrow aisles this is often a very valuable feature. Either



Storage Battery Tractor

type steer on all four wheels and are built as two or four wheel drives. The two-wheel drive machine can be converted to a four-wheel drive by the owner by purchasing the necessary worm and wheel housings, differential, etc.

The frame is built up of commercial rolled channel section steel and the bumper plates are of heavy boiler plate bent at the corners and riveted to the frame. Coupler castings are of the three-step type which makes it possible to use trailers of various heights.

The battery boxes are constructed with easily removable side doors for changing batteries and with a hinged top plate for easy access for flushing or inspection. Any type of battery can be supplied up to a maximum of 42 cells of the A-8 type Edison battery or 24 cells of a lead battery with 21 plates per cell. The removal of four nuts makes it possible to lift the frame and battery box from the chassis, leaving the entire driving mechanism accessible for inspection and repairs.

Power is transmitted from the motor through a single reduction worm and gear down through a differential to the wheel by means of a rugged universal joint capable of operating at an angle of 43 degrees. This universal joint is enclosed in a patented dust and oil-proof case formed by the pivoting wheel knuckle and its supporting yoke.

Wheel bearings are a high grade type of ball bearing and are considerably oversized to permit the universal joint to be drawn out through the full floating mounting of the wheel. The pivot bearings are of such a size that it is easier to steer the tractor than it is to steer the average pleasure car.

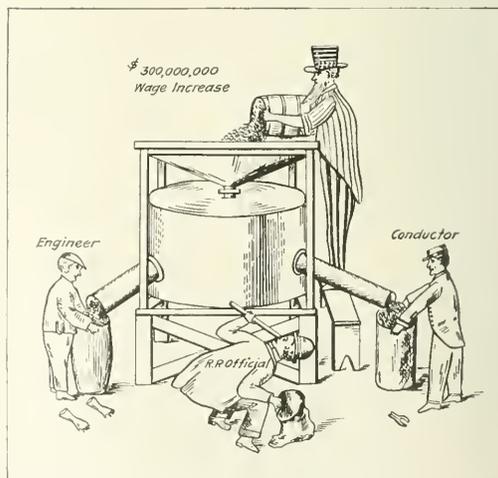
Two separate brakes are provided. The emergency brake is operated by the left foot and the service brake by the right.

To operate the tractor the operator must be sitting in the seat with his left foot pressing the emergency brake pedal down. If his left foot is lifted from the brake pedal the brake is applied and a clutch on the controller shaft throws the controller handle out of gear and the controller into neutral position. It is then impossible to start the machine again without first releasing the emergency brake and bringing the controller handle back to the neutral position. The electric horn is operated by a push button in the controller handle. An additional safety feature is found in the tilting steering wheel. This wheel is so located that the operator must tilt the wheel in order to leave his seat. This tilting arrangement is interlocked with the controller shaft clutch so that under no circumstances can the power be applied until the steering wheel is in the running position.

The locomotives are heavy and substantial machines built for any practical gage from 24 in. to the standard gage of 56½ in. Except for the absence of differentials, universal joint drive mechanism and steering mechanism and the substitution of flanged steel wheels for rubber tired ones, the locomotives contain all of the features described for the tractors. They are adapted for use in factories, warehouses, munition plants, depots, freight terminals, mines, etc. Practically all of the parts are interchangeable with those of the trucks and tractors.

The load carrying Type "L" truck and elevating platform type "E L" truck are of 4,000 lb. capacity. Each of the trucks has exactly the same power parts and with the exception of the motors all parts are interchangeable with those of the tractor. With a fleet of trucks and tractors of this type it would be necessary to keep on hand only one additional power unit to keep the fleet secure against loss due to accident or breakdown. The elevating mechanism on the type "EL" truck will lift its rated load of 4,000 lb. to a height of 5 in. and is operated by a hydraulic ram which in turn is connected through its pump to a small motor. A unique feature of this mechanism is that it requires no expenditure of current in lowering the load which means an appreciable saving.

Ball, radial and thrust bearings are used throughout, hardened pins in the renewable bushing are provided for all joints, and lubrication is taken care of by means of grease cups of the ratchet type.



Anonymous

Stopped Up

Concrete Caissons Sunk by Open Dredging Method*

Development of This Form of Foundation from Simple Boxes to Cylinders Driven to Great Depths

By L. W. Skov

Assistant Engineer Bridge Department, Chicago, Burlington & Quincy, Chicago, Ill.

IN THE CONSTRUCTION of ordinary railroad bridges, it is quite frequently necessary to put the footings a considerable distance below the ground line or the bed of the stream to obtain a good foundation or to eliminate danger from scour. It is in foundation work of this kind that the concrete caisson sunk by the open method of excavation has its field. By the selection of the proper design, concrete caissons sunk by this method can be built to cover a large variation of soil and sinking conditions, as the caisson can either be built complete over its final location before the

Design and Construction

The walls of the caissons are designed for a variable unit load equal to that usually used in designing walls retaining an earth fill. In cases where a considerable head of water is expected the hydrostatic pressure is added to the above unit pressure. The bottoms of the sidewalls and interior struts are tapered down to a width of from 3 in. to 1 ft. on the bottom, to form a cutting edge. Where caissons are sunk through clay or sand it is customary to leave the concrete cutting edge unprotected; where gravel, rip rap or other hard materials are encountered the cutting edge is protected by steel angles or hardwood timbers, depending on the material through which the caisson is to be sunk. Steel-protected cutting edges are not used except where the material penetrated is very hard and offers a great resistance. The hardwood cutting edge is found to give better protection to the concrete and on account of its greater width gives a much stronger caisson wall near the bottom.

Openings are left in the interior walls of sufficient size to allow the free passage of men and tools from one chamber to another in caissons where the excavation is to be done

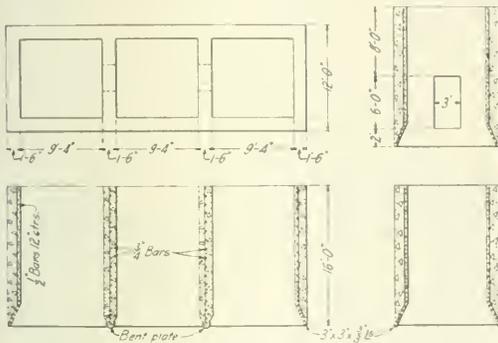


Fig. 1—An Early Type of Caisson

sinking operations start, or it can be partly built, sinking started and additional sections of concrete added from time to time as the sinking progresses. If the location of the pier is in the wet part of the channel, the caisson will be built on temporary staging and lowered to position on the bed of the stream by means of lowering screws or built on an artificial island.

Some of the reasons for the use of the concrete caisson are: (1) The elimination of wooden or steel sheet pile cofferdams, which must necessarily be made larger than the neat dimensions of the footing, to allow room for wales and bracing. (2) The walls of the concrete caisson are practically impervious to water. (3) The finished structure is one solid piece of concrete, no timbers being imbedded in it, as would be the case where a construction requiring interior bracing is used. (4) The amount of timber required for forms for a concrete caisson is very much less than that required for building cofferdams. This, of course, is a very great advantage at the present time, as the government has reserved all of the larger sizes of timber for shipbuilding and other government construction activities. (5) The amount of equipment required is reduced, inasmuch as it eliminates the use of sheet pile driving equipment, and allows a reduction in pumping equipment. (6) Eliminates the pulling of sheet piling, where the leaving in place of the sheet piling is objectionable. (7) Saves time in construction, as it is not necessary to first drive a cofferdam.

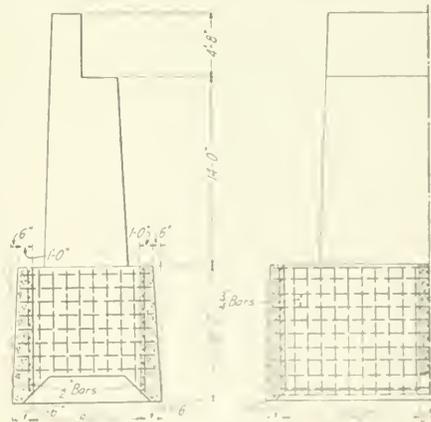


Fig. 2—A Later Type with Battered Walls

by hand. The walls of the caissons are made of 1:2:4 concrete and the core of 1:3:6 concrete, the only reinforcing used in the core is the stub bars for tying on the neat work.

In cases where caissons are sunk to eliminate danger of scour, it may be found necessary to drive piling to carry the load. In this case the piles are driven in the usual way, after the excavation has been completed. Caissons sunk under these conditions are usually full of water and require sealing around the piles with a tremie. After the concrete has set sufficiently, the water is pumped out, the piles cut off, and the balance of the caisson filled with concrete.

When it is desirable not to have the caisson project above

* Abstracted from a paper presented before the Western Society of Engineers, June 10, 1918.

the ground line a triple-lap wooden cofferdam is built on top of the concrete caisson, the lower wale being bolted to the concrete. When the pier has been constructed it is an easy matter for a diver to remove this wooden crib by unscrewing the nuts on the bolts holding down the cofferdam.

Fig. 1 shows one of the first concrete caissons built by the Burlington. Steel angles and plates were used to protect the concrete cutting edge, which is made very narrow to insure sinking of the caisson by its own weight. It has, however, been found by experience that it is not necessary to employ as narrow a cutting edge as the one used for this case. On this job a concrete cap covering was cast on top of the caisson, for the purpose of making a more nearly watertight joint between the caisson and the core. Subsequent experience has shown that this is not necessary.

Fig. 2 shows a caisson built one year later than the one shown in Fig. 1. It will be noted that the design of cutting edge has been changed, and that no protection is used for the concrete. The cross struts or walls have been raised two feet above the cutting edge, which allows a passage for the water from one compartment to the next and in that way simplifies the pumping problem. The outside of the walls has also been tapered off toward the top, the idea being to reduce skin friction. It has been found, however, that the difference in friction for the straight wall and the battered wall is very small and the battered wall design has been discarded on account of the greater cost of forming. This caisson was hand excavated, the material being removed by shoveling in stages. As the caisson was sunk for the purpose of getting below the scour line, and as there was no hard ground here near the surface, softwood piles were driven to carry the load. This caisson was sunk through clay, and only a small amount of water was encountered.

One caisson built in 1912 was sunk through stiff clay,

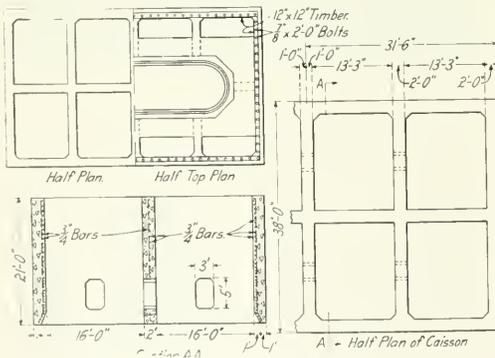


Fig. 3—Large Caisson Used for Pier 8 of the Metropolis Bridge

and for a while considerable trouble was experienced in making it settle. Even after the excavation had been removed below the box would remain suspended. It so happened that the old bridge at this point was a pile trestle, the new caissons being built between the old pile bents. The foreman one day conceived the idea that it would be possible to put up struts resting on the top of the caisson and long enough to reach the bottom of the stringers of the trestle bridge which would deflect under load, and then let a train across the bridge and in this way give the box an initial start. This scheme was tried and worked very well. After the caisson was once started, the skin friction was reduced enough to allow it to sink down as far as the excavation had been made.

A caisson sunk in the Missouri river at Kansas City, was built on made ground, retained by a dyke of cement sacks filled with sand. The sinking conditions here were very unusual, as the land side of the caisson had to penetrate a rock ledge while the river side was resting in sand and an old garbage dump.

The rock was blasted and removed by loading on skips and raising with a derrick. Considerable trouble was encountered from the water breaking in on the river side and several logs were encountered which had to be removed from under the cutting edge by pulling them into the caisson; one large log encountered about 10 ft. below the ground had to be cut off outside of the chamber before it could be pulled

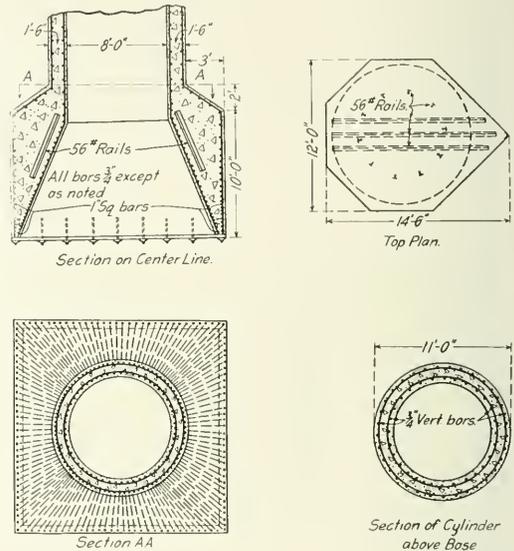


Fig. 4—Type of Caisson Used in the Ashland Bridge

in. The water trouble was finally overcome by the liberal use of cinders placed along the river side and the caisson landed on a rock bottom.

Fig. 5 shows the caisson used for pier No. 8 of the Metropolis Bridge over the Ohio river, and is the largest concrete caisson ever built by the Burlington. It was sunk through a sandy clay to a depth of 50 ft. below the ground line where a sand foundation was obtained. Originally it was planned to sink this caisson about 35 ft., but when this depth was reached the soil was still unsatisfactory to carry imposed loads, so it was decided to continue sinking. A timber cofferdam built on top of the caisson was wrecked by the high water and was replaced by building an additional 16 ft. of concrete caisson on top of the original one.

The excavation was removed by two clamshells operated from stiff leg derricks resting on pile supports driven at opposite corners of the caisson. Upon the completion of the excavation 129 soft wood piles were driven with long leads extending down into the caisson. The driver rested on top and was easily moved from pile to pile. After all the piles had been driven the caisson was sealed through 40 ft. of water with a tremie. After the concrete had sufficiently set the caisson was pumped out and the remainder of the concrete poured in the dry. The caisson was not completely filled with concrete, but open pockets were left along the two sides of the pier to save material. Upon the completion of

the pier to the top of the concrete caisson the timber crib was removed, letting the dirt fall into the open side pockets.

When it is necessary to sink to a great depth a considerably larger caisson is required if it is constructed of wood, thus adding a large amount of additional excavation, as well as area subject to skin friction and at the same time reducing the average weight per cubic foot of volume to a large extent. This will be more clearly seen when we remember that as timber weighs only about two-thirds as much as water, it will require a considerable amount of concrete or other ballast to be placed in a timber caisson before any weight is available for the overcoming of skin friction. The overcoming of the skin friction of rest usually requires ballast of some kind even with concrete caissons when sunk to a considerable depth.

Fig. 4 shows a design of caisson especially adapted for deep foundation work. The pressures used in designing this kind of a caisson are the same as previously mentioned, and for great depths attain a considerable magnitude. It may seem at the first glance that it would not be necessary to design for hydrostatic pressure in addition to the usual earth pressure, but the caisson is sealed with only a few feet of concrete, and it is pumped dry before the core is filled with concrete. With this in mind, it will readily be seen that it is the proper thing to do; furthermore, the fill against the walls is a loose one, giving a maximum chance for large pressures being developed. The circumferential steel in the circular shaft, would not be required if we were sure of equal distribution of pressure along the entire circumference of the shaft; this, however, is a little too much to expect, there being a good many ways in which the equilibrium may be disturbed, such as cave-ins in the loose ground, boulders, scour on the up-stream half, or floating bodies striking the shaft. Caissons of this type, like the ones already discussed, can be built on artificial islands or on falsework, and lowered in place by the use of lowering screws. In some cases it may be economical to build a cofferdam, pump the water out and start the caisson on the inside.

The reason for the enlarged rectangular-shaped bottom section is to give larger bearing area and to reduce skin friction. Experience shows that this is a very effective way of doing both. Some fear was felt, when the first caisson of this design was being built, that the steering would be difficult; however, this proved to be erroneous. Rather the opposite is true. The railroad rails shown embedded near the top of what may be called the working chamber, are placed there to protect the concrete from excessive abrasion, due to the bucket rubbing against the sides of the working chamber. The shaft is built up in successive sections poured in place. In this case the sections were 15 ft. but this can be varied to any length desired. The caisson just described was one of several sunk in the Platte river,* near Ashland, Neb.; several circular steel caissons were also sunk for this bridge.

RAILWAYMEN'S WAR BONDS IN ENGLAND INCREASED.—The war wage of 21s. (\$53.04 a week now granted to certain classes of railwaymen engaged in the manipulation of traffic has been advanced to 25s. (\$6.00) a week. Boys and women will also receive certain advances in the war wage now granted to them.

A VAST LIGHT RAILWAY SYSTEM has been created in France, according to the British War Cabinet report for 1917, involving the supply during last year of approximately 1,700 miles of track and the whole of the equipment. Exclusive of these light railway systems the total amount of permanent railway track supplied complete to all theatres of war was about 3,600 miles.

Orders Governing Western Regions

THE RAILROADS included in the newly created Northwest, central Western and Southwest region, will be governed by the following orders recently issued by R. H. Ashton:

A communication dated June 12, asks that railroad managers be just as careful during the period of federal control to prevent damage to National forests from fires started by locomotives, as they were under private control when the possibility of heavy claims by the government made careful railroad operation good business practice.

A circular, dated June 13, states that the United States Fuel Administration will encourage the opening of new coal mines whenever it appears that this can be done without taking labor from mines already producing. New mines, however, should not be opened if it appears to the Railroad Administration impossible or inexpedient to furnish the necessary railroad facilities. The supplement sets forth in detail the procedure to be followed in filing applications for the opening of new mining properties.

Supplement No. 1 to Circular R. P. C. No. 2 dated June 12, contains a letter sent by the War Industries Board to the Central Advisory Purchasing Committee at Washington outlining a tentative method of procedure in securing cement supplies for the railroads. Railroads are urged to endeavor to get the benefit of the prices fixed by the government in placing orders for cement where such prices are lower than those which they are now paying. The supplement also contains a list of prices of cement at various points throughout the country fixed by the War Industries Board for the four-month period ending August 31.

Supplement No. 1 to Circular R. P. C. No. 13, issued June 14, clears up certain misunderstandings in connection with the disposal of scrap rail. The present maximum price for scrap steel rail, sold for rerolling purposes, is \$14 per gross ton delivered at the consumer's works. This classification includes scrap steel rail five feet and over, standard sections, 50 lb. and heavier, free from frog, switch and guard rails. This may include pieces of switch points five feet and over, 50 lb. and heavier, which may be cut off so that no part of the taper is included, or other similar pieces five feet and over in length. Because of the difference in price of \$5 between other scrap rail and rail for rerolling it may pay roads to sort scrap rail more carefully and cut off the tapering portions of switch points. Other scrap rail should not be sold at above \$29 per gross ton delivered at the consumer's works, except when sheared to short lengths for use in cupolas or hand charging furnaces, when it may be sold at not above \$34. Scrap ends from resweld rail come under the short length class at \$34 a gross ton.

Supplement No. 1 to Circular R. P. C. No. 5 issued June 15, contains additional instructions concerning the purchase of locomotive fuel. While railroads and coal operators are free to make contracts for railroad fuel at any prices agreed upon, that price shall not be in excess of the government price. Railroads are not permitted to turn a preferential supply in consideration of a reduced price. Carriers may contract for a large amount of fuel for delivery each month from any operator as the necessity may require. Contracts, however, should not cover a period exceeding 12 months. If for any reason it is advisable to make a contract for a longer period, such a transaction must be previously approved by the regional purchasing committee. Railroads are requested to obtain bids on fuel requirements at the earliest possible moment and submit contracts for approval to the regional purchasing committee.

In making contracts, the position of fuel should be carefully considered. Of course, of the scarcity of coal roads

*The caisson was built by the U. S. Army, and the work was done by the U. S. Army Engineers, under the supervision of the U. S. Army Engineers, under the supervision of the U. S. Army Engineers.

will undoubtedly be compelled to use grades which heretofore have not been desirable.

Supplement No. 1 to Circular No. 121, issued on June 14, asks railroads to report the number of contracts with outside companies for repairing cars and the number of cars by classes undergoing such repairs. Copies of the contracts are also asked for together with a statement of the average cost per car for repairs on each contract, apportioned according to the cost of the labor, the material furnished by the contractor and the material furnished by the railroad to the contractor.

In a communication to western roads, dated June 12, the announcement is made that the director-general authorizes each of the railroads under federal control to purchase one membership in the American Society for Testing Material. Railroads are asked to designate representatives for this society who can give the matter adequate attention.

Circulars on Track Labor

Supplement No. 4 to Circular No. 63, dated June 11, states that in order to co-ordinate the work of the government and private labor agencies in obtaining track labor, the various private employment bureaus at Chicago, Kansas City, Mo., St. Louis, Minneapolis, Minn., Duluth, Kansas City, Kan., Superior, Wis., St. Paul, Minn., Omaha, Neb., and Sioux City, Ia., were taken over by the United States Employment Service. Under the present scheme of organization any railroad desiring track labor will file its order directly with the government agency or with its branches, the former private agencies. Railroads are authorized to continue their present organizations for securing track labor but these will be under the general direction of the government employment service. The railroad agencies will offer no rates of pay, working conditions or boarding conditions different from those offered through the government agencies. When a railroad has its own labor agencies it will place its orders with the United States Employment Service at the same time that it places them with its own agencies, so that the federal organization may have equal opportunity to secure the required men.

Supplement No. 5 to Circular No. 63, dated June 13, provides that the standard day for all track laborers shall be 10 hours and that the maximum rate of pay for a track laborer outside of the large terminals, important industrial centers and metal mining regions shall be 27½ cents per hour. Within the large terminals and in important industrial centers the maximum rate shall be 30 cents an hour. The minimum rate shall be that fixed by the director general's order No. 27 and where minimum rates are higher than the maximum rates above specified, they shall apply. No allowances of any kind shall be made for board, or for any other reason, that have the effect of increasing compensation. Railroads may continue the practice of paying the fare for laborers from labor markets to the point needed and their return fare to the point where employed. Labor agents are not permitted to recruit laborers or forces for one company from another road.

A telegram sent to western lines on June 15, asks for information on the behalf of the Board of Railroad Wages and Working Conditions concerning the normal summer force of the various kinds of common labor and the classes of common labor which are needed quickly to put the property in normal shape for winter service; the rates of pay recommended as necessary to obtain an adequate supply of common labor; and the minimum differential expressed in per cent over the usual monthly earnings of common labor which should be paid a foreman.

Advertising Regulations

Circular No. 126 issued by the regional director of western railroads on June 11, directs that lines be governed by

regulations relative to advertising prepared by the inter-regional advertising committee, A. L. Craig, chairman. These regulations provide that time-table folders will be informative only. All advertising of luxurious trains, claims of superior service, slogans, illustrations, and extraneous matter of every description, including paid and complimentary advertising, is to be eliminated. Trade marks, however, which serve to distinguish the folders of various lines and systems may be used.

A limited free distribution of local folders is authorized in foreign territory to meet the needs of the public and of ticket agents. The distribution of local folders in foreign territory may be covered either in whole or in part by the use of gateway folders to be prepared jointly by lines in the territory leading up to a gateway. In order to test the practicability of gateway folders the lines in the eastern region will issue a folder showing condensed service of all lines westward from Chicago, while lines in the western regions will issue a folder covering service on all lines from Chicago eastward. Joint folders between commercial centers will follow the standard for general local folders but may vary to such an extent in form and arrangement as will best show the service via all lines. Folders are to be distributed through the ticket offices and railroad information bureaus. No distribution is to be made on trains.

For the information of the public and ticket agents lines may at once issue resort, hotel and boarding house lists, but they should contain no maps or illustrations and where practicable will be jointly issued by lines interested. Descriptive resort publications are to be discontinued until further notice. Publications setting forth agricultural possibilities of sections of the country not now fully settled, may be continued, but where practicable should be joint. When reduced fares are made for special trains operated on account of state, county or industrial fairs, local excursions, etc., a limited amount of advertising is permissible.

The regulations also specify the manner in which schedules of individual roads shall appear in the Official Guide. No expense is authorized for representation in any other railway guide.

A letter sent to northwestern and central western railroads on June 17 contains a report from one of the largest western flour mills which indicates what can be done in connection with the intensive loading of flour. During the month of May this mill loaded 38 cars, with total marked capacities of 2,910,000 lb., with 3,228,986 lb. of flour, or 10.96 per cent overload.



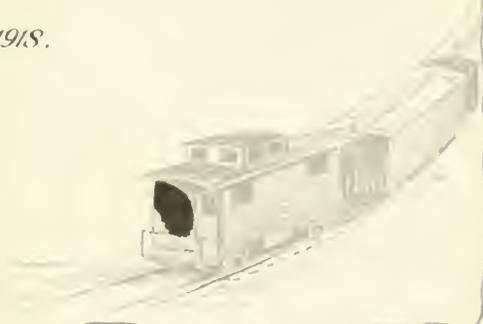
International Film Service

Anti-Aircraft Guns Mounted on Railway Trucks



Report of the
Fifty-first Annual Meeting
of the
Master Car Builders' Association,
and of the
Fiftieth Annual Meeting
of the
American Railway
Master Mechanics' Association

Chicago, June 19 and 20, 1918.



Comment on the Meetings

Grain Cars for Western Roads

THE MOST IMPORTANT matter brought before the attention of the joint meeting of the Master Car Builders' and Master Mechanics' Association was that of the car situation for grain loading in the West. Orders have been issued to send box cars to western roads to handle what will be a bumper crop. Cars have been sent indiscriminately to the western lines with the result that most of the roads are overwhelmed with box cars unsuitable for grain loading. One road received 4,000 cars which will have to be repaired before they are suitable for handling grain. Of about 2,000 on one road specified for grain shipment only 15 per cent were fit for that service. Another road reports only about 20 to 25 per cent of the cars received were suitable for this purpose. Something must be done to relieve the situation. It has been suggested that in ordering cars west the orders should state that the cars sent must be suitable for handling grain, and that the western roads be permitted to refuse cars not fitted for this commodity. The car repair situation the country over is serious. The shops both in the East and West are congested. The output is limited on account of lack of labor and material. In order adequately to meet the situation it will be far more practical to pick out the cars suitable for grain and send them West than to send unsuitable cars West and have them repaired there. Unless relief is given the western lines at once it will be impossible to handle the vast grain business this year.

Welding Truck Side Frames

THE PRACTICALLY unqualified endorsement of welding truck side frames and bolsters by the association seems surprising in view of the data presented in the exhibits accompanying the report. Of the two sets of tests the greater weight has apparently been given to those shown in book *B*. There were 23 castings tested in this series, of which only three broke in the weld. However, some of the tests give no indication of the strength of the welded members in tension. Six of the castings included in the tests reported in book *B* were welded in the compression member and one was tested transversely. Eliminating these we find that 13 of the test castings welded in the tension member failed outside the weld, while three failed in the weld. The data in book *A* were not summarized by the committee. Of the 21 side frames and bolsters, the test results of which are published in this exhibit, three castings had no defects, two had defects but were tested without being welded, and two were welded in the compression member. Of the remainder 11 broke in the weld and three outside the weld. Thus of all the parts welded in the tension member that were tested in both series 14 failed in the weld while 16 failed at other points.

It is reasonable to assume that the welding of these castings was done with fully as much if not more care than would be given to similar work under actual repair conditions. The committee in its report emphasizes the fact that the skill of the operator is the most important factor influencing the strength of the weld. Unfortunately this cannot be controlled by any rules adopted by the association to govern welding practice. Unquestionably the application of autogenous welding to the reclamation of side frames and

bolsters will effect great economies and will help to keep equipment in service particularly under the present conditions of the material market. Careful supervision of the work will be necessary however to prevent failures from occurring. Care must be taken until the best method is finally determined. If wrecks should occur due to improper workmanship on welded parts the result might be the prohibition of this practice, desirable as its adoption may seem in the present circumstances.

M. C. B. Association and Federal Control

THE MASTER CAR BUILDERS' ASSOCIATION has in the past performed an exceedingly important function in the handling of inspection, repair and interchange problems of freight cars. Its field of usefulness is by no means reduced under government control. This association through its Arbitration committee has studied these problems for years and experience gained in this work makes it well qualified to continue it. Since the railroads have been under the control of the government the standard M.C.B. rules have been revised in different parts of the country to an extent which under the conditions of private ownership would not be tolerated. The Division of Transportation in issuing Circular No. 7 has made a radical modification of the rules. The order was put into effect without giving the M. C. B. Association an opportunity to modify its rules to agree with the circular. This naturally creates confusion among the inspectors and repair men who at best find it difficult to interpret the present rules. For the sake of uniformity and in order that the existing rules may be kept up-to-date and in accordance with the latest developments of the Railroad Administration all such matters should either be sent out through the M. C. B. Association as a government order or the association should be permitted to issue changes to the rules simultaneously in order that any conflicting rules may be revised. In view of its past experience this association can be made a valuable adjunct to the Railroad Administration.

Revision of Loading Rules

THE MASTER CAR BUILDERS' loading rules are an important factor in securing the maximum utilization of cars. If cars are not properly loaded the full capacity cannot be utilized, and the car is apt to be delayed in transit owing to the necessity of transferring or readjusting the lading. Evidently it was a realization of this fact that led to the complete endorsement of the loading rules by the Railroad Administration. While the intent of the clause in Circular No. 7 issued by Mr. Gray in which he states that discipline will be imposed for violation of the Master Car Builders' rules is not clear, it is safe to say that the intention is to compel shippers to load cars in accordance with these rules. With the authority of the Railroad Administration added to the weight which the Master Car Builders' rules carry, the committee should be able to get splendid results.

The present conditions require that cars be loaded, not

necessarily in the manner that is cheapest for the shipper, but in a way that will utilize the maximum capacity of the car and enable it to be sent to its destination without delay. The loading rules should be revised at once to secure this result. The committee has met the situation in a manner that leaves little to be desired. The adoption of the changes in the rules for loading lumber now under consideration should eliminate one of the major causes for transferring loads. Some other changes in the present rules with the same end in view should bring good results by insuring better utilization of cars and a reduction of the expense of transfer and loss and damage to lading.

Displaying Foresight After the Fact

WILLIAM SCHLAFGE, of the Erie, president of the Railway Master Mechanics' Association, ranks high among the mechanical officers of the railways of the country. His address at the meeting in Chicago was in part an inspiring appeal to the association's members to accept loyally and in good faith the new regime in railway affairs, and to do all they can to make government operation of railways a success.

There are features of Mr. Schlafge's address, however, which seem eloquently to manifest the common faculty of hindsight, rather than that very unusual faculty, foresight. By implication he criticises the Master Mechanics' Association because it had not during its 50 years of existence in time of peace "made constructive efforts to assist the nation to react reasonably to the conditions of war with its tremendous added burden upon the transportation facilities," or "so shape its course even to render assistance to the end, palpably in sight for many years, of a thorough co-ordination of the transportation business of the country in the interests of its people."

We submit that this is all very far fetched. If any member of the Master Mechanics' Association had suggested in one of its conventions prior to three or four years ago that this organization should take steps to assist the nation "to react reasonably to the conditions of war" he would have been laughed out of the meeting hall. Perhaps that is the reason why Mr. Schlafge never made the suggestion; for we are quite sure that he never did make it.

To criticize a civilian technical organization on the ground that it did not take steps to assist the nation to "react reasonably to the conditions of war," when it is notorious that the government of the nation itself did nothing of the kind until we were almost at war, borders on the absurd. Similar comment may be made on the reference to "the end, palpably in sight for many years, of the thorough co-ordination of the transportation business of the country." To whom was this end so "palpably in sight?" Mr. Schlafge conceded that the end was not palpable to "railroad interests," for he added: "It is only fair to say, however, that the limitations upon its (the Master Mechanics' Association's) proper expansion and development were largely beyond its control because of the general failure of railroad interests to recognize the fundamental principle that the transportation business of a nation is a natural state monopoly, and that, sooner or later, a progressive state will either dominate the control of its transportation lines or own them." The end in question certainly was not "palpably in sight" to government officials, for they were engaged in defeating by proceedings under the anti-trust law, every effort the now despised "railroad interests" themselves made to bring about co-ordination. It must be, then, that it was merely to Mr. Schlafge that this end was "palpably in sight." It is a great pity that there are so many people in the world who do not reveal what they have foreseen until after it is an accomplished fact.

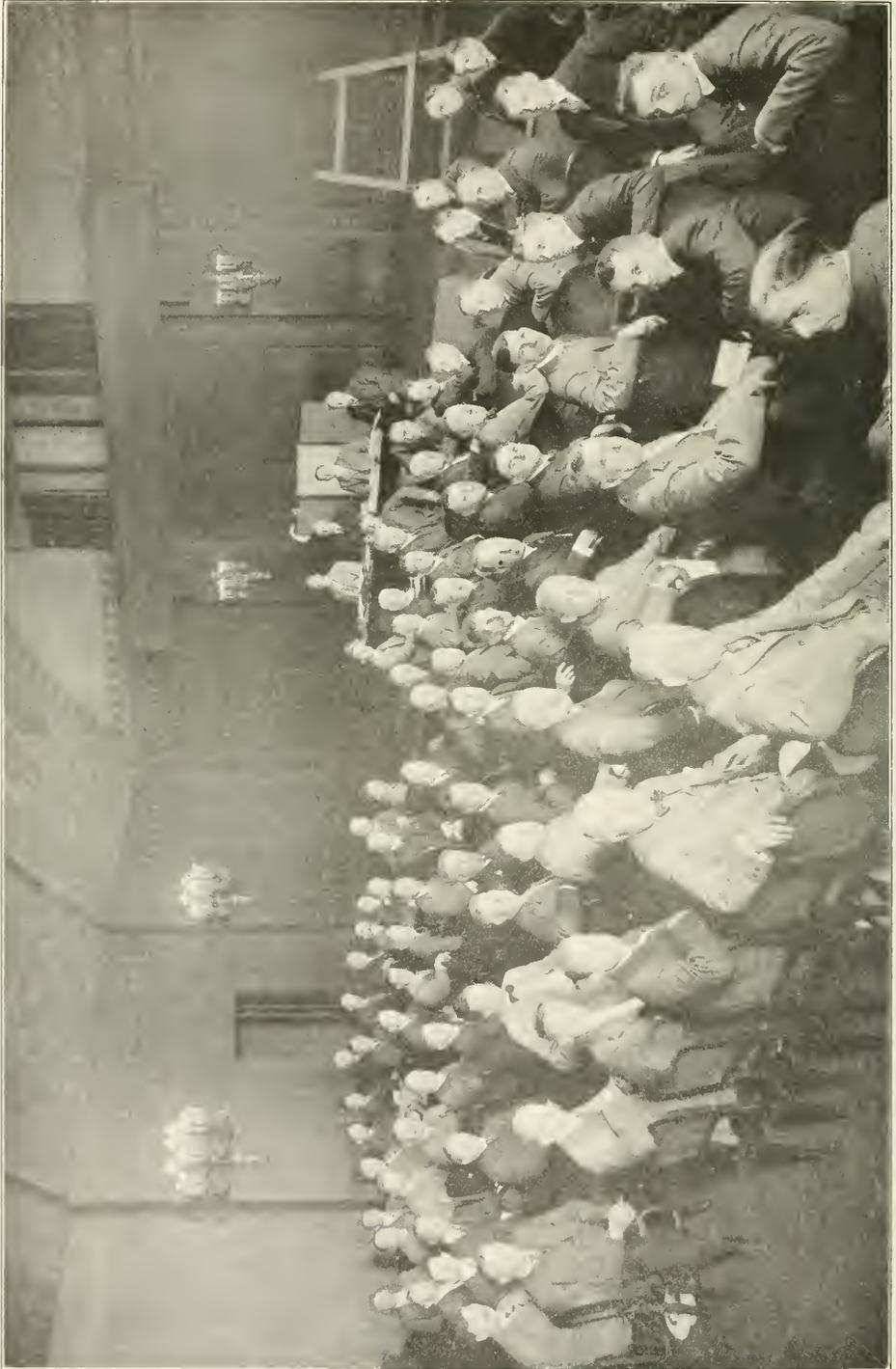
Having disclosed that "to foreseeing men it has been clear

for many year that even peace conditions demanded the nationalization, either under private control or public ownership, of all the transportation agencies of the country," Mr. Schlafge proceeds to show that, "therefore, standardization of the instrumentalities of commerce was inevitable at the highest efficiency was to be attained." He goes on merely to defend standardization of locomotives, but to condemn the Master Mechanics' Association because "this association practically failed to recognize the inevitable trend of events, so that when, as a necessary war measure, the national railway administration demanded a standard locomotive, the association had no standard to offer." The American Railway Association did have a standard freight car to offer, and it was not adopted. Why was there no standard locomotive available? Simply because nobody in the railway business—except, possibly, Mr. Schlafge, who kept very quiet about it—considered that, in the diverse circumstances in which locomotives must be operated, standardization of locomotives was either feasible or expedient.

It is extremely desirable that railway officers of all ranks and in all branches of the service should accept the new regime of government operation of railways gracefully and put forth all of their ability and their energy to make it a success. Their self-respect and their patriotism will impel them to do so. But loyalty and patriotism do not demand, and their self-respect should forbid, that they shall stultify themselves, and cast discredit upon their former superior officers and the associations to which they have belonged by criticising failure to do things which those making the criticisms never suggested ought to be done, and which the government and the public opinion of the United States prevented from being done. The course of the Railway Master Mechanics' Association, and the management of the railways of the United States, were not nearly so benighted before the adoption of government control as Mr. Schlafge would now have us believe; and even if they were this would be a late day for him and other railway officers to break their silence on the subject.

Saving Fuel in Power Plants

THE DISCUSSION of the report on Fuel Economy and Smoke Prevention at the Master Mechanics' Association meeting drew attention to one source of fuel economy which has generally been neglected. This is the railroad power plant. It is true that the aggregate saving which may be made in railroad power plants is small when considered in relation to the possibilities in locomotive service, inasmuch as probably not more than eight per cent of the total amount of fuel used by the railroads is consumed in power plants. At present, however, no possible saving should be overlooked, and while the supervision of fuel consumption on locomotives is very generally well organized and working according to highly developed plans, practically no organized effort has ever been made toward economy in the power plant. It has lately been repeated several times that with the careful application of the information on fuel economy which is already generally known, there would be an ample supply of coal to meet all requirements. To attain this end, however, organized effort is necessary. A study of railroad power plant conditions should generally be made with a view to developing effective methods of applying this knowledge and checking the performance of power plants. The plan of power plant supervision referred to by W. J. Tolbert in his discussion of the report, has resulted in a material improvement of conditions relative to fuel economy on the Rock Island. An aggregate saving of fuel too large to be neglected will result from a general development of some such plan of supervising the power plants of all the railroads of the country.



Master Mechanics' and Master Car Builders' Convention in Session at Chicago on Wednesday Morning, June 19



T. W. Demarest
Vice-President, M. C. B. Association



C. E. Chambers
President, M. C. B. Association



J. Coleman
Vice-President, M. C. B. Association

Master Car Builders' Association Proceedings

The Maintenance of Freight Cars and the Rules of Interchange Receive Special Attention

THE FIRST SESSION of the joint meeting of the Master Car Builders' Association and the American Railway Master Mechanics' Association was held in the Floristine room of the Congress hotel, Chicago, June 19, 1918. C. E. Chambers, president of the Master Car Builders' Association, presided. The meeting was called to order at 10:20 a. m.

While the papers of the two associations were presented without any attempt at segregation—the meeting being in

fact a joint session—the following report of the proceedings of this meeting will be classified for convenience under the two heads.

Remarks by President Chambers

Gentlemen: We welcome you this morning at another one of our annual meetings. It is not necessary to state that since a year ago we have been making history and it is also unnecessary to state that each day we do not know what is



G. W. Wildin
Vice-President, M. C. B. Association



J. S. Lentz
Treasurer, M. C. B. Association



V. R. Hawthorne, Secretary,
M. C. B. and M. M. Associations

going to happen, and what will be the condition of affairs the next day. The uncertainty of the times has made it necessary to follow out the principle established one year ago in holding as brief a meeting as we could to take care of the necessary business. Perplexing problems are coming before us from time to time in the form of instructions or orders. As an executive committee we get requests from the United States government or the Railroad Administration to consider certain changes; at other times we get a notice that such and such things are ordered. In that case it is only necessary to notify you that these orders have been put into effect, and this is going to continue. Many times orders will be sent out that individually we may not concur in, but we are all working for the one great cause—to win the war.

What we have gained in the way of progress in 50 years or more that these conventions have been held is by reason of the general getting together of a number of opinions, and boiling them down to find out which seems to be the best. That, I think, in all cases is the wise plan. However, regardless of what order may come, it is up to each of us individually or collectively to put into effect to the best of our ability anything that our government may want.

Letter from J. J. Tatum

The secretary read the following letter from J. J. Tatum, manager of the car repair section, U. S. Railroad Administration:

"It would have given me a great deal of pleasure to have been able to meet all at the annual meeting this year, but I feel at this writing it will be almost impossible. There are pressing matters here at Washington that require my attention, and I feel I will be compelled to sacrifice the pleasure it would afford me to attend this meeting.

"There is a stupendous task before all of us; our obligations to the nation at this time are greater than ever before in our history. For this reason I feel I should remain at Washington as close to the 'firing line' as possible, to give all possible support to the Railroad Administration that is within my power. Today you and I are helping by our efforts in keeping up the railroads of the United States to fight the greatest of all wars for Democracy. You and I have the task to see that every possible piece of rolling stock is made available to carry foodstuffs and munitions to our soldiers

'over there.' Not only for those noble men who have left our country, but for our allies, and the noble women of this and our allied countries who are doing Red Cross duties for our soldiers. There is nothing we can do for them that will equal what they are doing for us; they are giving their all, the best they have, their life. We should be equally willing to do as much for them over here.

"In closing I would ask that we all pledge ourselves to our President of the United States, his director general of railroads and assistants, to give all we have in ability and force at our command, in order that they may be able, through the railroads, with our energy and effort to meet every requirement of their responsibility and by the united efforts of our men we will have placed our flag in the foremost ranks for democracy and liberty of the whole world."

I. S. Downing (C. C. C. & St. L.): I move that this association pledge itself to the assistance of Mr. Tatum's entire section of the government's work. The motion was carried.

Report of the Secretary

The report of the secretary, V. R. Hawthorne, showed the membership in the Master Car Builders' Association on June 8, 1918, to consist of 446 active members, 593 representative members, 14 associate members and 19 life members; a total membership of 1,072. The receipts during the two years were \$67,470.37 and the disbursements \$65,500.50, leaving a balance for the period of \$2,169.87.

(The report was received and a committee consisting of W. R. McMunn (N. Y. C.), J. H. Milton (C. R. I. & P.) and J. A. Carney (C. B. & Q.) was elected to audit the records.)

The President: Among the members that have died during the past year none is more noticeable than that of Joseph W. Taylor. He had been with the association so long that it seemed that he would always be there. I know that all the members miss him. We were very fortunate, however, in being able to secure, at least temporarily, Mr. Hawthorne, who from his number of years of railroad life not only was fitted for the office, but, having served practically one year as a member of the special committee inspecting the railroads, was exceptionally well fitted for this task, and it seemed to be most opportune that he should be at our disposal just at this particular time.

Revision of the Rules of Interchange

WITH THE APPROVAL of the Executive Committee, this committee has continued the rendering of interpretations of such questions as have been asked by the members regarding the rules. The committee has decided that until the status of the Master Car Builders' Association in relation to the Master Car Builders' Rules of Interchange shall be established no change in these rules will be recommended except in the rules governing prices of material. During the year, arbitration cases No. 1061 to



J. J. Hennessey
Chairman

1147 have been decided and copies have been sent to the members in accordance with our usual practice.

Changes in Rules Governing Prices of Material

RULE 98.

The committee recommended that the table of prices for wheels and axles shown on page 128 be revised as follows:

	New	Second-hand	Average credit price
	Eliminate this item.		
One 36-in. cast iron wheel.....			
One 33-in. cast iron wheel.....	{ From... \$9.00	.....	\$4.75
	{ To... 15.00	.....	7.75
One 33-in. cast steel wheel.....	{ From... 19.50	.....	9.75
	{ To... 37.00	.....	16.00
			Scrap
One 33-in. wrought or rolled steel wheel..	{ From... 19.50	.....	\$4.50
	{ To... 50.00	.....	8.00
One M. C. B. Standard axle, 140,000 lb..	{ From... 25.50	\$15.25	4.50
	{ To... 46.50	27.00	9.30
One M. C. B. Standard axle, 100,000 lb..	{ From... 19.50	11.75	3.70
	{ To... 40.00	24.00	8.00
One M. C. B. Standard axle, 80,000 lb...	{ From... 16.50	16.00	3.00
	{ To... 33.00	19.80	6.70
One M. C. B. Standard axle, 60,000 lb...	{ From... 13.00	7.75	2.00
	{ To... 26.00	15.00	5.30
One M. C. B. Standard axle, 40,000 lb.....	Price to remain as at present		

RULE 120.

The committee recommended that the average scrap credit

prices shown for wheels removed from dismantled cars, under the provisions of Rule 120, and shown near the bottom of page 146 be revised as follows:

	From	To
One 15 in. wheel, 15 in. diameter, 1 1/2 in. wide, 1 1/2 in. thick, 1 1/2 in. diameter at center	2.00	\$ 1.00
One 15 in. wheel, 15 in. diameter, 1 1/2 in. wide, 1 1/2 in. thick, 1 1/2 in. diameter at center, 1 1/2 in. diameter at rim	1.00	7.25
One 15 in. wheel, 15 in. diameter, 1 1/2 in. wide, 1 1/2 in. thick, 1 1/2 in. diameter at center, 1 1/2 in. diameter at rim, 1 1/2 in. diameter at rim	1.00	7.25

The committee recommended that the table covering new and average credit prices for non M. C. B. standard axles, shown at the top of page 150, be revised as follows:

	From	To	Average credit price
One 3 in. axle, 3 in. diameter, 60,000 lb. or under	11.00	8.14	\$1.40
One 3 in. axle, 3 in. diameter, 60,000 lb. or under	11.00	6.00	7.00
One 3 in. axle, 3 in. diameter, 60,000 lb. or under	11.00	11.00	6.00
One 3 in. axle, 3 in. diameter, 60,000 lb. or under	11.00	6.00	5.50

The committee recommended that the first paragraph on page 142 be revised to read as follows: "The price for new wrought steel wheels shall be based on the scrap value of \$8.00 for metal inside the condemning limit (which is 1/4 in. above the limit groove) plus \$1.75 for each 1/16 in. of service metal (on radius of tread) in connection with standard full flange contour, also base of limit groove not less than 2 1/2 in. in diameter. In no case shall a charge or credit for service metal be made in excess of 1 1/2 in."

RULE 101.

The committee recommended that the following prices be revised:

	From	To
Item 106a. 106a to be consolidated in one item to be known as Item 106a.		
Item 106b. Coupler, complete, new, M. C. B. "D" style	\$18.00	
5 in. by 7 in. or 6 in. in shank	18.30	\$26.00
Item 107 and 108 to be consolidated in one item to be known as Item 107b.		
Item 107b. Coupler body, new, M. C. B. "D" either 5 in. by 7 in. or 6 in. by 8 in. shank	10.85	15.75
Item 107c. Coupler knuckle, new, applied, M. C. B. "D"	4.55	6.55
Item 107d. Coupler knuckle lock, new, applied, M. C. B. "D"	1.35	1.95
Item 107e. Coupler lock lifter, new, applied, M. C. B. "D"	.25	.35
Item 107f. Coupler knuckle drawer, new, applied, M. C. B. "D"	.47	.65
Item 107g. Coupler knuckle pin, new, applied, M. C. B. "D"	.53	.75
Item 107h. Coupler M. C. B., complete, new, steel 5 in. by 7 in. shank	9.00	19.00
Item 108. Coupler M. C. B., Temporary Standard, complete, new, steel 5 in. by 5 in. shank	10.50	21.50
Item 109. Coupler, M. C. B., complete, new, steel 5 in. by 7 in. shank	9.50	20.00
Item 110. Coupler, M. C. B., Temporary Standard, complete, new, steel 5 in. by 7 in. shank	11.00	22.50
Item 111. Coupler body, M. C. B., one new, steel 5 in. by 5 in. shank	5.90	12.50
Item 112. Coupler body, M. C. B., Temporary Standard, one new, steel 5 in. by 5 in. shank	7.40	15.00
Item 113. Coupler body, M. C. B., one new, steel 5 in. by 7 in. shank	6.10	13.50
Item 114. Coupler body, M. C. B., Temporary Standard, one new, steel 5 in. by 7 in. shank	7.90	16.00
Item 115. Coupler pin, one new, steel, applied	.25	4.75
Item 116. Coupler knuckle pin, one new, applied	.25	50
Item 117. Coupler lifter, one new, applied	.60	1.25
Item 118. Wagoning over 100 lb. each, in tooling list, 500 lbs. or more per pound	.04	.08

RULE III.

The committee recommended the following changes in Rule 111:

Item 56. Triple valves removed, cleaned, oiled, tested and stored, including all necessary repairs (labor and material), exclusive of renewal of body or conversion of valve from one type to another

Average	From	To
Train crew		\$1.10
Retaining		3
Removing		4
Crack		5
Exhibit		6
Chlorine		90
Total		\$1.10

Reason. This average will obviate the necessity of following each individual triple valve to ascertain just what

repairs are made (including valves shipped to the manufacturers). At present there is no uniform practice of obtaining the information on the various roads and no doubt many of the details are overlooked while others are assumed. The proposed average charge will eliminate a lot of complicated record.

PASSENGER CAR RULE 71

The committee recommended that the following prices be revised:

Item	From	To
One 15 in. wheel, 15 in. diameter, 1 1/2 in. wide, 1 1/2 in. thick, 1 1/2 in. diameter at center	2.00	11.50

PASSENGER CAR RULE 72

The committee recommended that the following prices be revised:

Item	From	To
Item 46. Wheel, wrought steel, 15 in. diameter, 1 1/2 in. wide, 1 1/2 in. thick, 1 1/2 in. diameter at center	2.00	\$1.00
Item 47. Wheel, wrought steel, 15 in. diameter, 1 1/2 in. wide, 1 1/2 in. thick, 1 1/2 in. diameter at center	2.00	6.00
Item 48. Wheel, wrought steel, 15 in. diameter, 1 1/2 in. wide, 1 1/2 in. thick, 1 1/2 in. diameter at center	2.00	6.00
Item 49. One 15 in. cast iron wheel	10.00	6.00
Item 50. One 33 in. cast iron wheel	4.75	7.75
Item 51. One 26 in. wrought steel wheel	6.00	6.00
Item 52. One 33 in. wrought steel wheel	12.00	6.00
Item 53. One 33 in. cast steel wheel	16.50	37.00

The committee further recommended that these changes in prices be made effective as soon as possible.

The report is signed by J. J. Hennessey, chairman, C. M. & St. P.; T. W. Demarest, Pennsylvania Lines; Jas. Coleman, Grand Trunk; F. W. Brazier, N. Y. C.; and T. H. Goodnow, C. & N. W.

Discussion

Geo. F. Laughlin (Armour Car Lines): I would ask, before the acceptance of the report, if this 55 per cent added to the bills will also be added to these prices?

T. H. Goodnow (C. & N. W.): That is the understanding.

I. S. Downing (C. C. C. & St. L.): Will Circular No. 7 issued by the Division of Transportation affect these rules? This says that the receiving roads shall transfer the lead at their own expense, while Rule 2 refers to American Railway Association Rule No. 15, which says that the delivering road will pay the expense. I ask the committee whether or not it intends to take that into consideration.

Mr. Goodnow: The committee did not know of Circular No. 7 when the report was prepared. The rule will be changed either as a result of this circular or under special instructions from the American Railway Association.

H. L. Osman (Morris & Co.): I would like to call attention to the prices allowed for trucks of destroyed cars. The rules provide, Section 115, for a 60,000-lb. capacity car. I think you will all admit that the price is far below the present cost of manufacturing trucks of that capacity. I find that a 60,000-lb. capacity truck with steel truck sides and steel truck bolsters costs in the neighborhood of \$650. Making the price \$115 is not quite in line with the costs of construction. This is borne out by the fact that very few railroads are today returning the trucks of destroyed cars.

F. I. Burton (N. Y. C.): With regard to Item 56, which recommends the price of \$1.10 for removing, cleaning, oiling, testing and making all necessary repairs to the triple valve, with the two exceptions which are mentioned. That subject was referred to the Train Brake and Signal Commit-

tee, of which I am chairman, and it is covered in a report we are making. We failed to concur in any suggestion of that kind, for reasons which are stated in the report. Briefly stated, the reasons are that \$1.10 would not go anywhere near covering the expense of repairing a triple valve, and we feel that the price fixed should be an average price, for the repairs and cleaning, because the present scale of prices would result in neglecting the question of repairs and confining attention almost exclusively to the more profitable job of cleaning.

Mr. Goodnow: Answering Mr. Burton, the Arbitration Committee was not aware that this matter had been referred to his committee. The average price of \$1.10 is obtained by the billing records of at least all of the roads represented on the Arbitration Committee, and I believe of one or two others. The expense of taking the triple off, taking it to the air brake room and giving it the necessary attention, including the testing, are included in this item. These records show that on several thousand cars on each road it runs from \$.90 to \$1.20. Therefore, the average of all was taken at \$1.10, which would, of course, carry the 35 per cent with it. You understand that there are certain exceptions, such as converting an *H* triple to a *K* triple, and one other that is mentioned.

Mr. Burton: I do not know how the price could possibly cover anything except the minor repairs that ordinarily go with the valve in its cleaning and oiling, especially when it includes the material and substitution of worn sockets and worn packing rings, and things of that kind. Such a price as this leads to the practice of putting old material in the valves in making ordinary repairs.

Mr. Goodnow: It probably would not if you take the individual triple, but if you take the thousands that go to your triple valve room the general average will cover it.

Mr. Burton: The principal point is that the rule will result in neglecting the triple valve entirely.

Mr. Goodnow: If he wants to take that chance on his road, that is true. The association is trying to check that matter now by having a report filed by all roads as to the tests they make and the style of rack they use. It would seem to me that if the Air Brake Committee has a report to make, that this report must be held up until we have the benefit of their report. I move that that one matter be held in abeyance until Mr. Burton's committee makes its report.

Mr. Osman: May we not have an expression from the committee as to this truck question?

Mr. Goodnow: The committee by its last action on Rule 113 for the settlement of cars, attempted to reimburse the car owner for the car since the war prices went in in 1914, by departing from the old arbitrary rule of prices as established in the M. C. B. rules and accepting the book values of cars. I appreciate that is not going to take care of the point that Mr. Osman raised, because the old arbitrary value will stand on the trucks if they are held. I think at the present that this is one of the things to be given consideration before the rules are issued in October.

The arbitrary values do not represent the value of the truck, either as salvage or scrap at the present time. But that is tied up with the general value of the car. Prior to 1914 we settled on the arbitrary value, but the arbitrary value of cars prior to 1914 does not represent the reproducing cost of that car today by any means. It did fairly compensate the company at that time for what cars were costing then. Now, if you are going to pick out the item of trucks, I can't see how we will handle it. Two years ago we attempted to establish fair valuations of cars, but had to give it up. When it comes to the trucks on cars prior to 1914, I am not prepared to say this morning just how that could be handled.

The President: There is no report coming before us that will have any bearing on that.

Mr. Goodnow: The committee has practically no report at

all. The prices that were changed were changed on account of being brought up by Mr. Tatum. On account of the suggestion coming from that source the Arbitration Committee recognized it and made those changes. Otherwise the committee has not taken any action, but did think that it could do so before the rules are issued in October.

J. J. Hennessey (C. M. & St. P.): There was a feeling a year ago that several questions would possibly come up before the rules would be changed. You remember the Arbitration Committee was authorized by the association to make such changes as they found absolutely necessary, and that was the feeling when the committee made this report.

A. E. Smith (Union Tank Line): I would like to ask what the association is going to do with the rule becoming effective on October 14 in regard to tank cars.

Mr. Goodnow: That is another rule that will simply have to be held in abeyance and action taken in the issuance of the rule, or in a circular prior to that time, taking care of that feature, if it is a necessity.

The President: I think now is the time for some action to be taken.

I. S. Downing (C. C. C. & St. L.): On the Big 4 at all inspection points we have put this Circular No. 7 in effect. If there are other rules that must be changed I think we should ask Mr. Gray if it would not be better to modify the rules through the Arbitration Committee. If we don't do it we are going to get badly mixed up.

F. C. Schultz (Chief Joint Inspector, Chicago): It occurs to me it will be necessary to take action on this now. Circular No. 7 will probably go into effect July 1. Mr. Goodnow is right; several changes are made. It occurs to me that within these two days we could work out something that would be in harmony with Circular No. 7 and adopt it as of July 1. Our rule provides that we can refuse cars under certain conditions. This rule compels the acceptance of all cars. That is one item alone that requires attention.

Mr. Goodnow: I don't believe that the Arbitration Committee would be able to act on the floor on embodying Circular No. 7 in the M. C. B. rules. That order is perfectly plain, and if it is to be put in, I believe that the Arbitration Committee can weave it into the rules, if the balance of the rules are to remain undisturbed and in line with authority. At the present time I don't feel that there is any action that can be taken until we have some expression of that kind. The interchange in the different terminals at the present time is being conducted on entirely different plans. Each big district or territory is independently putting in rules and systems carrying out its own ideas and governed by the local conditions.

The President: It goes without saying that Order No. 7 is effective. It doesn't say July 1 or December 1, but it says June 8, and so we have got to put that into effect. I think it would require some little thought as to just what M. C. B. rules might be affected by this order. I agree with Mr. Downing that a proper channel would seem to me to place these suggestions before the Arbitration or Executive committees for consideration.

Mr. Downing: I have maintained that there is no better way to interchange cars than under the M. C. B. rules. You might take the same position with regard to this general order that Mr. Goodnow does about the A. R. A. rules. It is not a physical operating rule. The repairing of cars at the nearest repair point is not a part of the M. C. B. rules. Determining the cost of the transfer as the transfer is made is not a part of the M. C. B. rules.

The President: We all may expect what we might consider a good many irregularities during transformation. All these things will be taken care of in a proper way when we have had time. As president of this association I naturally would raise the question as to just what Mr. McAdoo and Mr. Gray expect us to do or how they expect us to do it. I think we

should have suggestions for consideration, and I think this matter will shape itself in due time.

C. F. Giles (L. & N.): May I ask if there has been any response made to the communication in regard to the coordination of these associations with the American Railway Association, which was considered at our meeting in May?

The President: Mr. Schlitz's letter and my letter were presented to Mr. Thompson, and they were brought before the Executive Committee of the American Railway Association possibly two weeks ago. Mr. Thompson called a meeting in New York on June 28 to go over this matter further.

Mr. Goodnow: It occurred to me that the recommendations of the Master Car Builders' Association would take care of the situation as suggested by Mr. Downing; that is, this association be recognized as a section of any association that may be formed. It seems to me that this is not the proper time to undertake to embody Order No. 7 in the M. C. B. rules. That order has been issued over the signature of Mr. Gray, approved by Mr. McAdoo, and all we can do now is to put it into effect, trusting that later on the Master Car Builders' Association, as a section of the proposed organization will be given an opportunity to pass upon questions of that kind before the order is put into effect. I believe if that organization is effected that it will take care of this situation.

F. W. Brazier (N. Y. C.): That was just the point I was going to raise. I think the members of this association, of fifty years' standing, know better how this should be handled than people that have had no experience. I was in hopes that the resolution which the joint bodies made here to the American Railway Association would have gotten further along and would have gotten before such men as Mr. McAdoo, and that they could see that here is a body of men that really has made the railroads easy running by its rules of interchange.

There are very few officers who know the condition of the equipment that is running through the country today. We have over 2,000 box cars standing on our line, and if I were asked tomorrow to put them in the grain service only about 10 per cent of them would be fit. Everybody seems to think the equipment is all right, but there is going to be an awakening by and by.

I am willing to go on record, and practically every car man ought to be, about the condition of the equipment of the country today. The gondola cars, which come north loaded with lumber, are substituted for hauling coal and other commodities for which they are not suited.

Mr. Goodnow: It seems to me that the railroads have not yet fully understood that there is only one railroad in the United States. There are now no independent roads. I believe that Circular No. 7 is only the start of the changes which will have to be made under the new order of affairs. Doing what we have called interchange in the past, is eventually going to resolve itself into the same thing as handling cars over your own line from one division to another. Undoubtedly when that is brought about, the proper regulation of the repairs and maintenance of equipments will come along with it. I have in mind one large terminal at the present time that is departing entirely from the established practice in the past. The receiving line's inspection is being cut out and the delivering line is inspecting the cars for protection under the rules where defect cards are due. It handles it with one force of inspectors. It needs no joint force to handle it, and if it works out it will be the simplest plan for handling cars under the present demand.

The M. C. B. rules are going to be changed. It is not a question of inspecting for certain defects on the car, belonging to a private car line, or an individually owned car, but the prime essential in connection with railroad cars is the question of their maintenance, and that is the only thing vitally important at the present time. There is no inter-

change inspection now, and should not be at a single question of maintaining the cars, and it will resolve itself into a repair proposition.

Samuel Lang (P. & I. E.): The fact that this order is issued shows that our superiors in Washington think this action is necessary. I do not think we should do anything today to criticize this action.

James Coleman (G. T.): I think the rules will be changed materially from time to time, and as orders are issued from Washington, the Arbitration Committee should apply them to the rules as they now stand. I understand that an order issued today abolishes the per diem. If that is true, all of the equipment in this country is practically pooled. The next question is in connection with maintenance of equipment. We should be prepared to consider certain recommendations to see how we shall maintain our equipment because it is all pooled.

The President: There is a question before us by Mr. Goodnow in connection with the report of the Arbitration Committee on withholding a portion of the report referring to the cleaning of triple valves.

Mr. Laughlin: There are certain changes in the way of making effective dates in the rules which will be necessary to facilitate the movement of equipment, and I understand from this discussion that these changes will be made by the Arbitration Committee before the rules are put into effect. I have in mind Paragraph F of Rule 8, which relates to the refusal of cars that have not been equipped with brine retaining devices. All the cars will not be equipped by the date when the rules are to be made effective, and we are asking for an extension of that time. I would like to know if that will be considered.

Mr. Goodnow: That naturally will be considered. As I have stated before, it was the intention to re-issue the rules the same as usual, provided we got advice that that should be done. At the same time, as to such questions as Mr. Smith and Mr. Laughlin have brought up, such matters should be presented in writing, so that they will not be overlooked. I think these rules are all dated October 1, and none has to be acted on prior to that time.

(Mr. Goodnow's motion was carried.)

W. J. Tollerton (C. R. I. & P.) (reading a letter): It has occurred to me that, in view of the desirability of avoiding, in every possible way, delays to freight cars incident to the making of repairs when standard material is not available, that the M. C. B. Association should issue a circular authorizing the railroads to make wrong repairs, as they may see fit, to foreign cars in their possession whenever such wrong repairs can be made in a manner permitting the car to be retained satisfactorily and safely in the service for which it is intended.

At the present time there are undoubtedly a great many instances where cars are being held out of service a number of days awaiting the receipt of standard material ordered from the owner, when in reality wrong repairs could be made and the car released with but a trivial delay.

If the M. C. B. Association sees fit to issue instructions of this character, it is my further recommendation that during such period as the association may see fit to permit of such practices, the party making the wrong repairs should be absolved from any claim on the part of the car owner for the expense of standardizing repairs upon the arrival of the car on its home rails.

(Continuing, he said.)

The western lines are all in the same position as regards foreign cars coming to their roads. As Mr. Goodnow has said, the receiving line has nothing to say as to what class of equipment shall be taken to interchange. In the past few months the foreign cars on our railroads have increased something over 200 per cent. Within the last two weeks we received an order from the car distributing section at Wash-

ington ordering 1,000 box cars to our lines for grain movement, and the prompt handling and loading of cars is important. It is a problem with us to handle that vast number of cars.

Take the case of a car coming from the New Haven and going to Herrington, Kan., for a load of grain. If we could put it in shape to load and send to the Atlantic seaboard, it would be folly for us to be held down by some restriction compelling us to go to the New Haven for certain repair parts, or be penalized for making wrong repairs. What has happened to us has happened to every railroad in the west. Therefore, I think it is very important that some modification be made of the wrong repair rule as it now exists.

Mr. Brazier: I wish to make a motion, that the Executive Committee send out a notice to the members to the following effect: Empty cars of 60,000-lb. capacity or over, when placed on shop or repair tracks for repairs must not be returned to commercial service until they have been placed in condition to meet full M. C. B. inspection without exceptions, including United States Safety appliances.

We are practically one railroad since the pooling question has been settled. If any car can be made fit for grain service, make it fit for grain service. If it is not fit for heavy freight, make such repairs to it as are necessary and use it for coarse freight.

There are many open top cars that are perfectly safe to carry lumber, but they cannot be used for ore and coal because the mechanism of the hopper doors and floor conditions are such they will not even carry coal, much less ore, and someone must repair these cars. For years we have done as little repairing as we could on foreign cars and keep them moving. We had about five per cent bad order cars ourselves and on looking over the foreign cars we had, we found a less percentage of bad order cars than with our own. We were not taking any more foreign cars for repair than we had to; we preferred to do the work on our own cars.

As far as the safety appliances are concerned, you can put on anything you like, and as long as they meet the requirement of the federal law, we will not say a word, as long as the repairs fill the bill. We lack 8,000 cars of having our gross number of cars completed, and we are going to treat your cars that way, gentlemen, whether you like it or not.

Mr. Coleman: I wish Mr. Brazier would embody in his recommendation that cars shall be inspected for certain classes of commodity or lading. In case there are 2,000 bad order cars on the New York Central they may go to the Rock I-land, and that road will have 2,000 cars to repair before it can use them for loading grain. We have 75 per cent of our foreign cars, out of nine per cent held for repairs, in the shop today. These we got on our lines because our transportation department did not say what they wanted to load in the cars. You must get the co-operation of the transportation department and traffic department in order to make a proper inspection of these cars for loading, and each railway asking for cars should say what they want to load in them.

A distinction should be made in inspection, and that is why I suggest certain recommendations be made to Washington as to how we should keep the cars in repair and maintain them. The time is coming when there will be no billing for repairs to cars as there will be only one railway.

Mr. Goodnow: The remarks by Mr. Brazier and those by Mr. Coleman are foreign to what Mr. Tollerton started to bring before us. The M. C. B. rules at the present time, so far as wrong repairs are concerned, are very elastic and the change which was made some two or three months ago positively permitted repairs of any kind to foreign cars so long as they were owner's defects and the only redress the car owner had was to charge for the labor to correct them. That only excepts the wrecked cars—if you wreck a car the M.

C. B. rules require that you rebuild it. I feel that the Arbitration Committee, if it is the expression of the meeting, would be willing to take under further consideration the portions of the report dealing with wrecked cars and the permitting of billing for labor only in correcting wrong repairs. I think it would be well to have Mr. Tollerton make that as a motion and then the Arbitration Committee will simply change its rules.

J. H. Milton (C. R. I. & P.): In our shops and on our railroad the work on the cars of other roads has increased about 75 per cent. We are making every effort possible, to turn out the foreign cars so that they will haul grain or any commodity you may wish to load in them. In unloading these cars on a railroad, if it has not the facilities for repairing the car at that point it will certainly have to provide them. In that case they have to undergo a back haul on it, and it will be very expensive to haul the car from one place to another. If you are not going to put all the repairing of the bad order car on to the other fellow we have got to get into the game somewhere and make facilities to take care of the cars.

As far as the repairs of their own cars is concerned I think the roads can take care of that, but we must understand that each road will have authority to make such repairs as it can with the best means at hand. We have been doing that on our railroad, and using such material as we can find, for such parts as grab irons, center posts, etc. It is much cheaper, even if we have to pay for it, to put these parts on with wrong material than to hold the cars for 60 days.

C. N. Swanson (A. T. & S. F.): We are facing one of the biggest grain crops which we have ever had and with scarcely a car with which to commence moving that crop. Orders have been issued that we are to receive about 15,000 box cars for grain loading. They have already begun to reach our lines and an inspection of 39 cars showed that only 9 of them were fit for grain loading. What will be the result? The side tracks of the western roads will be congested with bad order cars and no facilities for taking care of them, and no cars for loading, and we are faced with one of the most serious problems we ever had in the west.

W. J. Tollerton: I move that the Arbitration Committee be instructed to withdraw the rule permitting the billing for correction of improper repairs.

C. W. Van Buren (C. P.): In any changes you might make in the rules I would like to call your attention to the fact that there are Canadian railroads which are not under federal control, and I ask you when you are making changes in these rules, to insert a clause which will cover the situation of the Canadian railroads.

Mr. Coleman: The railways in Canada will no doubt consider changing their policy to meet the changed conditions over here. They will have to do that in order to interchange their cars going to and coming from the United States. What that change will be I do not know. We are ready to do that and we are considering it now.

The President: I do not believe the motion as put is going to hurt any individual railroad as much as they think it will. I think in the past many ill-advised things have been done to make things standard.

Mr. Laughlin: I understand that this is restricted to cars under federal control. I am saying this, because I think it should be said, and I am saying it in favor of refrigerator cars, because under certain circumstances if certain materials not having the same insulating value were used, it would affect the efficiency of the cars.

The President: The rule contemplates the safety of the car and the efficiency of the car, so I cannot see that it would damage your cars at all.

M. F. Covert (Swift & Company): In connection with Mr. Tollerton's motion I think some exception should be

made to the effect that roads not under government control be excepted, because there have been certain rulings by Mr. Prouty of the Division of Accounts in connection with a certain order that has been issued and that order has reference to returning bills for correction. Mr. Prouty has ruled in the case of private lines that that order only referred to roads under federal control, and therefore Mr. Tollerton's motion would conflict with private ownership.

Action Taken

The report of the committee was approved.
T. H. Goodnow (C. & N. W.): The Arbitration Committee, at a special meeting held since presenting its report,

decided to ask the approval of the following resolution to be immediately issued as a circular:

"M. C. B. standard 60,000-lb. capacity axles with 14,000-lb. seat less than the condemning limit for such axle but above the condemning limit for a non M. C. B. standard axle may be used until October 1, 1920 to replace M. C. B. standard 60,000-lb. capacity axles with wheels less than the condemning limit for such axle, but above the condemning limit for non M. C. B. standard axles."

This is simply recognizing a practice already in vogue, but it will make it plain to some who feel it to be not a matter of it should be at the present time.

On motion the recommendation was adopted.

Discussion on Freight Car Maintenance

THE CHAIRMAN: It is of great importance that the Master Car Builders' Association go on record as to the importance of the requirement that cars delivered for lading by other lines be in fit condition for the lading intended. Some of the western lines are going to be loaded up with cars sent to them for the loading of grain which they will not be able to use. The western lines are going to suffer unless they can get some relief from the lines sending the cars and the intervening lines before the cars get into the loading territory.

C. E. Fuller (U. P.): It ought to be the consensus of opinion of the association as well as the railroads in general that an order for cars should carry with it an understanding that the cars be at least in serviceable condition for the commodity which they are to haul. Cars have been sent to the western lines with bad order cards on them. The condition of the cars plainly indicate that they have been on the repair track for months.

The crop of wheat in Kansas and Colorado, if nothing interferes with it, is going to be the largest crop we have ever had, and it is going to take a large number of cars to handle that grain quickly. In general, repair points on western lines are far apart and if the eastern lines send bad order cars it is going to swamp all of us. The desire to move cars quickly is an incentive to the transportation departments to move them irrespective of their condition and have them repaired at the loading point. There is a limit to that, and if the mechanical departments do not make a strenuous effort to have the roads send only cars in suitable condition for loading we will not be able to handle the business.

No one knows more about what should be done to make cars acceptable than the members of this association, and we should not sit still and approve, or not disapprove, of a practice that is ultimately going to get us into trouble. We are going to be blamed for this condition and we had better make ourselves felt before we are in trouble, and not afterward.

Many cars are all right for rough loading, and unfortunately we in the west have a lot that are in that condition, and if we get still more there is a limit to our capacity to handle these cars.

F. C. Schultz (C. J. L., Chicago): What must be done is to control the situation in some manner in the way of repairs. The bad order situation today as far as this city is concerned is worse than it ever was since I can remember. It is going to get much worse on account of the pooling of equipment. We must get ourselves in a frame of mind by which we can't tell a Rock Island car from a Union Pacific car. If we were able absolutely to control the movement of bad order cars into a territory where they have the loading, we could repair them. In a city like this or others as large

we should co-ordinate our facilities. There are occasions here where private car shops are out of work when our railroad shops are full of bad order cars and if some plan could be worked out by which we could put the cars where we could repair them and assemble the material we could do something.

T. H. Goodnow (C. & N. W.): The situation just referred to is the least of our troubles. Under the congested conditions of handling traffic we have got to repair the cars outside of the large cities, and that is particularly true of the lines in the west. The sixth clause of circular No. 7 of the Division of Transportation says, "empty cars offered for interchange, if in safe and serviceable condition, must be accepted." Under the Car Service Commission's rulings, M. C. B. rules so far as the acceptance of cars is concerned have practically been abrogated. Empty cars must be accepted regardless of their condition. They have said to you in effect if they were not fit for grain, use them for brick; if they were not fit for brick, use them for something else. That is the condition that has to be reconciled. Whether this clause that I have just read is in line with the Car Service Commission's idea I do not know. If circular No. 7 is to prevail, it will help the mechanical departments out of their trouble somewhat.

The grain car repairing situation is not the whole problem. Cars are repaired at points where there are no shop facilities. For handling home cars the material is framed and shipped out to these points in car-load lots. Today that condition is entirely changed. You can't frame material in advance. At large repair tracks with no facilities you have to handle the individual foreign car as it comes; either frame the material by hand or wait to send to shop points and get it framed. The output of repaired cars is reduced enormously on account of that one condition.

There is another condition. All of us have certain cars that we were re-enforcing. On the Chicago & North Western we are putting on cast steel draft arms and changing the draft gear on some 12,000 cars. We have material piled up that we have no use for because we do not have those cars on our line. The foreign roads cannot carry a stock of that material and repair those cars as they get them because that would tie up an untold amount of money. Those cars should not be continued in service in their present condition. They have short draft timbers and will not stand modern service. If we are not going to get our cars back we are not going to be able to improve the equipment of the country as it should be improved and as most roads are and have been arranging for during the past five or six years.

Cars that have been used in the east in loading steel and steel products would continue in that service without repairs, but the minute those cars go to the northwest for grain, if there is a post shoved away or a splinter out of the floor so

there is a hole in it, they must be repaired. No one road has the facilities to repair a lot of cars unloaded on it within a few weeks' time and get them distributed to the elevators. It is very necessary that the roads as a whole in all sections of the country help in putting cars in condition for grain. If circular No. 7, clause 6, is to apply, then we probably will be in a position somewhat to enforce that through the refusal of unserviceable cars when offered in interchange.

F. W. Brazier (New York Central): If you went out in your yards and inspected foreign cars as closely as you do your own, instead of having five per cent or 6 per cent bad order cars you would have 25 per cent, and the sooner that is generally known the better. We are up against a serious problem on the rate we are paying our men. It is impossible to hold men at the rates the railroads pay when the men in ammunition plants and common street laborers are getting better rates. It is impossible to get any long yellow pine for sills. We are splicing everything and anything. I want to call attention to the repairs of foreign cars. We are all government employees now, trying to help the government out. We have got to make our shops repair all classes of cars. We have started to do so on the New York Central. Right or wrong, we are going to put on anything we can to get the cars in safe and serviceable condition.

J. J. Hennessey (C. M. & St. P.): Every road should make an effort to put its own cars in better condition than they are now. I realize that we are only divisions of the American railroad, but every road can repair its own cars in better shape and for less money than can a foreign road. It has the material on hand, framed and ready to put on. If we would all make an effort to put our cars in first class condition before they leave the home road we would not have such a congestion of cars as we are having today.

I want to endorse the proposal that no cars should be accepted unless they are serviceable for the commodity they are ordered for.

I. S. Downing (C. C. C. & St. L.): Our men are being taken by the war. We can't replace them. It is going to be impossible to repair any more cars than we have been repairing. I do not believe in hauling whole trainloads of pine lumber to the north to repair wood underframe cars. Even if the Government had to build shops in the South for the purpose of putting wooden underframes under the cars, it would be a better investment than to haul the lumber north, then haul the cars north and put the wooden underframes under them and then haul them all back south for loading. Those light capacity cars should be kept in the section where they have the material. In the north we handle heavier trains. On our division from Indianapolis to Cleveland we had 15 ends pull out in one day, draft timbers and all, on classes of cars that probably all roads are re-enforcing.

Another thing that has increased this bad order situation is the fact that most of the roads have cars standing on their side tracks that they were going to dismantle. In 1916 we tore down something like 1,700 cars. We would have torn down just that many more in 1917, but instead of doing that we put them in service. In 1916 and 1915 we could not get force enough to repair those cars and we can't get it now. I am not opposed to contract shops, but it has been my experience that every time we give a contract shop a lot of cars to repair, they take our men. Until our own facilities are worked to capacity we should not let cars to contract shops. If we would start right now in the transportation department to send every car that comes out of the shop fit for grain in the direction of the roads that have the big grain loading, we will get enough cars in the west. I don't believe that all of our equipment is in a rundown condition but we are not going to be able to get men and material enough to repair all of these cars which are in such bad condition. The impression seems to prevail that a car repairer can be made in about

three weeks. You cannot make a first class car repairer under three or four years. Women are not satisfactory in this class of work. We are trying them, but a woman cannot do that kind of work.

In view of the fact that we cannot get men to keep up even our ordinary running repairs, we ought not to have to spend money on repairs for cars to haul grain when standing in our freight houses there are cars in which they are loading steel and other commodities, that are suitable for the loading of grain, and the steel and other commodities could be loaded in the same cars we are trying to repair.

J. H. Milton (C. R. I. & P.): We are making every effort possible to take care of foreign equipment. In the last two months our repairs on foreign cars have increased about 75 per cent. We have on our railroad between fifteen and eighteen shops doing heavy repairs. We find in doing work on the cars of other roads, that if a car has a drawbar or draft-arm pulled out, a drawbar or draft arm is put into the car, without doing the other work that should be done at the same time; the car goes through ten or twelve transfers and the last road that receives it is the one which has to do the work on it. We are taking out side and end sills and putting in posts and braces, and doing everything that possibly can be done to get the cars in condition to haul the freight they are intended to haul.

J. C. Fritts (D. L. & W.): The conditions in the east are nearly as bad as they are in the west. We meet the same conditions in regard to the loading of coal that the western roads are going to meet in loading grain. What has brought about this condition? Certainly, to a large extent, the pooling of equipment. From a transportation standpoint that is easy to do, but from a maintenance standpoint it is a difficult proposition. Every car man in this country ought to put his shoulder to the wheel, and the Government can rightly expect some advice from this Association, which has been handling the car problem for the last 50 years. We have a lot of so-called foreign cars on our road that are in very bad shape, and as near as I can find out every other road is in the same condition. We have reduced our repair output at least 30 per cent on account of the so-called foreign car situation throughout the country. The re-enforcement of cars has been entirely stopped. We have any amount of trouble pulling ends out of cars with short draft sills. We are loading cars heavier than we have ever done before in the history of the road, and pulling longer trains, and consequently we must repair the cars to meet these new conditions.

It has never been possible, and never will be, to have all cars in such shape that they will handle commodities of all kinds. Therefore when a body of cars moves under Commission order, designation should be made as to what they are going to be loaded with so that an inspection can be made and the bad cars sorted out and diverted to other traffic. That will relieve a lot of empty hauling, and a congestion of cars in bad order in sections where a large movement of a certain kind of commodity is to be handled.

By centralizing material we can bring about much economy in operation. If we had one point in Chicago, one in New York, one in Buffalo and at other convenient places, where we could keep material for these various foreign cars, and where we could get it in case we had a foreign car on our tracks that needed repairs of an unusual character, we could make the proper repairs. The present practice will never bring about the results that are looked for.

Cars should be delivered direct to the original owning road when they are in bad order. When they cannot be returned directly arrangements should be made by the transportation department to load them to the original road, or a road that can deliver them direct. In that way we can get rid of a lot of cars we are now holding for material and on which we have to make wrong repairs.

I wish to call attention to the air brake situation.

We are cleaning 10 per cent more cars than before and still I find hundreds of cars on our line which are out of date. That indicates to me that some road is not doing what it ought to do. If this practice is continued we will be in serious shape on the mountains in handling trains next winter.

C. E. Chambers (C. R. R. of N. J.): The reason that the air brakes have not been cleaned as frequently as they should be is that we have not had the men to take care of the work. The reason you do not put on re-enforcements on short draft cars is that you do not have the men and material. Foreign bad order cars must be put in serviceable condition including the safety appliances. Many times you do not have to repair a car so as to make it serviceable for carrying grain, but you can make it serviceable for rough freight. When the car goes to a road which has to use the car for carrying grain that road must repair the car and make it suitable for that purpose.

Action Taken

The meeting adopted the following resolutions concerning the handling of cars with the suggestion that they be forwarded to the Railroad Administration at Washington for consideration.

The first resolution was: "It is the recommendation of this association that cars ordered from one part of the country to another or from one road to another on authority of the Car Service Commission for designated loading shall first be inspected by representative of the mechanical department of the road furnishing the cars as to their fitness for the loading intended and be side-carded showing that

they have been passed by C. O. K. For the same reason cars can be rejected when offered unless it has been specially arranged to send bad order cars.

The second resolution included several recommendations varying widely in character but all intended to facilitate traffic, as follows:

"First, that if possible cars of recent manufacture construction that have not been reinforced be confined to home roads and kept off of trunk line railroads with heavy grades where heavy tonnage trains are handled.

"Second, that all loads must be loaded strictly in accordance with the M. C. B. loading rules within the clearance dimensions of the roads over which the cars route and no cars will be moved from the loading point unless so loaded.

"Third, that all unloaders will be held strictly accountable for any damage done to cars in unloading. This applies to damage to cars in unloading machines as well as damage such as tearing out cross tie braces of open cars etc., resulting from unloading bulk lading with machinery.

"Fourth, that in the repairs of cars the M. C. B. standards and rules governing the maintenance of air brakes must be strictly followed out when cars are on repair, classification or other tracks, so that the air and hand brakes of such cars will be in proper condition for handling on grades.

"Fifth, that the coupling speed of all cars and locomotives should not exceed a reasonable speed for safety.

"Sixth, that railroads are hereby required to carry in stock castings and other materials standard to their cars for which substitution cannot be made or which cannot be purchased in the open market."

Specifications and Tests for Materials

THE COMMITTEE report covers the different subjects which were reviewed during the past year and recommends that changes be made in the several specifications, as shown under the respective exhibits.

Exhibit A.—Specifications for Steel Axles

1. SECTION 5—Drop Tests.—Change to read as follows:

"(a) The test axle shall be so placed on supports 3 ft. apart that the tup will strike it midway between the ends. It shall stand without fracture



A Corner of a Chemical Laboratory

five blows from a tup of 2,240 lb. falling from a height as specified, and the permanent set produced by the first blow shall not exceed that specified for axles of corresponding dimensions, as shown in the following table. The axle shall be turned through 180 deg. after the first and third blows.

"(b) The permanent set is the difference between the distance from the straight-edge to the middle point of the axle measured before the first blow and the distance measured in the same manner after the blow. The straight-edge shall rest only on the collars or ends of the axle.

"(c) The temperature of the axle, when tested, shall be between 40 and 120 deg. F."

2. Table.—Omit the words "Weight of Tup, 2,240 lb. Supports 3 ft. Apart," and the words "Result of First Blow" shown in last column, and add to the table a column, under "Size of Axle, In." with the heading "Length Overall, In." and "84¼, 86½, 88½, 90¾," for axles having journals 4¼ by 8, 5 by 9, 5½ by 10 and 6 by 11 in. respectively.

3. SEC. 10.—Permissible Variation.—Change the tolerance for excess length overall, from 5/32 in. to 1/8 in.

Exhibit B.—Specifications for Mild Steel Bars for Passenger and Freight Equipment Cars

1. SEC. 10.—Number of Tests.—(a) Change to read as follows.

"One tension and one bend test shall be made from each melt; except if material from one melt differs ¼ in. or more in thickness or diameter, one tension and one bend test shall be made from both the thickest and the thinnest material rolled. When the material from separate melts cannot be identified, one sample shall be taken from each lot of 50,000 lb. or fraction thereof. When the bars in any lot are not all of the same diameter or thickness, samples shall be taken so as to represent each size differing in diameter or thickness by ¼ in., and in all cases the thickest and the thinnest sections shall be represented."

2. SEC. 11.—Permissible Variations. Change to read as follows.

"All bars shall conform to the limits given in the following table."

(Add the following table, to supersede present Table No. 1 and Paragraph (b) Flat Bars—(1) and (2) M. C. B.

1917 Proceedings, page 827, and M. M. 1916 Proceedings, page 603.)

ROUNDS, SQUARES, HEXAGONS.

Size.	Variations in Size.	
	Under.	Over.
Up to and including 1/2 in.	.007 in.	.007 in.
Over 1/2 in. and including 1 in.	.010 in.	.010 in.
Over 1 in. and including 2 in.	1/64 in.	1/32 in.
Over 2 in. and including 3 in.	1/32 in.	3/64 in.
Over 3 in. and including 5 in.	1/32 in.	3/32 in.
Over 5 in. and including 8 in.	1/16 in.	3/8 in.

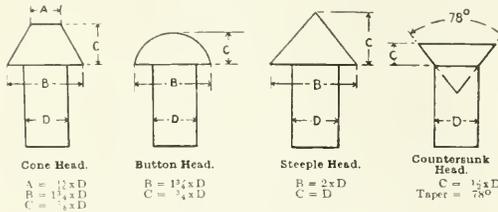
FLATS.

Width of Flats.	Variation in Width.		Thickness of Flats.		Variation in Thickness.		Under and Over.	
	Under.	Over.	3/16 in. and under.	1/2 in. up to 1 in.	1/2 in. up to 2 in.	1 in. up to 2 in.	Over.	Under.
	Under.	Over.	Under.	Over.	Under.	Over.	Under.	Over.
Up to and including 1 in.	1/64 in.	1/32 in.	.006 in.	.008 in.	.010 in.	.010 in.	.007 in.	.007 in.
Over 1 in. up to and including 2 in.	1/32 in.	3/64 in.	.008 in.	.012 in.	.015 in.	1/32 in.	1/32 in.	1/32 in.
Over 2 in. up to and including 4 in.	3/64 in.	1/16 in.	.010 in.	.015 in.	.020 in.	1/32 in.	1/32 in.	1/32 in.
Over 4 in. up to and including 6 in.	1/16 in.	3/32 in.	.010 in.	.015 in.	.020 in.	1/32 in.	1/32 in.	1/32 in.

Exhibit C.—Specifications for Rivet Steel and Rivets for Passenger and Freight Equipment Cars

1. SEC. 5.—Number of Samples for Chemical Analysis.—Omit the words "for Chemical Analysis," and also omit the words, forming the last sentence of Paragraph (a), "These samples shall be used for check analysis by the purchaser."

2. SEC. 19.—Change to read as follows:
"Dimensions of Head. Rivet heads shall conform to the dimensions shown on the purchaser's standard drawings, when so specified, otherwise the heads shall conform, within five per cent above or below, to the dimensions shown in Table No. 2."



Proportions of Standard Rivet Heads

(Add the following table and formula, to supersede the present Table No. 2 page 831, M. C. B. 1917 Proceedings; page 607, M. M. 1916 Proceedings.

TABLE II. DIMENSIONS FOR RIVETS.

diam. of Rivet.	DIMENSIONS FOR RIVETS.								
	Cone Head.			Button Head.		Steeple Head.		Countersunk Head.	
	A	B	C	B	C	B	C	B	C
1/4	15/64	7/16	7/32	7/16	3/16	1/2	1/4	1/8	1/8
5/16	19/64	35/64	9/32	35/64	15/64	5/8	5/16	5/32	3/8
3/8	23/64	21/32	21/64	21/32	9/32	3/4	3/8	3/16	7/16
7/16	27/64	49/64	25/64	49/64	21/64	7/8	7/16	7/32	1/2
1/2	15/32	7/8	7/16	7/8	3/8	1	1/2	1/4	9/16
9/16	17/32	63/64	1/2	63/64	27/64	1 1/8	9/16	9/32	5/8
5/8	19/32	1 3/32	35/64	1 3/32	15/32	1 1/4	5/8	5/16	1 1/16
1 1/16	41/64	1 13/64	39/64	1 13/64	33/64	1 3/8	1 1/16	13/32	3/4
3/4	45/64	15/16	21/32	15/16	9/16	1 1/2	3/4	3/8	1 3/16
13/16	49/64	1 27/64	23/32	1 27/64	39/64	1 5/8	13/16	13/32	7/8
7/8	53/64	1 17/32	49/64	1 17/32	21/32	1 3/4	7/8	7/16	1 5/16
1 5/16	7/8	1 41/64	53/64	1 41/64	45/64	1 7/8	1 5/16	15/32	1 1/2
1	15/16	1 3/4	7/8	1 3/4	3/4	2	1	1/2	1 1/16
1 1/16	1	1 55/64	15/16	1 55/64	51/64	2 1/8	1 1/16	17/32	1 1/8
1 1/8	1 1/16	1 31/32	63/64	1 31/32	27/32	2 1/4	1 1/8	9/16	1 3/16
1 3/16	1 1/8	2 5/64	1 3/64	2 5/64	57/64	2 3/8	1 3/16	19/32	1 1/4
1 1/4	1 11/64	2 3/16	1 3/32	2 3/16	15/16	2 1/2	1 1/4	5/8	1 3/8
1 3/8	1 9/32	2 13/32	1 13/64	2 13/32	1 11/32	2 3/4	1 3/8	1 1/16	1 1/2
1 1/2	1 13/32	2 5/8	15/16	2 5/8	1 1/8	3	1 1/2	3/4	1 3/4
1 3/4	1 41/64	3 1/16	1 17/32	3 1/16	15/16	3 1/2	1 3/4	7/8	2
2	1 7/8	3 1/2	1 3/4	3 1/2	1 1/2	4	2	1	2 1/16

Exhibit D.—Specifications for Heat-Treated Knuckle Pivot Pins for Passenger and Freight Equipment Cars

1. SEC. 3.—Chemical Composition.—Omit the lower limit for manganese, 0.40, and change to read: "Manganese, not over 0.60 per cent."

2. SEC. 6.—Drop Tests. Change to read as follows:
"This test shall be made on a standard M. C. B. drop-test machine (see Plate 29-D), the pins resting on rounded supports held rigidly 10 in. center to center, shall be subjected to one blow by a 1,640-lb. tup dropping from a height of 3 ft., or a 2,240-lb. tup dropping from a height of 2 1/4 ft. and shall show a deflection of not less than 15 deg. or more than 30 deg., without cracking or breaking."

Exhibit E.—Specifications for Air-Brake and Train Air-Signal Hose

1. SEC. 3.—Tests. Change to read as follows:
"Hose shall be subjected to the following tests, which shall be made with the temperature of the air not lower than 65 or higher than 90 deg. F., and the samples shall be kept at a temperature within these limits for at least one-half hour previous to the time of test."

Exhibit F.—Specifications for Welded Pipe

1. SEC. 4.—Flattening Test. Change to read as follows:

"For steel pipe over 2 in. in diameter, a section 6 in. in length shall be flattened until the distance between the plates is one-third the outside diameter of the pipe, with the weld located 45 deg. from the line of direction of the applied force, without developing cracks."

2. Add a new Section 5, to read as follows, and renumber subsequent sections accordingly:

"5. Fracture Test.—For wrought-iron pipe, a section 6 in. in length shall be flattened until broken by repeated blows of a hammer or by pressure; the fracture developed shall have a fibrous appearance."

3. Change present Section 5 to read as follows:

"6. Bend Test.—For wrought iron or steel pipe 2 in. or under in diameter, a sufficient length of pipe shall bend cold through 90 deg. around a cylindrical mandrel, the diameter of which is 15 times the nominal diameter of the pipe, without developing cracks at any portion and without opening in the weld."

4. Change present Section 9 to read as follows:

"10. Workmanship.—For pipe 1 1/2 in. in diameter or under, the outside diameter at any point shall not vary more than 1/64 in. over nor more than 1/32 in. under the standard. For pipe 2 in. in diameter or over, the outside diameter shall not vary more than one per cent over or under the standard. All pipe shall be provided with the prevailing standard thread which shall make a tight joint when tested to the internal hydrostatic pressure at the mills. The threads shall not vary more than 1 1/2 turns either way when tested with a Pratt & Whitney standard gage. All burrs at the end of the pipe shall be removed."

Exhibit G.—Specifications for Air-Brake Hose Gaskets

1. The following revision to supersede the present specifications:

1. Scope.—These specifications cover all gaskets for use in air-brake and air-signal hose couplings.

2. Material.—Gaskets shall be made of a rubber compound that will be tough and have enough elasticity to conform to the requirements for strength and elongation, and that the gasket can be readily applied in the couplings under all service conditions and form an air-tight seat.

3. Deflection Test.—(a) Gaskets shall be subjected to

(1) **SEC. 8.—Permissible Variations.** Change to read as follows:

"(a) The cross-section, or weight per lineal ft. of shapes shall not vary more than 2.5 per cent from that specified.

"(b) **When Ordered to Weight per Square Foot.**—The weight of each lot of sheets in each shipment shall not vary from the weight ordered more than the amount given in Table No. 1. One cubic inch of steel is assumed to weigh 0.2833 lb.

"(c) **When Ordered to Thickness.**—The thickness of each sheet shall not be more than 0.01 in. under that ordered. The overweight of each lot of sheets in each shipment shall not exceed the amount given in Table II.

"(d) A variation from the length ordered of $\frac{3}{8}$ in. under and $\frac{1}{4}$ in. over will be permitted for sheets or shapes under 12 ft. in length, and a variation of $\frac{1}{4}$ in. under and $\frac{1}{2}$ in. over will be permitted for sheets or shapes 12 ft. and over in length."

The report is signed by C. D. Young, chairman, Pennsylvania; J. R. Onderdonk, B. & O.; J. J. Birch, N. & W.; I. S. Downing, C. C. C. & St. L.; Frank Zeleny, C. B. & Q.; A. H. Fetters, Union Pacific; H. B. MacFarland, A. T. & S. F.; G. S. Sprowle, A. C. L.; and H. G. Burnham, Northern Pacific.

Discussion

F. M. Waring (P. R. R.): In the specification for rivet steel there is a change in the clause for chemical analysis to make the meaning clear and a new table for dimensions of rivet heads. In the specification for air brake and signal hose the only change made was the insertion of a paragraph in reference to the temperature at which the test pieces shall be tested. The specification for air brake hose gaskets has been changed as to form and also as to substance in regard to the deflection tests and slightly different requirements

inserted. A change in the specification for steel plates was made in the sulphur content raising it from .05 to .06 per cent and inserting a table of permissible variations in thickness and over-weight. In the specifications for structural steel for freight cars, the same changes were made as in the structural steel for passenger cars.

Action Taken

J. J. Burch (N. & W.): *I move that Exhibit J be withdrawn.* Since getting up the report the government has issued a specification covering cast steel side frames and truck bolsters which in some respects conflicts with this and I think we should withhold our recommendation.

Mr. Waring: I believe that such a motion would find favor with the committee.

I. S. Downing (C. C. C. & St. L.): Is it the idea to adopt the government specification which is an expedient and lessen our quality of materials and what we really should have? Shouldn't we go on with our specifications and make them as they should be and then accept the exception that has got to be made with war material? If you take tin out of your journal bearings, which they have told us to do now, we have an idea that the lining will be pretty soft. We know we can't get the tin and we want to comply with their instructions, but we don't want to go on record making specifications for journal bearings without the tin lining that would make them too soft.

Mr. Waring: I think the committee would like to review this subject. In the opinion of the majority of the committee perhaps something better than the present government specifications is to be desired. I don't think there is the slightest intention on the part of the committee to put in an inferior grade of material; in fact, the tendency is all the other way.

Mr. Burch's motion was carried.

Brake Shoe and Brake Beam Committee Report



C. D. Young
Chairman

OWING TO THE EXISTING conditions arising from the national crisis, this committee has only been able to meet once this year. The committee agreed that, with the exception of one item, namely, the addition of dimensions on the brake head gage, as shown on M. C. B. sheet 17, it would report progress for the year 1918. The following items which were up for consideration, and by correspondence, through the year:

The committee recommends that M. C. B. sheet 17, "Standard Brake

Head, Shoe and Key-Standard Gages for Brake Head and Shoe" be changed as follows:

(a) A radius of $\frac{5}{32}$ in. to be shown at each corner of the gage where it enters the toe of the head, and that the open dimension (marked *K*) should be changed from $1\frac{5}{16}$ in. to $1\frac{3}{16}$ in.; this change is made to provide the proper clearance for the gage entering the head.

(b) That there should be shown on this same gage a dimension of $1\frac{3}{4}$ in. for the width of the head where the

gage enters, and that a $\frac{1}{8}$ in. radius should be shown at the intersection of the sloping line with the bottom of the fork at the upper and lower toe openings of the head.

The above two items are to be submitted to letter ballot as new standards.

The following subjects are before the committee at the present time for their consideration, and upon which the committee reports progress:

First.—The committee is investigating the desirability of modifying the present standard brake beam gage as shown on M. C. B. sheet 17-A, with a view of simplifying the gage and reducing its cost; the new gage to provide for checking substantially the same dimensions and angles as the present gage.

Second.—M. C. B. sheet 17 shows a new standard contour for brake head. The question of a modification of this contour to meet foundry practices, as recommended by brake beam manufacturers, is being considered. The committee is awaiting its final decision for additional information, and to ascertain what, if any, action is taken by the Railway Administration in providing a new brake head for the cars being purchased this year.

Third.—The present Recommended Practice M. C. B. sheet *R* shows the recommended practice for No. 2 Brake Beam. The committee is considering, in connection with this beam, the location and design of two upper hanger openings as shown in dotted lines on this sheet, in order to provide a more satisfactory bearing area for the openings to meet certain requirements in foundry practice, as suggested

by the manufacturer. The committee is also considering a modification in the vertical location of the center hanger openings with reference to the radial line of the brake beam to the truck axle, and has received recommendations from the manufacturers on this subject, which, if accepted, will modify the present dimensions as shown on M. C. B. sheet R.

Fourth—The committee is considering, in conference with the manufacturers, a change in the face dimensions of the brake head as shown on M. C. B. sheet 17, in which a bearing area of 1 3/8 in. is provided for the brake head where it bears against the brake shoe, and is also considering the res-

triction at the 1 1/2 in. clearance of the 17 1/2 in. dimension which was made standard last year.

The report is signed by C. D. Young, chairman; P. B. & W. Prof. Chas. H. Benjamin, Purdue University; I. L. Burton; N. V. C. C. B. Young; U. S. Railroad Administration; C. H. Billy; C. M. & St. P.; G. H. Gilman, Nor. Pac.; and I. J. Burns, Mich. Cent.

Action Taken

There was no discussion. The report was accepted and submitted to letter 1410.

Welding Truck Side Frames, Bolsters and Arch Bars



W. O. Thompson
Chairman

IN ACCORDANCE with the action taken by the association at the 1916 convention, this subject was referred to the Executive Committee with the recommendations that the views of the majority of the committee prevail, that a special committee be appointed to investigate the subject and determine the possibilities and limitations of this practice with reference to truck sides and bolsters, and that if welding is permitted certain specific instructions shall be framed as to how the work shall

be performed to produce the result desired and to bring the structure up to a proper condition for service. One member of the committee dissented from the report made in 1916.

The committee arranged to have tailed and welded side frames and bolsters shipped to two manufacturers, where suitable facilities were provided for conducting the tests, 23 of which were made at the Bettendorf Company's plant, Bettendorf, Iowa, and 21 at the American Steel Foundries plant, Alliance, Ohio. A 1,500-ton hydraulic press was used for this purpose at Bettendorf and a Riehle testing machine of one million pounds capacity at Alliance, Ohio.

The general arrangement of the machines and the manner in which the tests were made to determine the strength of welds, also the views and data of each individual piece tested, are shown in photo views folios A and B. Each member of the committee and the secretary of the association have been furnished copies. [See the résumé of the data in folios A and B given at the conclusion of the report.—Editor.]

The committee in preparing this report have endeavored specifically to mention and illustrate the results obtained welded material by submitting the following tests:

TEST NO. 3: BOOK "A" ANDREWS SIDE FRAME

This frame was received from the railway to be welded by the manufacturer. The frame had a crack in the tension member 3 3/4 in. long, as shown in Fig. 1, and for the information of the committee was tested without welding, as it was a good sample of a frame that would be considered unsafe and would not be accepted under load in interchange. Under a load of 195,000 lb. the crack opened slightly, under a load of 230,000 lb. the crack opened 1/8 in., and under a load of 250,000 lb. the tension member broke as shown in Fig. 2.

TEST NO. 8: BOOK "A" ANDREWS SIDE FRAME

This frame was removed from a truck by the railway, due to a crack 1 1/2 in. long in the tension member. It was placed in the machine and tested without being welded, fracture taking place under load of 332,000 lb.

From the described tests and the data contained in Books 1 and B, it is evident that the art of welding, which has formerly been defined as a process of uniting two pieces of metal by hammering them together while hot, may be safely extended to the joining of two pieces of metal by fusion.

In one of the committee reports on this subject (1916) the position was taken that fractures indicate weakness in the design of cast steel truck side frames and bolsters, and the welding would not add to the strength, but introduce a condition of further weakness by improper workmanship, thereby introducing another chance for failure. This is truly a bad combination and applies equally to other parts of cars, either of cast steel, rolled or pressed sections when built into a design inherently weak.

In this report the designs were not taken into consideration, for the reason that they were made by engineers skilled in car construction employed by the railroads and manufacturers and approved by superior officers before being specified. When cracks or failures occur, due to a poor quality of metal, track conditions, overloading of cars, bolster springs too weak and going solid, or other causes, the frames and

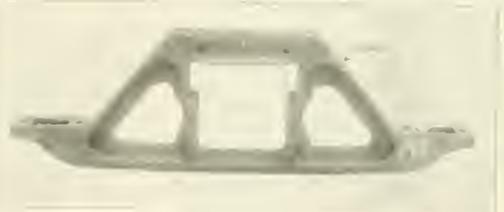


Fig. 1—Book A, Test 3. Side Frame Before Testing, Cracks 3 3/4 Inches Long

bolsters are subjected to greater loads and stress than that for which they were designed.

The frame shown in Fig. 1 had a crack 1 1/2 in. long, yet under tests did not show signs of opening until a load of 195,000 lb. was applied, and opened 1/8 in. under a load of 230,000 lb. The frame used in Test No. 8 Book A, with a crack 1 1/2 in. long, took a load of 332,000 lb. before the fracture occurred. Any methods employed in welding or preventing cracks of this character from extending would permit the frame to remain in service with safety, as it is only in isolated cases that frames ever failed without giving sufficient

warning that by ordinary inspection replacement or repair could be made to prevent accident or derailment. In many cases they have been kept in service until the crack commenced to open or extend into the vertical section before removal and without anxiety on the part of mechanical officers responsible for their performance.

A number of the castings tested were welded where broken entirely across the tension member, yet the welds were sufficiently strong so that under test, the casting broke at some location other than the weld. Therefore, the proper welding of side frames and bolsters should be permitted, the limit to

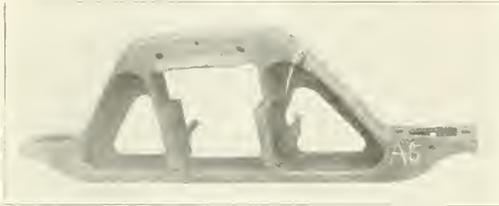


Fig. 2—Book A, Test 3. Side Frame Broken Through Crack. Breaking Load, 259,000 Lb.

prohibit welding to be when the strength of the weld would not equal that of the joining sections.

The committee invites your careful consideration of the following in all autogenous welding:

Selection of Operations

First.—Experience has shown that an ordinary helper, handy-man or laborer is not possessed of the ability to make proper welds, as they are not conversant with the changes which metals undergo while being welded. A competent mechanic should be selected and given the necessary instruction by an experienced welder before being assigned to this important work. When the desired proficiency has been acquired, the operator's ability should be certified to by the mechanical officer in charge or by an instructor qualified by

dation should be made by a competent operator or instructor.

Third.—Great care should be exercised to prevent welding under load becoming a general practice for the reason that internal strain is liable to be set up through welding, which

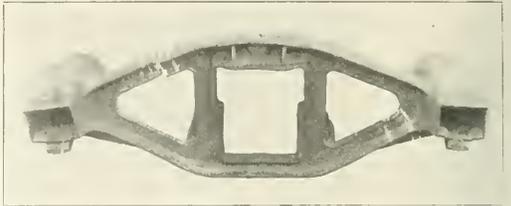


Fig. 3—Book A, Test 9, Side Frame Broken Through Weld. Breaking Load, 149,600 Lb.

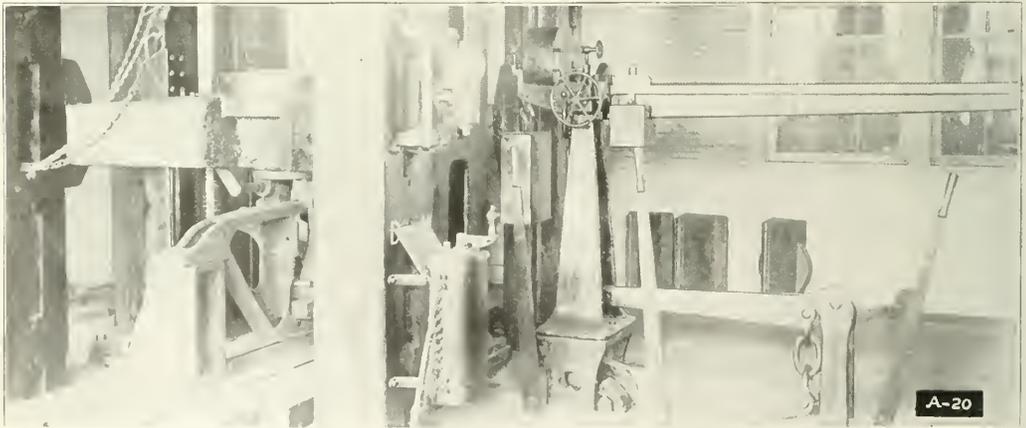
can be avoided by preheating. Therefore, it is considered good shop practice to preheat cast steel and pressed form bolsters and side frames and this should be done whenever possible.

Fourth.—In making the weld the fracture should be cut



Fig. 4—Book A, Test 16. Truck Bolster, Broken Through Weld. Breaking Load, 159,300 Lb.

or burned out beveled or V shape in order that a good surface will be obtained for the uniting of the metal, care and patience as well as skill being employed to prevent oxidiza-



Method of Testing the Truck Frames

tion. To insure this, the work should be placed at an angle that would allow the flowing out or blowing out of all slag or impurities in the fused metal; the operators giving the torch a rotary movement, will assist in their removal and make a stronger weld than if this practice was not observed.

Second.—Only in an emergency should an attempt be made to weld a side frame or bolster until it has been removed from the car, and whenever it is necessary to do so the recommen-

tion. To insure this, the work should be placed at an angle that would allow the flowing out or blowing out of all slag or impurities in the fused metal; the operators giving the torch a rotary movement, will assist in their removal and make a stronger weld than if this practice was not observed.

It is also considered good practice to increase the welded section 15 or 20 per cent a short distance on each side of the weld and gradually taper down to the original thickness of section.

Tip—Experienced authorities in electric welding claim that the success of removing the part to be welded from a car may be guaranteed by welding right in position on the car, the only hindrance being the ability of the operator to clean

the surface to be welded at the end of the track, which would have a tendency to prevent the final train working across.

After flipping the metal over the V should extend nearly through the plate or section, the operator should start to weld at the broad flattest point from the outside edge and work the weld back toward the edge. This process has proven more successful than where the weld was commenced at the outside and worked toward the center. Inasmuch as the

Test No.	Material	Dimensions	Character of Failure	Breaking Load	Weight of Casting	Remarks
TRUCK						
TRUCK SIDE FRAMES						
3	Andrews	Crack in tension member	Broke through web	70,000 lb.	115 lb.	Long ends (outside portion)
4	Andrews	Crack in tension member	Broke through web	100,000 lb.	67 lb.	Welded with iron of low tensile strength
5	Andrews	Crack in tension member	Broke through web	100,000 lb.	413 lb.	Welded with iron of low tensile strength. See Fig. 4
6	Andrews	Crack in tension member	Broke through web	100,000 lb.	414 lb.	Welded with iron of low tensile strength
7	Andrews	Crack in tension member	Broke through web	100,000 lb.	314 lb.	Welded with iron of low tensile strength
8	Andrews	Crack in tension member 1 1/2 in. long	Broke through web	100,000 lb.	408 lb.	Welded with iron of low tensile strength
9	Bettendorf	Crack in tension member	Broke through web	140,000 lb.	471 lb.	Base weld. See Fig. 3
10	Bettendorf	Crack in tension and compression members	Broke through web	100,000 lb.	440 lb.	Long weld
18	Bettendorf	Crack in tension member	Broke through web	111,000 lb.	430 lb.	Welded with the electrical arc
19	Bettendorf	Crack in tension member	Broke through web	100,000 lb.	500 lb.	Welded with the electrical arc. Long from stock, 1/2 defect
20	Andrews	Crack in tension member	Broke through web	100,000 lb.	400 lb.	Welded with iron of low tensile strength, no defect
TRUCK BOLSTERS						
14	Chalmers	Crack in flanges	Broke through web	170,000 lb.	300 lb.	
15	Issett	Crack in compression members	Broke through web	100,000 lb.	674 lb.	
16	Chalmers	Crack in tension member	Broke through web	100,000 lb.	537 lb.	See Fig. 4
17	Issett	Crack in compression member	Bolster distorted and cracked in tension members	64,700 lb.	616 lb.	
19	Issett	Crack in tension member	Broke through web	80,000 lb.	617 lb.	Taken from service, no defects
BODY BOLSTERS						
11	Issett	Crack in tension member	Broke through web	100,000 lb.	636 lb.	
12	Issett	Crack in tension member	Broke through web	100,000 lb.	602 lb.	
13	Issett	Crack in tension member and web	Broke through web	181,000 lb.	601 lb.	
BOOK B						
TRUCK SIDE FRAMES						
1	Bettendorf	Crack in compression member	Truck side frame broke through spring plank seat	249,385 lb.	.....
2	Bettendorf	Crack in tension member	Frame distorted	310,451 lb.	471 lb.	
3	Bettendorf	Crack in tension member	Broke through journal box	225,500 lb.	4.4 lb.	See Fig. 5
4	Bettendorf	Crack in tension member	Broke in unwelded tension member	279,960 lb.	415 lb.	
6	Andrews	Crack in compression member	Broke new journal box seat	350,000 lb.	374 lb.	
17	Andrews	Crack in tension member	Broke through web	764,600 lb.	467 lb.	Welded with iron of low tensile strength
19	Bettendorf	Crack in tension member	Broke through spring plank seat	133,750 lb.	444 lb.	
21	Bettendorf	Crack in tension member	Frame distorted	700,000 lb.	430 lb.	
TRUCK BOLSTERS						
7	Issett	Crack in compression member	Broke through tension member	245,000 lb.	660 lb.	
8	Issett	Crack in tension member	Broke through tension member outside web	310,450 lb.	600 lb.	
9	Issett	Crack in tension member	Broke in tension member outside the web	177,335 lb.	663 lb.	
13	Issett	Welded in compression member	Broke in tension member	9,600 lb.	643 lb.	Taken from service
14	Issett	Cracked in compression member	Broke in tension member	271,880 lb.	600 lb.	
18	Issett	Crack in compression member	Broke in tension member	447,300 lb.	786 lb.	
22	Chalmers	Crack in tension member	Broke in tension member	110,450 lb.	630 lb.	
23	Chalmers	Crack in tension member	Frame distorted	44,700 lb.	68 lb.	
BODY BOLSTERS						
10	Issett	Crack in tension member	Broke in tension member outside the web	68,600 lb.	570 lb.	
11	Issett	Crack in tension member	Broke in the web	187,700 lb.	.....	Pin weld
12	Issett	Crack in tension member	Broke in tension member outside the web	160,700 lb.	321 lb.	
15	Issett	Crack in tension member	Broke in tension member outside the web	147,700 lb.	267 lb.	Found compressive
16	Issett	Crack in tension member	Broke in tension member outside the web	54,700 lb.	705 lb.	See Fig. 6
20	Issett	Crack in tension member	Broke in tension member	147,700 lb.	470 lb.	Matched base weld pair

out the check or crack in the proper manner before starting to make the weld.

In repairing a broken part where the material is not too heavy or over one inch in thickness it can readily be done by chipping out equally on each side of the crack, making the cut about 30 degrees. This can ordinarily be done with an air hammer and chisel, or by hand if it is impossible to get the air hammer to the job. Be sure to chip out the entire crack, even if it extends only part way across the section, chip far enough back so there will be no portion of the crack in the metal. Failure to do this permits the check or crack to continue to work its way across the metal to the farther side, due to the constant vibration, even after the weld has been made. If it is impossible to chip or cut out the check or cracked section so as to eliminate it, good practice would

be to drill a hole at the end of the crack, which would have a tendency to prevent the final train working across.

After flipping the metal over the V should extend nearly through the plate or section, the operator should start to weld at the broad flattest point from the outside edge and work the weld back toward the edge. This process has proven more successful than where the weld was commenced at the outside and worked toward the center. Inasmuch as the

weight introduced has a tendency to expand the parts being welded, when cooling takes place it produces a strain on the inner portion of the weld.

It is very difficult to present detailed instructions on this class of work, as practically every job is a problem of itself, the grade of material to be used depending on the quality of the stock to be welded. The diameter of the electrode, thickness of material, the place where the work is to be done, and the strength necessary to have in the weld when completed, are or should be all based on the knowledge of the operator working on the welding of the part. Hence the necessity of having an operator with an extended experience on work of this character.

NOTE—The committee recommends that when welding is done the weld should be made smooth like the steel dies let-

Report of Committee on Loading Rules



A. Kearney
Chairman

THE COMMITTEE submitted the following recommendations covering additions and changes in the present Code of Loading Rules. The committee has received a number of recommendations and suggestions from the Regional Directors and others, relative to new rules to cover lading not taken care of in the present Code of Loading Rules and changes in the present rules. The suggestions in the main have reference to the conservation of the car supply by increasing the load carried per car

and by prohibiting the use of hopper bottom cars for shipments of pig iron, billets and similar material, so that this type of cars may be available for ore and coal shipments.

On account of the apparent necessity that immediate action be taken, this committee has prepared several new rules and revised others, sending them to the executive committee for their approval, they being later issued as a supplement to the present Code of Loading Rules.

The rules which have been revised and issued as a supplement to the present Code of Loading Rules by the Executive Committee, are as follows: Supplement Circular No. 16, issued November 20, 1917, revising rules 31, 53, 98-A and 98-B, 103-A and 124-B; Supplement Circular No. 35, issued March 4, 1918, revising rules 57, 58, 117-D and 121-B, and Supplement Circular No. 42, revising rule 53.

Proposed Changes in the Loading Rules

In addition to the foregoing, the committee recommends the following changes in the present M. C. B. Loading Rules:

Rule 7.—Change the second sentence, reading "If lading is placed on top of sides of gondola cars, etc.," to read "If lading is placed on bearing pieces located on top of sides of gondola cars, etc."

Explanation: To clarify the intent of the rule.

Rule 9.—In the first line after the word "project" change the word "over" to "beyond."

Explanation: To permit of loading longer material as a single load without the use of an idler.

Rule 10.—In the second line after the word "project" change the word "over" to "beyond," also add to the last sentence the following: "except flat cars of 60,000 lb. capacity equipped with an inverted truss may be used as an idler."

Explanation: Relative to changes in rule, see explanation under Rule 9. The addition to the rule will permit 60,000 lb. capacity wooden flat cars having inverted trusses to be used as idlers.

Rule 12.—In the second sentence of note, change the 36 in. dimension to 46 in.

Rule 21.—In the first line after the word "project" change the word "over" to "beyond."

Explanation: See explanation Rule 9

Rule 23.—Change the first sentence after the word "car" to read "except as provided for in Rules 80 and 82."

Explanation: To make the requirements more definite as to when it is permissible to use bearing pieces or to use

lading pieces between the bolter and the end of the car.

Page 23.—Change general heading reading as follows: "Rules governing the loading of lumber on open cars" to read "Rules governing the loading of lumber or timber on open cars."

Page 25.—Change heading relative to loads on single cars reading as follows: "Lumber loaded on single cars as in Figs. 5 and 6," to read "Lumber or timber loaded on single cars as in Figs. 5 and 6."

Rules 32 and 33.—In the first line after the word "lumber" insert the words "or timber."

Rule 34, Section B.—In the first line after the word "lumber" insert the words "or timber."

Explanation: To clarify the intent of the rules.

Rule 34, Section C.—Change the first paragraph reading as follows: "For loads of lumber not lapped or stripped, the size of hardwood stakes must not be less than;" to read "For loads of lumber or timber not of equal thickness, which can not be lapped or stripped, the size of hardwood stakes must not be less than;"

Explanation: To clarify the rule as to lumber or timber that may be loaded without being lapped or stripped.

Page 33.—Change heading reading as follows: "Long lumber loaded on top of single loads as in Fig. 7," to read "Long lumber or timber loaded on top of single loads as in Fig. 7."

Page 35.—Change heading reading as follows: "Lumber loaded as per Figs. 8 and 9," to read "Lumber or timber loaded as per Figs. 8 and 9."

Explanation: To make the heading conform to the changes in rules referring to lumber shipments.

Rules 36 and 48.—Change last sentence to read as follows:

"Stakes must not be less than two feet nor more than four feet apart from center to center of stakes."

Explanation: To clarify the rules as to the permissible distance between stakes from center to center. This change has no bearing on the spacing of the stake pockets as referred to in Interchange Rule 3, paragraph (N).

Rule 41.—In the second line after the words "bearing pieces," insert "having a bearing surface bottom and top its entire length."

Explanation: To clarify the intent of the rule.

Page 38.—Change heading reading as follows: "Lumber loaded as per Figs. 10, 11, 12 and 13," to read "Lumber or timber loaded as per Figs. 10, 11, 12 and 13."

Explanation: To clarify the intent of the rule.

Rule 49.—In the second line after the word "Section" insert "having at least 10 in. bearing surface bottom and top extending the entire length of bearing piece."

Explanation: To clarify the intent of the rule.

Page 38.—Change the second heading reading as follows: "Lumber on gondola cars as per Figs. 14 and 15," to read "Lumber or timber on gondola cars as per Figs. 14 and 15."

Explanation: To clarify the intent of the rule.

The heading on all cuts referring to lumber loading should be changed to read "Lumber or timber."

Rule 51.—In the first line after the word "Material" insert "except Logs, Telegraph and Telephone Poles, Piling and Props."

Explanation: This is an undesirable manner of loading logs and poles.

Figs. 14, 14-A, 15 and 15-A omit reference to "Logs, Telegraph and Telephone Poles, Piling and Props."

For explanation, see Rule No. 51

Rule 52.—In the second line after the word "inches" insert "in section having at least 10 in. bearing surface bottom

and top extending the entire length of bearing piece and".

Explanation: To clarify the intent of the rule.

Rule 81-L.—Second line: Change the words "with two bearing pieces and two or four sliding pieces" to read "with two bearing pieces with or without sliding pieces."

Explanation: To clarify the intent of the rule.

Rule 113.—At the end of the third sentence add a sentence reading: "If the pipe do not completely fill the space between stakes, angular shocks not less than 4 in. x 5 in. in section should be placed against the outside pipe and securely nailed to the bearing piece."

Rule 114.—A sentence should be added to the rule reading as follows:

"If the pipe do not completely fill the space between the stakes, angular chocks not less than 4 in. x 5 in. in section should be placed against the outside pipe and securely nailed to the bearing piece."

Explanation: To make the rules conform to the changes made in Figs. 78 and 79.

Figs. 78 and 79.—Change bearing pieces from 4 in. x 5 in. to 2 in. x 4 in. to make the cuts conform to Rules 113 and 114, also show on cuts the maximum distance between the ends of the two top courses of pipe in the center.

LOADING OF LARGE MILL BLOCK, LARGE BRIDGE STONE, SHODDY, BREAKWATER OR OTHER LARGE STONE, HAVING REGULAR OR IRREGULAR SURFACES.

Rule 120.—"Mill block having a regular surface to rest on car floor, no dimension of such bearing surface being less than the height of stone, should be protected on the sides and ends by cleats not less than 2 in. x 4 in. in section, of sound straight-grained lumber, extending at least three-fourths of length or width of stone. When the stone is loaded close together or wedged apart, cleats are required on sides and ends only of outside stone. When such stone is loaded in tiers, standard end and side protection must be provided.

"Mill block containing as much as 100 cu. ft., resting on channel or scabbled surface not less than 25 sq. ft., or proportional for increased sizes, must be so loaded that the weight of total lading will be uniformly distributed over the floor of the car, resting on a layer of sand, cinders or crushed stone, covering the entire bearing surface of the stone.

"Gondola cars are preferable for such shipments, but if flat cars are used, the lading must be placed at least 18 in. back of end of car. Each block of stone loaded lengthwise, crosswise or obliquely must be protected against creeping by side and end cleats, securely nailed to floor of car with 40-penny nails. (When two blocks of stone are loaded parallel and close to each other, or wedged apart, they will be considered as one stone as to cleating.)

"If stone is placed lengthwise of car and is 4 in. or closer to side of car, two standard side stakes 6 in. in height must be placed opposite such stone in lieu of cleats, on that side of stone. Stone must not be loaded obliquely when it is possible to load it lengthwise or crosswise of car.

"Cleats must consist of not less than 2 in. x 4 in. sound straight-grained lumber, and extend at least three-quarters of length or width of stone.

"If the 2-in. cleat does not have a full 1-in. vertical bearing for its full length against edge of stone, cleats may be built up to the requisite height, retaining the specified width."

Rule 120-A.—"Large stone containing as much as 30 cu. ft. and having a regular surface of at least 8 sq. ft. to rest on car floor, but no dimension of such bearing surface being less than 1 ft. 6 in., should be protected at the end with standard end stakes extending at least one-half the height of the stone. In no case must the height of the stone be more than one and one-half times the smallest dimension resting on the car floor. The distance from the end of the stone to the inside edge of the stakes must be not less than 6 in.

measured across the car; otherwise standard board should be securely nailed to the inside of the stakes. When single large blocks as much as 6 ft. in length are loaded crosswise of the car, the end protection should be two standard stakes extending at least one-half the height of the stone.

"Any large stone having regular surface, not covered by the preceding paragraph, must, in addition to the specified end protection, be secured at the sides by the standard stakes opposite the stone. The distance from the end of stone to the inside of stakes must be not less than 12 in. measured lengthwise of car. If on account of the location of the stake pockets or for any other reason this distance can not be obtained, standard boards should be provided opposite the tier of stone to prevent any possibility of the stone becoming insecure. Boards should be securely nailed to the inside of the stakes."

Rule 120-B.—"Large stone with irregular surfaces, loaded on flat cars, must be securely wedged, stripped or blocked to prevent the stone from rocking. Standard end protection must be provided as specified in Rule 120-A, also two stakes must be placed opposite each outside piece of stone. The end of the stone must not be less than 12 in. from the inside edge of the stakes measured lengthwise of car. If on account of the location of stake pockets or for any other reason this distance can not be obtained, standard boards should be provided opposite the blocks of stone to prevent any possibility of the stone becoming insecure. When such stone is loaded in gondola cars it should be securely wedged, stripped or blocked if there is any possibility of the stone rocking. Large block bridge, shoddy, breakwater or other large stone should not be loaded in gondola cars unless there are derrick facilities for unloading."

Explanations: A paragraph has been added to cover small mill blocks containing less than 100 cu. ft., also the paragraphs have been rearranged in order to clarify the rules.

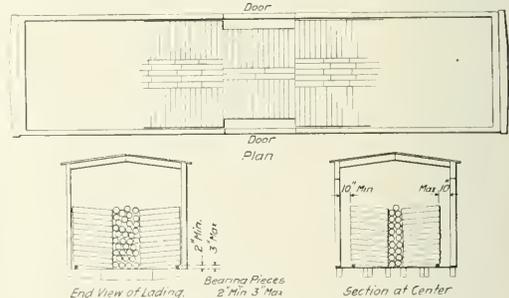


Fig. 104-A, Rule 126—Manner of Loading Wood Cores 3 ft. to 4½ ft. Long in Box or Stock Cars

Rule 126.—Add a paragraph reading as follows:

"Wood cores and similar round wood 3 to 4½ ft. in length should be loaded as per Fig. 104-A. This method makes the stripping of door opening unnecessary."

The report was signed by A. Kearney, chairman, assistant superintendent motive power, Norfolk & Western; A. B. Corinth, general car inspector, Atlantic Coast Line; L. H. Turner, superintendent motive power, Pittsburgh & Lake Erie; R. L. Kleine, chief car inspector, Pennsylvania; E. J. Robertson, superintendent car department, Minneapolis St. Paul & Sault Ste. Marie; C. N. Swanson, superintendent car shops, Atchison, Topeka & Santa Fe; H. C. May, superintendent motive power, Chicago, Indianapolis & Louisville, and H. H. Harvey, general car foreman, Chicago, Burlington & Quincy.

Discussion

A Kearney (N. & W.), chairman. The other items still pending are as follows: Loading pipe on flat cars, and loading sheet or iron plates in box cars. We will soon be able to submit a report on this. The committee has been working on the loading of concrete culvert pipe on flat cars and will have something governing that soon. Then we have rules 56 and 57 relating to changing the height of lading requiring the wiring from four feet to five feet. The last relates to requiring bulkheads in connection with the shipment of dressed lumber on flat or open cars. The loading of dressed lumber on open cars has given us a good deal of concern. During the last year an embargo was put out by one of the lines entering Chicago which was objected to by some of the lumber shippers. A great deal of correspondence ensued and finally the embargo was lifted. After meeting the lumber people a special committee was formed of railroad men and lumber shippers, but principally shippers from the south. An arrangement designed at Altona, by Mr. Kleime was put into the hands of the lumber shippers with the idea of building up a number of loads and shipping them to destination to see how they ran and how the loads held. As yet we have no report from the loaders. It might also be interesting to add that the lumber shippers appealed to the Interstate Commerce Commission and we, in turn, received some correspondence through Mr. DeGroot who now has that matter in

hand. He told me a few days ago that the embargo had been lifted on the line running out of Chicago and they thought it would remain so until they got the final report from the lumber committee and the sub-committee and finally our committee on loading rules.

If in order I would suggest that the balance of the report be put in shape as quickly as possible, and submitted to a special ballot, unless you would care to adopt it in the near future. Our idea is that if it could be sent out in advance of the regular October issue of the report the shippers would receive a good deal of benefit in the meantime.

F. W. Brazier (N. Y. C.). I want to call the attention of the committee to a severe accident we had lately in loading structural timber 60 ft. long piled upon two cars. The train was moving from one track to another such a strain was brought on the stakes that they broke off and the timber fell over on the passing track. Fortunately only a derailment occurred. These timbers were loaded according to the M. C. B. rules.

Action Taken

Mr. Brazier: I move that the report be adopted as read.
 J. J. Hennessy (C. M. & S. P.). I would like to second that motion to the effect that the report be received and adopted as read and that the report of the committee and sub-committee be referred to the Executive Committee without waiting for letter ballot.
 The motion was carried as amended.

Couplers, Report of Standing Committee



R. L. Kleime
Chairman

THE M. C. B. STANDARD *D* coupler was adopted by special letter ballot in 1916 and is now shown in the 1917 Proceedings, Sheet 23-B. The following details were left for further consideration and investigation: Contour line; design of 6-in. by 8-in. shank and key slot; gages to insure interchangeability of coupler parts; and, specifications for purchase and acceptance. This report covers briefly the investigations of the above features, with definite recommendations for adoption.

Two contour lines, the No. 5 and the No. 10, as shown in previous reports of the committee, were thoroughly tried out in connection with both road service and laboratory tests of the experimental couplers, including the Type *D*. Practically equal numbers of each contour were used. The various phases of the investigations covering this subject are given in brief as follows:

Angling and Coupling.—This question has been discussed in previous reports of the committee. The results of tests conducted demonstrated that either the No. 5 or No. 10 line permits at least as much horizontal angling as the M. C. B. 1904 line, with a slight advantage in favor of No. 5; and both the No. 5 and No. 10 lines provide for more vertical angling than the present M. C. B. 1904 line, the No. 10 line providing the larger amount.

The No. 10 lines when coupling with themselves require a slight amount of momentum to effect the final closure of the knuckle on curves. This is also true when coupling to

the M. C. B. (1904) contour but only when the knuckle of the latter is open. This momentum is imparted to the knuckle when coupling even at low speeds.

Observations of actual couplings were made but no instance has any difficulty been reported in coupling with the No. 10 lines.

Conclusions on Angling and Coupling.—In view of the various tests and road experience, either the No. 5 or No. 10 contour is acceptable.

Slack in Contour.—While slack in couplings has generally been considered undesirable, a certain amount of slack in any contour line is essential to provide for freedom in coupling as well as angling. It is not the initial slack in the contour line but the ultimate slack developed by wear and distortion of parts with which we are concerned.

The slack as follows for the three contour lines under discussion when the couplers are new, having been contour lines:

- 14-32 in., M. C. B. 1904 contour line.
- 21-52 in., No. 5 contour line.
- 1 in., No. 10 contour line.

To obtain data on actual conditions in service three separate investigations were conducted by the committee as follows:

First Investigation.—This covered M. C. B. (1904) contour couplers and was given in the 1917 report from which we quote the following:



From the above it is clearly evident that the M. C. B. 1904 contour lines develop a large amount of slack under service conditions.

Second Investigation.—This covered a train of 10 N. & W. 20-ton capacity cars equipped with *A* and *B* couplers of No. 5 and No. 10 contour which had been in service about

nine months. This investigation was included in the committee's report for 1914. The detail figures of this report show that ten couplings of the No. 5 contour averaged 1.112 in. slack per coupling and 14 couplings of the No. 10 contour averaged 1.268 in. per coupling. Assuming that these couplers were of the mean contour when applied, the results would indicate that both lines are developing slack, the development in the No. 5 lines being at the greater rate.

No.	Couplings—Type couplers and contours coupled	Slack per coupling—Inches		
		Minimum	Average	Maximum
4.	A-5 with A-10.....	1.44	1.477	1.57
4.	B-5 with B-10.....	1.24	1.277	1.33
2.	A-10 with B-10.....	1.43	1.495	1.56
2.	A-5 with B-10.....	1.52	1.555	1.59
4.	B-5 with A-10.....	1.10	1.147	1.65
SUMMARY				
8.	No. 5 with No. 5.....	.....	1.455	.....
9.	No. 10 with No. 10.....	.....	1.439	.....
14.	No. 5 with No. 10.....	.....	1.423	.....

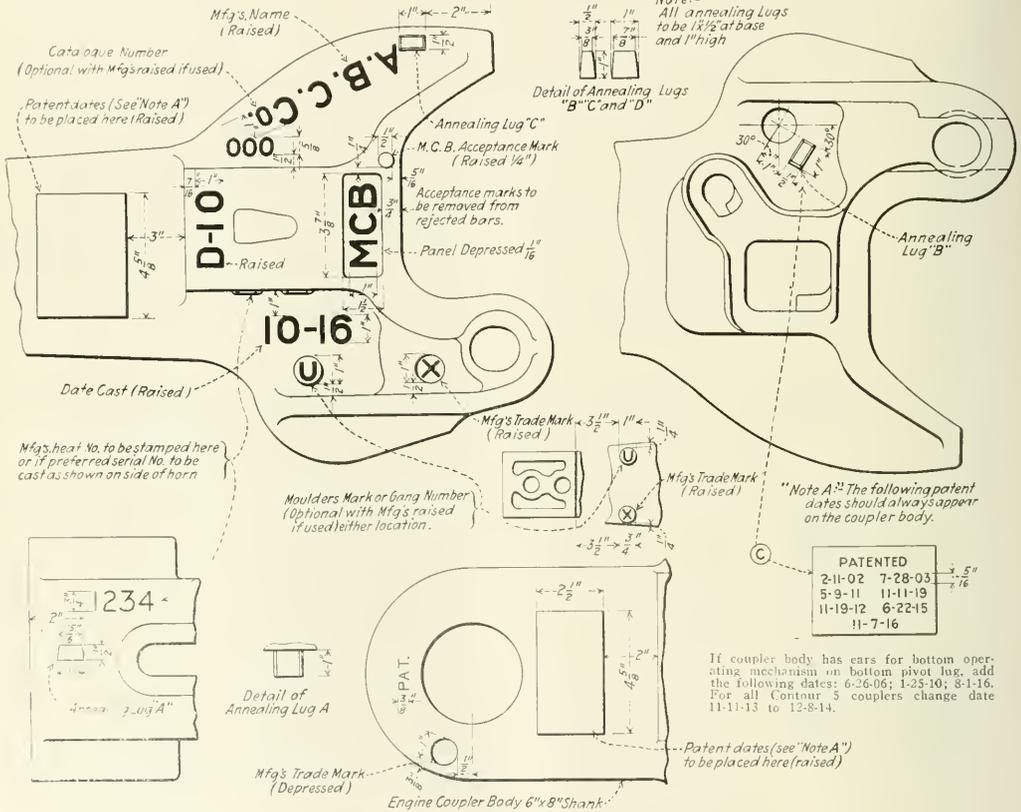


Fig. 1

Third Investigation.—This covered a number of complete trains of 90-ton cars on the Norfolk & Western. The investigation was conducted in April, 1917, at which time the N. & W. had 750 cars of 90-ton capacity three years old, half of which were equipped with A couplers and half with B couplers, (these cars were of the same series as those referred to in the second investigation), also 1,000 cars of 90-ton capacity nine months old, half of which were equipped with C and half with D couplers. The different types of couplers were divided about evenly between the No. 5 and No. 10 contours. Table I. gives the average results of this investigation:

TABLE I. SLACK PER PAIR OF COUPLERS AFTER THREE YEARS' SERVICE

No.	Couplings—Type couplers and contours coupled	Slack per coupling—Inches		
		Minimum	Average	Maximum
5.	A-5 with A-5.....	1.41	1.598	1.72
0.	B-5 with B-5.....	0	0	0
3.	A-10 with A-10.....	1.41	1.616	1.86
4.	B-10 with B-10.....	1.20	1.277	1.39
5.	A-5 with B-5.....	1.08	1.217	1.30

TABLE II. SLACK PER PAIR OF COUPLERS AFTER NINE MONTHS' SERVICE

No.	Couplings—Type couplers and contours coupled	Slack per coupling—Inches		
		Minimum	Average	Maximum
4.	C-5 with C-5.....	.94	1.112	1.27
2.	D-5 with D-5.....	.74	.825	.91
5.	C-10 with C-10.....	1.29	1.356	1.45
5.	D-10 with D-10.....	1.00	1.12	1.28
3.	C-5 with D-5.....	.94	.977	1.00
8.	C-5 with C-10.....	.91	1.061	1.20
9.	D-5 with D-10.....	.64	.671	1.13
9.	C-10 with D-10.....	1.12	1.223	1.31
12.	C-5 with D-10.....	.81	1.027	1.41
11.	D-5 with C-10.....	.90	1.038	1.18
SUMMARY				
9.	No. 5 with No. 5.....	.....	1.003	.....
19.	No. 10 with No. 10.....	.....	1.231	.....
40.	No. 5 with No. 10.....	.....	1.002	.....

Conclusions on Slack.—These figures verify the deductions made in the second investigation, that while the slack initially in the No. 5 contour is less than that in the No. 10 contour it increases more rapidly in service in the former. It also shows that the slack is about equal in both lines after three years' service and that this slack is less than in couplers with the M. C. B. 1904 line.

Advantages of No. 10 Line—The No. 10 line on account of having the coupler face and front face of the knuckle parallel to each other and perpendicular to the longitudinal center line of the coupler shank provides ideal conditions for pushing service in that it keeps the longitudinal center line of mating couplers in alinement. This was clearly demonstrated in tests conducted on a 2 per cent grade and 9 deg. curves on the Pennsylvania with locomotives and cabin cars equipped with No. 10 contour line couplers.

By eliminating the inclined face on the head of the coupler the nose of the knuckle is relieved of strains in coupling and buffing, furthermore, the wedging action due to the knuckle

Specifications for Purchase and Acceptance of Couplers

Uniform specifications for the M. C. B. Standard D coupler have been developed jointly with the coupler manufacturers, the M. C. B. Committee on Specifications and Tests of Materials and the Coupler Committee and are appended as Exhibit D. These specifications have been tried out and are found to be satisfactory.

The principal departure from the present M. C. B. Standard coupler specifications is in the omission of the physical tests for the complete couplers and separate knuckles, as such tests are unnecessary since we have but one design and this design has been fully tested out before adoption as standard. The recommended specifications provide for physical and chemical tests of the steel, checking of the annealing as well as limiting weights of the coupler and parts, which, together with the gages, will fully control the product.

These specifications involve the testing of the various heats of steel at the time of manufacture and are acceptable to the coupler manufacturers if carried out by a central inspection bureau controlled by the M. C. B. Association or some other central body.

Recommendations

In accordance with the above report the committee recommends that the following be submitted to letter ballot for adoption as Standard of the Association in connection with the Standard D coupler:

- I. No. 10 Contour Lines as shown on Exhibit A.
- II. Design of 6-in. by 8-in. Shank and Key Slot for same as shown on Exhibit C.
- III. Gages to insure interchangeability of coupler parts.
- IV. Specifications for Purchase and Acceptance as per Exhibit D.

The report was signed by R. I. Klein, chairman Penn-

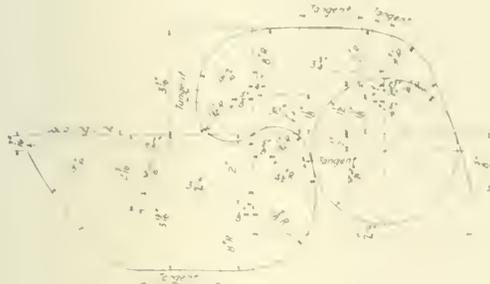


Exhibit "A"—No. 10 Contour

engaging both the face of the coupler and the guard arm is also eliminated.

Conclusions on Contour Line—At a joint meeting of the coupler manufacturers and M. C. B. Coupler Committee, held at Altoona, March 29, 1918, the coupler manufacturers were unanimous that but one contour line should be adopted and that the same should be decided by the Coupler Committee. The committee thereupon unanimously agreed to recommend for adoption the No. 10 contour line, as shown on Exhibit A.

Note—At this meeting R. E. Janney, of the American Steel Foundries, presented his views on the contour lines with the request that it be embodied in the minutes of the meeting. Accordingly it is included as Exhibit B.

Design of Six-inch by Eight-inch Shank and Key Slot

Exhibit C shows the design of the 6-in. by 8-in. shank as agreed upon between the coupler manufacturers and the M. C. B. Coupler Committee at the meeting held at Altoona, March 29, 1918. This design was also approved by the Committee on Car Construction and conforms with the design adopted by the United States Government for freight cars. This shank takes a 1 1/2-in. by 6-in. key.

Gages to Insure Interchangeability of Coupler Parts

Since the M. C. B. Standard D coupler and parts will be made by different coupler manufacturers, interchangeability is a very essential and important feature. The committee in conjunction with the manufacturers has very thoroughly gone into the matter and recommends for adoption as standard, gages which will control the coupler and all its parts. To maintain the correctness of these gages, master gages have been designed and are now being placed in the hands of the coupler manufacturers.

Note—The drawings of the gages listed above are on file with the association.

The committee has tried out these gages on the product of two of the coupler manufacturers and finds that the gages control the interchangeability of the parts as intended.

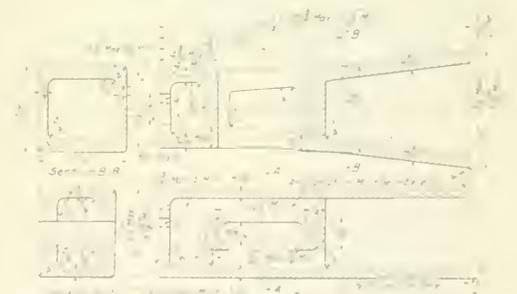


Exhibit "C"—Design of 6 in. by 8 in. Shank for Standard "D" Coupler

sylvania; G. W. Wilkin, I. W. Brazier, New York Central; F. H. Stark, Missouri; J. W. Small, Seaboard Air Line; J. A. Pilsner, Norfolk & Western; and W. Alexander, Chicago, Milwaukee & St. Paul.

Exhibit "B"

R. E. Janney submitted a statement in favor of the No. 5 contour. Mr. Janney claimed (1) that there is as much room for vertical angling in the No. 5 contour as in the No. 10; (2) that back 16-lb. couplers with the No. 10 contour will cause the blow in buffing to fall on the face of the contour just beyond the guard arm and on the lugs on the coupler while with the No. 5 contour the contact is distributed over the whole face of the contour from the base of the guard arm to the throat of the knuckle; and (3) that the inclined face of the coupler has no influence on face-breakage.

ing has not been properly done, he will require the castings to be re-annealed as prescribed in Section 3. If, after annealing or re-annealing, any casting is so much out of gage as to require grinding in order to bring it within the gage limits, it shall be re-annealed before it shall be accepted. In event of failure of the inspector and manufacturer to agree upon the quality of annealing as determined by the fracture, the

10. If *Working Test*—Test will be waived on orders for less than ten complete couplers or less than one hundred parts other than bars, in which event all castings shall preferably be from the same melt, and the manufacturer shall furnish the purchaser a copy of his record showing satisfactory chemical analysis and physical properties obtained from the melt of steel in question, and the annealing log showing his proof



Fig. 3—Normal Annealing



Fig. 4—Over Annealing



Fig. 5—Under Annealing

matter shall be arbitrated by polishing and etching a portion of the annealing lug to develop the structure and examining this under the microscope. If the structure is in accordance with Fig. 3 the material will be considered to be properly annealed, but if the structure is similar to that of Fig. 4 or 5 the manufacturer shall re-anneal the castings to produce a structure like Fig. 3.

of the appearance of the fracture of the brooding lugs.
11. *Test Specimens*—(a) Test specimens shall be obtained as prescribed in Section 4.

(b) When subcut coupons have not been cast a test specimen may be cut from a finished casting at a location mutually agreed upon by the inspector and the manufacturer, and this casting replaced in the lot.

(c) Tension test specimens shall be machined to $\frac{1}{2}$ in. in diameter with a 2 in. gage length, with either blank or threaded ends to suit the holder.

12. *Number of Tests.*—At least one chemical and physical test shall be made from each melt of steel represented.

13. *Tests of Knuckle Pivot Pins.*—For each two lots of 100 couplers or less, otherwise accepted, one pivot pin shall be removed from a complete coupler and subjected to the requirements of the M. C. B. specifications for heat treated knuckle pivot pins. If this pin fails to pass the specifications, all pins in this lot of couplers will be rejected. Pins thus removed from the assembled couplers shall be replaced by the manufacturer by an additional pin after the test in order to complete the coupler.

14. *Grouping.*—The manufacturer shall have the material grouped in lots of 100 complete couplers or 100 detail parts, and this will be an inspection lot. Where possible, care should be taken to put all couplers of the same melt number in the same lot. The manufacturer should endeavor to cast as many parts from one melt on a given order as is possible.

IV. VARIATIONS IN WEIGHT AND GAGE

15. *Weight.*—(a) One detail part of the lots as established by Section 14 shall be weighed and come within the limits as shown in the table. Failure of any part to come within the minimum weight shall reject that detail and each such detail in the entire lot so represented shall then be weighed and every piece less than the minimum weight shall be rejected.

(b) When couplers are purchased complete and assembled, each assembled coupler shall be individually weighed and shall come within the limits as shown in the table. Detail parts shall come within the limits as shown in the table, one coupler being dismantled in each 100 and weighed.

(c) When castings are more than the allowable maximum weight as shown in Fig. 6, and all other requirements are satisfactory, castings may be accepted at the maximum allowable weight, excess weight being at the expense of the manufacturer.

LIMITING WEIGHTS—"D" COUPLER

	Minimum pounds	Maximum pounds	
Coupler bar—5-in. by 7-in. shank—9 $\frac{1}{8}$ -in. butt.....	265	285	
Coupler bar—5-in. by 7-in. shank—6 $\frac{1}{2}$ -in. butt.....	259	279	
Coupler bar—6-in. by 8-in. shank—6-in. butt.....	291	311	
Solid knuckle—9-in. face.....	97	103	
Cored knuckle—9-in. face.....	90	96	
Solid knuckle—11-in. face.....	101	107	
Cored knuckle—11-in. face.....	94	100	
Lock.....	13.5	15.5	
Complete coupler—5-in. by 7-in. 1 9-in. solid knuckle.....	386	416	
shank—6 $\frac{1}{2}$ -in. butt.....	1 9-in. cored knuckle.....	379	409
Complete coupler—5-in. by 7-in. 1 9-in. solid knuckle.....	392	422	
shank—9 $\frac{1}{8}$ -in. butt.....	1 9-in. cored knuckle.....	385	415
Complete coupler—6-in. by 8-in. 1 9-in. solid knuckle.....	398	428	
shank—6-in. butt.....	1 9-in. cored knuckle.....	391	421
	11-in. solid knuckle.....	402	432
	11-in. cored knuckle.....	395	425

16. *Gage.*—(a) Castings shall conform to the prescribed limits and gages. Five per cent of each lot of 100 or less, but in all cases at least one of the complete couplers or separate parts in each, shall be completely gaged. Assembled couplers shall be dismantled before gaging.

(b) Failure of any part in the lot to come within the gages or limits shall be sufficient cause to reject the lot so represented. Failure of a lot to meet the gages will not be sufficient cause to reject a re-offering of the same lot on the same order after the manufacturer has adjusted these parts to the gages. After this adjustment by the manufacturer, the inspector will then gage ten couplers or pieces selected at random in the lot, and failure of any to meet the gages will reject the entire lot, which shall not again be offered.

(c) The inspector shall inspect and gage each coupler in a lot in order to determine if they comply to the contour gage.

V. WORKMANSHIP AND FINISH

17. *Workmanship.*—(a) The castings shall conform to the size and shape as shown on M. C. B. standard drawings and shall be finished in a workmanlike manner.

(b) When assembled, knuckles and locking pins or blocks must work freely, but the lost motion between knuckles and locks must be such that the knuckle cannot be pulled forward by hand beyond the proper contour line, but $\frac{1}{8}$ in. to $\frac{1}{4}$ in. lost motion in opposite direction is desirable.

(c) In order to determine that the requirements of paragraph (b) have been complied with, not less than ten couplers out of each lot of 100 shall be tried. Failure of any one properly to operate will be sufficient cause for rejection of the lot, but this does not prohibit the manufacturer re-offering the lot on the same order for inspection after adjustment, providing it is shown that all other requirements of the specifications have been complied with.

18. *Finish.*—The castings shall be free from blow holes, sand pockets, shrinkage cracks and other injurious defects.

19. *Sand or Shot Blast.*—All castings shall be properly cleaned by sand or shot blast or other approved process. The inspector may require that any or all castings again be subjected to sand or shot blast or cleaning in order to better examine for checks and shrinkage cracks which in his opinion would be detrimental to the strength of the castings.

20. *Welding.*—Welding minor imperfections which do not impair the strength of the castings will be permitted when done under the jurisdiction of the inspector and by a practice approved by him. All castings shall be re-annealed after such welding.

VI. INSPECTION AND REJECTION

24. *Inspection.*—(a) The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture, test and inspection of the material ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy himself that the material is being furnished in accordance with the specifications.

(b) The purchaser may make the chemical test to govern the acceptance or rejection of the material in his own laboratory or elsewhere. Such chemical tests, however, shall be made at the expense of the purchaser.

(c) The physical tests may be made at the plant of the manufacturer, providing the purchaser is satisfied with the accuracy of the test machine and that the pulling speeds for determining the elastic limit and ultimate strength are in accordance with the recommended practice of the American Society for Testing Materials for two-inch test piece.

(d) All tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the works.

(e) After the inspection and tests have been completed and before castings are loaded, at the option of the purchaser, all remaining annealing lugs shall be removed and surface where located put in a workmanlike condition.

25. *Rejections.*—(a) If any of the test coupons or annealing lugs selected to represent the melt do not conform to the requirements specified in Sections 7, 8 and 9, the lot will be rejected.

(b) The basis of acceptance of physical tests shall be upon test coupons showing clean fracture without blow holes or imperfections and that break within the middle third of gage length. In event the test coupon is imperfect or breaks outside of the middle third of the gage length, additional test coupons shall be furnished, but this shall be the only cause for reheating for the physical tests, except as specified in paragraph 3 (b).

(c) All castings which show any injurious defects or do not conform to the weights or gages shall be rejected.

(d) From each bar or knuckle rejected by the inspector

under these specifications, he shall cause to be dipped the M. C. B. acceptance mark shown on Figs. 1 and 2.

Discussion and Action Taken

R. I. Kleine (P. R. R.): Five of the six coupler manufacturers are now in position to turn out the M. C. B. standard couplers. They all have received the gages and are satisfied with the specifications as they have been developed jointly between the manufacturers and the coupler committee.

F. W. Brazier (N. Y. C.): The interesting part of the coupler situation is that the government after the 51 years of existence of the Master Car Builders' Association has looked upon us as knowing what a good coupler is and adopted it. May I ask if the government accepted No. 10 contour line?

Mr. Kleine: As far as I know they have adopted No. 10 couplers as standard for cars.

Mr. Brazier: I think we may as well adopt the No. 10 contour line as we must have it.

C. F. Giles (I. & N.): Shortly after the convention of 1916 we built a large number of cars to which we applied this standard coupler and it has proved highly satisfactory. I have no report of a single failure of one of the couplers since. It has practically eliminated broken knuckle pins where we had thousands of them with the old type.

A. Kearney (N. & W.): I move that this part of the report as the committee has recommended to be presented to letter ballot be so handled.

The motion was carried.

The Report of the Tank Car Committee

FOR THE YEAR 1918 the Tank Car Committee does not recommend that the existing specifications be disturbed.

Owing to the conditions brought about by the war, it has been necessary to suspend some of the requirements, as, for instance, that of the use of large quality steel in the construction of Class III tanks, and that of hydraulic retests of all classes of tanks, the former until July 1, 1919, and the latter until January 1, 1920.

Safety Valves

Leakage.—The principal complaints regarding the details of the tank cars have come from the field producing casing head gasoline, and, in brief, were that the safety valves were not tight, and did not adequately relieve the pressure, as it was claimed locomotive pop valves of the same size would do.

The committee secured a number of sample safety valves and subjected them to tests, mounting them on a large drum and supplying steam from a locomotive boiler. The committee has in its possession an extensive report, giving the performance of each of these valves as originally assembled, and also as reassembled with parts of the different valves. As this report is very voluminous it is not included here, but a copy will be filed with the secretary of the Association.

It developed that all of the valves tested had a capacity very much better than any locomotive pop valve of the same diameter, for the reason that the lift was several times as great. The complaint regarding the lack of capacity was evidently made under a misapprehension, due to the method of making the test. If the valve is mounted on a container of small volume, the initial movement of the valve relieves the pressure, so that the amount of lift is hardly measurable. On the other hand, if the container is of large size, as in actual service, the lift is very great, one pound increase above the popping pressure producing in the best valves a vertical lift of about 0.5 in. This is shown by diagram P.2738. For comparison, diagram P.2745 is given, the valve having the same housing, but a clapper from which the maker had entirely omitted the outside huddling lip. (See Fig. 1.)

It was found that the standard dimensions of the safety

valve are not always followed, and that in the case of individual valves the deviations resulted in a reduction of the possible capacity by over one-half.

During the tests it developed that there was apparently a very close relation between the inner edge of the lip at the lower periphery of the clapper and that of the inside corner of the seat. The best performers were obtained when the plate of the valve seat and that of the under side of the lip most nearly coincided, in which case the critical lift was that due to the difference between the out-

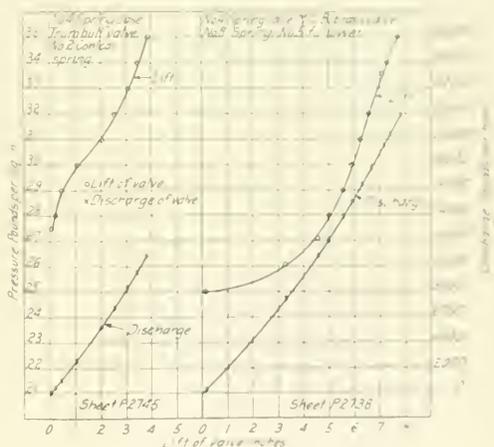
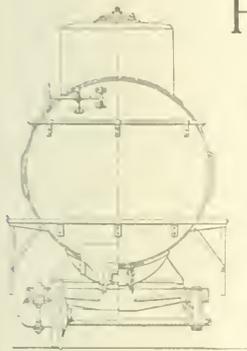


Fig. 1—Safety Valve Lift Tests

side diameter of the seat and the inside diameter of the lip on the clapper.

So far as the tests have gone no valve has proved to be absolutely tight up to popping pressure. After the seats were ground the valves were assembled for test on the drum, and water poured into the cavity above the clapper. The leakage was principally in the form of isolated bubbles to within a few pounds of popping pressure. The point at which leakage ceased when the valve closed differed with each valve.

A conical valve will fit a conical seat only when the axes strictly coincide, the reason being that the only spherical section is that normal to the axis. With any tilting the section becomes elliptical. This explains why valves are

all conditions. The governing requirement then was that the valve should adequately vent the tanks in case they were exposed to fire. It was not expected that higher settings would be required and the valves were designed from the safety standpoint. With the springs used the clearance around the wings of the valve was ample. When it became necessary to provide for the 25 lb. setting it was felt that the hinges should, if possible, be confined to the substitution of a heavier spring than that in the original design. The outside diameter of the coil being practically fixed by the casing, an increase in the diameter of the wire reduced the

clearance between the valve and the casing, and any change from the present standard angle of 45 deg.

Experience has developed that some of the details of the valve shown by Fig. 9 A of the specifications should be modified.

The drawing of the spring follower shows three small lugs which engage the flat faces of the nut on the bottom of the valve stem. It was believed that the valve could be rotated on its seat without causing the stem to turn in the threaded nut, but it has been found in practice that turning the valve around on its seat has a tendency to loosen the bottom nut, thus changing the setting of the valve. With existing valves this can be most easily provided against by the use of two nuts jammed on the bottom of the thread, with a washer above the upper nut of sufficient thickness to prevent the lugs on the under side of the follower engaging the nuts. For future valves it is recommended that the depth of the base be increased from $\frac{7}{8}$ in. to 1 $\frac{1}{8}$ in. as shown in Fig. 9 A, which will eliminate these lugs.

The angle of 45 deg. for the under side of the valve stem head has been indicated.

Safety Valve Applied to Top of Dome. Fig. 10 A.—The thickness of the skirt below the threaded portion of the spring case has been reduced from $\frac{7}{8}$ in. to $\frac{5}{8}$ in., without changing the inside diameter, because of complaints that owing to foundry variations the skirt would not in all cases pass through the threaded opening in the collar on the dome, except by machining all over. As the skirt has no function other than to guide the lower end of the spring, there is no reason why the $\frac{1}{8}$ in. additional freedom should not be allowed.

It has developed that the arrangement of the inside radial ribs, shown by section B-B of the spring case, results in foundry difficulties, and that to avoid these some valves have been made with four ribs instead of eight as called for. As these ribs are intended to center the spring, none of them should be omitted, but their form has been modified as shown on the drawing of the case in Fig. 10 A to provide proper draft in molding.

The surfaces to be dressed (D) have been indicated on the drawing of the spring case. These are the same as in Fig. 9 A, and should have been shown when Fig. 10 A was prepared.

Apparatus for Testing Safety Valves in Place on Car.—It has been found that while the apparatus shown by Fig. 13 of its specifications, is sufficiently strong for testing valves with 12-lb. setting, it should be strengthened for use with the 25-lb. setting, and the committee has revised the design which it recommends be substituted for the present design. The figures for the "Side Ribs in L. T.", page 42, should be changed in the case of the 25-lb. setting to a diameter of 4.00 and a maximum of 55.00 agree with those on the revised print which are correct for the 2-lb. tolerance adopted last year.

Class V Car

During the repair of a number of Class V cars, have been found for handling superheated steam and the committee hopes that in time such welded tanks will be available for ordinary commercial shipments. While the specifications call for a maximum test of 30 lb. per square inch the material carries their own weight from each corner, the $\frac{1}{2}$ inch tanks to 50 lb. pressure.

The committee has approved designs for the safety valve, the inlet and outlet pipes, their attachment to the dome head, and the pressure barrier.

Section 20 (10) of the specifications provides that the safety valve shall be of the lever type. In order to meet a satisfactory arrangement of the valve on the dome head the committee has revised a design of safety valve with a screw fit, pressure and this shall be a safe design of the safety valve.

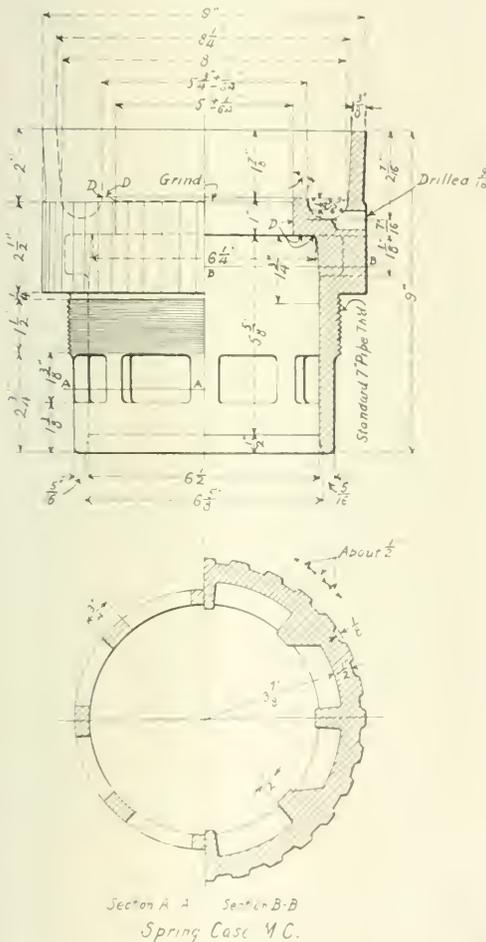


Fig. 10—A—Corrected Drawing of Spring Case for 5-inch Safety Valve Applied to Top of Dome

clearance between the inside of the coil and the wings of the valve encircled by the coil. When the workmanship of the springs is good not much interference need be expected, but with carelessly made springs there is probably interference explaining why valves tight in the position may leak when turned to another.

One of the valves tested *in a seat* at 15 deg. to the vertical. This valve stuck to a dangerous extent, and the committee

is not manipulated after being applied as is the case with the inlet and outlet valves. To cover this feature, the committee recommends that the word "preferably" be inserted between the words "shall" and "be", so that the requirement will read: "Valve shall preferably be of the flanged type, etc." The requirement that the design of the valve must be approved, remains.

The government in ordering tank cars for general service has accepted the Master Car Builders' Specification for Class II car.

The report is signed by: A. W. Gibbs, chairman, Pennsylvania; Thomas Beaghen, Jr., Union Tank Line; C. E. Chambers, C. R. R. of N. J.; Wm. Schlafge, Erie; S. Lynn, P. & L. E.; John Purcell, A. T. & S. F., and O. J. Parks, General American Tank Car Corporation.

Discussion and Action Taken

C. E. Chambers, (C. R. R. of N. J.): The committee has gone to a great deal of trouble and spent much time trying to ferret out the trouble with the safety valves. It found large spring irregularities and irregularities in the material and sizes. It has been very difficult to find a spring that would pop at the proper pressure and close at any given pressure. Several of the springs would be almost tight up to 20 lb. and then commence to blow a little bit and let loose at 25 lb. They would not seat until they got down to 3 lb. pressure with quite a considerable blowing all the way down. The tests are still being carried on.

Mr. Chambers moved that the association grant \$500 more for the continuing of this test. The motion was carried and the report was accepted.

Report on Train Brake and Signal Equipment

THE COMMITTEE submitted the following report:

Part 1—Water Raising System

J. E. O'Hearne, superintendent motive power, Chicago & Alton, having reported improper performance of brakes on passenger cars having a water-raising system in conjunction with L triple valves and suggesting that the air supply for the water-raising system on cars with this type of triple valve be taken from the air pipe leading from

the object being to have one fixed charge for all triple valves applied and a fixed credit for all valves removed, regardless of conditions, so as to facilitate billing.

The committee does not concur in this recommendation for three reasons:

First: the charge should be proportional to the service rendered.

Second: the inauguration of such a scheme would necessitate a difference between charge and credit which would be in excess of the present charge for cleaning and oiling only, and less than the present permissible charge for repairs, thereby tempting a road handling foreign cars to neglect entirely the question of repairs and to confine attention to the more profitable job of cleaning and oiling for which the authorized charge would be excessive.

Third: granting that the proposed method if adopted would not encourage "bad practice" on the part of repair men, considerably more time and labor would be required than is now available in arriving at a satisfactory credit and charge price.

Part 3—"A" and "B" End Double Cylinder Passenger Cars

A non-member of the association having raised the question as to how the *A* and *B* ends of passenger cars having two brake cylinders, with their pistons travelling in opposite directions, could be determined, the subject was referred to this committee, evidently because of the brake cylinder and direction of piston movement being used as a means of designating the *A* and *B* end of single cylinder cars.

The committee could devise no practical scheme whereby the *A* and *B* end of double cylinder cars could be properly designated by any part of the brake.

Part 4—Triple Valve Test Rack

The drawings shown in Fig. 3 between pages 474 and 475, 1917 Proceedings, shows an operating handle *R* which, as far as the committee has been able to learn, has never been made a part of the test rack, what is known as a "blocking device" being used instead. As the blocking device serves every purpose anticipated through the use of the operating handle referred to, and is in quite general use, it is the recommendation of the committee that the triple valve test rack drawing, Fig. 3, be revised in accordance with exhibit *A* of this report, and that the first paragraph at the top of page 484, 1917 Proceedings, pertaining thereto, be revised to read:

"During this test there must be a steady exhaust of air from the vent port of valve *B* to insure the proper differ-



T. L. Burton
Chairman

the triple valve to the supplementary reservoir, adjacent the former, the subject was considered in conjunction with practically all types of passenger brakes. The committee believes that, as a fundamental principle, when the water-raising system is used on cars whose air brake equipment includes an air reservoir, which is supplementary to the auxiliary reservoir, the air supply for the water raising system should be taken from the reservoir in which the air pressure is not reduced during service brake applications. On this basis the air supply should be taken from the following points in the brake system with the types of brakes mentioned below:

- (a)—Schedule PM—from the auxiliary reservoir.
- (b)—Schedule PC—from the emergency reservoir.
- (c)—Schedule UC—from the emergency reservoir.
- (d)—Schedule LN—from the supplementary reservoir.

Where a cut-out cock is used in the brake system for cutting out the supplementary or emergency reservoir, the air connection for the water-lifting system should be made between the reservoir cut-out cock and the triple valve or control valve.

Part 2—Charges and Credits for Repairs to Triple Valves

J. J. Tatum, superintendent freight car department, Baltimore & Ohio, suggested the advisability of a fixed charge and credit covering the substitution of a triple valve in good order for a defective valve, or a valve due to be cleaned and lubricated, in lieu of a standard charge for cleaning and oiling, with additional charges for repairs.

ential being maintained on the triple valve piston. If, in making this test, the triple valve for the 8 in. cylinder releases or indicates excessive ring leakage make another test, after blocking the triple valve piston in service lap position."

Part 5—Cleaning Air Brakes

At the last convention of the Air Brake Association, the following resolution was adopted.

"It is earnestly and unanimously recommended that the Master Car Builders' Association quickly supplement interchange rule No. 60, at least for the duration of the war, so that foreign car brakes bearing cleaning stencils nine months old or more may, when on repair or other tracks where the work can be done, be cleaned and repaired and the proper charges made against the owning road.

"This does not change the present rule which makes a

for doing the work properly but are not permitted to bill car owners for similar repairs to foreign cars, unless the brakes are tested and their condition determined before cleaning the cylinder and triple valve. The recommendation of the Air Brake Association also harmonizes with M. C. B. rule No. 1.

The report was signed by T. J. Burton, chairman, consulting air brake engineer, N. Y. C.; B. P. Flory, N. Y. O. & W.; J. M. Henry, P. R. R.; L. P. Streeter, Ill. Cen.; R. B. Ra-bridge, P. & R.; W. J. Hartman, C. R. I. & P.; and G. H. Wood, A. T. & A. T.

Discussion

T. J. Burton (N. Y. C.): Mr. Henry suggested that the committee should have recommended another triple valve test rack and should have made a definite recommendation on designating the A and B ends of double cylinder pas-

Description of Cocks Requires

- Cock No. 1. 3/4 in. three-way cock having 1/8 in. side outlet.
- Cock No. 2. 3/4 in. cut out cock.
- Cock No. 3. 3/4 in. cut out cock.
- Cock No. 4. 3/4 in. cut out cock.
- Cock No. 7. 1/2 in. cut out cock.
- Cock No. 8. 1/2 in. cut out cock.
- Cock No. 9. 1/2 in. cut out cock.
- Cock No. E. 3/4 in. cut out cock.
- Cock No. F. 1/2 in. cut out cock.
- Cock No. X. 1/2 in. three-way cock with two 1/8 in. side outlets.
- Cock No. Y. 3/4 in. cut out cock.
- Cock No. Z. 3/4 in. cut out cock.
- Two 1/4 in. drain cocks.

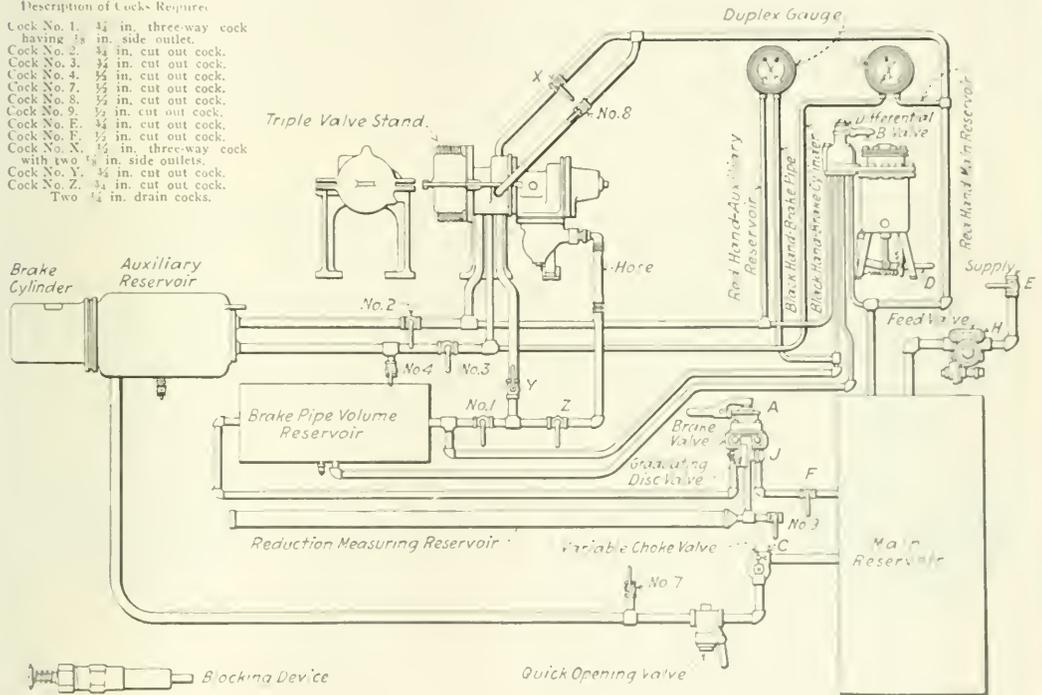


Exhibit "A"—Assembly Diagram, Triple Valve Test Rack. Fig. 3.

twelve months old stencil or over an ineffective brake and permits switching of the car at will to the repair track. It does not suggest that cars stenciled nine or ten months be switched to repair tracks, it is merely to take the greatly needed advantage of such cars being on tracks where the work can be done to do it, without in two or three months having to switch them and take them out of service when they are so greatly needed, and incur the additional expense of switching, which is more than the cost of cleaning."

The committee has carefully considered the above resolution and earnestly recommends its early adoption by the M. C. B. Association, if concurred in by the proper committee on rules. In fact the practice on many roads is to clean, oil and test brakes on home cars when the stencil dates are approximately nine months old, providing the car is out of service where help and facilities are available

single cars. Unfortunately he could not be present at the time these matters were discussed or I think he would have been fully in accord with the views of the committee.

L. H. Goodrow (C. & N. W.). The charge for cleaning, including the testing of the triple valves and also including the repairs, is the matter that was left open in connection with the report of the Arbitration Committee. I get the impression from Mr. Burton's remarks that his committee was going to make a recommendation as to a charge for that but I see instead it has discontinued the practice. I am somewhat surprised at the reason that it gives. I do not believe that the question of charges is going to have anything to do with the working of the triple valve, especially under present conditions. It is to the benefit of no one to take advantage of an opportunity of not doing honest work.

The Arbitration Committee went very carefully into this matter and the arbitrary figure set for doing this work is based on several thousand cars and the experience of three or four roads. *I feel that so long as charges for work are going to be continued the divided costs as now shown in the rules should be withdrawn and the arbitrary figures recommended in the Arbitration Committee's report adopted.*

T. L. Burton: As was stated the committee felt in arriving at the conclusion in Part 1 of the report, that any so-called average price that might be fixed for doing anything to a triple valve, from cleaning and oiling it up to and including heavy repairs, would not result in the maintenance of the equipment to the standard at which it should be maintained. The price for cleaning and oiling a triple valve, is about 50 cents. We know that the cost of repairs, exclusive of bushings and parts mentioned by the Arbitration Committee, will run as high as \$10. That is the actual cost of doing the work, not the cost proposed in the M. C. B. rules. Do you think a man will hold himself down to doing a two dollar job and get a dollar for it, when he can keep busy on a 50 cent job and get 75 cents for it? The result as we see it will be that there will be no repairs made, except in remote cases, and it was with the thought of at least trying to maintain a reasonable standard that I raise the issue.

T. H. Goodnow: The committee fully understands that

an individual triple might cost \$8, and also took into account the hundreds of triples that would have only cleaning and testing, at an average price of \$1.10. I feel assured that Mr. Burton is overlooking the fact that there is only one railroad and one company's cars at the present time.

T. L. Burton: I am not overlooking that.

T. H. Goodnow: I think that it is entirely a matter of honesty. The Arbitration Committee stands back of the arbitrary figure of \$1.10 as representing the average cost, and in that we have the advantage of the knowledge of the special committee which for some time has been checking this work all over the country.

J. J. Hennessey (C., M. & St. P.): It seems to me that Mr. Burton has lost sight of the fact that the basic principle of the M. C. B. rules is common honesty. If you wipe that out there is nothing left to the rules.

E. W. Pratt (C. & N. W.): If this is a matter of averages why is any charge made at all?

Mr. Goodnow: There has been no authority given up to the present time to eliminate charges for car repairs and the charge in question is an item of car repairing and therefore so far as we know to be continued at the present time.

Action Taken

The recommendation of the Arbitration Committee was accepted.

Report on Train Lighting and Equipment



J. R. Sloan
Chairman

THE committee, as recommended in last year's report, took up the question of standardization of ball bearings for axle generators. The 412 bearing in ball annular size had been made recommended practice for truck hung axle generators and had been generally adopted by the generator manufacturers previous to the advent of the body hung generator. When the committee took the matter up it found that body hung axle generators were on the market, using the following sizes of ball bearings, viz., 304, 307,

308, 314, 407, 408, 409, 410, 411 and 412, a total of ten different sizes.

The committee obtained from the axle generator manufacturers all data relative to the various types of axle generators they were building or contemplated building, necessary to determine the proper size of bearing to use. This information was transmitted to the ball bearing manufacturers, who formed a committee and made recommendations as to the size of bearing that should be used in each case.

A joint meeting of the representatives of the ball bearing manufacturers, axle generator manufacturers and this committee was then called. At this meeting the following recommendations were unanimously adopted:

1. *Truck hung generators:* All truck hung generators should use the 412 size bearing.

2. *Body hung generators:* (a) Body hung generators requiring, to transmit the necessary power, a 3 in. belt or smaller, to use the 407 size. (b) Body hung generators

requiring, to transmit the necessary power, a 4 in. belt, to use the 409 size. (c) Body hung generators requiring, to transmit the necessary power, a 5 in. belt, to use the 412 size.

3. The same size of bearing should preferably be used on both pulley and commutator ends, but if desirable from a design and manufacturing point of view, the following sizes of bearings may be used at the commutator end: (a) Those requiring to transmit the necessary power, a 4 in. belt, may use a 407 bearing. (b) Those requiring to transmit the necessary power, a 5 in. belt, may use a 409 bearing.

After arriving at this agreement, the Franklin Railway Supply Company discovered that to use this 407 bearing on their T-35 generator would entail a redesign and would result in a design that would not be in proportion to the balance of the equipment. They, therefore, requested that they be allowed to use the 404 bearing on this size of generator, to which the committee unanimously agreed.

The committee would, therefore, recommend that the following sizes of ball bearings be accepted as recommended practice for axle generators:

TRUCK HUNG	BODY HUNG				Franklin Railway Supply Co.	
	WIDTH OF BELT REQUIRED TO TRANSMIT NECESSARY POWER				3 Inch	T-35
	Both Ends	Pulley	Commutator	Pulley	Commutator	Both Ends
412	412	*412	†409	409	*409	†407
						404

*Preferred. †Alternate.

The committee also took up the question of the rating of axle generators referred to in last year's report and have made a series of tests as to the temperature attained by the generator in service on the road and on the bench. While these tests have been completed, the work was finished so recently that the committee has not been able to study it and will, therefore, present a report on this subject next year.

The members of the committee have been asked as to what was the intent of its recommendations in the 1917 report as to changes in the Passenger Car Rules. In order to make the matter clear we would advise as follows: 1. That

the rate per car mile which the owning road was permitted to bill the handling road was intended to cover all expense in connection with electric car lighting. 2. That all expenses incurred, while the car was on a foreign road, in maintaining the electric car lighting equipment, were chargeable against the owner unless due to unfair usage, derelict or accident.

The report is signed by: J. R. Sloan, chairman, Pennsylvania; C. H. Quinn, N. & W.; D. J. Cartwright, Lehigh Valley; E. W. Jansen, Illinois Central; E. Wanamaker, C. R. I. & P.; Alex. McGary, N. Y. C.; L. G. Billan, B. & O.

Discussion and Action Taken

W. R. McMunn (N. Y. C.): Is it the intention that we should charge for inspection as well as repairs?

J. R. Sloan (Pennsylvania): All expenses should be included. There is a lot of inspection made when the car is on a foreign road and considerable labor expended in making such inspection when it is not necessary. Where inspection is necessary I think the labor should be charged against the owning road.

Mr. McMunn: I think it is entirely improper and in conflict with rule No. 1 of the M. C. B. Passenger Rules. I object to it further on account of the impracticability of

checking the character of the inspection made to the electrical apparatus on the cars and because of the fact it will complicate the car repair bills.

I. S. Downing (Big Four): I move that this matter be referred to the arbitration committee.

F. M. Waring (Pennsylvania): The inspection of electric lighting equipment is done by special men—experts—and the work is entirely different from the ordinary run of inspection for safety. I think it is a proper charge against the car owner.

Mr. McMunn: I think the proper thing is to let these men make the inspection and if they find defects in making the inspection let them charge for any repairs.

C. I. Giles (L. & N.): There is not any more reason why there should be a charge made for inspecting electric lighting equipment than for making a charge for inspection of any other part of the car.

M. R. Reed (Penna.): I do not think that the cost of inspection of this electrical equipment should enter into the expense chargeable against the owner.

Mr. Sloan: The only inspection we had in mind was inspection made at a terminal enroute and was not to be made unless advance information was received that the car was in trouble. (Mr. Downing's motion was carried.)

Report on Standards and Recommended Practice



T. H. Goodnow
Chairman

THE FOLLOWING is a report covering such subjects as have been referred to this committee during the past year:

Wheel Defect, Worn Coupler Limit, Worn Journal Collar and Journal Fillet Gage. (Standard.) Page 440. Sheet M. C. B. 16. A member suggests that the standard wheel defect gage be changed to show a radius of 5/16 in. at the lower right-hand corner and a radius of 3/8 in. at the lower left-hand corner for the purpose of checking the fillets of journals. The

committee concurs in this suggestion.

Box Car Side Door Fixtures. (Standard.) Page 715. Sheet M. C. B. 50. A member calls attention to considerable trouble being experienced with the breaking of house car door fastenings, due to the failure of the door hasp through the eye-hole. The committee refers this to the Committee on Car Construction.

Center Plates. (Recommended Practice.) Page 585. Sheet M. C. B. 5. A member recommends that this be advanced to standard, eliminating the center plate shown on Sheet M. C. B. 20. The committee refers this to the Committee on Car Trucks.

Definitions and Designating Letters of General Service Freight Equipment Cars. (Recommended Practice.) Pages 738-745. Through the secretary, a communication was received from the General Chemical Company, requesting the appointment of a classification for a steel tank of M. C. B. construction (Class 2) equipped with a combination concrete and lead lining. The committee concurs, and suggests the following:

TL—*Lead Tank*. Of same general construction as oil tanks, but having lead lining.

The report is signed by: F. H. Goodnow, chairman, C. & N. W.; C. E. Fuller, Union Pacific; A. R. Ayers, N. Y. C. & St. L.; O. C. Cromwell, B. & O.; O. J. Parks, German-American Car Lines; R. E. Smith, Atlantic Coast Line; C. F. Thiele, Pennsylvania Lines; and A. G. Trumbull, Erie.

Discussion

T. H. Goodnow, (C. & N. W.) chairman. Since this report was made, the question of the change in the width of the 4 1/4-in. by 8-in. and 5 1/2-in. by 10-in. journal bearings, as made last year, has been brought to the attention of the committee on standards. That change was made on the recommendation of J. T. Wallis, chairman of the Car Truck Committee. This was brought up by a number of different members of the association and by C. B. Young who is in charge of the tests and inspection at Washington. Mr. Young wrote a letter to the committee as follows:

"I wish to call your attention to the fact that the M. C. B. Proceedings for 1917 show that the bearings for 5 1/2-in. by 10-in. and 4 1/4-in. by 8-in. axles were changed so that the over-all width of the bearings was increased to 5 3/8 in. and 4 3/8 in., respectively. The drawings for the gages for these bearings, shown on M. C. B. Sheet 14, have not been revised since 1915, and therefore, are for the narrower or old style bearing. Also the wedges for these bearings have not yet been changed in the M. C. B. Proceedings for 1917. If I read the drawings in the M. C. B. 1917 Proceedings correctly the slope of the sides will not be the same as before and, therefore, the gages and wedges will not fit and will result in needless difficulty and confusion."

Prior to that time I had referred the matter to Mr. Wallis, as it originally came up through his committee, and I have received the following letter from Mr. Wallis:

"In regard to increasing the over-all width of 4 1/4 in. by 8 in. journal bearing shown on M. C. B. Sheet 6 from 4 1/4 in. to 4 3/8 in., and increasing the over-all width of the 5 1/2-in. by 10-in. journal bearing shown on M. C. B. Sheet 12 from 5 1/2 in. to 5 3/8 in., so as to provide stiff neck material

Page 442—Materials and Chill.

Paragraph (b) It shall not exceed 1 in. in the middle of the tread nor be less than 3/8 in. in the throat for wheels having a maximum weight of 625 lb.

Paragraph (c) It shall not exceed 1 in. in the middle of the tread nor be less than 7/16 in. in the throat for wheels having a maximum weight of 700 lb.

Page 444—Marking

Paragraph 15, Marking (The last sentence of this paragraph should read as follows:) Wheels conforming to the requirements and furnished under this specification shall have plainly formed on the outside plate, M. C. B. 1909 for wheels of nominal weight of 625 and 725 lb., and M. C. B. 1917 for wheels having a nominal weight of 700 and 850 lb.

Sufficient time has not elapsed since the adoption of the new recommended practice cast-iron car wheels of 700 lb. and 850 lb. weight to draw any conclusions based upon actual service, and the committee is, therefore, not in position at this time to recommend changing the shape of the plate or the weight of the 625 and 725 lb. wheels.

The report is signed by W. C. A. Henry, chairman, Pennsylvania; C. W. Van Buren, Canadian Pacific; J. A. Pilcher, N. & W.; O. C. Cromwell, B. & O.; J. M. Shackford, D. L. & W.; H. E. Smith, N. Y. C.; C. T. Ripley, A. T. & S. F.; and F. T. Slayton.

Action Taken.

The report was received with no discussion.

Other Business

F. W. Brazier (N. Y. C.) offered a resolution as follows: "Resolved, when empty cars of 60,000 lb. capacity or over are placed on shop or repair tracks for repairs they must not be returned to commercial service until they have been placed in condition to meet full M. C. B. inspection without exceptions, including United States Safety Appliances." This resolution was adopted.

At a meeting of the Executive Committee of the Master Car Builders' Association, I. S. Downing of the Big Four was made third vice-president, vice George W. Wildin, who has left railroad service. T. H. Goodnow, (Chicago & North Western) was appointed a member of the executive committee to fill the unexpired term of Mr. Downing. The personnel of the committees will remain unchanged for the coming year. The dues of association will remain the same as last year.

The secretary read a letter from R. W. Schulze, superintendent car department, St. Louis-San Francisco, asking that the association make some recommendation either for or against the application of switch chains on twin loads.

It was voted that the provision of the M. C. B. rules requiring defect cards for switch chains delivered with double loads should be eliminated.

It was voted to submit to letter ballot the matter of marking metal spacing blocks behind the coupler horn nomenclature.

M. M. Registration

- Barnum, M. K., S. M. P., B. & O.
- Brazier, F. W., S. R. S., N. Y. C.
- Bunker, W. D., M. M. C. B., & Wyo.
- Burton, T. L., Consulting Air Brake Expert, N. Y. C.
- Chambers, C. E., S. M. P., C. R. R. of N. J.
- Connolly, J. J., S. M. P., D. S. S. & A.
- Curry, H. M., S. M. P., N. P.
- Dunham, W. E., Asst. to G. S. M. P. & C. D., C. & N. W.
- Endsley, L. E., Prof., University of Pittsburgh.
- Fogg, J. W.

- Fuller, C. F., Supt. Mach. L. & N.
- Giles, C. F., Supt. Mach. L. & N.
- Keatney, Alex., A. T. S. M. P., N. & W.
- Kinney, M. A., S. M. P., H. V.
- Pratt, Edward W., A. S. M. P., C. & N. W.
- Purcell, J., Asst. to V. P., A. T. & S. F.
- Richmond, W. H., M. M. C. B. L. S. & I.
- Ripley, Chas. T., G. M. I., A. T. & S. F.
- Sample, W. H., Grand Trunk
- Sullivan, J. J., S. M. N. C. & St. L.
- Thompson, W. O., S. R. S., N. Y. C.
- Tollerton, W. I., G. M. S., C. R. I. & P.
- Waring, F. M., Engineer of Tests, Penn. R. R. Associate
- Wright, O. C., A. T. M. P., Penn. Lines West.

M. C. B. Registration

- Bartum, M. K., S. M. P., B. & O.
- Bohan, W. J., M. F., Nor. Pac.
- Boutet, H., Chf. Joint Inspector, Cincinnati, Ohio
- Brazier, F. W., S. R. S., N. Y. C.
- Breaker, E. R., C. E., S. A. U. & G.
- Burch, J. J., D. C. I., N. & W.
- Burton, T. L., Consulting Air Brake Expert, N. Y. C.
- Carson, G. E., D. M. C. B., N. Y. C.
- Chambers, C. E., S. M. P., C. R. R. of N. J.
- Coleman, James, S. C. D., Grand Trunk
- Collins, C. F., Audt., Paris & Mt. P.
- Conerly, J. L., M. C. B., M. K. & T.
- Connolly, J. J., S. M. P., D. S. F. & A.
- Covert, M. F., A. M. C. B., S. R. T. Co.
- Curry, H. M., M. S., No. Pac.
- Downing, I. S., G. M. C. B., C. C. C. & St. L.
- Dunham, W. E., Asst. to G. S. M. P. & C. D., C. & N. W.
- Endsley, Prof. L. E., University of Pittsburgh.
- Fritts, J. C., M. C. B., D. L. & W.
- Fuller, C. F., S. M. P. & M. U. P.
- Giles, C. F., Supt. Mach. L. & N.
- Goodnow, T. H., A. S. C. D. C. & N. W.
- Graff, F. M., Supt. Apprentices and Piece Work, Erie R. R.
- Hacking, E., Grand Trunk Pacific
- Halbert, M. W., Chf. Interch. Insp., East St. Louis.
- Hall, E. H., G. C. I., C. G. W.
- Harvey, H. H., G. C. F., C. B. & Q.
- Hennessey, J. J., M. C. B., C. M. & St. P.
- Hogarth, Wm., Cudahy R. & T. Lines.
- Jansen, E. W., Elect. Engr., I. C. R. R.
- Kearney, A. A., S. M. P., N. & W.
- Kinney, M. A., S. M. P., H. V.
- Kinter, D. H., G. F. C. D., Mong. R. R.
- Kleine, R. L., Chief Car Insp., P. R. R.
- LaMar, A., M. M., Penn. Lines
- Laughlin, George F., S. C. D., Armour C. L.
- Lentz, John S., M. C. B. L. V.
- Lyon, Samuel, M. C. B., P. & L. I.
- Mather, A. C., Pres., Mather S. C. C.
- McGary, Alex., S. C. T., N. Y. C.
- McMunn, W. R., G. C. I., N. Y. C.
- Mohan, J. F., A. M. C. B., C. M. & St. P.
- Milton, J. H., S. C. D., C. R. I. & P.
- Neary, J. S., M. C. B., C. R. & E.
- Osman, H. J., S. C. D., Murrin & Co., R. L.
- Pratt, F. W., Asst. S. M. P., C. & N. W.
- Purcell, John, Asst. Vice Pres., A. T. & S. F.
- Rashbridge, R. B., S. C. D., Phila. & Reading
- Robertson, J. J., S. C. D., M. St. P. & S. S. M.
- Rohder, W. L., M. C. B., Cent. of Ga.
- Richmond, W. H., M. M. C. B. L. S. & I.
- Riles, C. I., G. M. I., A. T. & S. F.
- Schultz, F. C., C. I. I., Chicago
- Schulze, R. W., S. C. D., St. L. S. I.
- Shearman, C. S., Chgo., I. C. T.
- Sloan, J. R., L. E. C. L., Penn. R. R.
- Smith, A. I., A. M. C. B., Union T. I. C.
- Stoll, W. J., Chf. Interch. Inspector, Toledo, Ohio
- Sullivan, J. J., S. M. N. C. & St. L.
- Swanson, Chas., A. S. C. S., A. T. & S. F.
- Thompson, W. O., S. R. S., N. Y. C.
- Tollerton, W. I., G. M. S., C. R. I. & P.
- Van Buren, C. W., G. M. C. B., Can. Pac.
- Waring, F. M., Eng. of Tests, Penn. R. R.
- Wright, O. C., A. T. M. P., Penn. Lines West.



Wm. Schlafge
President, M. M. Association



F. H. Clark
First Vice-President, M. M. Association

Master Mechanics' Association Proceedings

Includes a Timely Discussion on the Conservation of Fuel
on Locomotives and in Power Plants

THE REPORTS of the Master Mechanics' Association were presented in conjunction with those of the Master Car Builders' Association at the joint meeting of the executive committees and representative members of the two associations at Chicago, June 19 and 20. In the absence of President Schlafge and Vice-President Clark, W. J. Tollerton, second vice-president of the association, officiated.

Mr. Schlafge Resigns

Mr. Schlafge in the following letter to the association tendered his resignation:

"In view of the decision to continue the present officers of the Association for the period of the war, I feel obliged to resign the office of president, and respectfully request that it be accepted as of June 19, 1918.



W. J. Tollerton
Second Vice-Pres. M. M. Assn.



C. F. Giles
Third Vice-President, M. M. Assn.



Angus Sinclair,
Treasurer, M. M. Association

"This action is taken with the deepest regret and reluctance but personal and official reasons, the weight of which I am entitled to judge, commend this course and I am committed to it irrevocably.

"May I be permitted to thank the members of the Association for conferring upon me the honorable trust that I now return to them and, in a more intimate sense, to express my gratitude as well as my thanks for the splendid support that I have received from all of the officers and members in the past two years. This chapter of my life will stand in undimmed letters to the end and that my interest in the affairs of the Association shall never abate."

Mr. Chambers: I am sure we all regret to see the stand Mr. Schlafge has taken. The executive committee, or joint executive committee, owing to many changes that were taking place from time to time and the difference in handling affairs that have come up, have deemed it wisest to continue with the present officers and make as few changes as possible until things assume a more quieted condition.

In the absence of Mr. Schlafge, Mr. Tollerton read his address to the association.

President Schlafge's Address

In this passion time of the world, in this greatest of all crises, not only individuals, but every association of individuals and every agency of human thought and action, especially those intimately related to the vital necessities of the nation's life must pass through a course of searching self-inquiry to determine to what extent the individual, or the association, or the agency is responsive to the full duty that rests upon him or it. In harmony with this thought, it is pertinent to recall that the test of the capacity of any individual or of any organization is his or its reaction to supreme emergencies. This association is an organization purporting to promote the interests of rail commerce in respect, primarily, of mechanical operation and the problems thereto related arising in the conduct of that vast enterprise.

The test then is—"Has this association, with exactly 50 years of experience behind it, so conducted its affairs; has it so impressed itself upon the thought of the railway world; has it so utilized its opportunities that it has in fact achieved the leadership that reasonably and logically could have been expected, so that in the supreme emergency of the nation's need, the director general of the national railways could turn to it as a perfectly organized and efficient instrumentality of railroad work and find in its proceedings solutions of many of the problems that he had to solve, and an active, smoothly running agency to put into effect the conclusions of its experience and to give constructive advice?" Did it so shape its course to render assistance to the end, in sight for many years, of a thorough co-ordination of the transportation business of the country in the interest of its people?

Candor compels the admission that while the association has justified its existence, it has not taken the high place to which it might have aspired. It is only just to say, however, that the limitations upon its proper expansion and development were largely beyond its control because of the general failure of railroad interests to recognize the fundamental principle that the transportation business of a nation is a natural state monopoly and that, sooner or later, a progressive state will either dominate the control of its transportation lines or own them.

To far-seeing men, it has been clear for many years that even peace conditions demanded the nationalization, either under private control or public ownership, of all the transportation agencies of this country. It was, therefore, apparent that standardization of the instrumentalities of commerce, as well as of methods was inevitable if the highest efficiency were to be attained and the nation be well served according to its constantly growing business expansion. This association practically failed to recognize the ineluctable trend

of events so that when, as a necessary war measure, the National Railway Administration demanded a standard locomotive, the association had no standard to offer.

All the voluntary railway associations have failed, more or less, to do the good they might have done for the simple reason that, as units, or collectively they had no authority to constrain the railroads to the standards they did prescribe. This brings us to the question of the future of the associations.

Both major mechanical associations have been continued by the director general of railroads as railway organizations to the support of which the carriers may contribute. It is obvious that, if the approval is to stand indefinitely, both associations must bring themselves into harmony with the demand that these, and all similar railway agencies, shall be fully co-ordinated under a plan that will insure the achievement of stated and definite ends.

Conceding that co-ordination does not necessarily imply consolidation, it seems, nevertheless, that the logic of the situation might justify an institution to be called, for example, the American Railway Mechanical Association, organized to effect definite and highly useful ends as a unit. The institution of a new organization to cover the field now occupied by two can be effected without impairing the usefulness of either; on the contrary, their usefulness would be increased.

I earnestly commend to the association the wisdom of complete responsiveness to the letter and spirit of the director general's desire that the work of all such organizations be brought into close co-ordination, clearing their conclusions through one central authoritative body which, it is submitted, should be the American Railway Association. There is a growing conviction in many quarters that sentiment is the chief obstacle in the way of consolidation and, however admirable sentiment may be in its proper place, it is scarcely entitled to any consideration here.

It is suggested that a plan can be worked out, using the American Railway Association as the clearing house, whereby the results of all railway experience can be crystallized into settled practice and whereby the sum of knowledge may be increased and an organization perfected meriting at least a quasi-public footing, that will be able and qualified to render valuable constructive service to the nation in time of peace as well as war.

Let me urge with equal earnestness the necessity of accepting and in every way encouraging the principle of the standardization of locomotives. There is little merit in the argument that standardization implies the end of improvement and progress. It would and ought to stop ill-advised and ill-considered innovation. By accepting the principle of standardization and applying it to details of construction, a start will have been made that will rapidly reduce the ranks of those real obstructionists who are always on the job to cover every sign post on the road to progress with the legend "It can't be done."

With the authority of the government back of this proposition and crediting its proponents with a full appreciation of the value, not to say the necessity of locomotive efficiency, may we not still dismiss all fears that evolution will be a violent dither or that any substantial discouragement will be given to American enterprise to continue to apply its genius to keep the development of the locomotive abreast of the improvement that America shall make in all other directions. Also, it should be kept in mind that whatever the ultimate fate of the railroads may be, all signs indicate that they will be operated in the future as a national system and the efficiency of their whole operation rather than of a given portion of it will be the test.

It is quite generally agreed that the present is inopportune to take such a radical step on account of the delay it will cause in deliveries. The force of this objection is dissipated

by the reflection that the duration of the war is problematical and that the present is the very latest time to take essential steps to guard the future. Standardization of ships and submarine chasers has justified itself—Why not locomotives?

The association has done much valuable work through its various standing and special committees. Many of the more important committees covering assignments of live subjects such as Fuel Economy and the related subjects of Mechanical Stokers and Powdered Fuel and Superheater Locomotives and Train Resistance Tonnage Rating, as well as the essential committees on Standards and Recommended Practice will be asked, doubtless, to collaborate with agencies created by the National Railway Administration.

All endeavors within the scope of the association's activities are indissolubly joined to the dominant issue of the national defense and it cannot be stated too often that the yard stick by which effort was measured in times of peace is utterly inadequate for application to the quality and quantity of endeavors that America now expects. A whole-hearted responsiveness to the plans and policies of the National leadership is the duty of every citizen and if more may be expected of any class than of another, it surely may be expected from

those like ourselves who are actually in highly essential government service.

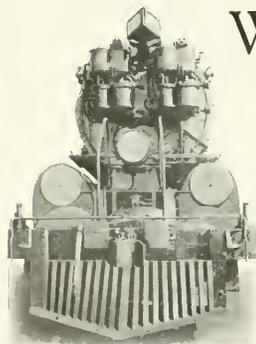
We stand here today in the place of that small group of forehanded men who a half century ago conceived and organized this association. Through all the years that have passed since then, it has held true to its original purposes and ideals. If it has failed in any respect to achieve the commanding position that it might have held, it must be granted that from its pioneer days it has been an active constructive force in its own field. Our faces must now turn hopefully to the future and, with the high inspiration of this stirring age to guide and encourage us, resolutely "carry on" and make up the lost opportunities of the past days.

Report of Secretary

The secretary reported the following membership: Active members, 902; representative members, 98; associate members, 17; honorary members, 45; and a total membership of 1,062. The total receipts during the two years ending June 18, 1918, were \$16,308.56; disbursements, \$12,809.35, leaving a cash balance of \$3,499.21.

The treasurer reported a back balance of \$2,115.50.

Report of Committee on Fuel Economy and Smoke Prevention



Front End of Norfolk & Western Mallet

WE are here, not in our former capacities as the officers of individual railroads, but as officers of the government, responsible no longer to private corporations for efficient performance of duty, but instead to the United States Railroad Administration and in a larger sense to the public, whose servants we are. The committee considers that it should first point out the added duties and obligations which the new conditions have imposed upon us, with the hope that we may stimulate the

sympathetic co-operation of every man in the mechanical department who is responsible for the use of fuel.

Never before in the history of the nation has there been a time when the fuel supply was generally inadequate to the demand, and never before was it so essential that our industries should be maintained at their maximum rate of production. It is realized now that upon the United States rests the hope of all the free people of the world, and it is not too much to say that the realization of this hope depends in no small degree upon the effective distribution and use of the available fuel supply.

According to the official figures in 1917 the railroads consumed 158,000,000 tons of coal. Estimates of the Fuel Administration indicate that the consumption in 1918 will aggregate 166,000,000 tons, an increase of seven per cent over last year. It is believed that this entire estimated increase can be avoided and a substantial saving effected over last year if the earnest co-operation of every railroad employee can be enlisted in the application of individual economies.

A few days ago the United States Fuel Administration

in an official statement said that "A saving of 60,000,000 tons of coal was the one possible avenue of escape from national disaster. The necessities of war must be supplied. The coal deficit must inevitably come out of the necessary fuel for non-war industries. These industries employ millions of our population and furnish the backbone of our national wealth. Factories will shut down and men be out of work in proportion to the coal deficit. Every ton of coal saved will keep 50 workmen from idleness and permit additional creation of several hundred dollars of national wealth.

Of the 60,000,000 tons of coal that the Fuel Administration states it is necessary to save, a million and a quarter tons per month could be saved by simple methods of economy that any man using fuel on a railroad could at once apply, without a minute's delay for additional appliances or personal instruction. These men have only to be impressed with the importance of the subject to make this potential saving a practical reality and the committee believes that every road foreman, supervisor, traveling engineer and fireman should immediately be acquainted with the situation so that its importance may be understood by every engine crew in the country.

But this probable shortage in the supply is not the only factor that demands our consideration. The fact is, that in the opinion of the Fuel Administration it is physically impossible to transport all the coal needed so that it may fairly be concluded that the difficulty is mainly one of transportation. This means that for every pound of coal saved, a pound of another needed commodity may be transported and in the same proportion may the present traffic situation be relieved and subsequent congestion avoided.

A saving of 10 per cent in the coal consumption on American railroads means a reduction in demand of 332,000 cars, which is the approximate equivalent of 8,500 trains per annum, representing a movement during the period of greatest congestion in the winter months of more than eight hundred trains per month. This is not all that the suggested economy could accomplish. If 10 per cent saving could be immediately effected by December 1, the reserve supplies could be increased by fully six million tons, thereby further avoiding

a repetition of the congestion and traffic interruption of last winter.

In its first report the committee provoked some discussion because of its comments in respect to the purchase of coal to specifications naming a definite standard of quality. The necessity for utilizing all the coal in the ground was then emphasized and to this principle there can be no dissent. In the past three years, however, the increasing demand for coal has unquestionably resulted in a deterioration in the average quality, while in the face of actual shortage, industrial plants have accepted a grade of fuel undeniably inferior to previous averages. This has resulted in correspondingly reducing the quality furnished the railroads, the claim not infrequently being made that coal accepted by private consumers should satisfactorily meet the requirements for locomotive purposes—an argument ignoring, not only the difference in combustion conditions, but the economic disadvantage resulting from the shipment of slate, bone, rock and other impurities familiar particularly to users of bituminous coal. These impurities reduce the available units of transportation, increase the cost of labor per ton of combustible transported, unloaded and utilized, reduce the efficiency of power plants, increase the necessity for excess plant capacity, not infrequently actually reduce plant output and always impair locomotive performance both directly by reducing operating efficiency and indirectly through the consequent increase in the cost of repairs.

For these considerations, a reasonable improvement should now be demanded in the quality of all coal loaded for railroad use. It would not be unreasonable to require the pre-war competitive standard.

The committee has heretofore chiefly considered the elements of fuel economy in their direct application, believing the scope of its work did not properly include many of the indirect factors that exert no inconsiderable influence upon railroad fuel consumption. But the critical situation portrayed in the official announcements of the Fuel Administration have suggested that brief reference should be made to some of these factors in order that emphasis may be placed upon the relation of all mechanical department employees to the problem of fuel economy and conservation.

There is not an element of locomotive maintenance that does not in some degree affect fuel consumption. Moreover, there are features of our maintenance that are intimately related to the coal consumption so that the question is one which should have large general interest to all employees of the mechanical department.

In order that the matter may be brought to the attention of those concerned briefly and comprehensively, a tabulation has been made indicating those details most affecting fuel economy in a properly designed locomotive. As far as any relative weight may be attached to the influence of these parts in fuel consumption, they have been arranged in what appears to be the order of importance, considered in relation to the maximum general effect.

LOCOMOTIVE DETAILS MOST AFFECTING FUEL CONSUMPTION

BOILER		ENGINE	
Leaks—		Leaks—	
Flues		Cylinder packing	
Superheater		Valve packing	
Mod ring		Cylinder heads	
Firebox		Cylinder	
Shell		Steam chests and covers	
Flue end		Inter. per. Adjustment	
Flues		Steam valve	
Brick arch		Steam inlet valves	
	AIR SYSTEM	Worn or Defective Parts Not Pa-	
Air pump cylinder packing		cking Leaks	
Air pump rod packing		Crack bars	
Air pump governor relief port		Tree	
Hose		Rods	
Hose Couplings			

One of the most frequent causes of poor steaming locomotives is a leak in the boiler front door or frame, which is frequently compensated for by a reduction in the area of the exhaust nozzle, thereby placing a double burden upon the

boiler and the coal supply further back. Every report of a poor steaming locomotive now requires immediate and special attention. We should so organize and instruct our forces as to insure prompt investigation and the application of the proper remedy in every instance.

In addition to the physical condition of the locomotives and their efficient operation, there are a number of particulars in which the motive power department may prove the effective agency for fuel conservation and to those brief references may profitably be made. The subject may be grouped under two headings, those relating to the locomotive and those to engine house conditions.

Probably there is no single source of immediate and absolute waste as great as the ash pit. Every pound of unconsumed combustible that finds its way to the ash pit is a direct loss and the total aggregates huge proportions. It is impossible to eliminate this waste entirely but it can be minimized by proper firing methods so that the locomotive will reach the pit with a light fire, by dumping the engines as soon as possible after arrival at the ash pit so that the use of green coal may be avoided, and by prompt movement from the pit to the engine house.

Another prolific source of ash pit waste is caused by defective crane buckets and careless crane operation. Coal is lost through the buckets into the ash pit. There are frequent instances where the boiler washing program is not transmitted to the engine dispatcher so that locomotives are dumped and fired up again before it is decided that they are to be washed, thus necessitating a second trip to the ash pit. It is safe to estimate that with a modern locomotive a loss of not less than four tons of coal is involved in this proceeding. Cars unloaded with a clam shell bucket are frequently re-consigned to the mines with coal in the hopper amounting to a ton or more. Our transportation necessities now demand that empty supply coal equipment be examined by the coal pocket foreman and every pound removed before the cars are re-consigned.

Two other factors require mention; one is unnecessary movement of engines and the other excessive use of air pump.

There are innumerable particulars in which engine house auxiliaries may increase the fuel cost. Relatively, the coal consumption is small compared to that of locomotives but the necessity for economy should lead us to investigate every avenue of waste.

The Fuel Administration is about to inaugurate a campaign for power plant fuel economy and is even considering the desirability of authorizing the distribution of coal to power plants on the basis of their relative efficiency. Railroad officers have given little attention to this phase of the subject but it now requires immediate and special consideration. Probably the most practical results could be obtained through special reports covering the essential factors in the use of fuel for all purposes, other than locomotives, handled through the engineering departments that are a part of most railroad mechanical organizations.

The sources of greatest waste about shops and round-houses, are usually heating equipment or the lack of it. It is certain that during the coming winter no division of the Railroad Administration can justify its position as an advocate of fuel economy if no attempt is made to eliminate the coal basket and open coal fire usually observed at ash pits and water cranes. In all such places an inexpensive form of enclosed sheet steel stove should be substituted.

The heating equipment for engine houses, shop buildings and offices is frequently installed without reference to the usual principles governing the amount of radiation required, with the result that many buildings, particularly the smaller ones are greatly overheated. Under the existing conditions, no office should be heated to exceed 68 deg. F. and a temperature of 60 deg. F. would be entirely suitable for most buildings where liberal labor is not required. All radiators

producing temperatures in excess of the actual requirements should promptly be eliminated.

Another common source of heat loss is found in steam pipes installed under ground, the course of which is frequently indicated by melting snow in the winter months. Exposed piping is often left uncovered. Effective means should be taken to insulate all such piping and suitable traps should be installed and maintained on all radiating systems.

There is one other problem relating to fuel conservation which is of great importance and although it may not involve any direct responsibility on the part of the mechanical department, it concerns the railroad organization as a whole and for that reason deserves attention at this time. This is the storage of coal, which will undoubtedly be required to a greater extent than heretofore not only because it permits the accumulation of large reserve supplies against extraordinary demands, but because it accomplishes a stabilization of the entire fuel supply situation.

In the past there have been huge losses because of the spontaneous combustion of stored coal, particularly bituminous, and this has not only resulted in loss of fuel, but has affected subsequent locomotive efficiency in some degree and made labor demands upon our organization at a time when labor could have been more advantageously employed elsewhere. The prevention of spontaneous combustion has received much study by various investigators, but the latest and most comprehensive treatment of the subject appears in the University of Illinois bulletin No. 6 on "The Storage of Bituminous Coal," by H. H. Stouk, Professor Mining Engineering.

The committee has selected from this publication certain conclusions which have been summarized to cover the conditions peculiar to the methods at present in use for the storage of coal by railroads.

Instructions for the Storage of Bituminous Coal.

1. The risk of spontaneous combustion in stored bituminous coal increases with the percentage of slack, consequently as far as practicable only lump coal should be stored and this should be as free from dust and fine coal as possible. This consideration suggests the selection of the less friable coal for storage purposes.
2. The risk of fire from the storage of fine coal or slack may be minimized by the exclusion of air from the interior which may be accomplished
 - (a) by a closely sealed wall built around the pile or
 - (b) by close packing of the fine coal.
3. It is advisable that coal for storage purposes be as dry as possible. It should not be dampened when or after it is placed in storage.
4. Where a choice is possible, coal having low sulphur content should be shipped for storage purposes.
5. The risk of spontaneous combustion is minimized by so packing that air cannot enter the pile.
6. The segregation of fine and lump coal in the same pile should be avoided.
7. Where space permits coal should be stored in low piles, divided by alley-ways.
8. The different varieties should not be mixed and stored in the same pile.

Storage appliances and arrangements should be so designed as to permit the coal to be quickly removed and large piles should not be made when there is no provision for loading quickly.

In storing coal, care should be exercised to remove pieces of wood, greasy waste or other easily combustible material.

All storage piles should be regularly inspected and the temperature recorded. If the temperature reaches 150 deg. F., the pile should be watched carefully and if it rises to 175 or 180 deg. F. the coal should be removed as promptly

as possible. The temperature should be taken with a thermometer at various places in the storage pile and at varying depths.

Where stored coal is under the jurisdiction of the mechanical department, it is recommended that these instructions be adopted as far as practicable and where the responsibility rests with the transportation department, that the subject be brought to the attention of the proper officer.

Heretofore we have approached the problem of fuel economy with a view to its effect upon operating expenses. Now we are obliged by force of circumstances to effect economy in order to conserve the available supply, and since as the director general says "The government now being in control of the railroads, the officers and employees of the various companies are no longer serving private interests. All now serve the government and the public interests only," we have a new obligation and a new duty and must grasp the spirit of the new era. Co-operation is necessary—individual effort indispensable.

The report is signed by: Wm. Schlafge, chairman, Erie; W. H. Flynn, Mich. Central; D. M. Perine, Penna. R. R.; Robert Quayle, C. & N. W.; D. J. Redding, P. & L., E.; W. J. Tollerton, C. R. I. & P., and F. H. Clark, B. & O.

Discussion

W. J. Bohan (N. P.): We hear a great deal of statistics about how much coal we are using and the places where it is wasted but no specific recommendation as to how to save it. Have any of the representatives any specific solution of the problem of conserving the coal, not only in locomotives but generally? The firemen and men handling the plants in shops can do a great deal to save coal if they had some specific rules to follow.

W. J. Tollerton: Few railroads have given the attention to stationary plants which they merit. The general practice, if a small terminal is to be established, is to pick out a discarded locomotive boiler for a heating plant—the most extravagant thing that could be put in. Our road some years ago, in common with a great many other railroads, established fuel supervising departments, not only for locomotives, but to supervise the fuel used in stationary plants. We have a supervisor of stationary plants, whose duty is not only to see that there is an adequate supply of steam for the work intended to be done at the shop or round house, but to follow the use of that steam from the time it is generated in the boiler until it is used up. He also has supervision over all the piping. If there are steam engines in the plant the valve motion is gone over, the air compressors are kept in shape and the exhaust steam is used for heating. If the boiler is of old design and uneconomical, recommendations are made to discard it and put in a more efficient boiler plant. The stack, the draft, and similar features, not only of locomotives but of stationary plants are of the utmost importance. We have a trained engineer who studies all these problems and makes his recommendations.

E. G. Gross (C. of Ga.): Statistics and the conclusions which are drawn from them, are the very things we need to correct our practice. The report is replete with positive suggestions. Nearly everything that is specified about the locomotive on the road will apply to the stationary power plants.

W. J. Bohan: I would like to ask Mr. Tollerton if, on his road, the power plant supervisor has absolute control of the power plant?

W. J. Tollerton: The supervisor of the stationary plants, in common with the supervisor of locomotive fuel, reports to the general mechanical superintendent, and the recommendation for any change or alteration or improvement in the stationary plant is made by the mechanical department; the actual execution of the work is by the superintendent's force. The specifications for all standard boilers as well as loco-

motive boilers are made by the mechanical department. When they are on the ground, however, the installation is made by the superintendent's force, under the supervision of the mechanical department.

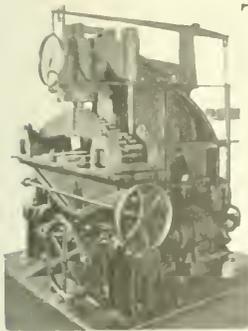
W. J. Bohan: How is the coal handled? One plant may take run of mine coal, another No. 4, and another No. 5, and so on. Does the power plant supervisor have control not only of the design but also of the operation of the power plants? The average railroad lets everyone, from division superintendent to the supervisor of bridges and buildings, run the boiler plants.

W. J. Tollerton: The superintendent handles the distribution of fuel on his division; he supplies the coal chutes with fuel and supplies the stationary plants with fuel. But if he has been told that a certain stationary plant on his division can use slack coal successfully, it must be provided with slack coal. Another stationary plant on the same division may be assigned run of mine coal. At the end of the month if for any cause he has furnished the slack coal plant

with the run of mine coal he is notified of the fact from our office. He is asked by his general manager why he did not provide the necessary fuel, and is called upon to make the necessary explanation.

E. W. Pratt (C. & N. W.): Only last week the committee of arrangements of the Fuel Association held a very important meeting here in Chicago. Mr. M. Auliffe, who is now manager of the Fuel Conservation Section of the Railroad Administration, is a member of that committee. The addresses delivered at the convention of the association will be sent under personal cover in government envelopes to every railroad company, every engineer and fireman and every shop man in the motive power department. To the first two classes, there will be included an instruction book, which has been devised by the Fuel Conservation Section and some other information of an official nature. Following that, I understand the railroads of the country will be divided into fuel districts, practically corresponding with the regional districts.

Specifications and Tests for Materials



Spring Testing Machine

THE COMMITTEE on Specifications and Tests for Materials submitted its report covering the different subjects which were reviewed during the past year, including also its report for the previous year (1916-17), with certain modifications, and made its recommendations as shown under the respective exhibits.

Exhibit A.—Specifications for Staybolt Iron

RECOMMENDED PRACTICE

1. **Scope.**—These specifications cover all staybolt iron.

1. MANUFACTURE

2. **Process.**—The iron shall be rolled from a bloom, slabpile or boxpile, made wholly from reworked puddled pig iron, or reworked knobbed charcoal iron. The puddle mixture and the component parts of the bloom, slabpile or boxpile shall be free from any admixture of iron scrap or steel.

3. **Definition of Terms.**—(a) Bloom. A bloom is a solid mass of iron that has been hammered into a convenient size for rolling.

(b) Slabpile. A slabpile is a pile built up wholly from flat bars of iron, of the full length of the pile.

(c) Boxpile. A boxpile is a pile, the sides, top and bottom of which are formed by four flat bars and the interior of which consists of a number of small bars the full length of the pile.

(d) Iron Scrap. This term applies only to foreign or bought scrap and does not include local mill products free from foreign or bought scrap.

II. CHEMICAL PROPERTIES AND TESTS

4. **Chemical Composition.**—At the option of the purchaser and when so specified, chemical analysis shall be made and drillings taken from tension test specimens which shall conform to the following requirements as to chemical composition:

Phosphorus	.....	not over 0.150 per cent
Manganese	.....	not over 1.10 per cent

III. PHYSICAL PROPERTIES AND TESTS

5. **Tension Tests.**—(a) The iron shall conform to the following requirements as to tensile properties:

Tensile strength, lb. per sq. in.	47,000-52,000
Yield point, lb. per cent of tensile strength ..	60
Elongation in 2 in., min. per cent	30
Reduction of area, min. per cent	48

(b) The yield point shall be determined by the drop of the beam of the testing machine. The speed of the cross-head of the machine shall not exceed 3/4 in. per minute. After passing the yield point the testing speed shall be between 3 and 4 in. per minute. The distance between the grips shall not be less than 10 nor more than 11 in.

(c) In no case shall the variation in tensile strength between the maximum and minimum figures, for one offering of iron under these specifications, be more than 3000 lb.

6. **Bend Tests.**—(a) Cold-bend Test. The test specimen shall bend cold through 180 deg. flat on itself in both directions without fracture on the outside of the bent portion.

(b) Nick-bend Test.—The test specimen, when nicked 25 per cent around with a tool having a 60 deg. cutting edge, to a depth of not less than 8 nor more than 16 per cent of the diameter of the specimen, and broken, shall show a clean fiber free from crystallization.

(c) Bend tests shall be made by pressure.

7. **Etch Test.**—The cross-section of the test specimen shall be ground or polished and etched for a sufficient period to develop the structure. This test shall show the material to be free from steel.

8. **Test Specimens.**—All test specimens shall be of the full section of material as rolled.

9. **Number of Tests.**—(a) Bars of one size shall be sorted into lots of 100 each. Two bars shall be selected at random from each lot or fraction thereof and tested as specified in Sections 5 and 6, except that only one of these bars shall be tested as specified in Section 7.

(b) If any test specimen from either of the lots originally selected to represent a lot of material contains surface defects not visible before testing, but visible after testing, or if a tension test specimen breaks outside the middle third of the gage length, a retort will be allowed.

IV. PERMISSIBLE VARIATIONS IN SIZE

10. **Permissible Variations.**—The bars shall be truly round within 0.01 in. and shall not vary more than 0.005 in. above nor more than 0.01 in. below the specified size.

V. FINISH.

11. **Finish.**—The bars shall be smoothly rolled and free from slivers, depressions, seams, crop ends and evidence of being burned.

VI. MARKING.

12. **Marking.**—The bars shall be stamped or marked as designated by the purchaser.

VII. INSPECTION AND REJECTION.

14. **Rejection.**—(a) Material represented by samples which fail to conform to the requirements of these specifications will be rejected.

(b) Individual bars which will not take a clean, sharp thread with dies in fair condition or which, subsequent to the above tests at the mills or elsewhere and their acceptance, develop defects in forging or machining will be rejected and shall be replaced by the manufacturer.

Exhibit B.—Specifications for Cast-Iron Cylinders and Cylinder Parts for Locomotives

1. The following revision to supersede the present Specifications for Locomotive Cylinder Castings, Cylinder Bushings, Cylinder Heads, Steam Chests, Valve Bushings, Packing Rings and Superheater Castings.

1. **Scope.**—These specifications cover cast iron for locomotive cylinders, piston valve bushings, piston valve pack-

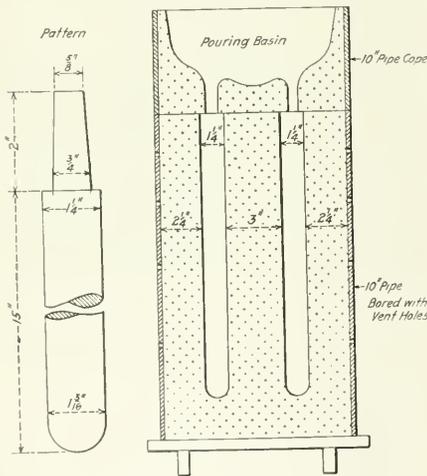


Fig. 1—Mold for Arbitration Test Bar

ing rings, piston valve bull rings, cylinder bushings, piston packing rings and piston head or bull rings.

I. MANUFACTURE.

2. **Process.**—All castings shall be made from good quality, close-grained gray iron. Cylinders shall be cast in dry sand molds.

II. CHEMICAL PROPERTIES AND TESTS.

3. **Chemical Composition.**—The iron shall conform to the following requirements as to chemical composition:

Phosphorus	not over 0.70 per cent
Sulphur	not over 0.12 per cent

4. **Ladle Analysis.**—An analysis shall be made by the manufacturer from a test bar taken during the pouring of each melt, a copy of which shall be given to the purchaser or

his representative. This analysis shall conform to the requirements specified in Section 3.

5. **Check Analysis.**—A check analysis of drillings taken from the fractured end of the transverse test bars may be made by the purchaser, and shall conform to the requirements specified in Section 3.

III. PHYSICAL PROPERTIES AND TESTS.

6. **Transverse Test.**—(a) The arbitration test bar, as described in Section 8, shall be placed horizontally upon supports 12 in. apart center to center, and when tested under a centrally applied load, the transverse strength shall not be less than 3200 lb. for castings 5/8 in. or less in thickness, nor less than 3500 lb. for castings over 5/8 in. in thickness; and

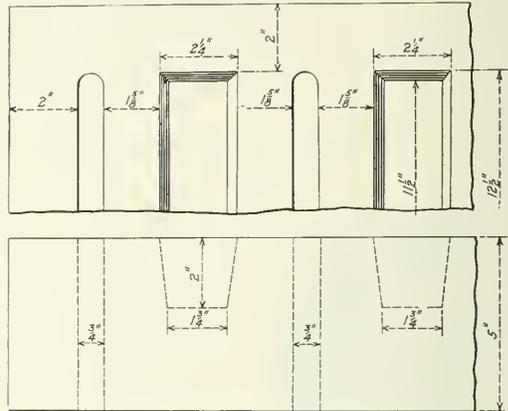


Fig. 2—Mold for Chill Test Specimen

the deflection, for either thickness of material, shall not be less than 0.09 in.

(b) If the transverse strength or the deflection of the first test bar does not conform to the requirements specified in paragraph (a), a test may be made on the second bar, as provided for in Section 8, which shall conform to the requirements specified.

(c) The application of the load, for a deflection of 0.10 in., shall be within a period of from 20 to 40 seconds.

7. **Chill Test.**—A sample of the molten iron shall be chilled in a cast-iron mold. The sample shall be allowed to cool in the mold until it is a dark red or almost black, when it may be knocked out and quenched in water. The sample, when broken, shall show a close-grained gray iron, with a well-defined border of white iron at the bottom of the fracture. The depth of the white iron shall not be less than 1/16 in. for castings 5/8 in. or less in thickness, nor less than 1/8 in. for castings over 5/8 in. in thickness.

8. **Test Specimens.**—Two arbitration test bars and one chill test bar shall be poured from each melt of iron, in accordance with the form and dimensions as shown in Figs. 1 and 2, provided that the diameter of the arbitration test bar shall not vary more than 0.02 in. above or below the specified size.

9. **Number of Tests.**—One transverse test, except as specified in Section 6 (b), and one chill test shall be made to represent each melt.

IV. WORKMANSHIP.

10. **Workmanship.**—Castings shall be smooth, well cleaned, free from shrinkage cracks and other injurious defects. When castings are to be machined, sufficient allow-

ance shall be made on patterns, that the castings will finish to blue-print dimensions.

V. MARKING.

11. **Marking.**—When so specified, the manufacturer's name or identification mark, the date when cast, the purchaser's pattern number and such other marking as may be designated, shall be cast on each casting in raised letters and figures.

VI. INSPECTION AND REJECTION.

12. **Inspection.**—(a) The purchaser or his representative shall be given reasonable opportunity to enable him to witness the pouring of the castings and test specimens, as well as to be present when physical tests are made.

(b) In case the inspector is not present to witness the pouring of the castings and test specimens, the manufacturer shall make all tests required by the specifications and, upon request, shall furnish the purchaser with a copy of the results of his tests and shall hold the transverse test and the chill test specimens, subject to examination by the inspector.

(c) The purchaser may make the tests to govern the acceptance or rejection of the material in his own laboratory or elsewhere. Such tests, however, shall be made at the expense of the purchaser.

(d) All tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the works.

13. **Rejection.**—(a) Castings represented by samples which fail to conform to the requirements of these specifications will be rejected.

(b) Individual castings which, subsequent to the above tests and inspection at the foundry or elsewhere and their acceptance, show defects or imperfections will be rejected and shall be replaced by the manufacturer.

14. **Rehearing.**—Samples tested in accordance with the requirements of these specifications, which represent rejected material, will be held for 14 days from the date of test report. In case of dissatisfaction with the results of tests, the manufacturer may make claim for a rehearing within that time.

Exhibit C.—Specifications for Mild Steel Bars

(See Exhibit B in the report of the Master Car Builders' Association Committee on Specifications and Tests for Materials.)

Exhibit D.—Specifications for Tank and Underframe Rivet Steel and Rivets

(See Exhibit C in the report of the Master Car Builders' Association Committee on Specifications and Tests for Materials.)

Exhibit E.—Specifications for Locomotive Rivet Steel and Rivets

1. **SEC. 6.—Number of Samples for Chemical Analysis.** Omit the words "for Chemical Analysis" and also omit the words forming the last sentence of paragraph (a), "These samples shall be used for check analysis by the purchaser."

Exhibit F.—Specifications for Welded Pipe

(See Exhibit F in the report of the Master Car Builders' Association Committee on Specifications and Tests for Materials.)

Exhibit G.—Specifications for Steel Axles for Locomotive Tenders

1. Add a new Section L to read as follows, and re-number subsequent sections accordingly:

"1. **Scope.**—These specifications cover axles up to and including those 6 1/2 in. in diameter at the center. Axles

over 6 1/2 in. in diameter at the center shall not be subject to the drop test, but may be purchased under the Standard Specifications for Annealed and Unannealed Carbon Steel Axles, Specifications for Quenched and Tempered Alloy Steel Forgings, or Specifications for Quenched and Tempered Carbon steel Axles, Shafts and other Forgings for Locomotives and Cars."

2. **SEC. 5.** Omit the "Formula" and "Note" as shown under the present paragraph (b), and change the present Section 5 to read as follows:

"6. **Drop Test.**—(a) The test axle shall be so placed on supports 5 ft. apart that the tup will strike it midway between the ends. It shall stand without fracture five blows from a tup of 2240 lb. falling from a height as specified, and the permanent set produced by the first blow shall not exceed that specified for axles of corresponding dimensions, as shown in the following table. The axle shall be turned through 180 deg. after the first and the third blows.

(b) The permanent set is the difference between the distance from the straight-edge to the middle point of the axle measured before the first blow and the distance measured in the same manner after the blow. The straight-edge shall rest only on the collars or the ends of the axle.

(c) The temperature of the axle, when tested, shall be between 40 and 120 deg. F."

3. **Table.**—Make the following changes:

Omit the words "Weight of Tup, 2240 lb. Supports 3 Ft. Apart."

Add to the table a column under "Size of Axle, In." with the heading "Length Over All, In.," and the dimensions "84 1/4, 86 1/2, 88 1/2, 90 3/4," for axles having journal dimensions 4 1/4 by 8, 5 by 9, 5 1/2 by 10 and 6 by 11 in., respectively.

Under "Maximum Permanent Set, In.," change the values "6 1/4" and "4 1/2" to read "6 1/4" and "4 1/2," respectively.

4. **Present Section 10. — Permissible Variation.** Change the tolerance for excess length over all, from 5/32 in. to 1/8 in.

Exhibit H.—Specifications for Boiler and Firebox Steel for Locomotive Equipment

1. **SEC. 3.—Chemical Composition.** Omit from the requirements the copper content "not over 0.05 per cent" for firebox steel.

2. **SEC. 13.—Weight.** Change to read as follows:

"The overweight of each lot* in each shipment shall not exceed the amount given in the following table. One cu. in. of steel is assumed to weigh 0.2833 lb."

(Substitute the following table for the present one, shown on page 551.)

PERMISSIBLE OVERWEIGHT OF PLATES ORDERED TO THICKNESS
PERMISSIBLE INCREASE IN WEIGHT WEIGH PER SQUARE FOOT OF PLATE FOR WIDTHS GIVEN, EXPRESSED IN PERCENTAGE OF NOMINAL WEIGHT

Order Gauge, inches	Under 36	36 to 42, excl.	42 to 48, excl.	48 to 54, excl.	54 to 60, excl.	60 to 66, excl.	66 to 72, excl.	72 to 78, excl.	78 to 84, excl.	84 to 90, excl.	90 to 96, excl.	96 to 108, excl.	108 to 120, excl.	120 to 132, excl.	132 in. or over
Under 36	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16
36 to 42, excl.	8	9	10	10	11	11	12	12	13	13	14	14	15	15	16
42 to 48, excl.	7	8	9	10	10	11	12	12	13	13	14	14	15	15	16
48 to 54, excl.	6	7	8	9	10	10	11	12	12	13	13	14	14	15	16
54 to 60, excl.	5	6	7	8	9	10	10	11	12	12	13	13	14	14	15
60 to 66, excl.	4.5	5	6	7	8	9	10	10	11	12	12	13	13	14	15
66 to 72, excl.	4	4.5	5	6	7	8	9	10	10	11	12	12	13	13	14
72 to 78, excl.	3.5	4	4.5	5	6	7	8	9	10	10	11	12	12	13	14
78 to 84, excl.	3	3.5	4	4.5	5	6	7	8	9	10	10	11	12	12	13
84 to 90, excl.	2.5	3	3.5	4	4.5	5	6	7	8	9	10	10	11	12	13
90 to 96, excl.	2	2.5	3	3.5	4	4.5	5	6	7	8	9	10	10	11	12
96 to 108, excl.	1.5	2	2.5	3	3.5	4	4.5	5	6	7	8	9	10	10	11
108 to 120, excl.	1	1.5	2	2.5	3	3.5	4	4.5	5	6	7	8	9	10	11
120 to 132, excl.	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	6	7	8	9	10
132 in. or over	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	6	7	8	9

*The term "lot" used in the above table means all of the plates of each group, width and gage thickness.

Exhibit I

1. Change the form and dimensions of Tension Test Specimens, Figs. 1, pages 560 (Specifications for Annealed

and Unannealed Carbon Steel Axles, Shafts and other Forgings for Locomotives), 577 (Specifications for Quenched and Tempered Alloy Steel Forgings), and 583 (Specifications for Quenched and Tempered Carbon Steel Axles, Shafts and other Forgings for Locomotives and Cars), to conform to the latest type of American Society for Testing Materials specimen.

Exhibit J.—Specifications for Annealed and Unannealed Carbon Steel Axles, Shafts and Other Forgings for Locomotives

1. SEC. 12.—Retests. Change paragraph (b) to read as follows:

"When annealed forgings are specified, if the fracture of any test specimen shows over 15 per cent crystalline a sec-

ond test shall be made. If the fracture of the second specimen shows over 15 per cent crystalline, the forgings represented by the specimen shall be re-annealed. The fracture shall be considered crystalline if the crystals which it contains are so large that the cleavage planes or sides of these crystals are easily visible to the eye."

The report is signed by C. D. Young, chairman, Pennsylvania; J. R. Onderdonk, B. & O.; A. H. Fetters, Union Pacific; Frank Zeleny, C. B. & Q.; H. E. Smith, N. Y. C.; H. B. MacFarland, A. T. & S. F.; Prof. L. S. Randolph, Virginia Polytechnic Institute.

Action Taken

There was no discussion. The report was accepted and will be submitted to letter ballot.

Design and Maintenance of Locomotive Boilers



C. E. Fuller
Chairman

TWO YEARS AGO a report was presented offering basic ratios to be considered in locomotive-boiler design, covering also, in a general way, the use of autogenous welding in the maintenance of boilers, which this committee found was being utilized by many roads with very satisfactory results. Last year Circular E was issued, requesting data covering the subject of autogenous welding as applied to locomotive boilers. Replies were received from 36 roads, indicating the extent to

which they are using these processes, and the committee now presents the results of the investigation.

Smoke Boxes

There is no doubt that the construction and renewal of smokeboxes is handled expeditiously and economically by the use of autogenous welding. For joining smokeboxes at the longitudinal seam, several roads use the oxy-acetylene torch, while an equal number prefer to electric weld this seam. The usual method followed is to tack the edges of the sheet together at intervals of about 8 in., with strips about 2 in. long, then complete the weld, thus providing for more uniform expansion of the sheet than if a through weld were made. Wherever welded seams have been used, the results have been satisfactory. The cost is approximately 60 per cent of a riveted seam.

Practically all of the roads reporting cut off old or damaged smokebox plates by oxy-acetylene. It appears to be the usual practice to weld in small plates, but for larger plates to use riveted joints. The reinforcing rings in smokeboxes are usually not disturbed, the weld being made ahead of the ring.

Flues

The practice of electric-welding flues, particularly superheater flues, is quite general. The flue is applied in the usual manner, after which the firebox ends are beaded and welded lightly around the bead. Where used, the results have been satisfactory, although some trouble has been experienced from leakage when locomotives are located at points which have no welding apparatus. Of the roads re-

porting, 42 per cent use the oxy-acetylene or electric process for filling up pit holes in flues.

From the reports it is evident that a broad field for the application of autogenous welding lies in the safe-ending of flues, or the welding in of a new section near the center for the purpose of lengthening them for re-application. The advantage which comes from not having to limit the length of safe ends, on account of the capacity of flue-welding machines, certainly offers an opportunity to reclaim material which would otherwise not be serviceable. Of the roads reporting, 20 per cent are using the autogenous welding process for safe-ending flues, with satisfactory results. Three of the reporting roads have welded a new section into the flues, and the results from this practice have also been satisfactory.

Of the roads reporting, 20 per cent practice cutting out for replacement the entire flat surface of the front flue sheet, without disturbing the flange or rivets. This method, however, has not been generally adopted, and it is usual to cut out the entire old sheet by the acetylene process, and to replace it with a new one. The practice of cutting out the section of the front flue sheet under the dry pipe, containing the flue holes, and replacing it by welding in a new section suitable for the application of superheater flues, has not met with wide favor, although the roads doing this report satisfactory and economical results. One road reports that by following this practice it can replace sheets at a cost of \$28, as compared with \$150 for entire new sheets riveted in place.

The majority of roads reporting do not apply back flue sheets by welding, but this is being satisfactorily accomplished on some few roads by either process. The use of oxy-acetylene or electric welding for repairing cracks in the knuckle of flue sheets is quite general and produces good results. There is, however, a wide variance in the methods of welding. Seventeen roads report that such cracks are welded on both sides, six weld on the water side only, while three weld on the fire side only. One road reports that it prefers to use electric welding from the water side, and oxy-acetylene from the fire side.

For repairing cracks in flue-sheet bridges, the usual practice is to remove the adjacent flues, cut the sheet, both sides, at about a 45 degree angle, and then fill in the space.

Staybolts

A number of roads are using oxy-acetylene torches for burning off the projecting ends of new staybolts before riveting them over. The results obtained have been, in most cases, satisfactory. To insure all bolts being cut off uniformly, one road uses a guide next to the nozzle.

Electric welding of cracks radiating from staybolt holes seems to be the most satisfactory. It is customary to remove

the staybolt, chamfer the hole for the purpose of eliminating the cracks, or, should the crack extend too far for this, to bevel both hole and crack to 90 degrees and fill the crack and hole up solid; the sheet is then drilled and tapped for the application of a new staybolt.

Fireboxes

There is no part of the boiler where the application of these processes of welding has been so uniformly successful or resulted in greater economy than for firebox application and repairs. Ranging in scope from putting in entire new fireboxes to building up around leaky mud-ring rivets, the manifold utility of autogenous welding seems to be limited only by the ingenuity of the operator.

Of the roads reporting, 25 per cent are using the electric process for welding in entire new fireboxes. The application of part or full firebox sheets and door sheets has been quite generally practiced. Door sleeves are renewed, part wrapper sheets and part back heads applied, and the application of patches reduced to a minimum by welding.

Where patches are required, the work is accomplished by welding, at about 60 per cent of the cost of riveted patches. The forms of patches used vary with individual roads. Some cut the sheet out with square edges, lay the patch over the hole in the sheet, with a lap around the outside of about 3/8 in., the patch being beveled on its edges, and build up over the bevel and onto the sheet. Another method is to flange the edges of the hole outwardly, lay the patch on the extending flange, with its beveled edge projecting outside the flange toward the sheet, and then join the beveled edge of the patch to the flange by building up a bead. Still another method followed on repairs to firebox sheets is to V out the sheet on the fire side, place a patch which has edges beveled in the opposite directions from the sheet into the opening, then fill up the 90-deg. opening. With this style of patch, an expansion knuckle parallel to the vertical center line of staybolts provides for stresses. The results are uniformly satisfactory. For filling up staybolt or rivet holes, both processes are largely used. Eight of the reporting roads weld exterior bosses, usually by the oxy-acetylene process, on the outside wrapper sheet, to give increased full threads for angular radial staybolts. Only two roads report having welded in arch tubes, while three weld firebrick arch studs to firebox side sheets successfully.

Three roads have reported cutting off firebox and wrapper sheets above mud rings to avoid disturbing mud-ring rivets, then welding new fireboxes at this point. This practice, as yet, has not been followed to any extent.

The welding of cracks is usually limited to those from 4 in. to 35 in. long, the latter being done only to keep the locomotive in service. Practically 8 in. is considered about as long a crack as it is desirable to weld for permanent repairs, most roads preferring not to exceed 4 in.

Mud Rings

For mud-ring repairs, either electric or oxy-acetylene welds are used, the former being preferred. The usual method followed is to cut out a piece of the side sheet, over the crack, in the mud ring, bevel the mud ring from the top, then fill up the opening, after which the sheet is patched. In cases where the mud ring is removed from the locomotive, some roads prefer to bevel from both sides and then weld. A large saving in the cost of repairs results from welding mud rings in place. Troublesome leaks in mud-ring corners are eliminated by building up the caulking edge.

General

Among the many other repairs made by these methods may be cited reducing worn washout plug holes, reclaiming superheater units, building up worn places on stayed surfaces and welding up abandoned flue or plug holes.

The use of a carbon electrode or a metal electrode is

primarily dependent on the size and strength of the weld desired. The carbon-electrode process should be used on work of considerable size if maximum strength is not a limiting factor, and is very desirable for rapid cutting. When using the carbon electrode it is customary for the operator to heat around the weld, so that extensive contraction may be avoided.

The metal electrode process, which is generally used in the various phases of boiler maintenance work, has the advantage of confining the heat more closely, and is used for welds requiring strength and for small work. The current required has a much lower value than that used with the carbon-electrode process.

If the current is too high for the size of welding wire being used, it is found the metal oxidizes and the weld becomes hard and brittle. Representative practice appears to be about as follows:

1/8 in. wire	11-12 amperes
3/16 in. wire	11-15 amperes
1/4 in. wire	11-16 amperes

The voltage at the panel should be from 70 to 75, reduced at the arc to about 20 to 30 volts. By following these limits it has been found the metal flows in its most natural state, leaving the weld unoxidized and ductile.

As a general rule, it is desirable after starting a weld to complete it if possible before stopping, on account of the effect of the contraction of the sheet if work ceases. In some cases it will be found advisable to have two men work alternately in order to accomplish this. On account of the wide variance in the methods followed, and the costs reported the committee does not feel that definite recommendations can be formulated, believing that local conditions so far govern these as to make such recommendations of little value.

While it is gratifying to consider how much has been accomplished in the use of the oxy-acetylene and electric processes for boiler maintenance, it is believed that the art is still in a formative and developmental state, and the future will see even greater progress, as the possibilities of economical application are exploited. It may not be amiss for this committee to sound a warning against too radical application. Stayed surfaces and appurtenances, which are not subject to direct radial pressure, offer a safe and attractive field for future experiments, and any work for the time being should be limited to these sections of the boiler.

The report was signed by C. E. Fuller, chairman, superintendent motive power, Union Pacific; A. W. Gibbs, chief mechanical engineer, Pennsylvania; D. R. McClain, superintendent motive power, New York Central; M. K. Barnum, assistant to vice-president, Baltimore & Ohio; R. I. Smith, general superintendent motive power, Atlantic Coast Line; C. B. Young, chief mechanical engineer, Chicago, Burlington & Quincy, and J. Snowden Bell.

Discussion

I. W. Pratt (C. & N. W.): We are spending a great deal of money for new shell sheets that are merely pitted in the belly; personally I can not see any danger with the present state of the art in welding up a pit hole there.

C. E. Fuller (Union Pacific): The welding of a pair of courses is nothing new. It has been practiced by the locomotive builders for a great many years. The objection that the government bureau has had against its practice was the inability to determine the fitness or safety of the welded sheet. There is no question but what a lot of pits in the shell can be taken care of with absolute safety as there is plenty of strength in the sheet with the possible exception of the circumferential seam around the sheet.

C. L. Chambers (C. R. R. of N. J.): I think it would be perfectly safe if a maximum depth of pitting could be established.

Action Taken

The report was received and the committee was continued.

Revision of Standards and Recommended Practice



W. E. Dunham
Chairman

AFTER CONSIDERATION of the present Standards and Recommended Practices of the Association, together with the replies received to the circular of inquiry sent to members, the committee submits the following report:

Driving Wheel Centers (STANDARD.) PAGES 529-530

1. A member suggests that the $\frac{1}{8}$ -in. retaining lip on the tire shown in connection with the details of driving wheel centers should be omitted. The committee concurs in

the suggestion and the secretary will be instructed to correct the drawings.

Specifications for Steel Axles for Locomotive Tenders (STANDARD.) PAGES 533-536

2. A member calls attention to the fact that inasmuch as axles for engine trucks are ordinarily tested under the drop from the same nominal center diameter as car axles, there should be a sheet of standard engine truck axles and a table for the drop tests made to correspond. The committee does not concur in the suggestion.

Journal Boxes, Bearings and Wedges (STANDARD.) PAGES 536-537

3. For Journals $3\frac{3}{4}$ by 7 in. Sheet M. M. 4. A member calls attention to the fact that the arc recess is not shown on Sheet M. M. 4, although its omission for larger-sized wedges was adopted by letter ballot in 1916, and suggests that similar action is advisable for the $3\frac{3}{4}$ by 7 in. journal box in question. The committee does not concur in the suggestion.

4. For Journals $4\frac{1}{4}$ by 8 in. Sheet M. M. 6. A member calls attention to the arc recess being indicated in the wedge in the plan and cross-section views of the journal box, and suggests that they should be omitted. The committee notes the error, and the secretary will be instructed to correct the drawings.

5. For Journals $4\frac{1}{4}$ by 8 in. Sheets M. M. 6 and 7. A member calls attention to the over-all width of bearing, $4\frac{1}{8}$ in., leaving an edge which is too thin after boring for a 5/16-in. lining metal, and suggests increasing this width to $4\frac{3}{8}$ in. The committee concurs in the suggestion.

6. For Journals 5 by 9 in. Sheet M. M. 9. A member calls attention to the arc recess being indicated in the wedge in the cross-section view of the journal box, and suggests that it should be omitted.

The committee notes the error, and the secretary will be instructed to correct the drawings.

7. For Journals $5\frac{1}{2}$ by 10 in. Sheet M. M. 12. A member suggests that the plan view of the journal box on Sheet M. M. 12 is misleading, as it is not clear whether the arc recess refers to the wedge or the brass. The committee does not concur in the opinion expressed.

8. For Journals $5\frac{1}{2}$ by 10 in. Sheets M. M. 12 and 13. A member recommends increasing the over-all width of $5\frac{1}{4}$ in. to $5\frac{3}{4}$ in., in order to allow for proper boring of the ocaring, the $5\frac{1}{4}$ in. leaving an edge which is too thin after

boring for 5/16-in. lining metal. The committee concurs in the suggestion.

Solid Wrought Carbon Steel Wheels

(RECOMMENDED PRACTICE.) PAGES 543-546. SHEETS M. M. H, I, J AND K

9. A member suggests that the drawings on Sheets H, I, J and K should show four $1\frac{1}{4}$ -in. holes through the plate, located at suitable radii so as to assist in holding the wheel when turning up in a lathe. The committee does not concur in the suggestion.

10. A member suggests advancing these specifications to Standard. The committee concurs in the suggestion.

Minimum Thickness for Steel Tires

(RECOMMENDED PRACTICE.) PAGE 547. SHEET M. M. B.

11. A member suggests advancing to Standard. The committee concurs in the suggestion.

Wheel Circumference Measure for Steel and Steel Tired Wheels

(RECOMMENDED PRACTICE.) PAGE 547. SHEET M. M. B.

12. A member suggests advancing to Standard for steel, steel tired and cast wheels, and eliminating the circumference measure shown on Sheet M. M. 20. The committee concurs in the suggestion.

Rotundity Gage for Solid Steel Engine and Truck Wheels

(RECOMMENDED PRACTICE.) PAGE 547. SHEET M. M. B.

13. A member suggests advancing to Standard. The committee concurs in the suggestion.

Plane Gage for Solid Steel Wheels

(RECOMMENDED PRACTICE.) PAGE 547. SHEET M. M. B.

14. A member suggests advancing to Standard. The committee concurs in the suggestion.

Specifications for Air Brake Hose Gaskets

(RECOMMENDED PRACTICE.) PAGES 591-592

15. A member suggests that the title should read, "Gaskets for Air Brake Hose Couplings." The committee does not concur in the suggestion.

Specification for Chain

(RECOMMENDED PRACTICE.) PAGES 594-597

16. A member suggests that in Section IV, paragraph 8 (a), the word "injurious" be incorporated in the first line, and in paragraph 8 (b) the word "perceptible" be incorporated in the last line. The committee does not concur in the suggestion.

Safety Appliances

(STANDARD.) PAGES 635-640

17. A member suggests that any conference or other published rulings of the Interstate Commerce Commission, as regards Safety Appliances as far as they pertain to steam locomotives, be published as a part of the proceedings. The committee concurs in the suggestion.

Inspection and Testing of Locomotive Boilers

(STANDARD.) PAGES 640-648

18. A member suggests that the reference to the date of July 1, 1912, should be omitted in paragraph 37. The committee does not concur in the suggestion.

Rules and Instructions for Inspection and Testing of Steam Locomotives and Tenders

(STANDARD.) PAGES 648-665

19. A member suggests that with the weight of springs in use in spring buffers between engine and tender, the 1/2 in. compression required in the last paragraph of Rule 22 is too much, and suggests that this be reduced to 1/4 in. The committee does not concur in the suggestion.

20. A member suggests that, inasmuch as we have had sufficient experience in autogenous welding to know that an autogenous weld can be made as solid as a fire weld, when welding up cracks, the second paragraph of Rule 28 be changed to admit of autogenous welding of cracks in rods. The committee does not concur in the suggestion.

21. A member suggests that the Rules 29 and 31, covering headlight requirements on road and yard engines, be superseded or modified by the latest instructions. The committee concurs in the suggestion, as covered by paragraph 24 of this report.

22. A member suggests that in the second paragraph of the Rule 52, in reference to the height between tender and locomotive decks, the words "when on straight and level track" should be added. The committee does not concur in the suggestion.

23. A member suggests that modifications of the original rules, when given by the Interstate Commerce Commission, should be embodied in the rule or attached as an explanatory note. The committee concurs in the suggestion.

24. A member suggests that interpretations and rulings shown in connection with the Rules and Instructions for Inspection and Testing of Locomotive Boilers and Their Appurtenances, and the explanations of the Rules and Instructions for the Inspection and Testing of Locomotives and Tenders be included as a part of the Proceedings. The committee concurs in the suggestion.

Rules for Determining Stresses in Locomotive Boilers

(RECOMMENDED PRACTICE.) PAGES 719-720

25. A member calls attention to the omission in the introductory paragraph of the fact that these rules apply only to new construction and not to existing boilers. The committee notes the omission and the secretary will be instructed to correct it.

Special Report on Pipe Unions

26. The committee would report that, owing to the death of H. G. Stott, chairman of the committee of the American Society of Mechanical Engineers who was to handle the matter of standard pipe unions, no progress has been made during the year.

New Business

27. A member raises the question as to the possibility and practicability of developing standards with respect to driving axles, engine truck axles, bearings, boxes and wedges along the lines of standardization now being completed in connection with freight equipment cars by the A. R. A., or the efforts in this direction made by the Harriman Associated Lines some time ago. The committee does not concur in the suggestion.

28. A member suggests a standardization of the draft gear attachments on both old and new tenders. The committee does not concur in the suggestion.

The report is signed by W. E. Dunham, chairman; C. & N. W.; M. H. Haig, A. T. & S. F.; A. G. Trumbull, Erie; C. D. Young, Pennsylvania; G. S. Goodwin, C. R. I. & P.; R. L. Ettinger, Southern; and B. B. Milner, N. Y. C.

Action Taken

There was no discussion of this report. It was received and the recommendations were adopted.

Train Resistance and Tonnage Rating



O. C. Wright
Chairman

IN ORDER THAT THIS COMMITTEE might have the benefit of the experience of the various roads in connection with train resistance and tonnage rating, Circular H, dated January 22, 1917, was issued, making request for replies to the following questions:

1. Have any tests been conducted on your road to determine the rolling resistance of freight or passenger cars of modern design other than that covered in the committee's report at the June, 1916, convention?
2. If so, what use of it has been made in connection with determining tonnage rating?
3. Please furnish curves showing the results obtained in such tests, to show the relation of resistance to weight of car or to the speed, or both.
4. Give general description of cars tested, including: (a) capacity, (b) light weight, (c) wheel base, (d) type of truck, (e) size of journals.
5. Give general description of track conditions under

which tests were made, i. e., weight of rail, kind of ballast, etc.

6. Give brief description of manner in which tests were conducted.
7. Please furnish such information as you may have in regard to the value of the superheater in increasing the available drawbar pull of the locomotive, giving the source of such information.
8. What method of supervision is in effect on your road to insure that the prescribed tonnage ratings are being hauled?
9. What would you recommend as a system of supervision which would be available to all roads?
10. Is any allowance made for the mechanical stoker in the calculation or application of tonnage rating on your road?
11. If such allowance is made, describe fully the basis for it.

Twenty-five replies to this circular were received. None of the roads gave any information in regard to Questions 1, 2, 3, 4, 5 and 6 with the exception of the Baltimore & Ohio and the Pennsylvania Lines West of Pittsburgh. The B. & O. furnished a resistance curve as shown on Plate A, which was drawn as a result of tests conducted on the B. & O. during October, November and December 1910, and January, 1911. This curve represents the average resistance of the cars used, the predominating car having the following characteristics:

Capacity	.....	110,000 lb.
Light weight	.....	40,000 "
Wheel base	.....	11 ft. 6 in.
Truck	.....	4 wheel cast steel with frames
Size of journals	.....	10 in. by 11 in.

These tests were conducted on track constructed of 90-lb. and 100-lb. rail with rock ballast. The average temperature under which the tests, represented by this curve, were made, was approximately 75 deg. F.

The Pennsylvania Lines West furnished a resistance curve as shown on Plate B, this curve having been drawn as a result of tests of Pennsylvania Lines' Class *G1*, *G1a* and *G1b* cars, the characteristics of which are shown by the following table:

	G1	G1a	G1b
Capacity, lb.....	100,000	100,000	100,000
Light weight, lb.....	39,200	39,050	38,700
Wheel base.....	28 ft. 9 in.	27 ft. 9 in.	27 ft. 3 in.
Type of truck.....	Arch Bar	Arch Bar	Arch Bar
Size of journal.....	5½ in. by 10 in.	5½ in. by 10 in.	5½ in. by 10 in.

These tests were made on track constructed with 85-lb. rail, part of which was laid on cinder ballast and part on stone ballast. The cars tested were of approximately the same dimensions as cars represented by the resistance curve as shown on Plate 11 of last year's report for 8-wheel cars. The resistance, it will be noted, is somewhat higher, which is probably due to the fact that these tests were made on 85-lb. rail, whereas the tests of the cars represented on Plate 11 of last year's report were made on 100-lb. rail.

The New York Central is the only road which gave any information in connection with Question 7 regarding increased tractive power due to superheat. The information given is shown on Plate C and is for two locomotives identical

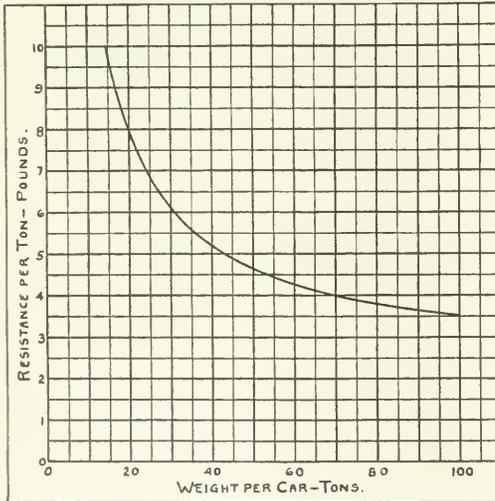


Plate A—Resistance of Freight Cars on Level Tangent Track—Baltimore & Ohio

in every respect with the exception of the superheater. The data for these locomotives are shown in the tabulation below:

Item	Saturated	Superheated
1. Class.....	G-6	G-6
2. Size of cylinders.....	23 in. by 32 in.	23 in. by 32 in.
3. Diameter of drivers.....	63 in.	63 in.
4. Steam pressure.....	200 lb.	200 lb.
5. Grate area.....	56.5	56.5
6. Number of large tubes.....	None	34—5½ in.
7. Number of small tubes.....	444—2 in.	233—2 in.
8. Tube heating surface.....	3,474 sq. ft.	2,542 sq. ft.
9. Firebox heating surface.....	185 sq. ft.	185 sq. ft.
10. Total heating surface.....	3,659 sq. ft.	2,727 sq. ft.
11. Superheater heating surface.....	None	580 sq. ft.

The following replies were received to Questions 8, 9, 10 and 11:

CHICAGO, BURLINGTON & QUINCY

8. The daily tonnage statement and monthly summary are checked in the general manager's office.

9. After the rates are worked up, a man in the general office should be assigned the duty of seeing that the rates are maintained, and if rates are found to be incorrect they should be revised, provided that there is no operating condition which needs correcting.

10. Stoker engines haul more tonnage.

11. Our Mikado engines with 28-in. by 32-in. cylinders, 64-in. drivers, 180-lb. pressure, and 60,000 lb. tractive power, are given an average of 7 per cent more tonnage when equipped with stokers. Our engines larger than this were equipped with stokers when purchased. With the stoker it is pos-

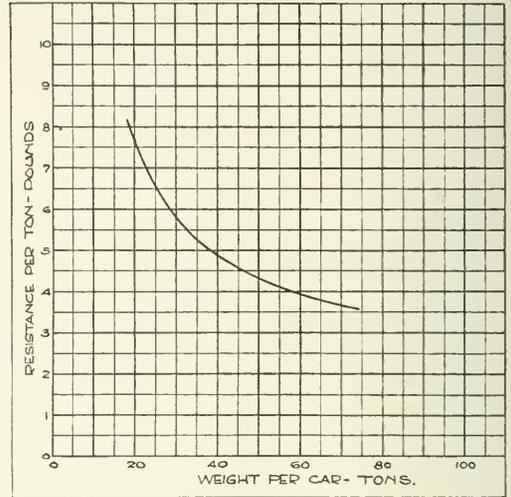


Plate B—Resistance Curve on Level Tangent Track—Pennsylvania Class G-1, G-1a, G-1b Cars

sible to keep up the boiler pressure on these large engines, which accounts for the greater tonnage hauled.

BALTIMORE & OHIO.

8. A daily record is kept showing the tonnage handled by each train and the theoretical rating for the given run. This statement is furnished to the superintendent, general superintendent and also the Bureau of Operating Statistics. The information given by the above record is referred to at frequent intervals for the purpose of checking observance of rating.

9. A method similar to that described in the answer to Question 8 should apply with good results to the operations on the road.

10. Yes.

11. In figuring ratings for hand-fired engines, a limit of 4000 lb. of coal per hour was fixed. With stoker engines, we have figured on the basis of 6000 to 7000 lb. per hour at maximum effort. This resulted in ratings about 10 per cent higher than with hand-fired engines of the same type.

PENNSYLVANIA LINES WEST OF PITTSBURGH

8. There is no direct supervision to insure that the prescribed tonnage shall be hauled. Ratings are made up based on tests, calculations or general practice. If criticism is made of any rating by the division officials, investigation is made to determine the correct rating, and the rating sheets are revised accordingly.

The tonnage rating sheets are issued in book form by the superintendent of motive power and approved by the general superintendent.

9. After the adoption of a rating, which is accepted as correct by the transportation department, there seems to be no reason why full tonnage should not be hauled.

Failure of a locomotive to handle full tonnage should be investigated by the trainmaster, road foreman of engines and master mechanic and the necessary steps taken to prevent recurrence of the failure.

10. No allowance is made for the mechanical stoker in calculation of ratings.

In reply to Questions 8 and 9 other roads reported that yardmasters and conductors were required to check trains, their reports being forwarded to the transportation officers. Computing machinery is used in some cases to figure the

drawbar pull, but it is necessary to know that the boiler is of sufficient capacity to supply the cylinders with steam at full boiler pressure and that it is possible to supply the firebox with the required amount of coal to evaporate the required amount of water. If the coal required per hour is beyond the capacity of a fireman, as it is in the case of many of our modern locomotives, a mechanical means of delivering the necessary coal to the firebox should be provided.

Second, from the standpoint of the transportation department, which should be vitally interested in this subject, and the question of loading trains under different weather conditions. Too often the setting of the rate is left in the hands of a yard clerk, who does not appreciate the importance of using the highest rate which can be hauled. The committee recommends that on every railroad the chief transportation officer provide a means of following up closely the train loading from day to day, with a view of determining the cause for hauling less than the rated tonnage and correcting the practice wherever possible.

Question 10 of the circular, in regard to taking into account the mechanical stoker, was asked by the committee in view of the fact that some of the roads have shown in their tabulated tonnage rating sheets higher tonnage for locomotives equipped with the stoker by from 5 to 13 per cent as compared with locomotives of the same type not equipped with stokers.

This committee cannot ignore the generally known fact that there are in every-day service on many railroads locomotives of a size and capacity so great that their rate of steam production, when hand-fired by a good fireman working at maximum capacity, cannot develop the maximum power for which they were designed, and that exactly similar locomotives, except that they are stoker equipped, are being operated at their maximum possible rate of steam production and developing their maximum power. It is our opinion that advantage should be taken of the opportunity of hauling whatever increase in tonnage is made possible by the ability to maintain full steam pressure by the use of the stoker. On the other hand, this is a matter of supervision, which should be taken care of in the designing of the locomotive, as in setting a proper tonnage rating it must be assumed that the specified boiler pressure can be maintained.

The report was signed by O. C. Wright, chairman, Pennsylvania; H. C. Manchester, Delaware, Lackawanna & Western; C. E. Chambers, Central Railroad of New Jersey; J. H. Manning, Delaware & Hudson; Frank Zeleny, Chicago, Burlington & Quincy; Maj. E. C. Schmidt, fuel conservation section, United States Railroad Administration; Joseph Chidley, New York Central and J. J. Carroll, Baltimore & Ohio.

Action Taken

W. E. Dunham (C & N W): The present report and also the past reports of this committee have all been reports indicating what the practices are and calling attention to the latest development in actual tonnage rating of locomotives on the railways of this country. It is one of the perpetual things which will continue with us, and I think the motive power departments of the railroads should receive from this committee from year to year a memorandum of the progress and practices recommended by us upon the subject of tonnage ratings.

The President: I think it is a committee that may well be continued because each year some new developments may come up. I think a motion to receive this report and continue the committee will be in order.

Mr. Dunham: I move that the report of the committee be received and the committee continued to report progress from time to time.

The motion was duly seconded and carried.

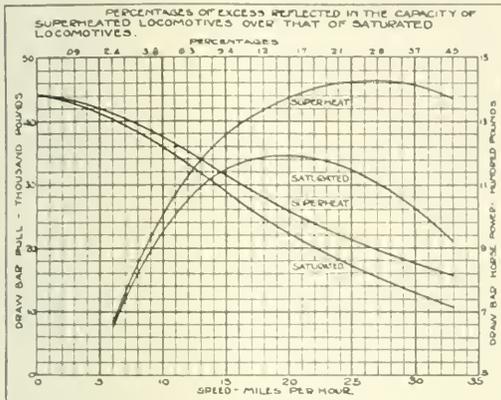


Plate C—Pull Speed Curves, Saturated vs. Superheated Locomotives. Class G-6 (Consolidation)—New York Central (Big Four)

tonnage. One road uses surprise tests by the trainmaster to insure that ratings are adhered to.

Summary

The resistance curves forwarded to the committee in answer to Questions 1, 2, 3, 4, 5 and 6 of Circular *H* and as covered by Plates *A* and *B* are submitted as a matter of interest.

The information shown on Plate *C* in regard to the value of the superheater corroborates very well similar information included in committee's report of 1916.

In regard to Questions 8 and 9 of the circular, the committee asked for this information, as it was indicated on the floor of the 1916 convention that the association desired the committee to present recommendations covering the supervision of the application of tonnage ratings. The committee was unable to obtain a great deal of information on this subject from the members to use as a guide for making such recommendations. However, the committee feels that this is a matter of very great importance and one which is not being given the attention by many of the roads which it should receive.

The supervision of the application of tonnage rating should be carried on from two standpoints:

First, from the standpoint of the mechanical department, to see that the locomotives are so designed and maintained as to be able to deliver at all times, under the conditions to which they are subjected, their rated drawbar pull. It is not sufficient to design a locomotive and say that because we have a certain size of cylinder, a certain diameter of wheel and a certain steam pressure the locomotive will at all times deliver a certain drawbar pull, corresponding to these dimen-

Semi-Elliptic Springs—Manufacture and Repair



M. F. Cox
Chairman

THE ART OF SPRINGMAKING dates back many years. As applied to locomotives, we find semi-elliptic springs practically the same in design as on the first locomotives of the Phineas Davis and Ross Winans type, about 1830. The methods in machine manufacturing have changed in keeping with modern progress. The advent of improved oil furnaces and other highly specialized machinery has simplified the construction, eliminated nearly all of the expensive hand work and greatly reduced

the cost of manufacture. What is said here applies to open-hearth steel of the following composition:

	Per Cent.
Carbon	1.00
Manganese	0.03
Phosphorus, not above	0.25
Silicon, not above	0.15
Sulphur, not above	0.03
Copper, not above	0.03

It is essential, that spring steel of a good, reliable quality be purchased to a specification, and also necessary that the

Material of unsatisfactory character may sometimes be improved and made to meet the requirements by hardening at a higher temperature. A .90 carbon quality spring steel should harden satisfactorily under a temperature as low as 1500 deg. F. Spring plates which have been hardened and fail, showing a coarse, white grain, indicate over-heating.

Operations in Spring Manufacture

There are eleven or twelve essential operations required in the preparation and manufacture of standard design semi-elliptic springs, mentioned below in order: shearing plates to length; upsetting, welding and punching ends of main plates (hot); rolling ends to a taper (one operation); nibbing the center of the plates; trimming the ends; rolling the plates and quenching (one operation); drawing the temper; assembling for banding; banding; testing and painting (paint bath).

Leaving the ends undrawn without any taper, practiced by some, reduces the cost by one operation, and it is claimed increases the life of the springs; the finished appearance of the spring, however, is not as neat.

The Spring

Locomotive driving springs and those for engine trucks, trailer and tender trucks are almost universally of the elliptic and semi-elliptic type, composed of a number of steel plates, according to the load they are required to carry. The plates of the various lengths are laid one upon the other,

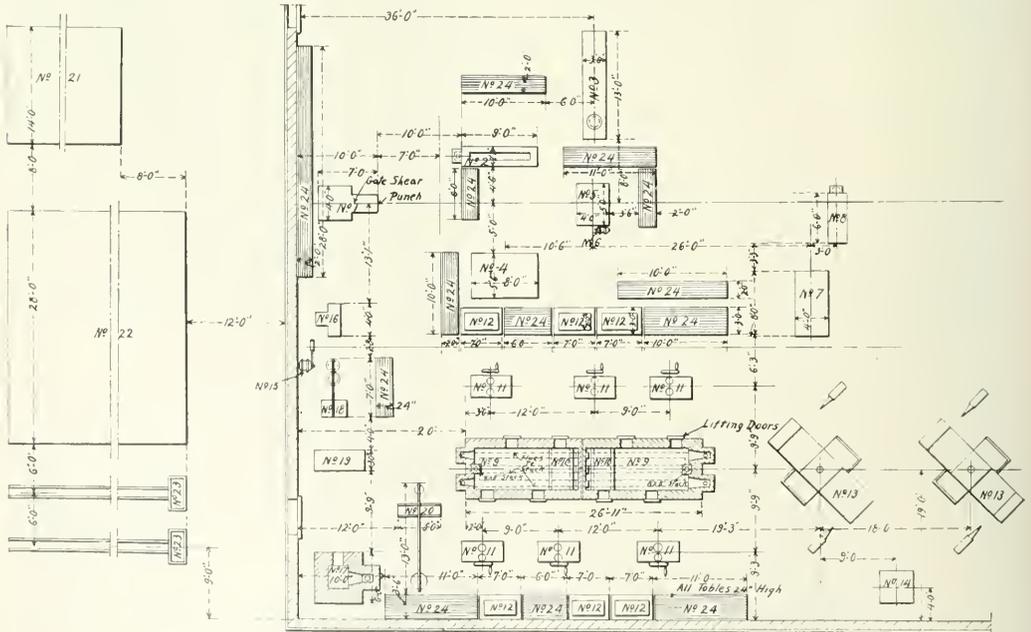


Fig. 1

springmakers obtain a correct knowledge of the character of the steel before beginning operations. The quality of the steel and the heat treatment are the all-important fac-

varying from 5/16 in. to 3/8 in. thick, and from 3 1/2 in. to 6 in. wide.

For many years the popular length of springs has ranged

from 34 in. to 42 in. from center to center of spring hanger slots. In order to standardize the shop construction, full-sized metal templates should be made for each main plate, for all classes of springs.

The length of the smallest leaf is usually made twice the width of the band, and the other plates are graduated accordingly.

A Typical Spring-Plant Arrangement

The machinery required for a railroad having 1,110 loco-

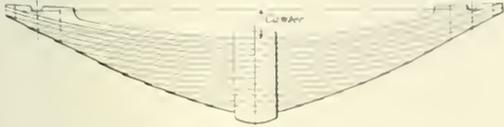


Fig. 2

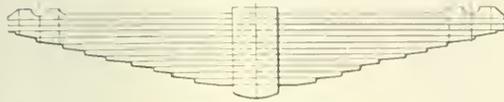


Fig. 3

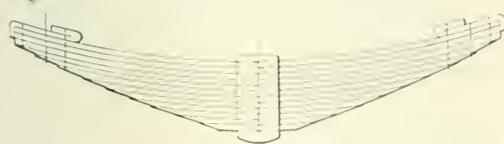


Fig. 4

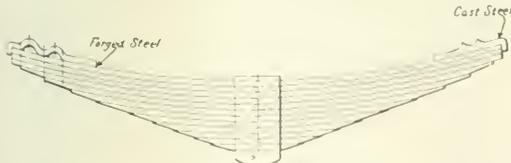


Fig. 5

motives and 667 passenger cars is shown in Fig. 1 herewith, a list of which is as follows:

No.	Machine	Size
1.	Combination punch and shear	14-5 1/2 in. by 1 1/2 in.
2.	Triple oil furnace for machines	14-5 1/2 in. by 108 in.
3.	Band remover	16 in. by 16 in.
4.	Tapering rolls	16 in. by 5 1/2 in.
5.	Combination trimmer and titter	16 in. by 5 1/2 in.
6.	Motor 8 h.p. for No. 5	16 in. by 18 in.
7.	Air bending machine	18 in. by 12 in.
8.	Oil furnace for No. 7	18 in. by 74 in.
9.	Heating furnace oil	18 in. by 74 in.
10.	Tempering retorts in No. 8	18 in. by 74 in.
11.	Spring rolls	18 in. by 60 in.
12.	Oil and water cooling vats	18 in. by 60 in.
13.	Double forges—coal	18 in. by 60 in.
14.	Steam hammer	1,600 lb.
15.	Motor for line shaft	18 in. by 12 in.
16.	Spring assembler air	18 in. by 12 in.
17.	Box banding furnace	18 in. by 54 in.
18.	Spring bander—air	18 in. by 7 in.
19.	Water tank for No. 18	18 in. by 7 in.
20.	Spring tester 1,500 lb.	18 in. by 7 in.
21.	Spring steel shed	18 in. by 26 ft.
22.	Spring storage shed	18 in. by 34 ft.
23.	Paint tanks and dipping racks	18 in. by 48 in.
24.	Serving tables	18 in. by 48 in.

The material throughout this department goes forward without side or back movement.

Fig. 2 is a fini-hed spring used for general purposes and is the accepted standard design. Fig. 3 occupies less vertical height and will take a shorter hanger than Fig. 2.

The more lumber and set a spring less. In after it is apt to be. It is better to design driving prongs a little stiff than otherwise. Many manufacturers are now making locomotive springs with plain main leaves and end clips, as shown in Figs. 4 and 5. By this method two expensive operations are eliminated and the cost of manufacture reduced. These clips serve best when made of scrap spring steel, boiler steel or drop forging. Malleable iron or cast-steel clips are only satisfactory on very light equipment.

The practice of manufacturing the main plates as shown in Fig. 6 is still standard with many railroads for engine and trailer truck springs as well as for driving springs.

Bandmaking

In small shops, where bandmaking is done by hand and the stock is usually selected equal to that of crown band, the fuller is used as shown in Fig. 7, after which the ends are drawn down, bent and welded. Where the stock is standard for size of band, the bending may be performed as in Fig. 8a on an air press, and welded by hand or Bradley strap hammer. Fig. 8b represents the most approved method of machine-made bands; the bending is done on an air machine and welded in a four inch forging machine.

Setting

The setting or cambering operation precedes the tempering. Spring manufacturers differ somewhat on this point and also as to the spacing of the plates to provide for free-

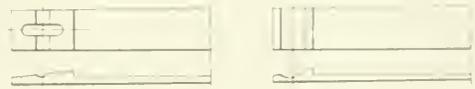


Fig. 6



Fig. 7

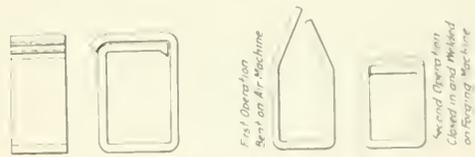


Fig. 8a

Fig. 8b

dom and flexibility. Some think the shrinkage which occurs in the hardening process provides for this, while others insist that no extra space should be allowed. Experience in one shop has demonstrated that a space of 5/16 in. diminishing toward the shortest one to within the last four or five plates; these may be set without any space allowance. See Fig. 9.

A number of plates may be placed in the fire together, as many as the operator can handle to advantage, after heating slowly to a good red color, they should then be drawn down with short, rapid strokes of the hammer or rolled as before stated. The steel should be worked at a moderate heat and at as even temperature as practicable. Overheating the ends and corners is to be avoided as it often causes them to chip off and fracture.

Tempering

In the tempering of spring plates, good judgment is required in order to meet with reasonable success. First of all, the furnace must be constructed exactly right and be under perfect control in order to maintain a uniform temperature throughout this very important process. If this is not done, the results will be confusing and unsatisfactory. Where a large number of springs are to be tempered in oil, it is necessary to have an oil tank of at least 200 gal. capacity, surrounded by a volume of water sufficient to keep the oil moderately cool, and there should be a false bottom or grate to prevent the spring plate coming in contact with the accumulation of scale and dirt which forms at the bottom.

Fish oil has been generally used in tempering, and it has proven satisfactory. Other varieties of oil and compounds are in use for which good results are claimed.

It was thought at one time that oil, after becoming hot, would not harden steel as effectively as cold oil or cold water. Long-continued practice has proven that steel spring plates, when hardened in oil moderately hot, possess all the requisite qualities. Some springmakers, after tempering, allow the plates to cool in a separate bath of oil and slowly harden, in order that the shape of the plates may change as little as possible.

After the leaves have been rolled to camber and tempered by quenching, the next operation is to place the plates in a retort, such as is shown in Fig. 1, which is a part of the heating furnace (No. 9) where the plates are brought up to a temperature (known as the flashing point) at which they become blue when cooled in air. This relieves any local strains that may set up in the hardening process, and gives a uniform temper and produces springs of good quality.

A tempered plate, after becoming cold, should not be struck with a hammer, as it often leads to fracture after the spring has been placed in service. A majority of all the ordinary tempering is left to the eye of the skilled operator, a method which is not altogether reliable. By the use of a pyrometer, or other heat-measuring instrument, much of the uncertainty of this operation may be eliminated and more satisfactory results obtained.

Then follows the assembling of the plates, clamping same tightly, in machine No. 16, Fig. 1. The band is heated

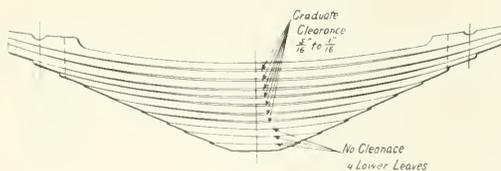


Fig. 9

in Furnace No. 17 and applied in machine No. 18. Care should be exercised that the band be placed exactly central, in order that the load may be distributed evenly; it should be made to the correct size, heated and put quickly into place with 40 to 50 tons pressure, and cooled in a water tank, No. 19.

The use of hydraulic or pneumatic power for this operation is essential. Testing the springs for uniformity of set under load is done under scale No. 20, after which they are ready for the paint bath.

Furnaces

The heating of spring plates is of vital importance, and no single detail contributes more to the success of this operation than a perfect-working furnace. The furnace hearth should be made equal to that of a sand-bottom furnace, so that the steel may find a suitable surface to rest on. The

heat should completely surround and uniformly penetrate the piece of steel. Pyrometer readings should be taken periodically at different locations within the furnace to insure that a uniform temperature is being maintained over the entire furnace.

Spring Repairing

The operations required in repairing elliptic and semi-elliptic springs are few and simple. After the spring band is taken off, an inspection of each plate is made for superficial defects. Plates which are found to be pitted or badly corroded are discarded. A close inspection will disclose most of the imperfections. Care must be used in the selection of such of the old plates which appear suitable for

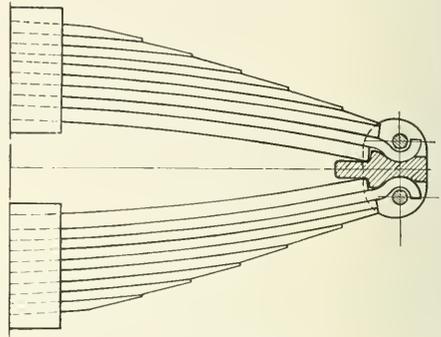


Fig. 10

further use. It is not correct to use plates of different thicknesses; uniform flexibility will be impossible with such a practice. It has been demonstrated that a plate, for example, 7/16 in. thick, worked in among those 3/8 or thinner, will be the first one to break.

Reclaiming spring plates is not altogether a satisfactory operation. It is a question whether it is not more economical in the end to supply new plates throughout. It has been noted that in substituting new plates of original strength for old ones, the new plate will often be the first to fail. If the camber in an old plate is standard, it indicates suitability for further service. One road reports the labor cost for repairing springs for eight months of last year at an average of .017 cents per lb. Another reports cost of manufacture of new springs for the past four years at \$1.07 per 100 lb. and repairing at 72½ cents per 100 lb.

The operation of re-applying an old spring band is the same as that required for a new one, as is also the retesting of the spring. Spring inspection should include loose bands, broken plates, free height below standard and total thickness of plates at edge of band.

End Connections

The ends of tender springs are subject to frequent failures; perhaps 70 per cent of them fail on this account.

Fig. 21 shows a design for overcoming this trouble. Under normal load the ends of each spring bear upon the recessed portion of the end forging; as the load is increased the bearing points are supplemented and reinforced, thereby shortening the length of the springs automatically and providing additional strength to take care of the extra load.

In conclusion, we believe it good practice to concentrate all spring work at one shop, the one most centrally located, where men may be trained and made expert in the art of springmaking. At this place there should be all necessary tools and scientific equipment that will insure a uniform as well as a high grade of workmanship. The greatly increased

size and weight of modern locomotives makes this subject one of considerable importance. There is still room for improvement, both as to methods of repairing and manufacturing springs.

The report was signed by M. T. Cox (chairman), Louisville & Nashville; Eliot Sumner, Pennsylvania; A. G. Frum-bull, Erie, I. W. Pratt, Chicago & North Western; I. A.

Loque, Minneapolis; St. Paul & Sault Ste. Marie, C. A. Gill, Baltimore & Ohio and G. W. Rink, Central Railroad of New Jersey.

Action Taken.

There was no discussion of this report. It was received and the committee discharged.

Development of Locomotive Feed Water Heaters

By J. Snowden Bell, Associate Member



J. Snowden Bell
Individual Paper

THE ECONOMIC VALUE of an appliance by which any substantial portion of the heat units contained in the waste gases of combustion and the exhaust steam of a locomotive can be made available in heating boiler feed-water, is too obvious a proposition to require discussion, and it was recognized by engineers at a very early day. While experiments have been made from time to time with numerous appliances of this character and have ordinarily failed to prove sufficiently satisfactory in practice to cause them to

be continued in regular service, the undeniable correctness of the general principle upon which they are based warrants, if not positively demands, its renewed consideration, particularly in view of the rigid economies in every department which present conditions have rendered indispensable, not merely to the profitable operation, but even to the very existence of the railroads of the United States.

After a general review of a number of feed-water heaters, A. L. Holley, in his comprehensive book, "American and European Railway Practice in the Economical Generation of Steam," 1861, makes the following statement:

"It is impossible to state the exact economical results of feed-heating—either the saving of fuel or the cost of repairs; because no experiments which fairly estimate all the conditions have been made. It is quite sufficient, for present purposes, however, to know that there is a saving worth making, and it is very obvious that the cost of maintaining such heaters as Clark's and Eaton's can not materially detract from the economy. It would, therefore, be unreasonable to neglect this improvement any longer, or, in fact, at least, where fuel is expensive" (p. 130.)

Mr. Holley's statement is as pertinent and noteworthy to-day as when written 56 years ago, and its importance is accentuated by the fact that appliances of improved construction have been produced since he wrote it, and the urgent present demand for the adoption of every improvement for which an operative economy, greater than the cost of construction and maintenance, can be assured with reasonable probability.

Feed-water heaters are of two different types, which may be termed, respectively, (a) "surface" heaters, being those in which the heating medium, either gases or steam, is applied to the surfaces of channels or passages (usually tubular) through which the feed water traverses on its way to the boiler, and (b) "injection" heaters, in which steam is discharged directly into the feed water. The former type,

in which the transfer of heat from gases or steam to the feed water is effected through walls of comparatively thin metal is that which has been the more frequently experimented with, and, for several reasons, would seem to be the more practical and desirable of the two types.

[The author sketched the development of feed water heaters from 1802 up to the present time showing the designs and giving descriptions of those experimented with both in the United States and abroad, the last one described being that of the Locomotive Feed Water Heater Company.—Editor.]

In a report on a system of feed-water heating used in France, the following conditions were laid down by a committee of French engineers, in 1896, as being those which should be followed as nearly as possible in a locomotive-feed-water heater:

"First.—Simplicity, and facility for examination, cleaning and overhauling.

"Second.—That the heater should take up little room and be of a minimum weight.

"Third.—The heater should give a continuous and certain supply of hot water.

"Fourth.—That the feed heater should be heated by steam that would otherwise be lost.

"Fifth.—That the steam used for the heater should vary with the quantity of feed required."

The paper of Trevithick & Cowan (*Proceedings, Institution of Mechanical Engineers*, March-April, 1913, pp. 355-356) clearly indicates that to effect the increase of the temperature of feed water to such a degree as will result in a substantial economy sufficient to warrant the application of a feed-water heater, a pump must be adopted as the feeding member instead of an injector, and this has been done in the systems before noted as having met with approval in European practice. After stating that two feed-water heating agents are available, *i. e.*, the exhaust steam discharged from the cylinders and the waste gases passing out of the stack, and that the process may result in reaching temperatures at which even the so-called hot-water injectors will not work, they proceed with what they term "a reconsideration of the feeding system generally," the following excerpt from which is believed to be of sufficient interest to be here presented:

"The ordinary injector will not pick up water above about 120 deg. to 125 deg. F. and the feed cannot, therefore, be effectively heated before it reaches the injector, while the admixture in that apparatus of live steam with the feed so raises the temperature of the latter that full advantage can not be taken of subsequent heating by either of the agents available. An injector may feed into a boiler at 180 lb. per sq. in. pressure, about 11.2 lb. of water for every 1 lb. of steam used. If the supply be at 65 deg. F. the delivery will be about 160.5 deg. F. This increase is not an economic gain. Delivery falls off as the boiler pressure rises, and the temperature of delivery is higher at the higher pressures. Subsequent feed-heating is of less advantage now than it would have been when pressures were lower.

"For each 1 lb. of steam used in the cylinders (1 + a fraction) must be produced in the boiler, from the temperature of the injector discharge, in order to supply both the engine and injector. The B. t. u. thus to be produced are given for various pressures in Fig. 1, by curve No. 1, which is based on data published by S. L. Kneass. If, subsequent to delivery from the injector, the feed be heated by the cylinder exhaust to 210 deg. F. the boiler work is reduced, as denoted by curve No. 2. The work needed increases with the boiler pressure. Heat can further be transmitted from the waste gases, and an average feed temperature of 280 deg. to 290 deg. F. obtained, but compensation can in no way be secured for heating during part of the process with live steam.

"At modern pressures the ordinary exhaust injector shows a thermal saving over the live-steam injector of some 9 per cent. The supplementary portion of the exhaust injector is handicapped by the water fed to it being already at a high temperature (about 180 deg. F.). Its steam consumption is thus high, and the final temperature of discharge is about 280 deg. F. Additional feed-heating is thus impracticable, even by the waste gases. The only gain procurable with this injector is that due to the use of part of the exhaust steam; this, however, may exceed the thermal gain of 9 per cent or so. In a more recent form of exhaust-steam injector the efficiency of the exhaust-steam jet has been improved, and much less supplementary live steam is needed. Though the thermal position is the same with both types, the discharge temperature is thus lower with the later pattern. The final temperature with the later type is 195 deg. F. compared with 280 deg. F. with the earlier, and further feed-heating is practicable.

"The pump offers advantages over the injector in connection with feed-heating since, with it, the feed temperature is not increased in the process of raising the pressure, and the temperature head is sufficient for the effective transfer of heat to the pump delivery, successively from the exhaust steam and the waste gases. On account of the sudden demands which a locomotive feed pump is called upon to meet, such an appliance should be arranged to work with water at moderately low temperatures, and the greater part of the feed heating process should be carried out between the pump and the boiler clack.

"Independent steam pumps suitable for locomotive work will deliver 100 lb. of water for about 1.5 lb. of steam, working at end against 180 lb. pressure. Curve No. 3, Fig. 1, shows the B. t. u. to be provided by the boiler for each 1 lb. of steam delivered to the cylinders, using pump supply and feed at 65 deg. F. Curve No. 4 shows the work required if the pump exhaust be utilized for feed-heating, about the same amount being required at all pressures. The pump and injector are then on an equal footing at modern pressures. Heating, further, by the main cylinder exhaust to 210 deg. F., reduces the boiler work to the amounts shown by curve No. 5. This system has a considerable advantage over the injector feed combined with heating to 210 deg. F. (see curve No. 2), and this is maintained if the feed-heating be carried still further."

The circular of inquiry which was addressed to the members of the Association and a few foreign motive-power officers, asked their opinion whether or not the application of feed-water heaters to locomotives, if a successfully operative design could be applied, "would be of advantage or effect sufficient economy of fuel to justify the cost of application and maintenance." In a few instances the replies were to the effect that the writers had not had any experience with feed-water heaters, and therefore did not feel warranted in offering an opinion, but in almost all the other cases the expressions were favorable to the feed-water heater.

Upon the basis of the unquestionable advantage obtained in the long-established use of feed-water heaters in station-

ary and marine practice; the reported satisfactory results of their operation on European locomotives; the probable increase of advantage from their use in connection with the now practically universal application of superheating; and the views expressed by the large majority of the replies of members to the writer's circular of inquiry, the following conclusions, as to the question of the advisability of the application

of feed-water heaters to locomotives, are submitted for the consideration of the Association:

(a) That the theoretical advantages of an appliance of this type, in the economization of fuel and boiler maintenance, or a corresponding increase in boiler capacity, are attainable without involving a structural complication and cost, and expense of upkeep, that would be sufficient to reduce such advantages to any appreciable extent.

(b) That an economy of fuel of at least ten per cent, as well as a reduction in the cost of boiler maintenance, under normal conditions, can be obtained by the application and operation of a correctly designed locomotive feed-water heater.

(c) That in order to be acceptable and of practical advantage in locomotive service, the design of a feed-water heater should, *first*, comply with the five general requirements of the Committee of French Engineers, noted above; *second*,

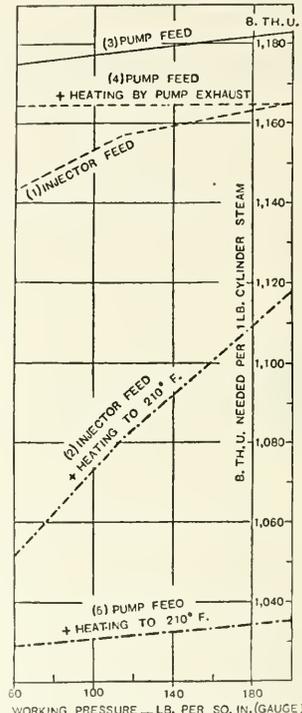


Fig. 1—Saturated Steam Boiler Output in B. t. u. Necessary with Various Conditions of Feed for Each Pound of Steam Used in the Cylinders.

should not be complicated by appliances for heating by the waste gases, but should utilize exhaust steam only as a heating medium; and, *third*, should provide for the separation and deposit of mud and saline matters, and should be easily accessible for their removal and for repairs.

Action Taken

The report was received without discussion.

Other Business

Dues of the association will remain the same as last year. Owing to the resignation of Wm. Schlafge as president of the association, an election of officers was necessary. The following were elected: F. H. Clark, general superintendent motive power, B. & O., president; W. J. Tollerton, general mechanical superintendent, C. R. I. & P., first vice-president; C. F. Giles, superintendent machinery, L. & N., second vice-president; C. H. Hogan, assistant superintendent motive power, N. Y. C., third vice-president; and H. C. Manchester, superintendent motive power and equipment, D., L. & W., member of the executive committee.

General News Department

G. V. Lomonosoff, head of the Russian railway mission to the United States, has been dismissed by the Russian ambassador because of a political statement.

Max Thelen, president of the California Railroad Commission, has been appointed supervisor of war contracts under Quartermaster General Goethals.

The Railroad Detectives' Association convention, which was to have been held in Baltimore this week, has been abandoned; this because of "unforeseen conditions breaking out on the railroads."

The machine shop of the Texas & Pacific at Marshall, Tex., was destroyed by fire on June 9, estimated loss, including machines, patterns and valuation records, \$300,000. The boiler shop and the erecting shop were slightly damaged.

James N. Wallace, president of the Central Union Trust Company of New York, has been appointed a member of the advisory committee to the director of the division of finance of the Railroad Administration. The other members of the committee, previously announced, are Franklin Q. Brown, chairman; Festus J. Wade, and Frederick W. Scott.

The salary of the chief inspector of locomotive boilers of the Interstate Commerce Commission is to be raised from \$4,000 to \$5,000 a year, the salaries of the two assistant inspectors from \$3,000 to \$4,000 and of the district inspectors from \$1,800 to \$3,000; all by virtue of a law passed by the Lower House of Congress, on June 5, and by the Senate, on June 18.

The Chicago, Burlington & Quincy has organized 50 students of the University of Chicago into a special gang which will start for Sheridan, Wyo., on June 17 to spend the summer on track work in that vicinity. This road has also secured nearly 300 high school boys for its track gangs as a result of a campaign which local officers have made in the high schools.

Employees of the Pennsylvania Railroad in military or naval service, including those from lines both east and west of Pittsburgh, now number 16,407. This is shown by reports just completed for the purpose of revising the figures on the service flag which hangs in Broad Street Station, Philadelphia. When the flag was first hung, March 20, 1918, the single blue star in the center contained the number 11,769, showing an increase of 4,638.

Scarcity of steel is now so very general that the amount which may be used for railroad purposes will be determined only after careful scrutiny. The agreement between the American Iron and Steel Institute and the War Industries Board, providing for complete government control of the distribution of steel and steel products, was noticed last week. When a railroad requires steel, the need for it must be first approved by the Regional Director, and it must then be passed upon by J. Leonard Replogle, director of steel supply for the War Industries Board, who assigns the amount due to one of the various plants. The steel required for the government cars and locomotives was allotted by Mr. Replogle through the American Iron & Steel Institute. After the priority of manufacture has been established, it is then necessary to arrange for priority in transportation.

The appropriation for railroad valuation was discussed in the House on June 14, and an effort was made by Representative Walsh, of Massachusetts, to strike out the provision in the sundry civil bill \$3,500,000, but he did not succeed. Mr. Walsh took the position that values have so increased that the work when finished will be of but little real value, and that the men and money employed in the work could be better employed in other ways. Representative Shirley, chairman of the appropriations committee, defended the bill,

saying that the field work is 70 per cent completed, and will be finished in January, 1920 while the office work should be completed a year later than that. He said the commission proposes to have a division whose special duty it will be to check up the additions made by the railroads so that the valuation will be brought up to date. An amendment to strike out the appropriation was rejected without a record vote.

The airplanes carrying letters between New York and Washington have completed their first month's operation, and it is announced in Washington that during this time they have carried over five tons of mail matter. The post office department regards the demonstration as successful, but is disappointed because the quantity of letters offered has not met expectations. A reduction in rates, from 24 cents an ounce to 16 cents, is under consideration. A considerable number of trips have been omitted because of fogs, the total number of which, however, is not mentioned. To surmount the difficulty of fogs it is proposed to have signal stations on the outskirts of New York and Philadelphia so that audible signals can be given, to enable aviators to get their bearings. The distance travelled in this first month is given as 11,109 miles. On June 12, Lieut. Culver made the trip from Philadelphia to New York, in 42 minutes, or at the rate of 127 miles an hour.

Messengers of the Western Union Telegraph Company were summoned before Grand Juries at Boston, New York and Washington, last Thursday morning, June 20, on charges of carrying letters on passenger trains contrary to the postal laws, which forbid the transmission of letters by private parties outside the mails. These messengers were carrying "night letters" between the cities named, and it is said that this practice has been in vogue for several months past. It appears that copies of these telegrams suitable for delivery at destination are typewritten at the originating office, and messengers have carried large numbers of them, presumably because of congestion on the wires. It is said that the Post Office Department has had knowledge of this transportation of letters by train for several months past, but it is quite generally assumed that the present action of the officers of the law has been instigated by the Commercial Telegraphers' Union, which is seeking to break down the rule of the Western Union that members of that labor organization shall not be employed in its offices.

Railroad Men Thanked

Director General McLean has issued a circular expressing his appreciation of the patriotism of the railroad employees of the company who subscribed for Liberty Bonds and bought them to assist in War Savings Stamps. The number is 8,785,000.

It is deeply gratified to learn of the large number of railroad employees who have subscribed for the third issue of Liberty Bonds. A large number of railroad employees will receive substantial amounts of work pay. It is especially gratifying to know that railroad employees who have been sent abroad to assist in the war are being so well cared for by the War Savings Stamps.

The Cost of a Collision

Reports from Washington, Ky., tell of a number of settlements which have been made by the Knoxville & Nashville for the death or injury to passengers in the Shepherdsville wreck last December. The Rev. H. H. Mathum receives \$1,000 for the death of his wife, Lee Polly, for injuries, \$1,600, Arch Miller, \$1,500 for the death of wife, Tom Miller, \$1,000 for the death of wife, daughter of F. T.

Cherry, \$32,000, for death of father, mother and brother; Tom Craven, Cox Creek, \$15,000, for death of wife and son; Mack Miller, \$25,000, for death of wife and son; J. B. Overall, \$16,000, for death of son and sister; Dr. R. H. Miller, \$13,000, for death of wife; three daughters of Charles Johnson, \$8,000, for death of father.—*Nashville Banner*.

Patriotic Texas Station Men

[From a Southern Pacific Agent.]

Mr. W. E. Costello,

Superintendent, Ennis, Tex.

Dear Sir—

In view of the existing and ever-growing scarcity of labor, both local and national, we the employees at this station vote to reduce the force by one man, thereby adding materially to the man-power and treasury of the Government.

We believe it is no longer a matter of each man doing his bit, but rather a matter of doing his utmost; and we shall distribute the work of the relieved man as equally among us as possible, and endeavor to keep the work of the station up to standard efficiency. (Signed by the agent, cashier and two operators.)

Inspection and Test Section

H. E. Smith, engineer of tests of the New York Central, has been named as chief materials inspector of the Inspection and Test Section of the Railroad Administration. He will have charge of the inspection and testing of all the material purchased for use of the Railroad Administration.

C. T. Markel, general foreman and chief locomotive inspector of the Chicago & North Western, and J. A. Rickabaugh, supervising inspector of the Pennsylvania, have been appointed respectively, chief construction inspectors of locomotives and cars. They will have charge of the inspectors at the various locomotive and car plants throughout the country where the Railroad Administration has purchased equipment.

Engineer Officers' Training Camp

An Engineer Officers' Training Camp will be opened about August 1 at Camp Humphreys, Va., where 2,000 candidates for commissions as captains and first lieutenants will be trained under the same facilities provided for the 17,000 engineer replacement troops now there preparing for overseas service. These facilities include the ordinary military arrangements, and in addition, some fifteen special schools to instruct men on such operations as mining, quarrying, gas and flame defense, barb wire fortification, water supply and railroad communication. Many applications for entrance to the training camp have been received. To examine these candidates, General Black has designated a traveling board which will visit several of the larger cities and determine the physical and mental fitness of the applicants. Candidates for first lieutenancies should be between 32 and 36 years old, and those for captaincies, between 36 and 42.

Alaska Railroad

Charles A. Sulzer, delegate from Alaska, made an unsuccessful effort in the House on June 15 to secure an increase from \$5,250,000 to \$7,250,000 in the appropriation for continuing the work on the construction of the Alaska railway. Mr. Sulzer said that while last year the Alaskan Engineering Commission obtained \$14,000,000, the Department of the Interior this year, on account of the war, reduced its estimate by 50 per cent to \$7,350,000; and he presented a letter from the acting secretary of the interior, saying that the further decrease recommended by the appropriations committee would work a serious hardship. The letter said that a force of over 2,500 men is now employed upon the work, and that if the appropriation be made less than the estimate, a dispersal of the force is likely to result. Mr. Sulzer said the reduction proposed by the committee would cut out the projected extensions on the north end of the Anchorage division from the Susitna river to Hurricane Gulch and the south extension of the interior division from Lignite to

Riley creek. Representative Mondell, who spoke on behalf of the appropriations committee, defending the reduction, said that the recommended appropriation would be sufficient to keep the organization intact and to extend the Seward division to the Turnagain Arm, while the line between Turnagain Arm and Anchorage would be completed with funds now available.

Train-Lot Movements of Oil to Be Extended

The Car Service Section of the United States Railroad administration held a conference at Washington on June 7, with representatives of the various railroad regions, the Fuel Administration and oil producers and refiners. The experience of the railroads in the western region in handling oil in train lots was discussed in detail. (The train-lot plan was described in the *Railway Age* of May 24, page 1275.) It was pointed out that the plan has proved so successful in the "mid-continent" oil fields that there is now a surplus of approximately 1850 tank cars in that territory. As a result an increased output of oil is now possible. The application of the train-lot plan of moving oil in the other railroad regions received considerable attention at the meeting and will be the subject of further study by the several regional operating officers. A steady increase in oil traffic is expected as long as the war continues.

Imported Injury Suits Not to Be Heard

The first judicial action following the issuance of Order No. 26 by the director general of railroads took place in the Hennepin county (Minn.) district court, when a personal injury case imported from Nebraska was continued until the end of the war. The injury sustained by the plaintiff occurred last year at Center City, Neb., or about 700 miles from the court. The section of the director general's order which forbids the trial of such cases until after the period of government control aims to prevent such interference with efficient railroad operation as would result from requiring railroad officers and employees to go long distances from their work to appear in court. The action of the Minnesota court virtually removed from its calendar 150 other suits of a similar character. Minnesota tribunals, and especially the courts of Hennepin county, have been a "dumping ground" for personal injury suits originating all over the Northwest.

Freight Claim Agents Meet at Chicago

In response to a call by the regional director, 75 freight claim agents from the principal western railroads met at Chicago on June 12 to consider the formulation of uniform rules for the settling of claims. Methods of reducing the number of claims and of investigating and disposing of claims more promptly were also discussed. It was believed feasible to do away with a great deal of investigation which was necessary under corporate control of railways instead of tracing to fix the responsibility for liability on one of the roads participating in the movement of a shipment, some plan will be devised according to which claim payments will be prorated among the participating roads on a mileage or some other basis. The recommendations of the meeting will be considered by the Railroad Administration, and no doubt will lead to some action by it in the near future.

Railroad Administration Receives Conscience Money

The Railroad Administration the other day received the first item for its "conscience fund" in a letter from a man who enclosed \$100 to pay for various rides he had enjoyed on railroad trains without the formality of meeting the ticket collector face to face. He also enclosed an itinerary of his free trips, which he asked to have checked up so that he might be informed whether he owed more than the \$100. As he did not mention the dates of his rides, the Railroad Administration is not quite sure as to the proper tariff rate to be charged for "side-door Pullman" accommodations, nor as to whether or not the rides were taken before or after the railroads were taken under government control. Therefore, it probably will be compelled reluctantly to appear

Chicago Track Elevation Work to Go On

A settlement has been reached between the Railroad Administration and the Chicago City Council Committee in relation to the track elevation work which has been held up since the railroads were taken over by the government. Under the plan agreed upon, work amounting to \$395,000 will be carried out and expenditures aggregating \$5,500,000 will be deferred. The work on the Illinois Central's Kensington & Eastern Line is avoided by discontinuing the operation of trains over a portion of the line. Work will also be abandoned temporarily on the Chicago & Western Indiana and on the Rock Island crossing at Cottage Grove avenue, where the work that was contemplated involved a cost of \$4,500,000. Track elevation work on the Baltimore & Ohio Chicago Terminal, from 64th Street to 69th Street will be completed at a cost of \$200,000. The Englewood Connecting Railroad (Pennsylvania Lines) track elevation, to cost \$1,000,000, will be deferred. The completion of the grade separation of Vincennes Road and Eighty Seventh Street with the Chicago, Rock Island & Pacific is authorized, at a cost of \$185,000. This work is partly completed and streets are left in a bad condition. No agreement was reached on the Illinois Central's South Chicago branch, involving 40 crossings within a distance of two miles, and that work will probably be deferred.

The Traveling Engineers' Association

The Railroad Administration has authorized the Traveling Engineers' Association to hold the next convention at Chicago, Ill., commencing September 10, 1918. The following are the subjects to be discussed:

(1) Fuel Economy under the following heads (a) Value of present draft appliances; can they be improved to effect fuel economy? (b) Best practice for handling locomotives at terminals to reduce coal consumption. (c) How can engine-men and firemen effect the greatest saving of fuel when locomotives are in their charge? (d) Whether it is most economical to buy cheap fuel, at a low heat value or a higher priced fuel at a greater heat value. (e) The most economical method of weighing fuel when delivered to locomotives, in order that individual records of coal used by engine-men and firemen may be kept. (f) Superheat applied to locomotives as effecting coal consumption.

(2) Engine Failures—causes and remedies, best methods of investigating same, and placing responsibility.

(3) The use of superheat steam in slide valve engines. Drifting, relief and by-pass valves or the absence of any one or all on superheat locomotives equipped with piston valves.

(4) Cab and cab fittings on modern locomotives, from the viewpoint of the engineman.

(5) How can the traveling engineer and general air brake inspector best co-operate to improve and maintain the air brake service?

There will be opportunity for such other matters as may be considered of interest to the association and the railroads under changed conditions.

Express Merger to Be Unscrambled After the War

The contract between the Railroad Administration and the express companies, providing for a consolidation into a single company, was the subject of a prolonged discussion, as noted on page 1466 of this paper. The objections of the postmaster general and the attorney general prevailed, and as a result of the conference held on Tuesday, the following provision was inserted in the contract:

"It is the intention that the provision herein made for carrying on the express transportation business through the agency of a single corporation shall continue in effect only during the period of federal control; and nothing herein contained shall be construed as sanctioning any combination or merger of the properties or business of the express companies to last beyond that period." Another clause provides that the express companies shall maintain their individual corporate existence and that on the termination of federal control their property or its equivalent shall be reconveyed by the new corporation.

Schweyer's Automatic Train Stop

An automatic train stop invented by D. H. Schweyer, of Easton, Pa., which requires no moving part on the roadway, and in which also, the principal member depending from the locomotive is immovable, is being tried on the Colebrookdale branch of the Philadelphia & Reading, between Bechtelsville, Pa., and Barto, and a public demonstration is to be made at Barto on Sunday, June 23, at 10:30 a. m.

A choke coil depends from the right side of the locomotive, 12 $\frac{3}{4}$ in. outside the gage line of the rail, with its bottom face $\frac{4}{8}$ in. above the top of the rail. This choke coil is in series with a condenser in the circuit of a steam turbine generator carried on the locomotive.

On the track, parallel to the right hand rail and 13 in. outside the gage line is a track armature, about 30 in. long, with its upper surface $2\frac{1}{4}$ in. above the top of the rail.

As the locomotive passes over a signaling point, the engine member clears the track armature $2\frac{1}{2}$ in.; and the current in the coil, (a. c.) drops in value 50 per cent. This current is connected to a transformer through an a. c. relay, the armature of which drops when the current is weakened; this opens the internal circuits of two neutral relays, one clear and the other caution; and at the same time a visual cab indicator (lamp) is energized through a back contact.

This process stops every train. But to provide for proceed indications, the leading truck of the locomotive is insulated from the frame, and at the moment that it passes the track armature it is on a short insulated section of track. On the locomotive there is a polarized relay, in a circuit which runs from the insulated truck to the frame of the locomotive and thence to the ground. Through the insulated truck this circuit is energized by a local track battery, the current from which is governed by the condition of the block or blocks ahead, so as to energize the caution relay or the clear relay as may be appropriate.

The plans for use of this stop on an electric railway provide for fixing a receiving coil on the locomotive so that it will hang midway between the two running rails and 3 $\frac{1}{2}$ in. above the plane of the top of the rails. A track coil, even with the tops of the rails, is momentarily energized by a local battery. The receiving coil passes through the flux produced by the track coil so as to cause the caution or the clear indication at the moment that the choke coil is under the influence of the track armature.

A failure of the local battery, or the breaking of a wire, would result in the application of the brakes and the stopping of the train. The application of the brakes is made by means of slide valves, operated by electro-pneumatic valves, controlled by the relays on the engine.

Provision for service application of brakes is made by means of an expansion reservoir, and the regulation of the degree of reduction of air pressure is effected by varying the amount of expansion space.

The choke coil on the locomotive is normally affected only by the track armature; other structures such as the rails of side tracks, or guard rails, may affect the coil but not in sufficient degree to open the relay. Any structure on or near the track which might possibly affect the circuit on the locomotive can be made harmless in this direction by the use of manganese steel, which is non-magnetic.

Federal Managers

The following table gives a list of the federal and general managers whose appointments have thus far been announced. The names are arranged alphabetically by roads.

ALABAMA & VICKSBURG.—See Southern Railway.
BALTIMORE & OHIO LINES EAST.—A. W. Thompson, Federal Manager, Baltimore, Md.
BALTIMORE & OHIO LINES WEST OF PARKERSBURG AND PITTSBURGH.—C. W. Galway, Federal Manager, Cincinnati.
BANGOR & AROOSTOOK.—P. R. Todd, Assistant to District Director and General Manager, Bangor, Me.
BOSTON & ALBANY.—H. M. Biscoe, Federal Manager, South Station, Boston, Mass.
BOSTON & MAINE.—B. R. Pollock, Federal Manager, North Station, Boston, Mass.
BUFFALO & SUSQUEHANNA.—E. R. Darlow, General Manager, Buffalo, N. Y.
BUFFALO, ROCHESTER & PITTSBURGH.—T. F. Brennan, General Manager, Rochester, N. Y.
CAROLINA, CLINCHFIELD & OHIO OF SOUTH CAROLINA.—See Southern Railway.
CENTRAL INDIANA.—See Cleveland, Cincinnati, Chicago & St. Louis.
CENTRAL NEW ENGLAND.—See New York, New Haven & Hartford.
CENTRAL OF GEORGIA.—W. A. Winburn, Federal Manager, Savannah, Ga.

defined in R. H. Countiss' tariff I. C. C. 1048, and all other points in the United States east of the Mississippi river via the Pacific coast: Agricultural implements, machinery, oil well supplies, sewing machines, railway equipment, locomotives, freight and passenger cars, lubricating oils, \$1.25; cigarettes and tobacco, \$1.56½; iron and steel articles from Colorado, 60 cents; Chicago, 75 cents; Pittsburgh and east, 85 cents. The import rates via the Pacific coast include green coffee, 80 cents; chinaware and glassware, \$1.87½; rubber, \$1.56½; silk, \$7.50 (l. c. l.); tea, \$1.87½; tin, \$1.25, and raw sugar, 87½ cents.

Car Service Office at Chicago

The car service section of the Railroad Administration is to establish at Chicago on July 1 a refrigerator department, for the purpose of facilitating the expeditious and economical handling of refrigerator cars, and W. L. Barnes, assistant manager of the car service section (Washington), will go to Chicago, and will have supervision over refrigerator cars, both those of railroad and those of private ownership. There will also be established, under the charge of Mr. Barnes, a tank-car record office, to deal both with railroad-owned and privately owned tank cars.

Coal Production

Bituminous coal production during the week ending June 8 was the largest in history, according to the weekly report of the Geological Survey. The soft coal produced, including lignite and that made into coke, is estimated at 12,465,000 net tons, an increase over the week of June 1 of approximately 1,900,000 net tons, or 17.8 per cent, and the same increase over week of June 8, 1917. The average daily production is estimated at 2,077,000 net tons, considerably in excess of the 1,791,000 net tons during the week preceding, and 1,789,000 net tons during the same week of the preceding year. Anthracite shipments during the week ended June 8 increased approximately 9,000 carloads or 28.3 per cent. During the week ending June 1, 29.4 per cent of full time output was lost for various causes, of which 8.4 per cent is said to be attributable to coal shortage.

Consolidated Ticket Offices

The Eastern Committee on Consolidation of Ticket Offices reports the approximate dates fixed for opening the following union city ticket offices:

New York—31 W. 32nd St.	July 5	Cleveland	July 1
New York—64 Broadway	July 10	Toledo	July 1
New York—114 W. 42nd St.	July 10	Indianapolis	July 10
Philadelphia	June 24	Boston	July 10
Baltimore	June 24	Cincinnati	July 15

The following consolidated offices have been in operation since the dates mentioned:

Rochester	May 1	Brooklyn	June 17
Syracuse	May 1	Reading	June 10
Williamsport	May 1	Wilmington	June 17
Grand Rapids	May 23	Pittsburgh	June 17
Detroit	June 1	Buffalo	June 17
Washington	May 6	Newark	June 17
New York—37 Chambers St.		Columbus	June 17
(280 B'way)	June 17	Dayton	June 17

Taking the Bull by the Horns

New York State's new large canals have been in operation now more than a month, and the progress toward success has been disappointing, not only to shippers but to the United States Government. In fact, the situation has become so acute that it is proposed by the transportation interests of the State to take some immediate action to prevent the remainder of the season passing without at least demonstrating that the State has not thrown away \$154,000,000 without bringing about some improvement over the old canals. With this purpose in view, the shipping interests will hold a convention in Albany on June 26, at which time, it is claimed, the searchlight will be turned upon whatever impediments stand in the way of using the new waterways in expediting shipments between the Great Lakes and the seaboard. Invitations have been sent out to more than a thou-

sand shippers and transportation companies inside the State to be present. It is understood that it is the intention not to invite any State officials to the convention. The shipping men propose to get the business men of the State together and to take the bull by the horns.—*Journal of Commerce, New York.*

Exports Control Committee

An Exports Control Committee to have complete control of the movement of export freight to the ports has been created, consisting of: Major General G. W. Goethals, representing the War Department; Rear Admiral C. J. Peoples, representing the Navy Department; George D. Ogdin, general freight agent of the Pennsylvania, representing the Railroad Administration; P. A. S. Franklin, representing the Shipping Control Committee, and D. W. Cooke, vice-president of the Erie, representing the Traffic Executive controlling Allied traffic. It will be the duty of this committee to inform itself: As to the probable amount of freight which must be exported for the prosecution of the war. How this war freight can best be routed through the various ports. How much of other essential export traffic has to be handled. The amount of local traffic necessary for each port. The committee will have authority to select the port to which specified freight shall be transported for trans-shipment overseas for the use of the War and Navy Departments, the Allied governments and others. The committee will also decide the distribution of the combined amount of all exports, as between the various ports, so as to facilitate its handling at, and avoid congestion in, any one port. The headquarters of the committee will be at Washington.

Regulations Respecting Advertising

Edward Chambers, director, division of traffic of the Railroad Administration, has issued a pamphlet of regulations respecting railroad advertising, giving detailed specifications for the construction of time table folders, advertising in the Official Guide, which is to be reduced in size, and for other forms of advertising. The new regulations amplify the circular instructions issued by the regional directors in March and will result in important economies.

For the convenience of the public individual time tables are to be issued by each carrier for free distribution. District time tables may be issued wherever economy or practicability can be secured thereby. Uniformity for each line is to be observed. Folders are to be informative only, claims of superior service to be eliminated. It is suggested that when there is a new issue because of change of time a supply only sufficient to meet the needs of each office for not exceeding 30 days be furnished. While standardization is to be followed as closely as possible any line, the service of which does not warrant a folder of the size specified, may reduce the size to correspond with its requirements. A limited free distribution of local folders is to be allowed in foreign territory, to meet the public need.

Except when required by state law, time table display cards, posters, etc., showing departure of trains, or regular train schedules, designed for posting at line stations, hotels or other public places are not to be used. For the information of the public and ticket agents railroads may issue brief hotel and boarding house lists. The issuance of resort publications has been discontinued until further notice; but when it has been determined that public policy permits they may be issued jointly, but must be informative only and "conservatively descriptive." All work on such publications for the present must be discontinued. Publications informative of the agricultural possibilities of sections not now fully settled may be continued, but where practicable should be joint. Publications intended to exploit limited or other luxurious train service, or other competitive features, are to be discontinued. A limited amount of advertising is permissible when reduced rates are made for special occasions.

Under the general prohibition of anything exploitative is given a list including such things as bill boards, souvenir books, blotters and calendars, wall maps, etc.

Detailed directions are given for representation in the Official Guide, which is to be issued monthly as at present, "at least until such time as it can be arranged to change train schedules less frequently"; and no expense is to be incurred for representation in any other railway guide.

Commission and Court News

Interstate Commerce Commission

The hearing before the Interstate Commerce Commission for the purpose of presenting arguments in the Kansas City Southern valuation case, which was set for June 21 and 22, has been cancelled.

The Interstate Commerce Commission has denied an application of the express companies for a 15 per cent advance in rates, but is expected to issue a decision shortly on the original application for a 10 per cent advance.

The Interstate Commerce Commission has issued the following administrative ruling:

Apparently war conditions will in the near future, because of heavy overseas movement, necessitate the utilization of all our ports and the allocation of vessels in accordance with the capacity of the various ports. It is desirable under these conditions that if a vessel is required to use a port other than the one which she would naturally choose that she shall not be penalized in the cost of bunker coal.

Competition of ports and of carriers has in the past led to varied practices with regard to transportation charges on coal for bunker use. These practices differ as between the ports through which there is a substantial trans-shipment of cargo coal and ports where there is relatively little, if any, such movement.

In view of the existing emergency conditions and the apparent necessities of the future during the continuance of the war, the commission is of opinion that carriers may properly make rates to the ports on coal delivered to vessels and that such rates may be stated as including coal for bunker use. It does not see any justification for lower rates on bunker coal than on cargo coal originating at the same point and delivered to the same vessel.

Interstate Commerce Commission Rate Procedure

The Interstate Commerce Commission has issued the following regarding the procedure to be followed in rate cases during federal control:

"The act for the federal control of railroads and certain recent orders of the Director General have raised questions regarding the status of some of the cases before the commission attacking rates not initiated by the United States Railroad Administration. Inquiry has arisen how far the existence of rates initiated under section 10 of the federal control act will limit or preclude the commission from making lawfully effective orders in proceedings brought prior to such initiation of rates.

"The commission has always lent its active assistance to the settlement of complaints and difficulties between carriers and shippers through informal adjustment. Thousands of complaints and difficulties have been thus disposed of. There seems every reason why under federal control this policy should be continued with reference to complaints involving rates initiated by the United States Railroad Administration. Since action on our part would seem to be mandatory under section 8 of the federal control act, and we intend to accord our advice, assistance and cooperation to that end wherever possible. We understand that the Director General is in accord with this plan of dismissing difficulties as regards rates initiated by the United States Railroad Administration.

"Failing such efforts to compose difficulties or settle causes of complaint informally, the commission is required under section 10 of the Federal Control Act upon complaint to enter upon a hearing concerning the justness and reasonableness of so much of any order made thereunder as establishes or changes any rate, fare, charge, classification, regulation or practice of any carrier under federal control. Save for the applied provisions of this statute the jurisdiction of the commission remains what it has been in the past. The commission has not made and will not make any commitment which will preclude its full exercise of the jurisdiction vested in it.

"A rate initiated by the United States Railroad Administration

and not yet formally altered by the commission cannot be considered after January 1st within the United States Railroad Administration is entitled to be heard. It follows that material as a new freight rate structure becomes effective June 21, 1918, of those rates which are not yet formally altered by the commission might enter proceedings under the act before such time as the orders were entered by the hands of the records of complaints now pending before us. It seems to us, however, that in certain cases the commission can make lawfully effective orders in proceedings brought prior to such federal initiation of rates. Thus, in pending complaints, where the complainant desires to use the finding of the commission as a possible basis for a suit at law for reparation, will be disposed of on the present matter as far as that matter is concerned. The rate structure of cases pending as of June 21, 1918, such reparation of a damage from rates lawfully initiated. Allegations of discrimination may, in certain cases, be disposed of on the records now before us. We do not propose the question which has been raised whether an amendment to pleadings in pending cases the United States Railroad Administration may be made a party against which a lawfully effective order may be entered.

"The commission will, of course, continue consideration and reach conclusions as above indicated in pending cases where it is possible to make a lawfully effective order without amendment of the pleadings that will be done, and so far as possible the records heretofore built up will be made available for the determination of the issues. The docket in existing cases will be analyzed, and where it appears that doubt exists whether without amendment or supplemental hearing, the commission can enter a lawfully effective order, the parties will be notified.

"Such appropriate changes as the federal control act may render necessary will be made in the commission's rules of practice."

Court News

Defeating Higher Through Rates

In the case of *W. H. Settle, et al., vs. the Baltimore & Ohio, the United States Circuit Court of Appeals, Sixth District*, has sustained the right of a shipper to make bona fide overstate consignments of freight to an intermediate point, assume the custody thereof and re-ship under a new bill-of-lading for the purpose of defeating the higher joint through rate. The case was taken in on error from the United States District Court for the Southern District of Ohio, the decision of which was reversed by the higher court. The shipments in question all originated south of the Ohio river and were of two classes: first, those originally consigned to the defendants and billed directly to Oakley, Ohio, which is within the switching district of Cincinnati; second, those originally consigned to others in Cincinnati or elsewhere, purchased by the defendants while in transit and upon arrival in Cincinnati switched to Oakley. It was the defendants' intention, from the time of the shipment, to receive the freight at Madisonville, Ohio. The interstate rate from the point of origin to Madisonville in each case exceeded the sum of the interstate rate to Oakley and the local rate from Oakley to Madisonville. Judge Kenning, in his opinion, says that in none of the cases cited by the plaintiff was the freight actually delivered to the intermediate points or destinations. None of the shipments involved the payment of actual commodity charges for delay in re-consigning. All of the cases seem to have turned exclusively or primarily upon the question of continuity of movement actual or constructive. The continuity of the shipments from Oakley to Madisonville, the court says, to be ultimately tested by the evidence in whether or not there was actual delivery of the shipment in good faith to the consignee at Oakley and actually a new and independent shipment therefrom by defendant to Madisonville, while the freight was physically present and in its possession. A shipment that delivered, possession and delivery being complete, is not a matter of law, converted into an interstate shipment by the continuity of an original and continuing intention to receive a lawfully issued invoice for the interstate movement. In substance the doctrine in the district was reversed by us by the grounds of stopping delivery and making a subsequent stoppage constituting a constructive part of the original and continuous movement of a party's shipment. He who uses the words "in its possession" in the original invoice, *W. H. Settle, et al., vs. Baltimore & Ohio*, December 7, 1918.

Equipment and Supplies

Cars and Locomotives For Lines in France

The United States Government is expected to place large orders shortly for additional cars and locomotives for service on the military railway lines in France. General Pershing has cabled to Washington requirements for locomotives, cars and steel which will greatly increase the orders already placed by S. M. Felton, director general of military railways, which include about 30,000 cars and 2,000 locomotives. The number of cars and engines wanted has not been given out, but it is understood that it is so large as to cause some perplexity on the part of the authorities in charge of the apportionment of the steel supply.

390 Locomotives Ordered

The order for 390 additional locomotives, mentioned last week, as about to be placed by the Railroad Administration, has now been placed.

Car and Locomotive Specialties

The Central Advisory Purchasing Committee has announced the following additional awards for specialties for the government cars and locomotives:

Locomotives

Metallic connection between engine and tender.....	400 Franklin Ry. Supply Co. 385 Barco Mfg. Company. 240 Greenlaw Mfg. Co.
Spings	To be purchased by builders.
Throttle valves	All Chambers Valve Company.
Rollled steel wheels.....	Forged Steel Wheel Company. Standard Steel Works Company.
Yokes for tenders (cast steel)	All, Buckeye Steel Castings Co.

Cars

Journal bearings	8,000 Haskell & Barker Car Co. 10,000 Bostwick-Lyon Bronze Co. 11,000 Southern Brass Company. 20,000 Keystone Bronze Company.
Wheels (steel)	Balance of order to be placed later. 3,000 Midvale Steel & Ordnance Co. 7,500 Forged Steel Wheel Company. 2,500 Carnegie Steel Company.
Wheels (cast iron).....	126,000 Griffin Wheel Company. 13,000 Brown Company. 13,000 Buffalo Car Wheel Fdy. Co. 16,000 Bass Foundry & Mach. Co. 16,000 New York Car Wheel Works. 20,000 National Car Wheel Company. 8,000 Ramapo Iron Works. 8,000 Southern Wheel Co. 4,000 Standard Steel Works Co. 8,000 Albany Car Wheel Co. 4,000 Louisville Car Wheel & Ry. Sup. Co. 56,000 Pressed Steel Car Company.
Door fixtures	248,000 American Car & Foundry Company. 64,000 Haskell & Barker Car Co. 32,000 Mt. Vernon Car Mfg. Company. 16,000 Lenoir Car Works.
Door operating mechanism...	25,000 single sheathed box. Camel Company. 25,000 double sheathed box. Union Metal Products Company.
Roofs	Composite gondola and 55 ton hopper cars. Combination of car builders design with Enterprise safety lowering device. 17,000 Murphy, Standard Ry. Equipment Co. 16,500 Chicago-Cleveland Car Roofing Co. 16,500 Hutchins Car Roofing Company. 10,000 American Steel Foundries.
Spings	5,250 Crucible Steel Co. 5,500 Union Spring & Mfg. Co. 5,350 Pittsburgh Spring & Steel Co. 2,400 Ft. Pitt Spring & Mfg. Co. 52,000 Railway Steel Springs Co. 3,000 W. G. Mitchell Spring Works. 7,500 Pressed Steel Car Company. 7,500 Standard Steel Car Company. 1,500 Keith Ry. Equipment Company.
Angle cock holders.....	All Railway Devices Company.
Ratchet brake levers.....	For composite gondolas and 55 ton hoppers 25,000 Robert H. Blackall. 20,000 Railway Devices Company.

Orders for the plates, bars and shapes for the cars and locomotives have been distributed among the steel companies.

One Car Completed

Although all of the specialties had not yet been ordered, Director General McAdoo's office announced on June 19 that he had just been notified by President Woodin, of the American Car & Foundry Company, that the first of the 33,000 freight cars for which that company held the contract had been completed, and that work on the entire order is progressing. The letting of this contract was announced on April 26.

This is a sample or model car built for inspection purposes and does not necessarily conform to complete final specifications.

For the purpose of facilitating delivery of cars and locomotives ordered, Central Advisory Purchasing Committee has established a procurement section which will follow up and expedite the delivery by keeping in close touch with progress of work at different plants and by rendering such assistance as possible in the procurement and delivery of materials needed. This section will be in charge of H. C. Peare. His office is at Washington, and he succeeds the Advisory Committee on Materials.

Machinery and Tools

THE CHICAGO, INDIANAPOLIS & LOUISVILLE has issued an inquiry for four 36-in. x 12-ft. engine lathes, four 24-in. x 10-ft. engine lathes, four 42-in. boring mills with bar head, three 30-in. planers, two air compressors of 1,500 cu. ft. per min. capacity, and one of 500 cu. ft. per min. capacity.

Track Specialties

THE NORFOLK & WESTERN is inquiring for 8,000 kegs of spikes.

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 1,700 kegs of spikes.

THE PENNSYLVANIA LINES have ordered 3,000 kegs of spikes of two Pittsburgh companies.

THE BALTIMORE & OHIO has placed an order with a Pittsburgh concern for 1,000 kegs of spikes.

LIGHT RAILWAYS IN PRUSSIA.—The aggregate mileage of light railways in Prussia at the end of March, 1917, was about 6,705 miles as against about 6,659 miles at the end of the previous fiscal year. The gages of these lines varied between 2 ft. and the German standard gage (4 ft. 8½ in.). The capital invested at the end of March, 1917, was nearly \$185,000,000.

THE RAILWAY BOARD OF INDIA has sanctioned the following surveys by the Darjeeling-Himalayan Railway: A meter gage line from Oslampur to Siliguri, via Titalia, a distance of about 36 miles; a meter gage line from Titalia or Rangunge to Jalpaiguri, a distance of about 22 miles; for converting the Kissen-gunge-Islampur line from the 2 ft. to the meter gage, a distance of about 18 miles; and for a 2-ft. gage line from Islamour to Dinajpur via Lahiree Hat with a branch from Lahiree Hat to Haldibari, a distance of about 89 miles.

THE URUGUAYAN RAILWAY PURCHASE.—Private advices received from Buenos Aires state that the bill pending in the Uruguayan Congress, which would authorize the government to purchase the Uruguayan Central Railway and a number of public utilities from British interests, provides for the issuance of government bonds to the amount of 65,000,000 pesos, or \$67,000,000 in American money. In order to insure the success of the flotation, the measure contains the rather unusual feature of compelling exporters to receive 25 per cent of the selling price of their goods in these bonds. It is explained that capital is comparatively scarce in Uruguay and, inasmuch as those engaged in the export trade are the most prosperous class in the country at the moment, it is the intention of the government to conscript a part of their newly acquired wealth in the sense of forcing them to subscribe to the bonds.—*Broad Street Gossip in the Wall Street Journal.*

Supply Trade News

W. M. Bosworth has resigned as mechanical engineer of the Norfolk Southern to go into the engineering department of the Underdeet Stoker Company, Chicago, Ill.

Charles P. Wright, sales representative of the American Brake Shoe & Foundry Company at Chicago, has been appointed assistant to the vice-president, with headquarters at Chicago, effective June 1.

The directors of the Pullman Company on June 10 elected **John F. Kane** secretary, succeeding **A. S. Weinsheimer**, deceased, and **Charles S. Sweet**, formerly chief clerk in the president's office, was elected assistant secretary, succeeding Mr. Kane.

The **Q & C Company**, of New York and Chicago, announces the appointment of the General Supply Company, Ltd., of Canada (358-360 Sparks street, Ottawa, Canada, with branch offices at Montreal, Winnipeg and Vancouver), as sole representatives in Canada.

David T. Hallberg, whose promotion to district sales agent of the P & M Company, with headquarters at Chicago, was announced in these columns on June 14, was born at Ottumwa, Iowa, on September 11, 1885.



D. T. Hallberg

After completing his education in the public schools in that city, he went to Chicago in 1901, and was there employed in the printing industry until he entered the passenger and advertising department of the Atchison, Topeka & Santa Fe, in 1905. Later he was appointed western representative of the Santa Fe Employees' Magazine, and remained in that position until he entered the service of the P & M Company as material inspector in May, 1910. Shortly

after that he became western representative and in January, 1918, he came to Chicago as sales representative, which position he held until his present promotion to district sales agent, as mentioned above.

G. H. Corse, Jr., has resigned as traffic manager of G. Amsinck Company, New York, to become traffic manager of the Robertson-Cole Company of New York, general exporters of motor cars, steel, etc., with headquarters at San Francisco. Until a few months ago, Mr. Corse was foreign passenger agent of the Union Pacific System.

The degree of Doctor of Engineering was conferred upon **Walter V. Turner**, manager of engineering for the Westinghouse Air Brake Company, at the University of Pittsburgh at the annual Commencement, in recognition of his valuable services to the engineering profession and to humanity. Mr. Turner is considered the foremost pneumatic engineer in the world, and has over four hundred (400) inventions, covered by U. S. patents, in use on most railways of the world and in many large industrial plants.

The **Universal Draft Gear Attachment Company**, Chicago, has joined with **John T. Llewellyn**, president of the Chicago Malleable Castings Company and associates in the purchase of the Harvey (Ill.) plant of the Whiting Foundry & Equipment Company, just west of the tracks of the Baltimore & Ohio Chicago Terminal. The stated consideration is \$75,000. The property includes a one-story building, about 400 by

125 ft., and two or more acres of land. The plant will be used mainly for the manufacture of steel castings for railroad cars. This transaction disposes of the smaller of two pieces of property of the Whiting Foundry & Equipment Company at Harvey.

Stanley W. Midgley, whose appointment as western representative in charge of railroad sales of the Liberty Steel Products Company at Chicago was announced in the



S. W. Midgley

Railway Age on June 14, was born at Chicago in 1875. After completing his education at the Lewis Institute (Chicago) he entered the sales department of the Great Western Cereal Company, having charge of the wholesale trade, with headquarters at Chicago. From 1902 to 1906, Mr. Midgley was general sales representative of the National Car Cooler Company, at Chicago, and from 1906 to 1914 he was western representative and western sales manager of the Curtin Supply Company, in the same city. Subsequently, he became general sales manager of the Acme Supply Company, with headquarters in Chicago, and remained with that company until his recent appointment as mentioned above.

The **Westinghouse Electric & Manufacturing Company** has purchased the property, business and good-will of the Krantz Manufacturing Company, Inc., Brooklyn, N. Y., manufacturers of safety and semi-safety electrical and other devices, such as auto-lock switches, distribution panels, switchboards, floor boxes, bushings, etc. The supply department of the Westinghouse Electric & Manufacturing Company will act as exclusive sales agent for the products of the Krantz Manufacturing Company, Inc., Brooklyn, N. Y., continued under its present name **H. G. Hoke**, of the Westinghouse Electric & Manufacturing Company, will represent the supply department at the Krantz factory.

Frank W. Edmunds has been appointed general eastern sales manager of the Schroeder Headlight & Generator Company, of Evansville, Ind., with offices at 30 Church street, New York.



F. W. Edmunds

Mr. Edmunds like many of the prominent men allied with the railway supply industry, began his business career as an office boy. His first employer was the man who put up the money for and built the famous "Monitor" of Civil War days, John A. Griswold, president of John A. Griswold & Co. With this company Mr. Edmunds started until it became the Troy Steel Company and then some years later liquidated. In the meantime he had been made secretary, treasurer and general sales manager. He then became secretary of the Q & C Company at Chicago, being also its western representative of the Pennsylvania Steel Company. He returned from this position to become associated with the Dresser Railway Lamp Works, of New York, with which company he has been for 15 consecutive years, remaining as sales manager to accept the posi-

tion mentioned above. The change becomes effective June 15. Mr. Edmunds served for years on various committees of the Railway Supply Manufacturers Association and other associations, and is now the secretary treasurer of the Signal Appliance Association.

George M. Coale, whose election as vice-president of the Duncan Lumber Company, with headquarters at Chicago, was announced in the *Railway Age* on June 14, was born at Gosport, Ala., on May 30, 1885. In 1903 he entered the employ of the Keith Lumber Company, at Voth, Tex., as a clerk, remaining with that company until 1905, at which time he was appointed assistant sales manager of the Continental Lumber Company at Houston, Tex. The latter part of the following year he was elected secretary and sales manager of the same company. In 1909 he became northern sales manager for the Kirby Lumber Company, with headquarters at Chicago, with which company he remained until 1911, when he returned to the Continental Lumber Company, as vice-president. He retained that position until his recent election as vice-president in charge of railway sales of the Duncan Lumber Company of Portland, Ore.

D. F. Crawford, who recently resigned as general manager of the Pennsylvania Lines West of Pittsburgh, has been elected vice-president of the Locomotive Stoker Company, with headquarters at Pittsburgh, Pa. When in railway service, Mr. Crawford obtained extensive experience in both mechanical and executive positions. He was born at Pittsburgh December 4, 1864, and attended the city and private schools and also the Pennsylvania Military College. He entered the service of the Pennsylvania System in July, 1882, in the freight department, transferring to the Altoona shops in December, 1885, as a special apprentice. From 1889 to February 1, 1892, he was an inspector in the test department. In February, 1892, he was appointed assistant master mechanic of the Fort Wayne shops of the Pennsylvania Lines West of Pittsburgh. From July 1, 1895, to November 1, 1899, he was assistant to superintendent of motive power of the Northwest System of the Pennsylvania Lines West and on the latter date was made superintendent motive power of the same system, where he remained until August 1, 1903, when he was appointed general superintendent of motive power of the Pennsylvania Lines West of Pittsburgh. On January 1, 1917, he was promoted to general manager of the Lines West. Mr. Crawford was president of the Master Mechanics' Association in 1913, and in 1915 he was president of the Master Car Builders Association. Since 1903, he has devoted much time and attention to the use and development of mechanical stokers for locomotives—and during this period developed the Crawford underfeed stoker, which is in extensive use on the Pennsylvania Lines West.



D. F. Crawford

Conference of Allied Manufacturers and Publishers

Representatives of the business and editorial departments of a large number of business papers were the guests at luncheon at the University Club in Chicago on June 17 of the manufacturing concerns associated with the Allied Construction Machinery Corporation. The occasion was a conference for the discussion of the American export situation after the war and of the means by which the publishers and the manufacturers can co-operate for their mutual benefit.

Announcement of the purpose of the conference was made by D. H. Nichols, managing director of the Allied Publicity

Bureau, and the toastmaster was S. T. Henry, vice-president of the Allied Construction Machinery Corporation. The speakers and their subjects were: F. A. Smythe, president of the Thev Automatic Shovel Company, "Publicity in the Sales Program"; W. T. Beatty, president, Austin Manufacturing Company, "Problems Encountered in Advertising Road Machinery"; E. J. Mehren, vice-president, McGraw-Hill Publishing Company, "The Publisher's Ability to Serve"; Charles F. Lang, president, Lakewood Engineering Company, "Visualizing Sales Through Publicity"; W. S. Kies, vice-president, American International Corporation, "Foreign Trade and American Manufacturers"; James H. Foster, president, Hydraulic Pressed Steel Company, "Manufacturing Efficiency in War Times"; Carl A. Luster, president, Clyde Iron Works, "The Value of Quality in Direct Appeal"; W. H. Taylor, president, Iron Age, "Conditions of the Iron and Steel Trade Now and After the War."

The Allied Construction Machinery Corporation was organized chiefly to further export trade, and is now studying conditions both at home and abroad with a view to promoting such trade for the companies associated with it after the war. The conference with the publishers in Chicago was the first of a series of conferences which the Allied Manufacturers will hold with different classes of persons and concerns with which they do business. Following the conference in Chicago on Monday, the manufacturers, accompanied by a number of the publishers, started on a tour of inspection of the plants of the allied manufacturers which will take them to Aurora, Ill.; Milwaukee, Wis.; Duluth, Minn.; Colfax Springs and Newton, Iowa; Cleveland, Ohio, and Lorain. The final conference between the manufacturers and publishers will be held at the Cleveland Athletic Club on June 28. The plants to be visited are those of the companies whose presidents appeared as speakers at the luncheon on Monday and also of the C. H. & E. Manufacturing Company; the Sterling Wheelbarrow Company, and the Barber-Greene Company. The purpose of the inspection trip is to so familiarize the publishers with the plants and products of the manufacturers as to enable the former to give the manufacturers better service through their advertising columns.

Trade Publications

WROUGHT IRON PIPE.—A photomicrograph showing a section of pipe magnified 60 diameters is an interesting feature of a folder recently issued by the A. M. Byers Company, Pittsburgh, Pa. The reason for the rust resisting properties of wrought iron is clearly brought out, and records of installation of Byers pipes are cited in the folder.

SWEDISH PURCHASE OF GERMAN RAILS.—The Swedish Railway management has entered into a fully guaranteed agreement with the German Steel Trust for the delivery of 80,000 tons of rails. One-third of the deliveries is to be made in each of the years 1918, 1919, and 1920. Payment is to be made by the deposit of Swedish crowns in the German Reichsbank, and about half of the amount, reckoned at 11,500,000 crowns (\$3,105,000) is to be paid immediately.—*Commerce Reports*.

EXEMPTIONS FOR BRITISH RAILWAYMEN.—A question in the English Parliament on the exemptions from military service granted by railway companies to railway employees received this answer: All railway men are protected from military service under arrangements originally made between the War Office and the Railway Executive Committee and continued by the Ministry of National Service. The release of railway employees for military service is carried out under the instructions of the Railway Executive Committee, and in agreement with the men's representatives. By this agreement, men are released in order of medical grade, age, marital conditions, and number of children. Any man considering himself to be released out of his turn has the right of appeal to an independent committee appointed by the Board of Trade, and accepted by the Railway Executive Committee and the men's unions. Railway men have the same rights of appeal to tribunals on other than occupational grounds as are enjoyed by other men.

Railway Financial News

ALABAMA, TENNESSEE & SOUTHERN. The reorganization committee of which G. C. Van Tuyl, Jr., president of the Metropolitan Trust Company of New York, is chairman, has adopted a reorganization plan for this company. It provides for the issuance of (1) \$3,500,000, 30-year 6 per cent prior lien gold bonds, \$850,000 of which are for the cash requirements of the plan, the rest to be reserved for general corporate purposes; (2) \$2,116,000 general (2d) 30-year mortgage gold bonds; (3) \$1,700,000 6 per cent preferred stock at par of which \$1,527,000 will be presently issuable under the plan; (4) \$2,500,000 common stock at par of which \$2,424,000 (y. t. c.) will be presently issuable under the plan. The new common stock will be assigned to George C. Van Tuyl, Jr., Louis V. Bright, George E. Warren, James C. Colgate, John T. Cockrane and H. A. Smith, to be jointly held by them and their respective successors as voting trustees for five years with the right either to terminate the trust at an earlier date, or to continue it for a further period of three years in the event that during the said period of five years the full rate of interest of 6 per cent per annum shall not have been paid on the general mortgage bonds for at least three years of said period. The plan gives the terms of exchange for existing securities and holders are advised to deposit their holdings with the Metropolitan Trust Company, 60 Wall street, New York City, on or before July 12.

BALTIMORE & OHIO.—An application has been filed by this company with the Ohio Public Utilities Commission for permission to issue \$20,000,000 5 per cent bonds. This action is understood to forecast an early request by the company for funds from the Railroad Administration to meet maturing equipment obligations and to provide for improvements recommended by the Railroad Administration.

BOSTON & MAINE.—See editorial comments elsewhere in this issue.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—See editorial comments elsewhere in this issue.

DENVER & RIO GRANDE.—William Salomon & Co. on the steps of the County Court House of New York County Thursday bid \$4,000,000 for the right, title and interest of the Denver & Rio Grande in the stock of the Utah Fuel Company, which has a par value of \$10,000,000. The banking firm acted on behalf of the Western Pacific Railroad, which has a 95 per cent interest in the \$38,000,000 judgment against the Denver & Rio Grande, which was obtained several months ago by the Equitable Trust Company as trustee of the old Western Pacific first mortgage bonds. The remaining 5 per cent interest is held by the old Western Pacific first mortgage bondholders who did not join in the reorganization. The sale was conducted under a protest of the Bankers Trust Company, acting as trustee for the first and refunding bondholders of the Denver & Rio Grande. The bid made by Salomon & Co. places a nominal value of \$12,300,000 on the Utah Fuel property, assuming as the \$4,000,000 price was paid for the equity in the property over and above the \$2,300,000 Utah Fuel bonds outstanding and the \$2,000,000 cash which must be paid to the Guaranty Trust Company to redeem the stock which is pledged with it as trustee, as collateral security for the Rio Grande Western consolidated mortgage. The Bankers Trust Company's protest served notice that that company, acting as trustee under the Denver first and refunding mortgage, would at the proper time take such action as may be appropriate to protect the first and refunding bondholders' interest in the Utah Fuel stock.

ERIE.—This company has applied to the New York Public Service Commission for permission to issue \$12,500,000 6 per cent series B mortgage bonds for general capital expenditures.

PHILADELPHIA & READING.—William K. Vanderbilt, Jr., and C. E. Dilkes have been elected directors to succeed Alfred H. Smith and William L. Kinter, respectively, resigned.

WESTERN PACIFIC.—See Denver & Rio Grande.

Railway Officers

Executive, Financial, Legal and Accounting

T. H. Gathin, assistant to vice-president of the Southern Railway, has been appointed assistant to president with headquarters at Washington, D. C.

A. M. Schoyer, resident vice-president of the Pennsylvania Lines West of Pittsburgh with office at Chicago, has been transferred to Pittsburgh, Pa., and the Chicago office has been abolished.

Samuel Rea, president of the Pennsylvania Railroad and subsidiary companies, has been elected also president and director of the Long Island, to succeed **Ralph Peters**, who has resigned to become federal trustee of the Long Island.

E. S. Jouett, general attorney of the Louisville & Nashville, has been appointed general counsel, and **J. H. Ellis**, secretary, has been appointed treasurer, also treasurer of the Louisville Henderson & St. Louis, both with headquarters at Louisville, Ky.

Alexander R. Lawton, vice-president of the Central of Georgia with office at Savannah, Ga., has been elected president of the Wadley Southern to succeed **William A. Winburn**, resigned to accept service with the United States Railroad Administration.

George M. Shriver, vice-president of the Baltimore & Ohio, has been elected vice-president and a director also of the Washington Terminal Company, succeeding **A. W. Thompson**, who has been appointed federal manager of the Baltimore & Ohio eastern lines.

L. S. Smith, assistant treasurer of the Texas & Pacific, has been appointed treasurer for the receivers of that company, with headquarters at Dallas, Tex., effective June 2. **C. W. Veitch**, secretary and treasurer with headquarters at New York, has been retained as secretary at New York.

H. T. Wickham, vice-president and general counsel of the Chesapeake & Ohio, is now general counsel. **L. F. Sullivan**, controller, has been appointed general auditor, **J. W. Nokely**, general auditor, has been appointed assistant general auditor, and **J. A. Hancock**, assistant treasurer, has been appointed treasurer, all with headquarters at Richmond, Va.

A. H. Plant, controller of the Southern Railway, has been appointed controller of the same road also the Georgia Southern & Florida, the Atlantic & Vicksburg, the Carolina, Charlotte & Ogle, and the Carolina, Charlotte & Ohio of South Carolina. The following assistants to vice-president of the Southern have been appointed on the same roads: **G. W. Taylor**, joint owner, transportation; **J. Hainen**, staff officer, mechanical; **F. W. Brown**, staff officer, headquarters; **H. H. Laughton**, staff officer, materials and supplies; **W. H. Gatchell**, staff officer, pass and baggage revenue; **Alex. Grant**, joint title manager; and **W. M. Netherland**, manager dining cars. **Randall Clifton**, freight train manager, has been appointed title manager, and **E. H. Shaw**, freight train manager, has been appointed assistant train manager. All with headquarters at Washington, D. C.

Operating

Ralph Peters, president of the Long Island, has been appointed federal trustee, with office at New York.

W. P. Kenney, president of the Great Northern, has been appointed federal trustee, with headquarters at St. Paul, Minn.

W. J. Harahan, president of the Western A. O. Long, with headquarters at Seattle, Wash., has been appointed federal trustee.

A. T. Hardin, vice-president of the New York Central, has been appointed assistant regional director, Eastern Railway, with office at New York.

H. L. Ingersoll, assistant to the president of the New York Central, has been appointed mechanical assistant in the office of the eastern regional director, New York city.

J. M. Hannaford, president of the Northern Pacific, has been appointed federal manager, with headquarters at St. Paul, Minn.

H. E. Byram, president of the Chicago, Milwaukee & St. Paul has been appointed federal manager, with headquarters at Chicago.

B. A. Worthington, president of the Cincinnati, Indianapolis & Western, has been appointed general manager, with office at Indianapolis, Ind.

T. F. Brennan, vice-president of the Buffalo, Rochester & Pittsburgh, has been appointed general manager, with headquarters at Rochester, N. Y.

Richard O'Sullivan, superintendent of the Ulster & Delaware, has been appointed general manager, with headquarters at Kingston, N. Y.

George E. Evans, fourth vice-president of the Louisville & Nashville, has been appointed staff officer—operation, with headquarters at Louisville, Ky.

R. H. Wilbur, vice-president and general manager of the Lehigh & New England, has been appointed general manager, with office at Philadelphia, Pa.

J. D. Hawks, vice-president and general manager of the Detroit & Mackinac, has been appointed general manager, with headquarters at Detroit, Mich.

H. C. May, superintendent of motive power of the Chicago, Indianapolis & Louisville, has been appointed general manager, with office at La Fayette, Ind.

J. H. Nuelle, general superintendent of the New York, Ontario & Western, has been appointed general manager, with headquarters at Middletown, N. Y.

H. W. McMaster, vice-president and general manager of the Wheeling & Lake Erie, has been appointed general manager, with office at Cleveland, Ohio.

Morris Rutherford, vice-president and general manager of the Lehigh & Hudson River, has been appointed general manager, with headquarters at Warwick, N. Y.

J. J. Bernet, president and general manager of the New York, Chicago & St. Louis, has been appointed general manager, with headquarters at Cleveland, Ohio.

G. R. Huntington, general manager of the Minneapolis, St. Paul & Sault Ste. Marie, has been appointed federal manager, with headquarters at Minneapolis, Minn.

E. M. Rine, vice-president and general manager of the Delaware, Lackawanna & Western, has been appointed general manager, with headquarters at New York.

R. N. Hudson, president and general manager of the Louisville, Henderson & St. Louis, has been appointed general superintendent, with headquarters at Louisville, Ky.

C. H. Erwing, vice-president of the Philadelphia & Reading, has been appointed federal manager of the same road, and the Central of New Jersey, with office at Philadelphia, Pa.

Kenyon B. Conger, assistant secretary, assistant treasurer, and real estate agent, of the Hudson & Manhattan, has been appointed general manager, with office at New York.

A. M. Darlow, assistant to president and superintendent of motive power, of the Buffalo & Susquehanna, has been appointed general manager, with headquarters at Buffalo, N. Y.

J. S. Spelman has been appointed general superintendent of the Western Pacific, with headquarters at San Francisco, vice **E. W. Mason**, resigned to accept appointment as major of engineers, U. S. Reserve.

R. V. Taylor, federal manager of the Mobile & Ohio, and the Gulf, Mobile & Northern, has been appointed federal manager also of the Southern Railway in Mississippi, with headquarters at Mobile, Ala.

D. F. Crawford, general manager of the Pennsylvania

Lines West of Pittsburg, has resigned to become vice-president of the Locomotive Stoker Company, with headquarters at Pittsburg, Pa., as mentioned in another column.

C. M. Kittle, federal manager of the Illinois Central, the Yazoo & Mississippi Valley and the Gulf & Ship Island, has been appointed federal manager also of the Mississippi Central and the New Orleans Great Northern, with headquarters at Chicago, Ill.

James Shannon, trainmaster of the Northern Pacific, has been appointed superintendent of the Pasco division, with headquarters at Pasco, Wash., vice **W. C. Sloan**, who has been granted leave of absence to enter military service overseas.

L. C. Gilman, president of the Spokane & Island Empire and of the Spokane, Portland & Seattle, has been appointed district director of the Puget Sound district, in charge of railroad operation in Washington and Oregon, with headquarters at Seattle, Wash.

M. J. Gormley, operating assistant to regional director, western railroads, has been appointed assistant regional director of the northwestern railroads, and **J. G. Woodworth**, traffic assistant in western region, has been appointed traffic assistant in northwestern region.

Ira L. Anderson has been appointed trainmaster of the Cherokee, Sioux Falls and Onawa districts of the Illinois Central, with headquarters at Cherokee, Iowa, succeeding **William E. Ausman**, resigned to enter military service, effective June 7.

W. L. Mapother, federal manager of the Louisville & Nashville and the Louisville, Henderson & St. Louis, with headquarters at Louisville, Ky., has been appointed federal manager also of the Nashville, Chattanooga & St. Louis and the Tennessee Central.

M. J. Wise, assistant to general manager of the Mobile & Ohio, with office at Mobile, Ala., has been appointed staff officer—operation, of the Mobile & Ohio and the Gulf, Mobile & Northern. The staff officer will assist the federal manager in all details of operation.

Jas. Shannon, trainmaster of the Northern Pacific, at Spokane, Wash., has been promoted to superintendent of the Pasco division, with headquarters at Pasco, Wash., succeeding **W. C. Sloan**, who has been granted leave of absence to go into military service overseas.

Stanley W. Crabbe, whose appointment as superintendent of the Canadian Pacific, with headquarters at Schreiber, Ont.,



S. W. Crabbe

has already been announced in these columns, was born on August 9, 1885, at Teeswater, Ont., and was educated in the public and high schools. He began railway work on May 25, 1903, with the Canadian Pacific as a trackman, and has been in the continuous service on that road ever since. He served consecutively as telegraph operator, yard agent and terminal agent, until his recent appointment as superintendent of the same road with headquarters at Schreiber as above noted.

E. T. Lamb, president of the Atlanta, Birmingham & Atlantic, with office at Atlanta, Ga., has been appointed federal manager of the Atlanta, Birmingham & Atlantic, the Atlanta & West Point, the Western Railway of Alabama, the Charleston & Western Carolina and the Frisco lines east of the Mississippi river.

A. W. Trenholm, vice-president and general manager of the Chicago, St. Paul, Minneapolis & Omaha, has been appointed federal manager, with headquarters at St. Paul, Minn. The terminals of all the railroads at Minneapolis and St. Paul, including Minnesota Transfer, will be under the jurisdiction of Mr. Trenholm.

On account of the consolidation of the Evansville & Indianapolis with the Chicago & Eastern Illinois for operating purposes under federal management the positions held by **C. B. Falley**, general superintendent of the former road, at Terre Haute, Ind., and **R. E. Farmer**, assistant superintendent at the same point, have been abolished.

W. W. Walker, vice-president and general manager of the Duluth, South Shore & Atlantic, has been appointed federal manager, with headquarters at Duluth, Minn. Mr. Walker, in addition to his duties as federal manager of the D., S. S. & A., will have charge of the ore, coal and grain traffic to and from Lake Superior and upper Lake Michigan ports.

E. D. Leavitt, trainmaster of Western division of the Southern Pacific, has been appointed assistant superintendent of the Stockton division, with headquarters at Stockton, Cal., vice **W. M. Stillman**, who has accepted service with the government, and **F. E. Yoakum** has been appointed trainmaster of the Western division, with office at Oakland Pier, Cal., vice Mr. Leavitt.

Horace Baker, general manager of the Southern Railway, lines west, has been appointed general manager of the same lines, the Georgia Southern & Florida, and the Alabama & Vicksburg, with headquarters at Cincinnati, Ohio. **W. N. Foreacre**, general manager of the Southern Railway, lines east, is general manager of the same lines, also of the Carolina, Clinchfield & Ohio, and Carolina, Clinchfield & Ohio of South Carolina, with headquarters at Charlotte, N. C.

J. G. Cowan, assistant superintendent of the Galena division of the Chicago & North Western at Chicago, has been promoted to superintendent, with the same headquarters, in place of **B. E. Terpping**, transferred to the Wisconsin division at Chicago, succeeding **G. W. Dailey**, promoted to assistant general superintendent at Huron, S. D. **J. Leppia**, assistant division superintendent at Chadron, Neb., has been transferred to the Galena division at Chicago, to take the place of Mr. Cowan.

W. A. Baldwin, general superintendent of the Erie, lines west, with office at Youngstown, Ohio, has been appointed transportation assistant, with jurisdiction over transportation matters heretofore in charge of the general manager. **E. T. Campbell**, assistant general manager at New York, has been appointed traffic assistant with jurisdiction over traffic matters. **R. E. Woodruff**, superintendent of transportation, at Youngstown, has been appointed general superintendent, lines west, vice **W. A. Baldwin**, promoted. **A. E. Wallace**, general superintendent at Chicago, has been appointed assistant general superintendent, lines west, and **C. D. Ward**, special agent, at Jersey City Terminal, has been appointed general agent at Chicago (with jurisdiction over Chicago and Hammond terminals), vice **F. G. Lantz**, transferred. The jurisdiction of the general superintendent of lines west is extended over the Marion division, and the offices of the general superintendent at Chicago and the superintendent of transportation, lines west, are abolished.

Traffic

D. M. Goodwyn, general freight agent, of the Louisville & Nashville, has been appointed assistant freight traffic manager, with headquarters at Louisville, Ky.

Francis LaBau, traffic manager of the New York Central (Buffalo and east thereof) has been appointed traffic assistant to the regional director, Eastern Railways, with office at New York city.

G. H. Ingalls, traffic manager of the New York Central Railroad, lines west of Buffalo, has been appointed resident traffic assistant to the regional director, Eastern Railways, with office at Chicago.

George W. Williams, commercial agent of the Chicago,

Rock Island & Pacific at Detroit, Mich., has been appointed division freight agent with headquarters at Des Moines, Iowa, to succeed **Albert W. Eberhart**, deceased.

F. L. Norman, commercial agent of the Grand Trunk at Seattle, Wash., has entered the service of the Grand Trunk Pacific Coast Steamship Co., Ltd. The Seattle and Portland offices of the Grand Trunk have been abolished effective June 1.

F. M. Whitaker, vice-president of the Chesapeake & Ohio, has been appointed traffic manager, with headquarters at Richmond, Va., and **R. H. Vaughan**, general manager of the Blue Ridge Dispatch, has been appointed assistant general freight agent of the C. & O., with headquarters at Cincinnati, Ohio.

D. E. Sullivan, northwestern freight agent of the Baltimore & Ohio, at Minneapolis, Minn., has been appointed division freight agent at Chicago. **J. R. Lee**, commercial freight agent at Detroit, Mich., has been transferred to Toledo, Ohio, succeeding **E. C. Law**, who has been appointed division freight agent at Toledo. The position of commercial freight agent of the B. & O. at Detroit has been abolished.

Charles Emil Muller, who has been appointed assistant general freight agent of the Seaboard Air Line, with headquarters at Savannah, Ga., was born on June 17, 1884, at Baltimore, Md., and received a college education. After serving in various capacities with the Baltimore Steam Packet Company, he entered the service in the Seaboard Air Line, in March, 1905, as soliciting freight agent, at Baltimore, Md. He later served as contracting freight agent, and since January 1, 1914, as general agent, at the same place, until his recent appointment as assistant general freight agent, of the same road, as above noted.

As a result of the director general's order to eliminate off-line traffic offices, the Chicago & North Western announces a number of changes in its traffic department, effective June 10. The following assistant general freight agents, with headquarters at Chicago, have been appointed division freight and passenger agents: **M. J. Golden**, headquarters at Boone, Iowa; **E. W. Hoops**, headquarters at Chicago; **H. C. Cheyney**, headquarters at Green Bay, Wis. The following general agents at off-line offices have been appointed traffic agents, with headquarters at various points on the Chicago & North Western: **H. B. Loucks, Jr.**, Antigo, Wis.; **B. H. Bennett**, Eagle Grove, Iowa; **W. L. Stannard**, Fond du Lac, Wis.; **John Mellen**, Huron, S. D.; **C. A. Thurston**, Mason City, Iowa. The following general agents at on-line points have been appointed traffic agents: **W. B. Richards**, headquarters Council Bluffs, Iowa; **E. E. Benjamin**, headquarters Deadwood, S. D.; **W. R. McGinnis**, headquarters Norfolk, Neb.; **H. J. Wagen**, general agent at Winona, has been appointed division freight and passenger agent, same headquarters.

Engineering and Rolling Stock

A. G. Smith has been appointed electrical engineer of the Boston & Albany, with headquarters at Boston, Mass., vice **C. W. Dodge**, resigned.

Charles S. Churchill, assistant to president of the Norfolk & Western, has been appointed, by the federal manager, chief of valuation, with office at Roanoke, Va.

J. A. Burnett, electrical engineer of the Grand Trunk, with office at Montreal, Que., has been appointed regional assistant with the British War Mission, Washington, D. C.

H. A. Cassil has been appointed engineer in charge of way of the Pere Marquette, with duties as assistant in track maintenance and construction and headquarters at Detroit, Mich.

L. J. Putnam, promoted assistant engineer in the Chicago & North Western, was promoted, on June 12, to chief engineer, succeeding **W. H. Finley**, who was recently elected president of the road.

F. J. Monahan, former engineer on the Montreal line in the Louisville & Nashville, has been appointed master mechanic of the Birmingham division, with headquarters at Boyles (Ala.) shops, and **T. H. Hogan** has been appointed

master mechanic of the Memphis line, with headquarters at Paris (Tenn.) shops, vice Mr. Monahan.

R. S. Parsons, assistant to president and general manager of the Erie, has been appointed chief engineer; **G. B. Owen**, chief engineer, has been appointed superintendent of maintenance; **H. Knight**, superintendent of maintenance, has been appointed assistant superintendent of maintenance; **R. H. Boykin**, assistant superintendent of maintenance, has been appointed assistant to superintendent of maintenance; all with headquarters at New York. The positions of general manager and assistant general manager have been abolished.

R. J. Middleton, valuation engineer of the Chicago, Milwaukee & St. Paul, at Chicago, has been promoted to assistant chief engineer of the Puget Sound lines, with headquarters at Seattle, Wash., succeeding **E. O. Reeder**, who has retired on account of ill health. **T. H. Strate**, valuation field engineer, with headquarters at Minneapolis, Minn., succeeds Mr. Middleton at Chicago, and **F. M. Sloan** takes the place of Mr. Strate at Minneapolis. **E. B. Crane** has been appointed assistant valuation engineer, with headquarters at Chicago. These changes were effective on June 15.

C. E. Lindsay, division engineer of the Mohawk division of the New York Central, with headquarters at Albany, N. Y., has accepted a position on the Board of Railroad Wages and Working Conditions under the United States Railroad Administration. **W. A. Murray**, division engineer of the Pennsylvania division, with office at Jersey Shore, Pa., succeeds Mr. Lindsay. **G. N. Edmondson**, division engineer of the Rochester division, with headquarters at Rochester, N. Y., has been transferred to Jersey Shore, succeeding Mr. Murray. **J. W. Stevens**, supervisor of tracks, with headquarters at Clearfield, Pa., has been appointed acting division engineer, Rochester division, succeeding Mr. Edmondson. **A. R. Jones**, assistant engineer in the office of engineer of track at New York, has been appointed supervisor at Clearfield, Pa., succeeding Mr. Stevens. **A. E. Johnson**, assistant engineer on the staff of division engineer of the Eastern division at New York, succeeds Mr. Jones.

Frank Carleton Huffman, resident engineer on construction, on the Chicago & North Western has been promoted to principal assistant engineer, succeeding **L. J. Putnam**, promoted. Mr. Huffman was born at Milford, Ind., on October 26, 1876. He was educated at Purdue University, graduating in 1905. He entered railway service with the Cleveland, Cincinnati, Chicago & St. Louis in June, 1903, as a rodman. During the summer months of the following two years he followed the same line of work with the same railroad. In the latter part of 1905 he went to the Pennsylvania Railroad at Pittsburgh, as assistant on the engineering corps. The following year he entered the employ of the Chicago & North Western as instrument man. Later he was appointed assistant engineer on construction. In 1908 he became assistant state engineer of South Dakota, at Pierre, S. D. The following year he returned to the North Western as locating engineer, with headquarters at Chicago. In 1912 he was appointed assistant resident engineer for the St. Louis, Peoria & North Western, a subsidiary of the Chicago & North Western. After the St. Louis line was completed he became resident engineer of construction, with headquarters at Chicago, having charge of grade reduction on the Southern Illinois division, the construction of the Kinnickinnic elevator at Milwaukee, the terminal elevator at South Chicago and the elevator at Council

Bluffs, Iowa. Mr. Huffman was engaged in this work until his present promotion as noted above.

Purchasing

E. W. Grice, assistant to president, of the Chesapeake & Ohio, has been appointed manager of purchases, stores and safety, with headquarters at Richmond, Va.

C. S. Goldborough, assistant to president of the Erie, at New York, has been appointed assistant to the federal manager with jurisdiction over the purchasing and stores department, and will perform other duties assigned to him.

H. P. McQuilkin has been appointed assistant general storekeeper of the Baltimore & Ohio, with office at Baltimore, Md., succeeding **E. W. Thornley**, who has been furloughed to accept service in the office of the Allegheny Regional Purchasing Committee.

Special

J. C. Tucker, assistant to vice-president in charge of operating of the Erie, at New York, has been appointed assistant to the federal manager with jurisdiction over the telegraph, employment, and safety departments, and will perform other duties assigned to him.

Percy R. Flanagan, general agent of the Chicago Great Western, at Spokane, Wash., has been assigned to duty as property protector, with headquarters at Chicago, effective June 1. The scope of his duties will include the protection of shippers' property in transit, as well as the property of the company.

Railway Officers in Government Service

W. C. Wishart has been appointed operating statistician in the office of the eastern regional director, New York city.

W. L. Barnes, assistant manager of the car service section of the Railroad Administration (Division of Transportation) at Washington, has been transferred to Chicago, where he will supervise refrigerator car and tank car service.

H. C. Woodbridge, assistant to general manager of the Buffalo, Rochester & Pittsburgh, has been appointed regional supervisor in the Fuel Conservation section, of the United States Railroad Administration, with headquarters at Philadelphia, Pa.

H. K. Mack has been appointed supervisor of coal traffic for the Railroad Administration in the southern Illinois coal fields, with headquarters at Herrin, Ill., effective June 12. Mr. Mack will have general charge of equipment and such other duties as may be assigned to him.

A. C. Everham, terminal engineer of the Union Pacific at Kansas City, Mo., has been assigned to work as a supervising constructing quartermaster, with the rank of major, in the quartermaster's corps of the National Army. Major Everham is now located at Washington, D. C.

H. T. Bentley, superintendent of motive power of the Chicago & North Western, who has been serving at Washington as mechanical assistant in the Division of Operation of the Railroad Administration, has resigned that place, and has returned to his office in Chicago. His duties at Washington will be taken over by **Frank McManamy**, manager of the locomotive section. The announcement says that Mr. Bentley's services have been very satisfactory, but ill-health has led him to ask to return to Chicago. As chairman of the committee on standards, he has had active charge of preparing standards for government engines and freight cars.

Obituary

E. H. Spalding, division engineer of the Duluth, Missabe & Northern, died at his home in Duluth on May 28 at the age of 67.

J. D. McNamara, passenger traffic manager of the Wabash, died on June 17, at St. Louis, Mo., from injuries received in an automobile collision.

C. J. Stewart, mechanical superintendent of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., died recently at Twin Lakes, Conn., at the age of 51.



F. C. Huffman

EDITORIAL

Railway Age

EDITORIAL

"Safety-First" is now eight years old and is a somewhat hackneyed topic, but any one who reads the article on the subject which is printed on another page of this paper, giving an up to date picture of a large safety organization, will at once be reminded that there is nothing stale about it. Ambitious

National Campaign for Safety-First

railroad officers have, today, as definite a field for activity in this direction as did those of eight years ago, for the constant accessions of new men in the service and the innate carelessness of all men (except as they cultivate alertness of mind) call for the constant repetition of old lessons. Men walk in front of moving cars, or neglect to report loose planks, or indulge their fondness for taking risks in various ways, just as they did in 1910. Men who seem otherwise to be level-headed will risk their lives to save one minute. Thousands of our railroad men have gone to France and are engaged in an enterprise where safety is rightly placed secondary; their first care is for the glory of the flag and the protection of helpless humanity, a duty which often must ignore safety. For us who are not soldiers, but who have a duty efficiently to feed, clothe and comfort the soldiers, the prime duty remains the same as before; to keep body and mind fit for the highest efficiency. Safety-first means safety all the time. One who, for a high cause, ignores personal safety is, indeed, a hero; but the every-day demand on the railroad man is for that patient continuance in well-doing which often proves more difficult than heroism.

The unsatisfactory condition which the country's transportation system is in at the present time is chiefly due to the malevolent and stupid policy of regulation of railways which prevailed for about ten years before we entered the great war. The railways were being operated, when government control was adopted, with the highest efficiency ever attained by any transportation system; and that they were unable to handle all the country's business was due to the arrest of the development of their facilities which had been caused by regulation. Two of the worst features of our system of regulation were the exercise of duplicated and often conflicting authority by the state and interstate commissions, and the prohibition of the Sherman law against every form of co-operation between parallel railways. It was hoped that, with the adoption of government control, the country would be freed from the effects of state regulation and the anti-trust law as applied to transportation, but this hope is being dissipated. The advance in freight rates, as originally planned, contemplated bringing the state rates up to the level of the interstate rates. The state commissions have made such a row about the matter, however, that they have frightened the Railroad Administration, and now it is announced that where state rates are lower than interstate they will be not brought to the same level. In other words, the unfair discriminations in rates resulting from both federal and state regulation are to be continued under government control. Again, the express companies have been merged, for both their good and that of the public, and the merger as originally planned was intended to be continued after the war. But the attorney-general of the United States has interposed, and a provision

has been inserted in the contract under which the express companies must be unscrubbled after the expiration of government control of railways. We think we detect a strong odor of politics about these matters. At any rate they indicate that the Railroad Administration is capable of showing much more aggressiveness in dealing with railway accidents than in dealing with the politicians. It is a disgrace to the nation that the discriminations in rates growing out of state and federal regulation should thus be continued and that the astute application of the Sherman law to the transportation business should be perpetuated.

It is a universally acknowledged axiom that "experience is the great teacher." This statement is true only insofar

What Lessons Do Collisions Teach?

as the lessons obtained from such experience are made applicable to similar conditions which may arise at some time in the future. Wracks have occurred on American railroads in the past—and will continue to occur in the future. Lessons learned from such accidents in the past should be applied to eliminate as far as humanly possible such accidents occurring in the future. The collision which occurred on the Michigan Central at Ivanhoe, Ind., about half way between Gary and Hammond on the morning of June 22, appears to have been another case of plain man failure, the result being that a large toll of human life was taken.

The annual report for the year ending June 30, 1917, made by the Bureau of Safety to the Interstate Commerce Commission shows that of 11 collisions investigated which occurred in automatic block signal territory, 8 or 73 per cent, were caused by the failure of the engineman properly to obey signal indications.

The point at which this accident occurred is on double track territory equipped with modern automatic block signals, the roadbed and physical property being in excellent condition and the operation of trains being under the best modern American railway practice but still such catastrophes occur. What is the remedy?

Had this accident occurred with the railroads under private control certain papers would have immediately started a hue and cry over the *gross incompetency of the railroads under private management*, and would have come forward with a panacea to cure all ills of like nature, viz., the substitution of government operation.

Irrespective of the fact that this particular road is under government control, and that no deficiency in the physical property exists, the wreck occurred. The government has long recommended that certain steps be taken to lessen chances of such accidents, and it would appear that such recommendations should be put in force now that the roads are under government operation. It would appear advisable that some form of automatic stop should be employed in conjunction with the automatic signals to prevent just such accidents as that which occurred. The argument has been advanced that such an installation would tend to lessen the responsibility of the engineman and would put a premium on carelessness. This need not be the case. Such an automatic stop should be so devised as to register any disobedience of a signal indication on the part of the engineman in addition to applying the air and stopping the train. This

record could be used for the proper administration of discipline as warranted by facts.

The railroads have long been investigating the possibilities of automatic stops but development of such apparatus cannot be accomplished in a day. The development must be gradual and improvements made as found necessary, as was the case with automatic signals.

It appears the time is past when the roads should wait until the ideal stop can be developed before such an application is made and this is now a matter deserving the serious consideration of the Railroad Administration.

When it is shown that an employee is responsible for such an accident he should be prosecuted under the criminal laws of the state wherein the accident occurred and if found guilty the penalty for such offense should be imposed. If employees realized they were required to pay the penalty for acts of carelessness greater care would be exercised.

The Reorganization of the Railways

THE REORGANIZATION of the railroads under government operation is being made very complete. Organization is, first, a matter of personnel, and, second, of the offices which the officers hold and of the relations which the offices bear to each other.

The changes being made in personnel are greater in some sections and on some roads than in other sections and on other roads. A larger proportion of presidents are being appointed federal managers in the West than in the South, and a larger proportion of the presidents in the South are becoming federal managers than in the East. All over the country, however, the changes in personnel being caused by the appointment of general managers, federal managers, district managers and regional directors are very considerable. In many cases vice-presidents are being appointed federal managers, thus succeeding to many duties formerly performed by the presidents. In some cases general managers have been appointed federal managers. In other cases presidents of small roads have been appointed merely general managers. In two instances regional directors have been given charge of railways in territories in which they previously had had little or no experience.

It is a notable fact, however, that with few exceptions the executive and operating positions of importance have been given to railway men, and that those to whom they have been given have been men who already occupied high positions in the service or who had been put in line for promotion to high positions by the managements of the railway companies. While there may be ground for criticism in the fact that the government has adopted the policy which has caused many men of ability and experience to leave important executive positions, nobody who believes in the ability and fitness of the higher officers of the railways generally can offer any general criticism of the appointments thus far made to the positions of regional director, district manager, federal manager and general manager. Almost without exception men who are regarded in the railroad business as fitted by ability and experience for these places have been appointed.

The form of the new organization and the functions and relationships of the different offices in it present an interesting contrast to the organization which existed under private operation. Under the old organization many railway presidents were chief executives, reporting only to their boards of directors. In other cases there were chairmen who outranked the presidents. In most cases, however, the chairmen handled financial matters and large questions of railroad public policy, and the president was the real chief executive of the property. Under the new organization the federal manager of a railway has quite an imposing hierarchy over him. In some terri-

tories he reports to a district manager. Of higher rank than the federal or district manager is the regional director, of whom there are now seven. Ranking still above them are the heads of the divisions of the Railroad Administration in Washington, who report to the assistant director general and the director general. In other words, in all cases the federal manager has at least four officers of higher rank over him, and in some territories five. All of these officers of higher rank have assistants of their own.

Now, in order to bring about due co-ordination of the railways it may be necessary to superimpose upon the federal manager this hierarchy of officials, but it is evident that unless the new organization is operated with great skill the position of the federal manager, especially of a large road, is going to be made very difficult. He will receive suggestions and instructions from numerous officers of higher rank, and he will have a lot to do if he observes all these suggestions and instructions. He will also have to perform functions formerly performed by the vice-president in charge of operation, the vice-president in charge of traffic, and the president of the road. This will be especially true on a road on which the vice-president in charge of operation has been made federal manager and no officer occupying a position equivalent to that of vice-president in charge of operation has been appointed. If the federal manager devotes too much of his time and energy to carrying out the suggestions and instructions of his superiors he will neglect work which he ought to do in order properly to maintain the property and serve the public. If, on the other hand, he devotes himself intensively to operating and maintaining the property and trying to satisfy the public, he may find himself in hot water because of failure to carry out all the suggestions and instructions of superior officers.

It seems obvious that, as under the old organization of the railways the president was the man who chiefly determined whether the railway was managed efficiently or not, so under the present organization the federal manager will mainly determine whether the operation of the property will be efficient or not. The success of the federal managers in getting results and the comfort or discomfort of their positions will depend very largely upon the authority and freedom of action they are given by the Washington office and by the regional directors. It never was true that a railway could be successfully operated from Wall Street, and it never will be true that the various parts of the railway system of the United States can be successfully operated from Washington. The regions into which the railways are divided even under the new organization contain an average of almost 40,000 miles of line, and this much mileage of railway cannot be well operated from a single headquarters. Therefore, if good results are to be obtained the Washington office will have to delegate very large authority and give great freedom of action to the regional directors and they, in turn will have to delegate very large authority and give great freedom of action to the district and federal managers. The present organization has the form of a great bureaucracy. It easily could be allowed to develop the red tape and the practice of "passing the buck" which are characteristic of the typical bureaucracy. There is danger that it will develop these characteristics in any case, and it certainly will unless the federal managers are given large authority and opportunity, the Washington office and the regional directors devoting themselves chiefly, not to trying to direct in detail the operation of the properties, but to trying to co-ordinate their operation.

Before government control was adopted it was predicted that it would result in the development of a great "overhead" organization. This prediction is being rapidly verified. Probably without such an organization the object of securing the operation of the railways as a single consolidated system could not be fully attained. It would appear, however, that in the long run the cost of this overhead organization will approach and perhaps equal any savings which may be made

by changes or reductions in the staffs of the individual lines. Only subsequent developments will show what increases in the efficiency and the economy of operation will be secured.

Control of Export Traffic

THE ANNOUNCEMENT LAST WEEK by the Secretary of War, the Secretary of the Navy and Director General McAdoo of the creation of a joint exports control committee with complete power to control the movement of export freight, represents one of the most important steps toward co-ordinating war transportation that has yet been taken by the government. If such a committee is able to organize itself so as to function in accordance with its purpose and its authority, it is not difficult to believe that its formation a year or two ago might have prevented most of the difficulties, at least from an operating standpoint, that led to the government's commandeering of the railroads; but, like many other things that are now being done, its necessity was not sufficiently recognized until after bitter experience had taught the lesson.

It is not only the duty of the committee to inform itself as to the probable amount of freight which must be exported for the prosecution of the war, how this freight can best be routed through the various ports, how much other essential export traffic must be handled and the amount of local traffic necessary for each port, but the functions of the committee are far more than advisory. It is to have authority to select the port to which specific freight shall be transported for trans-shipment overseas for the use of the army and navy, the allied governments and others, and it is given the responsibility of deciding the distribution of the combined amount of all exports as between the various ports so as to facilitate its handling at any one port and to avoid congestion at any one port. In order to carry out its important task with full knowledge of the various requirements, the committee consists of authoritative representatives of the War and Navy Departments, the Railroad Administration and the shipping interests and the Traffic Executive controlling the allied traffic. Its organization is the result not only of numerous conferences between all interests involved, but of numerous special studies that have been made by experts representing the Railroad Administration and the Shipping Board into the conditions surrounding export traffic.

Long before the United States entered the war, the results of a lack of co-ordination and control of export traffic were made evident in serious congestion throughout the eastern industrial section and particularly at the North Atlantic port terminals. Shippers who received their money for goods consigned to the allied governments as soon as the freight was loaded on cars were naturally over-zealous in starting freight toward the ports regardless of the possibilities of handling it at destination or of the capacity of boats to carry it across the ocean. At a time when the country had not yet awakened to the seriousness of the situation railroads were too reluctant to place drastic embargoes and rather than risk the unpopularity of doing so, tried to crowd more freight through the neck of the bottle than could be accommodated. When the embargoes finally were placed it was too late. More freight than could be transhipped had been carried to the eastern terminals, choking the main lines as well as yard and terminal tracks, and when this situation developed to such an extent that it was necessary to unload freight on the ground, the congested condition extended so far back toward the west that it was difficult to return empty cars. The unpopularity of the embargo was so great that freight would often be embargoed half way towards its destination and intermediate lines were blocked in both directions.

This condition became steadily more acute and, while many people blamed the railroads, the railroads retorted by saying

that the difficulty was with the shipping situation. They were carrying freight to destination as billed, but ships were not available to take away the freight they had delivered. While certain ports were overcrowded others were not being utilized to capacity, but the railroads had no control over the routing of freight, and goods were sent to the ports where the boats were most numerous. When efforts were made to secure a larger number of sailings to the ports which were not being utilized to capacity the shipping interests said that the freight offered at those ports was not sufficient to justify them in sending vessels there.

Now the routing of freight has been taken out of the hands of the shipper and placed in the hands of the railroads, and with the creation of the exports control committee there is sufficient authority to direct the railroads where to put the freight and simultaneously to direct the boats to go there and get it. Moreover, the committee will be able to develop a policy which has already been under way for some time, of using the embargo for regulative purposes. The congested condition has improved to such an extent that it is not necessary to use embargoes to prevent the movement of freight, but they may be used to prevent it from going in the wrong direction. When embargoes were formerly treated as an emergency measure to be applied whenever and wherever the necessity became evident or, as too frequently happened, a little bit after that time, they frequently caught the freight part way to its destination in such a way that it could move neither backward nor forward, but only added to the congestion. Now it is possible to apply the embargo at the point of origin so that consignments will not be sent to ports where they cannot be handled, but may be diverted to places where they are needed and can be accommodated. This is expected to develop a much more intensive use of the South Atlantic and Gulf ports, which still have much unutilized capacity and still greater potential capacity.

Changing Wheels on Freight Cars

THERE ARE ALMOST none of the repairs ordinarily included in the everyday maintenance of freight cars which can long be overlooked for the sake of the immediate advantage without seriously impairing future transportation capacity. There are some repairs, however, which, for the sake of safety, must not be neglected even for temporary advantage. Truck repairs belong to this class. That there has been some neglect of this important matter is indicated by the epidemic of truck failures generally experienced last winter. These failures may in part be attributed to the extraordinary weather conditions prevailing, but the one great underlying cause was probably the letting down of the standard of wheel maintenance, permitting defective wheels to remain too long in service before removing them.

Defective wheels are not only unsafe in themselves, but may result in more deterioration of the whole structure of the car, especially the truck, in one mile than would ordinarily occur in hundreds of miles of service. There should be a general raising of the standard of wheel conditions. Wheels should be changed before they reach the M. C. B. limits rather than a little after these limits are reached. The average car load has materially increased during the past year owing to heavier loading of all classes of cars and, on many lines, to an increase in the proportion of commodity freight moved in maximum capacity loads. Furthermore, war conditions have forced a lowering of former standards of track maintenance. Truck failures mean wrecks and consequent loss of equipment and lading, and temporary suspension of traffic movement. At present we can ill afford to stand any of these losses. Safety, therefore, demands that the condition of wheels be improved by a

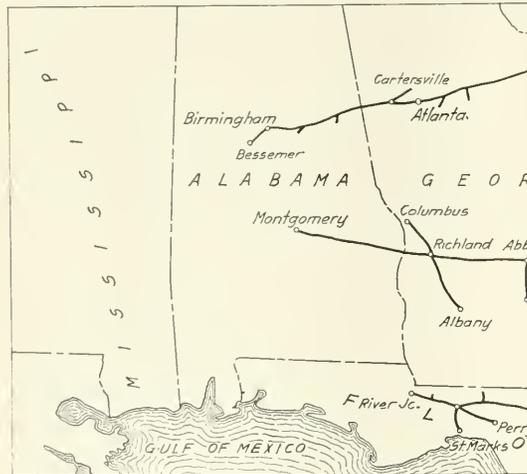
more rigid inspection and changing of the wheels of all cars passing over the repair track, before the M. C. B. limits have been exceeded.

Seaboard Air Line

ON THE BASIS of actual operation and earnings in the calendar year 1917, the prospects for the Seaboard Air Line would be good. Notwithstanding the fact that labor costs were increased \$1,350,000 by war conditions in 1917 as compared with 1916, and fuel costs by \$814,000, the company after having paid these extraordinarily high expenses, interest charges and the full 5 per cent interest on the adjustment bonds had a surplus of \$854,000. On the other hand, if the company is to be compensated only on the basis of the average operating income for the three years ended June 30, 1917, as provided for in the railroad control bill, there will be apparently but a few thousand dollars left after paying interest on the adjustment bonds. The fiscal year 1915 was a very severe strain on the Seaboard and,

will have the further increased revenues from the new line and a larger proportionate operating income, justify the belief that so far as actual showing is concerned, the road will do well in 1918.

It would appear that the Seaboard is one of the companies which will suffer a real injustice if an adjustment is not made in working out the compensation to provide for

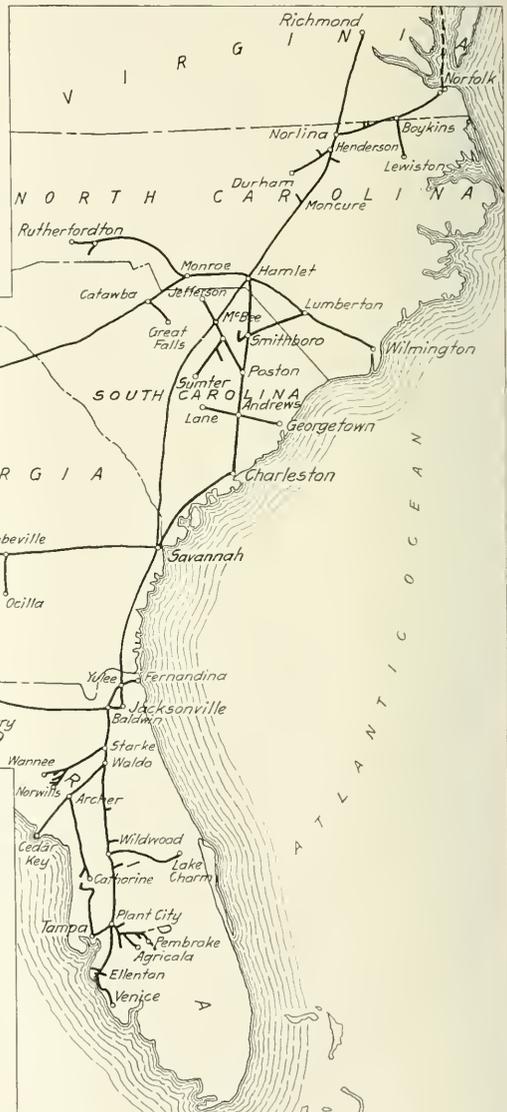


The Seaboard Air Line

while the calendar year 1916 was a good one, the fiscal year, ended June 30, 1916, was not so favorable.

According to the tables which were prepared for the Railway Executives' Advisory Committee, the average operating income, as arrived at for purposes of working out the compensation under the railroad control bill, is \$6,455,000. The company has about \$400,000 other income, but interest charges, rentals, and the 5 per cent adjustment bonds interest call for \$6,370,000.

Total operating revenues amounted to \$30,345,000 in 1917, an increase of \$4,160,000. It must be remembered that the new short line, which the Seaboard built from Charleston, S. C., and Savannah, Ga., was not opened until after the close of 1917. The added revenue and the greater economy of two lines from Hamlet, N. C., to Savannah were, therefore, not available. The new line was opened January 1, 1918, and should add to revenues as well as decrease the cost of handling through business from Florida to Richmond and Norfolk. The facts, therefore, that the 1917 gross revenues increased by 15.89 per cent and operating expenses by 23.87 per cent, and in 1918 the Seaboard



special cases. In view of this situation, it is understood that the Seaboard will make application for an increase in its compensation to cover at least the interest on the investment occasioned by the cost of these lines, which will amount to at least \$850,000. It is also understood that it has in

contemplation the making of other just claims which will add to this amount.

The operation of the road was seriously hampered by the shortage of labor in 1917. Common labor, especially, was almost impossible to procure in the quantities needed; thus, in addition to the increased price of coal, a much heavier labor charge had to be paid to get this coal placed on tenders. Track labor was particularly scarce and poor. There was \$5,216,000 spent for maintenance of way in 1917, an increase of only a few thousand dollars over 1916; but the 1917 expenditure represented less work done than was done in 1916 and is not an accurate measure of the amount that would have been spent had track labor been available.

Maintenance of equipment cost \$5,105,000, an increase over 1916 of \$1,195,000. Both increased cost of labor and increased costs of materials figured in this maintenance of equipment expenditure.

Transportation expenses amounted to \$10,252,000, an increase of \$2,560,000 over 1916. The increase in fuel cost has already been mentioned. Higher wages paid to engineers and trainmen affected the Seaboard as it did all other roads that were forced to grant higher wages to the brotherhoods under the guise of an eight-hour day law. There were other costs, however, which bore particularly heavy on the Seaboard as, for instance, labor at stations which, in 1917, cost \$567,000, an increase of \$108,000 over 1916. Yard conductors' and yard foremen's wages amounted to \$159,000 in 1917, an increase of over \$50,000, or nearly 50 per cent.

The following table shows the percentage of each class of operating expenses to total operating revenues:

	1917	1916
Maintenance of way	6.0	7.17
Maintenance of equipment	16.8	14.93
Traffic expenses	3.7	4.47
Transportation expenses	37.40	31.8
Miscellaneous expenses	4.67	0.58
General expenses	1	0.90
Total	71.57	69.85

Passenger revenues amounted to \$7,777,000, an increase of \$2,428,000. Freight revenues amounted to \$19,674,000, an increase of \$1,462,000. The tonnage of freight carried totalled 10,729,000, an increase over the previous year of only 2.22 per cent; but the average length of haul was 192 miles, an increase of over 13 per cent. The average rate per ton per mile was 9.56 mills, or 1.75 per cent lower than in 1916. The average trainload was 859 tons in 1917 as against 355 tons in 1916. The carloading was considerably better in 1917; the average being 17.68 tons as against 16.18 tons in 1916; and on all freight, including company freight, the average carload was 20.31 as against 18.23, an increase of more than 10 per cent.

The following table shows the principal figures for operation in 1917 as compared with 1916:

	1917	1916
Average mileage operated	3,411	3,471
Freight revenue	\$19,674,000	\$18,212,000
Passenger revenue	7,777,000	5,349,000
Total operating revenue	27,451,000	23,561,000
Maintenance of way and structures	5,216,000	3,197,544
Maintenance of equipment	5,105,000	4,009,974
Traffic expenses	390,000	967,006
Transportation expenses	10,252,000	8,693,688
General expenses	444,000	754,373
Total operating expenses	21,407,000	17,653,600
Taxes	1,386,000	1,200,691
Operating income	7,237,900	7,448,999
Gross income	7,729,857	7,889,431
Net income	1,046,627	2,862,911
Interest on 5 per cent income bonds	1,250,000	1,250,000
Surplus	854,067	1,612,911

Letters to the Editor

A Report "Greatly Exaggerated"

TO THE EDITOR:

LOUISVILLE, KY.

In your issue of May 8, page 1152, you say that Patrick Ryan, locomotive engineer of the Illinois Central, member of the American Railway Engineers' Regiment in France, was killed in action on April 18. This is not correct.

Pat Ryan was traveling engineer on Kentucky division of the Illinois Central when he enlisted in the Engineers' Regiment, and I am today in receipt of a letter from Pat in which he states that he is not dead but that they are using him for a traveling crane in the back shop of a French locomotive works. He stands 6 ft. 4 in. in his stocking feet and says he is able to pick up a French locomotive under each arm and place it where it is desired.

I. E. HILL,

Superintendent Kentucky Division, Illinois Central.

General Order No. 20

ST. LOUIS, MO.

TO THE EDITOR:

In the writer's opinion General Order No. 20 is based on the idea that every person who has anything to do with statements, bills, etc., will consider it his patriotic duty to live up to the intent of the order to the best of his ability, without taking advantage of the injunction which the order places on the road against which the billing is rendered. That all of us are not playing the game fairly is illustrated by the following actual case where the billing road takes advantage of the protection against checking and absolutely disregards the last sentence of the order, which reads:

"The carrier rendering such statements, bills, etc., shall take the necessary measures to insure the correctness thereof."

A car repair bill was recently rendered which contained charges made against nearly 100 cars, 46 per cent of the cars and 59 per cent of the amount of the charges did not belong to the road billed. These errors were so apparent that a glance detected them and checking was not necessary. Request was made for correction and the only reply made by the billing road was the following notation made on the original request for correction: "See Order No. 20 of April 22, 1918; withdraw exception."

While no road should pick up errors in violation to Order No. 20 it is absolutely necessary to take some step to prevent deliberate attempts to bluff such glaring errors to a conclusion.

It is evident either that the person making the bill did not fully digest General Order No. 20, which was mentioned as backing for the billing road's position, or it was a deliberate attempt to "put one over." Ordinary precaution was not exercised to get the correct initials of the cars repaired when the repair cards were made out because it would be very unusual to get 46 per cent of the car initials wrong, especially when the repairs were supposed to be made at twelve different places on the billing road. Again, the person who made the bill did not use the Equipment Register to ascertain whether the cars belonged to the road billed. If railroads are going to live up to General Order No. 20 in not checking car repair bills and bills can be rendered for cars that do not belong to the roads billed against, what is to prevent the billing of half a dozen roads for the same repairs? What such proceedings will do is very apparent and they should be nipped in the bud.

I. F. GIVIN,

Master of Engines, Chicago, St. Louis & N. O. R.R.



Temporary End of Double Track in the East Approach Cut of the Sherman Hill Tunnels

Completing the Double Track on the Union Pacific

Heavy Traffic Necessitated the Construction of 96 Miles of Second Main Line During 1917

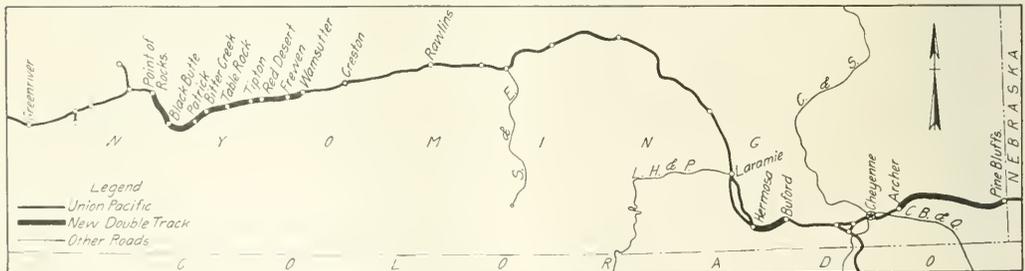
NEW IMPROVEMENTS carried on by the railroads during the past year are of greater importance as a war necessity than the closing of the last gaps in the double track line of the Union Pacific between Omaha, Neb., and Granger, Wyo. The traffic over this important artery of the country's commerce has increased greatly during the last 15 years, but the enormous impetus which war activities have given to the transportation of various commodities from the Pacific coast, combined with the almost total absence of shipping via the Panama Canal has imposed an unusually heavy burden on the Union Pacific, and in consequence the 96 miles of single track still remaining at the beginning of 1917 constituted a most serious obstacle to the free movement of the traffic.

This single track was in three sections: from Pine Bluffs, Wyo., to Archer, a distance of 33.35 miles in the engine

struction carried out between 1898 and 1902 and in consequence such grade revisions as were made in this recent work do not radically affect the existing operating arrangements. In general the prosecution of this work was characterized by an effort to complete short sections of the second track as quickly as possible in order that they could be turned over to the operating department immediately, and these additions to the existing double track, made from time to time during the course of the work, did much to relieve the congestion of traffic under which the operating department was laboring.

A Comparison of Traffic Densities

Some idea of the growth of the traffic on the Union Pacific may be gained from a comparison of the train movements at the present time with those at the completion of the grade



Map of Union Pacific Lines in Wyoming, Showing Sections of New Double Track

district between Sidney, Neb., and Cheyenne, Wyo.; from Buford, Wyo., to Hermosa, a distance of 11.11 miles in the engine district between Cheyenne and Laramie; and from Wamsutter, Wyo., to Point of Rocks, 51.9 miles in the engine district between Rawlins, Wyo., and Green river. The first of these sections is located within the limits of the Union Pacific's water grade line from Archer, Wyo., to Omaha and involved no grade or line changes. The other two sections are within the limits of the extensive recon-

struction work in 1902. At that time the average movement daily in each direction, on the engine district between Rawlins and Green river was four passenger and 7.5 freight trains. In comparison with this, in August, 1917, there were 9 to 10 passenger trains and an average of 16.5 freight trains each way, taking no account of the great increase in train load resulting from the use of heavier power. There have been days in the last year when as many as 90 trains were handled through the sections of single track.

The characteristics of the freight train movement in this same engine district for one month in 1917 is indicated by the following statement:

RAWLINS TO GREEN RIVER, 114.1 MILES

		August, 1917	
		Net tons one mile	Net ton miles per mile of line
Westbound	.....	30,057,000	264,000
Eastbound	.....	19,170,000	140,000
Total	.....	49,227,000	404,000
Average total number of freight trains daily	.....	113	1.1
Average net tons per train	.....	435	655

Between Cheyenne and Laramie the train movement was even heavier because practically the same traffic is handled in trains that averaged lighter.

CHEYENNE TO LARAMIE, 107 MILES

		August, 1917	
		Net tons one mile	Net ton miles per mile of line
Westbound	.....	1,800,000	208,100
Eastbound	.....	246,000	434,300
Total	.....	2,046,000	642,400
Average total number of freight trains daily	.....	37	3.7
Average net tons per train	.....	556	556

The figures for the average trainload in 1917 are not as large as those in 1916, as shown by the following table:

AVERAGE NET TONS PER TRAIN	AUGUST, 1916	AUGUST, 1917
Nebraska division	600 tons	1917
Nebraska division	763 tons	1916
Wyoming division	606 tons	1917
Wyoming division	707 tons	1916
Western division	671 tons	1917
Western division	671 tons	1916

There are two reasons for this: a greater proportion of unbalanced eastbound traffic in 1917 than in 1916 and the necessity for loading engines lighter in consequence of the congestion of traffic in order to expedite movement. There is, however, one exception to the conditions indicated in the

only 12 miles west of Creston, the Union Pacific crossing of the Continental divide. Nevertheless, the country traversed between Wamsutter and Point of Rock bears more of the characteristics of a heavy rolling country than a mountainous region. Because of this fact it was possible to locate the original line with westbound grade not exceeding 1.3 per cent and an eastbound grade not over 1.28 per cent. In the revision work started in 1898 these grades were reduced to a maximum of 0.8 per cent in each direction. The double track work recently completed was the occasion of a further grade improvement, in that an eastbound line is provided with the maximum grade of 0.5 per cent and since this grade is not exceeded between Point of Rocks and Green river, the eastbound track has a ruling grade of 0.5 per cent for the 9 1/2 miles from Green river to



Widening Solid Granite Cut for Second Track



West Portal of the Twin Tunnels

above table and this is on the ninth engine district, between Evanston, Wyo., and Ogden, Utah, where the trainload was increased from 608 net tons in 1916, to 645 net tons in 1917, as a result of the completion of the grade reduction and second track between Wahsatch and Emory, described in the *Railway Age Gazette* of August 24, 1917, page 529.

The Work Between Wamsutter and Point of Rocks

The longest single piece of double track work in the Union Pacific project was between Wamsutter and Point of Rocks, 51.9 miles, which comprises over one third of the engine district between Rawlins and Green river. Wamsutter is

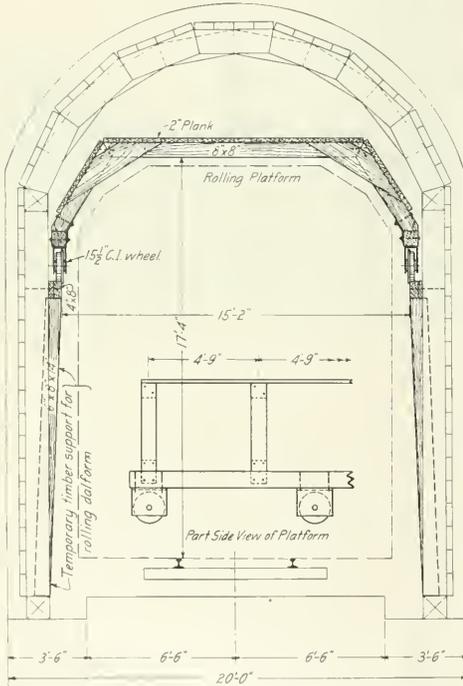
Wamsutter. Advantage will be taken of this condition by loading eastbound tonnage trains for the 0.5 line and then reducing tonnage at Wamsutter to run the remaining distance to Rawlins. The improvement in grade was accomplished with a departure from the existing alignment only in the 15.86 miles between Tipton and Bitter creek. The second track follows the existing alignment for the entire distance from Wamsutter to Tipton and from Bitter Creek to Point of Rocks, although a slight change of alignment was made near the latter place to reduce curvature. Aside from the improvement in grade, the relocation between Tipton and Bitter creek accomplished a saving of 0.276 miles of distance and the new line has only four curves with a total angle of 105 deg. 57 min. as compared with 15 curves with a total angle of 195 deg. 57 min. on the old line. The maximum degree of curve is 2 deg. on both lines.

On the east end of the second track the work in the vicinity of Wamsutter and Tipton was relatively light, consisting for the most part of filling from borrow pits alongside with some large pits in the hillside. Near Red Desert there is an embankment 3/4 mile long which was widened for second track from a large steamshovel pit. There was also some soft hill work in this same vicinity with the second track alternately in the inside and outside of the old line.

Under normal conditions the grading on the change of line west of Tipton would be classed principally as team work, but owing to the shortage of men and teams it was handled largely as a steamshovel job, since shovels were used in cuts much smaller than are usually considered profitable

work for them. The largest work included two cuts 25 ft. deep and a fill 25 ft. high near Tipton. Between Point of Rocks and Tipton the total excavation was 450,000 cu. yd. of which 275,000 cu. yd. was from borrow. Near Monel a fill of 46,000 cu. yd. having a maximum height of 10 ft. was made with a steamshovel converted into a drag-line excavator. It was equipped with a 55-ft. boom and a 2-cu. yd. drag line bucket. This machine worked down one side of the fill and up the other, borrowing from pits on either side that were separated from the toe of the embankment by berms 40 to 50 ft. wide. Two drag scrapers were employed to dress up the fill as the work progressed.

The bridge work consists in converting single-track, through-girder spans into double-track structures. At the crossing of Bitter creek where there are now three tracks, the 50-ft. single-track girder span is being replaced by three I-beam deck spans with open decks. There are also several arch culverts. The country traversed by this work is dry, there being no usable water supply in the entire distance between Point of Rocks and Wamsutter, so that the facilities for supplying the operating department with water in



Section Through the Old Tunnel Showing Platform Built for Repairing the Lining

this district had to be extended to furnish water also to the construction forces.

The new passing tracks are 4,000 ft. long. These include center passing tracks at Red Desert and Black Buttes, a new westbound passing track at Bitter creek and eastbound passing tracks on the new line opposite Monel and Table Rock. The work on this section was started in May, 1917, and finished in November, but large sections of the second track had been placed in service for a considerable time before the last work was completed.

The Sherman Hill Work

The work on Sherman hill, the highest point on the Union Pacific, involved the construction of 11.11 miles of second track between Cheyenne and Laramie. The crossing of the Laramie mountains constituted one of the most formidable obstacles in the original construction of the Union Pacific and was accomplished with adverse grades of 1.85 per cent and 1.66 per cent against eastbound and westbound traffic respectively, and with a maximum elevation of 8,247 ft. above sea level. Between 1900 and 1902 this part of the line was largely reconstructed. A new eastbound line on an independent location was built from Laramie to Hermosa, 15



Laying Track on the New Line Near Table Rock

miles, and a new single track line for traffic in both directions was built from Hermosa to Buford, 11 miles, so that the grades opposing the eastbound traffic were reduced to 0.82 per cent. Between Cheyenne and Buford, 26 miles, improvements were made, but it was found impracticable to provide a better grade than 1.65 per cent against westbound traffic, this being one of only two places on the Union Pacific between Omaha and Ogden where the 0.82 per cent ruling grade determined upon in 1898 proved impractical. The other point is between Emory, Utah, and Wahsatch where a new 1.14 per cent eastbound line was built in 1916.

The relocated line from Hermosa to Buford involved heavy work, including a tunnel 1,800 ft. long and several high fills and reduced the summit of the elevation to 8,010 ft. With the completion of double track up Buford hill, this section remains the one gap in the double track until the completion of the work undertaken last year. The character of this line is shown on the profile. A number of large gulches were encountered, some of which required embankments 120 to 130 ft. in height, and in the construction of the first track involved yardages of 500,000 to 760,000 cu. yd. of earth, while the entire 11 miles required a total of about 5,000,000 cu. yd. of material.

On the other hand the construction of the second track alongside the existing line involved the handling of only about 300,000 cu. yd. of material for the entire distance, so that it was the construction of the second track tunnel, rather than the embankments which constituted the most formidable feature in the work recently completed.

Excavation on the new work exclusive of the tunnel was classified as 125,000 cu. yd. rock and 25,000 cu. yd. earth in the cuts, with 150,000 cu. yd. of borrow. The most important question involved in this work was the stability of

the thin slabs of material placed on the sides of the high embankments to widen them the required amount, but owing to the absence of moisture and the preponderance of rock in both the old and new embankments, no trouble was encountered. The rough faces of the slopes afforded an adequate bond in most cases but as a special precaution the fills were benched, even resorting to the use of explosives in some cases before the new filling was placed. Excavation in the rock cuts was conducted with extreme care to avoid blocking the line and as shown in one of the photographs it was carried on with the use of narrow gage material tracks to avoid any use of the main track. No bridge work was involved in this



Dumping Muck from the East Heading Off a Trestle

method from four faces, one from each portal and two from a shaft driven down from the surface at mid length and which was also connected with the old tunnel by an adit. The work on the heading was first carried out to the full width of the section down to the level of the wall plates of the arch timbering but after noting some indications of distress in the walls of the old tunnel following blasts, the work on the headings was restricted to a 12-ft. drift along the north side. The remaining portion of the arch was later removed by shooting holes drilled parallel to the axis of the tunnel, taking special care not to disturb the wall between the two bores. The bench was taken down in two lifts of eight feet each, the muck being removed by air-operated steamshovels.

In the headings two Ingersoll-Levner water drills were used mounted on columns and drilling 14 to 15 holes 6 ft. deep. Only one shift of drillers was employed on each heading although a gang of muckers worked at night. The gangs consisted usually of four drillers, four muckers, one nipper and one shift boss. The muck was collected in dump cars running on a two-foot gage track, and was dumped at the end of the bench where it was picked up by the steamshovel with the rest of the spoil from the bench. The muck from the two interior headings was disposed of on the surface near the head of the shaft.

The progress in the headings was from 5 to 5 1/2 ft. per day, while the progress of the shovels on the bench was about 4 ft. per shift, so that when working two shovels and two shifts a total progress of 16 ft. was made daily.

The bench was shot in two lifts of 8 ft. each using three

project; drainage through the embankment was provided for by the extension of culverts.

The Tunnel

The twin tunnels on the Sherman hill pass through a ridge of granite having a crest 85 ft. above the top of rail, which reaches an elevation of 7,930 ft. on a vertical curve in the tunnel, the crest of a second summit that is separated from the main summit at Sherman station by a sag, having a minimum elevation at Dale creek of 7,800. The new tunnel is the same length as the old one and is located on a center line 52 ft. to the north of the old center line. This involved a base width of the approach cuts of over 50 ft. which, considering that each cut had a maximum depth of over 50 ft. involved a large increase in the cut excavation. The decision as to this feature, as with all matters having to do with the construction of the new tunnel, was determined by one consideration—the safety of the existing tunnel, for any accidents interfering with the movement of trains through the latter would have involved the interruption of the transcontinental traffic of the Union Pacific without chance of any detour east of Ogden.

Accordingly one of the first precautions taken was to repair the timber lining of the old tunnel to guard against rock falls resulting from vibrations incident to blasting on the new work. The manner in which this was done without interference with traffic is shown in the cross-sectional drawing of the tunnel where a rolling platform is indicated on which men were supported while at work patting the timber work and filling voids in the packing. Owing to rush work in the completion of the original tunnel, the overbreaks in the arch and sides were larger than usual and a large amount of packing was necessary.

The new tunnel was driven by the top heading and bench



Air Operated Shovel Picking Up Muck at the West Bench

holes 5 ft. center to center drilled from the top of each lift. These holes were drilled by jack hammers about 6 ft. back from the face, but the center hole was considerably closer to the face than the others. Any trimming was done with plug drills or jack hammers. The holes were first sprung with 10 to 12 sticks of 40 per cent. gelatine after which they were charged with 20 sticks of the same explosive.

The Utah Construction Company, Ogden, Utah, which had the general contract for the entire Sherman hill section, carried on the work on three headings of the tunnel with its own men employing an average of about 100 men. The Christensen Construction Company of Salt Lake City was the sub-contractor for the east heading and employed about 60

men. The supporting plant of the general contractor located west of the west portal of the tunnel consisted of five 100-hp. boilers, four Ingersoll-Rand compressors having a capacity of 500 cu. ft. of free air per minute, with pumps for the supply of water to drills, etc.

The tunnel was timbered as shown in one of the photographs with timbers used previously on tunnels on the Wahsatch work done the year before, but it was decided to replace the timber work with concrete just as soon as the shovels had completed the removal of the bench. The concreting was carried on from three concrete plants, one located above each portal and one at the head of the shaft. From these plants, concrete was spouted into small cars running on tracks at the level of the arch springing line, from which it was again spouted into the wall forms or shoveled into the arch. The tunnel work involved 36,000 cu. yd. of rock excavation and 10,000 cu. yd. of concrete.

The shaft was started in April, 1917, and the headings from the shaft in May, while the outside headings were started in June. The work on the double-track section outside the tunnel was also started in April and was all completed about September 26, except for a section a mile long through the tunnel. The track through the tunnel will be ready for service about mid-summer of this year, this being the last section of the double track to be placed in operation.

All of the new work on the double-track project including the tunnel work was carried on by the engineering department of the Union Pacific under the general direction of R. L. Huntley, chief engineer with W. S. Woodworth, engineer in charge; W. G. Tinney was resident engineer in charge of the work between Pine Bluff and Archer; H. C. Mann was in charge of the work west of Wamsutter, and F. W. Newhart has supervision of the tunnel construction. The track laying and ballasting was handled by the maintenance of way department under the direction of W. R. Armstrong, engineer of maintenance of way. The entire project was under the general supervision of E. E. Adams, consulting engineer of the Union Pacific System, New York City.

Orders Governing Western Regions

DURING THE PAST WEEK the following were among the orders issued to the railroads in the western regions: Supplement No. 2 to Circular 126, dated June 21, is in explanation of Supplement No. 1, which provided that no trains or other devices containing advertising matter for governmental activities be placed in passenger coaches. It was not intended by these instructions that advertising matter which had heretofore been displayed in coaches should be ordered removed, but rather that no additional advertising matter be displayed until a definite standard has been adopted.

A communication dated June 21, outlines the specifications for United States standard interchangeable electric headlight, which is being placed on all the standard locomotives recently ordered by the Railroad Administration. The blueprints and wiring diagrams are not yet available, but will be distributed shortly. Each headlight equipment will consist of one 500-watt, 32-volt turbo-generator, one micrometer lamp stand and one dimming device, the case to be air tight, round headlight case, No. 22 U. S. S. gage steel, with copper (32-oz.) triple-plated reflector, 18 in. in diameter and 9 in. deep, and an automatic circuit connector complete. The headlight will be of the incandescent lamp type, conforming to the requirements of the Interstate Commerce Commission in an order dated December 26, 1916. The socket for supporting the headlight will be located at the rear of the reflector and will support the headlight lamp in a horizontal position, so mounted that it can be moved in any direction with fine adjustment, to

permit of focusing the headlight lamp and locking in any position. Suitable electric connections must be provided so that on removing the reflector from the headlight case the circuits will be broken automatically and, in replacing, it will be made automatically. A small unit incandescent lamp will be provided in the headlight case for illuminating the locomotive number. Headlight dimming resistance of rugged construction to withstand severe operating conditions will be provided with each turbine generator equipment.

Sub-committees of the San Francisco district freight committee have been appointed at Los Angeles, Cal., and Salt Lake City, Utah.

The city ticket offices of the railroads in Minneapolis and St. Paul will be consolidated. In the former city they will be located in the Office Equipment building and in the latter city in the Great Northern building.

Orders of Southern Regional Director

B. L. WINCHELL, regional director of the southern region, has asked the railroads in his territory to furnish at the earliest possible date, for the year 1918, an estimate of gross revenue, showing separately the customary items of traffic earnings and an estimate of traffic expenses.

A. R. Smith, traffic assistant to the southern regional director, in a circular letter says there exist among lines in the southern region both formal and informal agreements under which one or more of the parties thereto are given preferential treatment in the routing of traffic within the control of another. The circular states that it should be understood that under common operation these agreements must be disregarded if they conflict in any way with the efficient and economical transportation.

G. R. Loyall, assistant regional director, calls attention to the light loading of cars originating in some parts of the southern region, especially cars loaded with lumber, and asks the roads to have attention given to the loading in order to obtain the maximum capacity of the cars, in view of the fact that cars are being moved empty long distances to supply the demand for lumber loading.

Circular letter No. 266 authorizes the railroads to transport between points on their lines the railroad track scale testing equipment of the United States Bureau of Standards and to provide transportation for the authorized attendants accompanying them.

Circular letter No. 267 states that the question of new rail inspection is up for consideration. Railroads are asked to advise whether they have a department for rail inspection, whether they have a contract with R. W. Hunt & Company or other inspection concerns and, if so, the terms of the contracts and the dates of expiration, together with their recommendations as to what should be done in the matter.

In the interest of sanitation and for uniformity, the roads are directed to discontinue the use of aisle carpets on the floors of passenger coaches.

Revenue passenger trains are to be given precedence over special trains, according to a circular issued by G. R. Loyall. The circular says that in cases where a special train with officers is operated over the line, if it is the practice to have passenger trains take the siding, the practice should be discontinued as it is desired that passenger trains hold the main line.

The Railroad Administration is considering a reduction in the number of signatures required on vouchers. B. L. Winchell, Southern regional director, has issued a circular letter asking roads in his territory to furnish information as to their present practice with respect to approval of vouchers and asking for suggestions, based on experience, as to the least number of signatures necessary to insure ample protection.

Doings of the United States Railroad Administration

Standard Equipment Assigned to Roads. More Budgets Approved. New Freight Rates in Effect

THE INCREASES IN FREIGHT RATES ordered by Director General McAdoo in General Order No. 28 went into effect on June 25 with the modifications published in the supplement issued on June 12 and in the order fixing specific export and import rates. Various changes of a minor character were also made by interpretations sent to the railroads by the division of traffic after complaints from shippers had been heard by Luther M. Walter, assistant director of the division of public service and accounting, and Paul P. Hastings of the division of traffic. They have also heard many complaints which will be referred for adjustment to the regional and district freight committees, who, as promised by the director general, will endeavor to work out a more satisfactory adjustment of rates on the higher level by maintaining existing differential and other relationships after the order is in effect. Mr. Walter and Mr. Hastings gave a hearing last week to the protests of the shippers of sand, gravel, brick, cement and crushed stone.

The higher rates are to be reflected in increased prices for many commodities. An announcement by the Price Fixing Committee readjusting the government prices for logs and lumber provides that any additional cost for log freight occasioned by the rate order is to be added to the prices fixed on logs so affected; the higher freight rates have also played a part in the discussion of iron and steel and wheat prices.

Fuel Administrator Garfield has issued a warning that prompt action will be taken against any dealer or distributor of coal who increases the price of fuel on hand to include the amount of the new increased freight rates and ordering that the increased rates may be included only in prices charged for coal upon which the higher rate actually has been paid.

The Interstate Commerce Commission issued an order extending for 30 days the time within which joint rates with railroads not under federal control may be filed, until July 26.

Express Contract Signed

The express contract between Director General McAdoo and the four principal express companies (Adams, American, Wells Fargo and Southern), the basis of which was announced by the director general on May 28, was signed by representatives of the express companies on June 21 and by Walker D. Hines, assistant director general, on the following day. The complete terms of the contract, which, as noted in last week's issue, were amended to provide for the reconveyance of the express properties to the individual express companies upon the termination of federal control, were communicated to the director general, who is in California, and received his personal approval.

The contract provides for the carrying on of the express business for all of the railroads under federal control, and the new express company now established, which will be known as the American Railway Express Company, will be the director general's agent for carrying on the express business. As announced on May 28, the character of the service and of the rates will be under the director general's control and subject to initiation by him. The contract will remain in force during the period of federal control unless previously abrogated. The contract provides that it can be cancelled by either side upon six months' notice after being in effect for four years.

Arrangements have also been made to have the new company take over the operation of the property of the Northern

Express Company, the Great Northern Express Company and the Western Express Company, operating on the Northern Pacific, Great Northern and Minneapolis, St. Paul and Sault Ste. Marie railroads, respectively, whose property will be leased to the merger company because the Railroad Administration declined to make individual contracts with them.

Board of Adjustment No. 2

Railway Board of Adjustment No. 2 met in Washington on June 21 and organized by selecting E. I. Potter of the Minneapolis, St. Paul & Sault Ste. Marie, as chairman, and F. J. McNulty, of the International Brotherhood of Electrical Workers, as vice-chairman. The board has designated the following dates as the beginning of each of its regular monthly meetings during the remaining portion of the year 1918: July 2, August 6, September 3, October 1, November 5 and December 3. W. S. Murrian, until recently superintendent of motive power of the Southern, has been appointed a member of the board succeeding W. F. Kaderly.

Change in Diversion and Reconsignment Rules

The car service section announces that in connection with tariff provisions affecting reconsignment and diversion, the Director of Traffic has instructed that the following clause be inserted under the heading of "Conditions" in Rules and Changes Governing the Diversion or Reconsignment of Carload Freight:

"Orders for diversion or reconsignment will not be accepted under these rules at or to a station or to a point of delivery against which an embargo is in force, or, except on perishable freight, coal, coke or fuel oil to a station or to a point of delivery against which an embargo was in force at the time that the shipment was forwarded from point of origin. Shipments made under authorized permits are not subject to this condition."

This change will be made in the regular way on statutory notice, but in the meantime it is desired that all railroads shall issue the clause as an embargo making the provision immediately effective.

C. S. Lake has been appointed assistant to the director of the division of operation, to have general charge of the relations between the division of operation and the labor adjustment boards Nos. 1 and 2. He will co-operate with the boards and with the division of labor to arrange for putting into effect promptly the rulings of the boards.

Assignment of Standard Equipment

The Railroad Administration has made an apportionment to the various roads under federal control of the 1,315 locomotives and 100,000 freight cars ordered by the Central Advisory Purchasing Committee. The apportionment is based on orders placed by the roads as revised by the regional directors and the officers of the central administration at Washington. It has been decided that the cars and locomotives will not be treated as the property of the government or as a "circulating reserve" as has been occasionally suggested, but they will be assigned to the railroads and will of course become their property in practically the same way as other equipment, although they will be subject to transfer to other roads when occasion requires. The federal manager of each road has been notified of the number assigned to it and asked to submit a formal requisition to the Division of Capital Expenditures, which has already

approved the budgets of the roads, including a total of \$497,031,860 for equipment. This item, however, includes \$36,959,423 for improvements to existing equipment, and \$28,459,830 for passenger cars, and \$12,970,109 for other equipment not comprised in the orders placed by the administration, as well as equipment previously ordered by the railroads.

The financing of the equipment ordered by the government will be handled in the same manner as other capital expenditures, that is, the railroads will finance it themselves wherever possible and if necessary they may apply to the government, through the Division of Finance and Purchases, for a loan from the revolving fund.

The 1,415 locomotives include the original order for 1,025 and the additional order recently placed for 390 and are all of the standard types except that 30 of the Consolidation type for anthracite burning have been ordered for assignment to the Philadelphia & Reading.

The assignment of the locomotives is as follows:

DISTRIBUTION OF STANDARD LOCOMOTIVES		
Railroads	Assignment	Total
SMALL MIXADO		
Baltimore & Ohio	100	
Chicago & Alton	15	
Chicago & Eastern Illinois	15	
Chicago, Indianapolis & Louisville	5	
Chicago, Milwaukee & St. Paul	50	
Chicago, Rock Island & Pacific	20	
Grand Trunk, East	15	
Grand Trunk, West	25	
Lehigh & Hudson River	4	
Long Island	6	
Nashville, Chattanooga & St. Louis	10	
New York Central	95	
Big Four	25	
Lake Erie & Western	15	
Michigan Central	20	
Pittsburgh & Lake Erie	10	
Pittsburgh, McKeesport & Youngstown	10	
Rutland	6	
Toledo & Ohio Central	15	
Oregon Short Line	20	
Pittsburgh & West Virginia	3	
Seaboard Air Line	10	
Texas & Pacific	11	
Southern	25	
Union Pacific	20	
Wabash	20	
Western Pacific	5	373
LARGE MIXADO		
Central of New Jersey	25	
Chicago Great Western	10	
Elgin, Joliet & Eastern	2	
Erie	50	
El Paso & Southwestern	5	
Louisville & Nashville	30	
Missouri, Kansas & Texas	25	
Wheeling & Lake Erie	20	157
LIGHT MOUNTAIN		
New York, New Haven & Hartford	10	
Southern	25	35
LARGE MOUNTAIN		
Chesapeake & Ohio	5	5
LIGHT PACIFIC		
Atlantic Coast Line	20	
Baltimore & Ohio	20	
Kansas City Southern	3	43
HEAVY PACIFIC		
Erie	20	20
LIGHT SANTA FE		
Ann Arbor	4	
Boston & Albany	10	
Baltimore & Ohio	26	
Chicago & Western Indiana	5	
Duluth, Missabe & Northern	10	
Pennsylvania Lines West	30	
Southern	50	
Seaboard Air Line	15	150
HEAVY SANTA FE		
Bessemer & Lake Erie	5	
Chicago & Eastern Illinois	25	
Erie	5	
Colorado & Southern	5	
Nashville, Chattanooga & St. Louis	10	50
8-WHEEL SWITCH		
Atlantic Coast Line	5	
Baltimore & Ohio	20	
Chicago Great Western	5	
Chicago Junction	5	
Chicago, Rock Island & Pacific	10	
Central Railroad of New Jersey	10	
Grand Trunk Western	5	
Mobile & Ohio	5	
Oregon Short Line	5	
Pittsburgh & West Virginia	2	

Pennsylvania Lines West	20	
Seaboard Air Line	10	
Texas & Pacific	14	
Terminal St. Louis	10	
Union Pacific	10	150
8-WHEEL SWITCH		
Atlanta & West Point	2	
Erie	16	
Elgin, Joliet & Eastern	8	
Georgia	9	
Kansas City Terminal	5	
Long Island	4	
Missouri, Kansas & Texas	10	
New York Central	25	
Big Four	10	
Indiana Harbor Belt	20	
Kanawha & Michigan	3	
Lake Erie & Western	2	
Michigan Central	10	
Rutland	2	
Toledo & Ohio Central	20	
Southern	2	
Wheeling & Lake Erie	5	150
LIGHT MALLET		
Chesapeake & Ohio	20	
Chicago & Western Indiana	10	30
HEAVY MALLET		
Virginian	20	20
P. & R. STANDARD CONSOLIDATION		
Philadelphia & Reading	30	30
Total		1,415

It is understood that orders for 50,000 additional cars, to include stock, refrigerator, general service and flat cars, are to be placed after the delivery of the first cars ordered is well along, from plans and specifications which have already been prepared by the car and locomotive standardization committee.

Locomotives to Work Their Way Home

The new locomotives turned out by the builders on orders placed by the government, and others to be delivered hereafter, will be required to work their way home, under steam and pulling a train of cars, according to a plan now under consideration by the Railroad Administration. The idea of imitating the practice that has grown up in the automobile and truck business, of driving new cars and trucks away from the factory instead of shipping them, has been recommended by Frank McManamy, manager of the locomotive section of the Railroad Administration, with the idea of making the locomotives do their bit en route to the roads to which they have been assigned, instead of being pulled in trains as in the past, in recognition of the fact that locomotives are no longer to be considered as merely the property of an individual road. It is estimated that this plan applied to 3,000 new locomotives a year would handle perhaps 500,000,000 ton miles of freight a year, by enabling each engine to haul a train, instead of itself occupying space in a train and exerting a dead weight equal to about three cars. The idea is to have the engines accompanied by a messenger from the locomotive plant, according to the usual practice, to look after the bearings, etc., during the trip, and to have them handled by regular crews of the roads over which they pass. It is believed that they will be delivered in better condition if used at the front of a train and given a thorough inspection at terminals than if handled in the usual way and that they may be "broken in" just as satisfactorily in this way as if the process were postponed until their arrival at the home road.

Freight Car No. 1

Although the completion of the first freight car of the government's order for 100,000 was announced last week by John Skelton Williams, director of the division of finance and purchases of the Railroad Administration, in the name of Director General McAdoo, there is thus far no news of car No. 2, or of the other 99,999 which are still to be built, and a considerable time may elapse before No. 2 arrives. Some curiosity was manifested by those who have been keeping track of the progress of the specialty orders placed by

Federal Managers and General Managers



A. T. Hardin
Assistant Regional Director, Eastern
Roads



J. J. Berner
General Manager, New York, Chicago
& St. Louis



E. M. Kine
General Manager, Delaware, La. & Western



W. J. Harahan
Federal Manager, Seaboard
Air Line



J. M. Hannaford
Federal Manager, Northern
Pacific



W. P. Kenney
Federal Manager, Great
Northern



W. J. Jenks
General Manager, Norfolk
& Western



H. E. Byram
Federal Manager, Chicago, Milwaukee
St. Paul



A. W. Trenholm
Federal Manager, Chicago, St. Paul,
Minneapolis & Omaha



W. H. Wood
General Manager, Grand Rapids &
Indiana

the Central Advisory Purchasing Committee, as to how the American Car & Foundry Company could have completed a car as announced at a time when the brake beams, side bearings and journal boxes had not yet been decided upon. We are informed that the car company had no inside information as to just what specialties to use on Car No. 1, but that from its standpoint the car represented merely the model, sample or pattern car, such as is usually turned out as the first of a large order, for inspection purposes, and might, therefore, be equipped with any specialties in stock, to be replaced later after the purchasing committee has finished its work and the ordered specialties have been built. No definite promises were made by the Railroad Administration as to the delivery of the cars. Its announcement of the first order simply stated that it was hoped the entire order would be completed in time for the fall and winter business. But when the locomotives were ordered, delivery was promised in July. A sample locomotive may be expected during the coming week, but deliveries are not expected until August.

Companies to Be Informed Regarding Capital Expenditures

In order to conform to the organization created by the appointment of federal managers and especially to afford railroad companies notice and timely information of the character and estimated cost of additions, betterments, terminals, road extensions, motive power, cars and other equipment made on or in connection with their properties under federal control, and also to invite the suggestions of the companies respecting such improvements, the Division of Capital Expenditures, Judge R. S. Lovett, director, has issued Supplement 1 to D. C. E. Circular No. 1, dated March 27, 1918, effective July 1, 1918, making the following amendments:

First: The monthly report to be made on D. C. E. Form 2 is to embrace projects involving a charge to capital account of less than \$1,000 instead of \$5,000 as required in D. C. E. Circular No. 1, this change commencing with the report for the month of July, 1918.

Second: The minimum amount to be reported on D. C. E. Form 3 is to be reduced from \$5,000 as fixed in D. C. E. Circular No. 1, to \$1,000, so that the projects to be reported on D. C. E. Form 3 shall be those involving a charge to capital account of not less than \$1,000 nor more than \$25,000.

Third: A monthly report of all work authorized during the month involving a charge to capital account of less than \$1,000 for each project or job, should be made on D. C. E. Form 6, grouped by classes of work showing location, general description and amount chargeable to capital account only.

Fourth: No changes are made in D. C. E. Forms 1, 1-A, 4 and 5.

Fifth: (a) Four copies of D. C. E. Forms 1, 1-A, 2, 3, 4, 5 and 6 should be prepared by the federal managers.

(b) Two copies of D. C. E. Forms 1, 1-A, 2 and 5 should be sent direct to the director of the division of capital expenditures at Washington, one copy to the regional director and the other copy to the president of the company in whose name the forms are submitted. These copies are for information only and require no action.

(c) Three copies of D. C. E. Forms 3 and 4 should be sent to the regional director and one copy to the president of the company in whose name the forms are submitted.

(d) Two copies of D. C. E. Form 6 should be sent direct to the director of the division of capital expenditures at Washington, one copy to the regional director, and the other copy to the president of the company in whose name the form is submitted.

Sixth: The regional director should at once transmit to the director of the division of capital expenditures the original and one copy of D. C. E. Forms 3 and 4, retaining the other copy for his file and information. In case he approves without qualification, he should sign the forms accordingly. In case he disapproves, he should transmit with the form a memorandum of his views.

Seventh: D. C. E. Forms 3, 4 and 6, sent to the president of the company, are intended as notice to the company of the character of the work and the estimated cost thereof, and should be submitted by the president to the board of directors (or a committee of the board exercising its power) for its approval; and the president or the secretary of the company should promptly inform the director of the division of capital expenditures of the action of the board or committee, using D. C. E. Form 7. If for any reason the board or committee should object to the expenditures covered by these forms, the president or secretary should inform the director of the division of capital expenditures of the reasons therefor in order that such objections may receive attention before his final decision, and a copy of such letter should be sent to the regional director.

It is important that the board of directors or the committee act promptly upon all such reports, and that the president or secretary inform the director of the division of capital expenditures without delay, as work cannot be postponed pending advice of such action.

Eighth: When the expenditures covered by D. C. E. Forms 3 and 4 have been approved by the director of the division of capital expenditures, one copy of each form will be returned direct to the federal manager of the line, together with a letter of transmittal, listing thereon the forms returned by serial number and amount chargeable to capital account. A copy of this letter will be sent to the regional director as information to note on his copy of the forms the action taken by the division of capital expenditures. A copy will also be sent direct to the president as advice to the company of the action taken.

Ninth: In the event the director of the division of capital expenditures should decide that expenditures covered by D. C. E. Forms 3 and 4 should not be made or that the work for which the expenditures are requested should be deferred, one copy of the form will be returned to the federal manager of the line with a letter stating the reason for the action taken, a copy of which will be sent both to the regional director and to the president of the company for their information and record.

Tenth: It should be understood that the foregoing does not in any manner modify the authority given by General Order No. 12 issued by the Director General, March 21, 1918, to proceed with work which does not involve charges to capital account in excess of \$25,000. All work within such limit may be contracted for and commenced subject to the conditions specified in paragraphs (a) and (b) of part fifth of such general order, without awaiting action of the board of directors or of the director of the division of capital expenditures.

More Budgets Approved

Additional budgets of capital expenditures for 1918 approved by R. S. Lovett, director of the division of capital expenditures, have brought the total up to \$971,780,739 on June 24. This represents not only the budgets of additional railroads, but also some changes in those which had previously been approved. The total now includes \$454,449,990 for railroads, but also some changes in those which had previously \$20,298,869 for extensions. Through the approval of budgets, the Railroad Administration is able to eliminate competitive railroad building. Both in the case of terminal and branch line extensions approval has been withheld of expenditures on behalf of one railroad when the same service

could be performed by an existing facility or line of another railroad, except where the project was so near completion that it would be an injustice and cause a waste of money to stop it. One instance which has been made public where government control has been exercised to prevent a duplication of an existing line concerns a case where the Monongahela Railroad proposed to extend a line up the Monongahela river in West Virginia parallel to the Morgantown & Wheeling Railway. Work on the Monongahela extension was stopped in the fall of 1917, but when it applied for permission to continue the work this spring the application was approved by the regional director and by Judge Lovett. Later it was learned that the Morgantown & Wheeling Railway, which would be paralleled by the extension, could perform the service which would be performed by the new line for only a slight expense for rehabilitation and that its property would be injured by the construction of the new line, so the approval for the new extension was revoked.

Short Lines

A list of several hundred short line railroads, to be relinquished from federal control because the railroad administration does not consider them of sufficient value to warrant paying them a guarantee, is expected to be announced on July 1.

The night of the representatives of short line railroads not to be relinquished from Federal control was transferred on June 24 to the Senate Committee on Interstate Commerce, which held a hearing on the resolution proposed by the Railroad Administration extending until January 1, the time during which control of any railroad may be relinquished. The short line representatives, who declared that many of them will be ruined if they are left to compete with the Government railroad system, have asked that the resolution be amended to provide that no line shall be relinquished while control of competing lines is retained. B. M. Robinson, president of the American Short Line Railroad Association, declared that the announced intentions of the Railroad Administration, as well as the resolution in the shape it was introduced, nullify the clear intention of Congress that the short lines should be retained. Ben B. King, of Dallas, Texas, and C. D. Cass, of Waterloo, Ia., members of the executive committee of the short line organization, also testified, saying that the proposal of John Barton Payne, general counsel of the Railroad Administration, to refrain from making contracts with short line railroads would destroy their credit, regardless of any promises made as to the Government's policy toward them. Mentioning the cases of the Gulf, Texas & Western, the Denver & Salt Lake and the Colorado Midland, they declared that the earnings had already been greatly reduced since the Government took control of the railroads because freight shipments have been diverted to other lines. The Government, they said, has refused to exercise jurisdiction over these lines since the managements of the roads have insisted on compensation based on the three-year average of net operating income, while the Government takes the position that this was made a maximum instead of a standard by the insertion of the words "not exceeding" in the railroad control law preceding the definition of the so-called standard return.

In testifying before the House Committee on Interstate and Foreign Commerce last week, General Counsel Payne of the Railroad Administration had stated that the regional directors have recommended the release of several hundred short lines, which, he estimated, it would cost the Government about \$20,000,000 a year to retain on a basis of guaranteed earnings.

A committee of bondholders of the Denver & Salt Lake has issued a circular regarding its negotiations with the Government, stating that it was advised that the road had

been relinquished after the Railroad Administration officials had proposed that the road be operated by the Government without compensation.

Members of Congress apparently are inclined to sympathize with the position taken by the short lines and Senator E. D. Smith, chairman of the Senate Committee on Interstate Commerce, is understood to have told the President on Tuesday that the resolution extending the time for deciding on the status of the short lines cannot be passed before July 1. This would require prompt action by the Railroad Administration in determining its policy. John Barton Payne and Walker D. Hines conferred with the President later in the day and there were indications that the Railroad Administration was speeding up its work in connection with the short lines preparatory to announcing its decision.

Kansas City, Mexico & Orient to Be Taken Over

The Kansas City, Mexico & Orient, regarding which there has been some uncertainty as to whether it would be retained under Federal control or relinquished with the short lines, has agreed tentatively upon a contract with the Railroad Administration for compensation. The plan provides for the payment of \$150,000 to meet the interest on the receivers' certificates and a division of the net operating income between the Railroad Company and the Government, with an option to the Government to commute this into a payment of \$350,000 a year after an experience of six months. It was understood at one time that it had been decided to relinquish this road and a large delegation of people from the territory traversed by the line came to Washington and asked that the road be taken over.

McManamy Appointed Mechanical Assistant

Frank McManamy has resigned as chief inspector of locomotive boilers of the Interstate Commerce Commission and has been appointed mechanical assistant to the director of the Division of Operation of the Railroad Administration, effective on July 1, succeeding H. T. Bentley. In this position he will have jurisdiction over the Car Repair and Inspection and Test Sections and general charge of matters pertaining to locomotive and car equipment. Mr. McManamy has also been manager of the Locomotive Section of the Division of Operation, having charge of locomotive maintenance while Mr. Bentley was in charge of the work of standardization of locomotive and car design.

F. A. Delano Resigns

F. A. Delano, member of the Federal Reserve Board and former president of the Wabash, has tendered his resignation to the President to accept a commission in the army engineer corps, for railroad service in France. His resignation has not yet been accepted.

Uniform Classification Committee

The Uniform Classification Committee submitted its report to the Interstate Commerce Commission on Wednesday and the commission will hold a series of hearings on it.

Exports Control Committee

The exports control committee organized at a meeting on Wednesday by electing as chairman George D. Ogden, freight traffic manager of the Pennsylvania Railroad and representative of the railroad administration. The committee will have offices in both Washington and New York.

INCREASED RAILWAY FARES IN IRELAND—The recent increase in ordinary passenger fares by 50 per cent on the railways in Great Britain was ordered to apply to Ireland from June 1.

Canadian Northern Stock

Valued at \$10,800,000

AFTER SITTING 50 DAYS in March, April and May, taking over 1,500,000 words of evidence and filing 211 exhibits, an arbitration board consisting of Sir William Meredith, chief justice of Ontario, representing the Canadian government; Wallace Nesbitt, K. C., of Toronto, representing Mackenzie, Mann & Co., and Chief Justice Harris of Nova Scotia selected as the third member, gave a unanimous award on May 25, placing a value of \$10,800,000 on the 600,000 shares of Canadian Northern capital stock.

The agreement under which the arbitration was held was made on October 1, 1917, by the king, represented by the Ministers of Finance and of Railways and Canals, Mackenzie, Mann & Co., Ltd., and the Canadian Bank of Commerce. In accordance with an act passed in the 1917 session of the Dominion parliament providing for the acquisition of the Canadian Northern stock, the arbitrators were selected to determine the value of 600,000 shares as of October 1, 1917. In arriving at their decision they were authorized to consider the reproduction cost new of the railroad but not to include therein any increase in value of labor, material or of property due to the war. It was agreed that if the value of the stock was found to total \$10,000,000, or more, the price to be paid therefor would be that figure, but if the value ascertained should reach less than that amount the value so determined would be the price paid by the government. It was also understood that the arbitrators' decision would be final, if unanimous, and that the price determined would be paid by the government within three months from the receipt of the award, less its proportionate share of the amount of any liabilities ascertained by the government to be outstanding against the railroad and undisclosed to the arbitrators. No deductions were to be made for liabilities properly chargeable to capital account unless the corresponding value produced thereby had been taken into consideration as an asset of the company.

In their decision the arbitrators admitted that the problem before them was one of great difficulty and subject to a great diversity of opinion. While the ascertainment of a surplus of assets over liabilities or the reverse is not a conclusive test of the value of stock, it is an element which cannot be ignored and which engaged much of the time and consideration of the board. After finding the reproduction cost of the physical property based on pre-war prices and making due allowance for depreciation and land grants, the arbitrators found the surplus of assets over liabilities of the company on October 1, 1917, to be not less than \$25,000,000. The board pointed out, however, that the valuation of physical property of a railway by the reproduction new method, less depreciation, is not to be regarded as the ascertainment of the real value, but is only a means to that end and, in fact, the only estimate available. Among the other considerations entering into the valuation were the prospective earning power of the company, its past earnings and expenditures, its present financial position, the location of the lines and their construction, the other railways already existing in competition, the rate of interest on the company's funded and other debts, and the probable future growth of the population and business of the country.

The \$10,800,000 award places a value on the 600,000 shares of the Canadian Northern at \$18 each, but as the amount to be paid for the property was limited by the agreement to \$10,000,000, the value per share according to the decision was \$16.66.

Rail Production in 1917

THE AMERICAN IRON AND STEEL INSTITUTE, New York, has issued a special bulletin giving the production of rails during 1917 as compared to previous years, since 1902 inclusive. According to the table given below, the production of rails in 1917 was 2,944,461 tons, or larger by 110,000 tons than in 1916. However, when the totals are considered in the light of the exports of rails during those two years, it will be seen that the consumption of rails in this country was considerably less than in 1916. During 1917 almost one half a million tons of rails were exported by the

PRODUCTION OF RAILS BY PROCESSES, IN GROSS TONS					
Years	Open-hearth Bessemer	Reroiled* Electric	Iron	Total	
1902.....	6,029	2,935,392	.....	6,512	2,947,933
1903.....	45,054	2,946,756	.....	667	2,992,477
1904.....	145,883	2,137,957	.....	871	2,284,711
1905.....	127,264	3,192,341	.....	318	3,375,929
1906.....	186,413	3,791,459	.....	15	3,977,887
1907.....	252,704	3,380,025	.....	925	3,633,654
1908.....	571,791	1,349,153	.....	71	1,921,015
1909.....	3,256,674	1,760,171	.....	†	3,023,845
1910.....	1,751,359	1,884,442	.....	†	3,635,801
1911.....	1,676,923	1,053,420	91,751	462	2,822,790
1912.....	2,105,144	1,099,926	119,390	3,455	3,327,915
1913.....	2,527,710	817,591	135,043	2,436	3,502,780
1914.....	1,525,851	323,897	95,169	178	1,945,095
1915.....	1,775,168	326,952	102,083	.....	2,204,203
1916.....	2,269,600	440,092	144,826	.....	2,854,518
1917.....	2,292,197	553,325	118,639	.....	2,944,161

*Reroiled from old steel rails. †Included with Bessemer and open-hearth steel rails from 1901 to 1910 inclusive. ‡Small tonnages rolled in 1909 and 1910 but included with Bessemer and open-hearth rails for these years.

United States Government alone for the use of the army in France. Another notable fact shown by the table is that the relative production of Bessemer rails has increased since 1915. In 1917 it represented 18.11 per cent of the total production as compared to 15.42 per cent in 1916 and 14.83 per cent in 1915.

Another table shows the production of renewed and rerolled rails for 1911 to 1917 inclusive, from which it is seen that in spite of the demand for rails there has been a further reduction in the practice of rerolling old material, the total being only 127,646 tons in 1917 as compared to 148,686 in 1916 and the maximum tonnage of 198,836 tons in 1913.

PRODUCTION OF RENEWED AND REROILED RAILS, 1911-1917

Years	Reroiled from new seconds, new defective rails, etc.		Total	Rolloled from old rails	Total rerolled
	Open-hearth	Bessemer			
1911.....	2,631	19,379	22,010	91,751	113,761
1912.....	13,740	29,446	42,586	119,390	161,976
1913.....	13,052	30,741	43,793	155,043	198,836
1914.....	13,538	13,234	26,772	95,169	121,941
1915.....	6,477	2,652	9,129	102,083	111,212
1916.....	1,711	2,149	3,860	144,826	148,686
1917.....	1,825	7,182	9,007	118,639	127,646

Further insight into the deficiency of rail production is to be found from the table giving the production of rails by weight per yard. Here it is seen that for 1917 the rails weighing 85 lb. and less than 100 lb. amounted to 989,704 tons and rails weighing 100 lb. and over aggregated 763,526 tons or a total of 1,753,230 tons in the weights of rails com-

PRODUCTION OF RAILS BY WEIGHT PER YARD, 1902-1917

Years	Under 45 pounds		45 and less than 85		85 and 100 pounds less than 100 and over		Total Gross tons
	Under 45	45 and less than 85	85 and 100 pounds less than 100	100 and over	Total		
1902.....	261,887	2,040,884	.....	645,162	.....	2,947,933
1903.....	221,262	1,603,088	.....	1,168,127	.....	2,992,477
1904.....	291,883	1,320,627	.....	672,151	.....	2,284,711
1905.....	238,252	1,601,624	.....	1,546,053	.....	3,375,929
1906.....	284,612	1,749,650	.....	1,943,628	.....	3,977,887
1907.....	295,838	1,569,985	.....	1,767,831	.....	3,633,654
1908.....	183,869	687,632	.....	1,049,514	.....	1,921,015
1909.....	255,726	1,024,856	.....	1,743,263	.....	3,023,845
1910.....	240,709	275,339	.....	2,099,983	.....	3,635,031
1911.....	218,758	1,067,696	.....	1,536,336	.....	2,822,790
1912.....	248,672	1,118,592	.....	1,960,651	.....	3,327,915
1913.....	270,405	997,313	.....	2,265,062	.....	3,502,780
1914.....	230,423	1,309,865	868,104	528,703	.....	3,977,885
1915.....	254,101	1518,291	742,816	688,995	.....	2,204,203
1916.....	295,535	1566,791	1,225,341	766,851	.....	2,854,518
1917.....	303,258	1882,673	989,784	763,526	.....	2,944,161

*Includes rails under 50 pounds. †Includes 50 pounds and less than 85 pounds.

LONDON-PARIS MAIL BY AIR.—An aerial postal service between London and Paris has been inaugurated.

monly used for renewals on important lines. This compares with 1,992,192 tons for 1916.

70-Ton Side Dump Hopper Cars Built by E. J. & E.

Center Sill Is Not Continuous; The Floor Members Are Arranged to Withstand Buffing Stresses

THE ELGIN, JOLIET & EASTERN is building in its shops at Joliet, Ill., 500 steel hopper cars. These are of the side dumping type and have a rated capacity of 140,000 lb. and a cubical capacity of 2,533 cu. ft. The length over the end sills is 41 ft., the maximum width



Center Sills and Bolster Assembled and Placed on Truck

is 9 ft. 10 $\frac{3}{4}$ in., and the maximum height of the car body is 11 ft. The average light weight is 57,500 lb.

One of the unusual features in the design is the way in which the floor members are made to serve as a part of the

ends toward the center of the car are cut at an angle approximately the same as the slope of the floor at the ends. At the center plate the sills pass through bolsters made up of two plates stiffened with angle irons and Z-bars. The end sill is built up of a 12-in. channel and pressed steel shapes. The side sills are made of 12-in. 20-lb. channels and extend only a short distance beyond the bolster toward the middle of the car. The center sill channels are fastened at the inner ends to three transverse members, a 4-in. by 5-in. angle at the extreme end, a 7-in. 16-lb. channel and a 6-in. by 6-in. angle opposite the ends of the hopper doors. These members serve to transfer the stresses from the center sills to the floor members.

The main floor is made up of 5-16-in. floor girders fastened to numerous transverse A-trapes built up of angle bars. Along the lower edges of the floor on each side of a 5-in. by 4-in. angle and at the top ridge there is fastened a 4-in. by 4-in., 18.5-lb., 100-deg. angle. This angle extends to the bolster while the main floor and sloping end are joined about two feet from the bolster. The end of the top angle is attached to two bent plates with angles at the lower ends, these angles being riveted to the upper flanges of the center sills. The main floor member is further stiffened by the runway, which is a 7-in. channel, fastened to the floor by numerous pressed steel supports.

There are three openings in the floor on each side to allow the links of the door mechanism to pass through. At each of these points the floor is stiffened with angles and the plates which form the openings for the door arms are

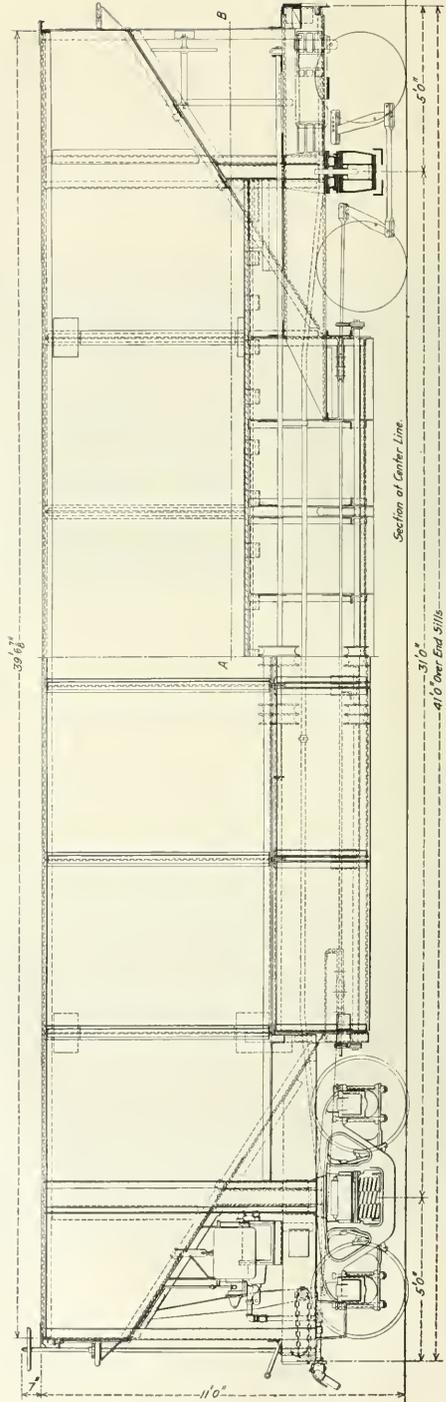
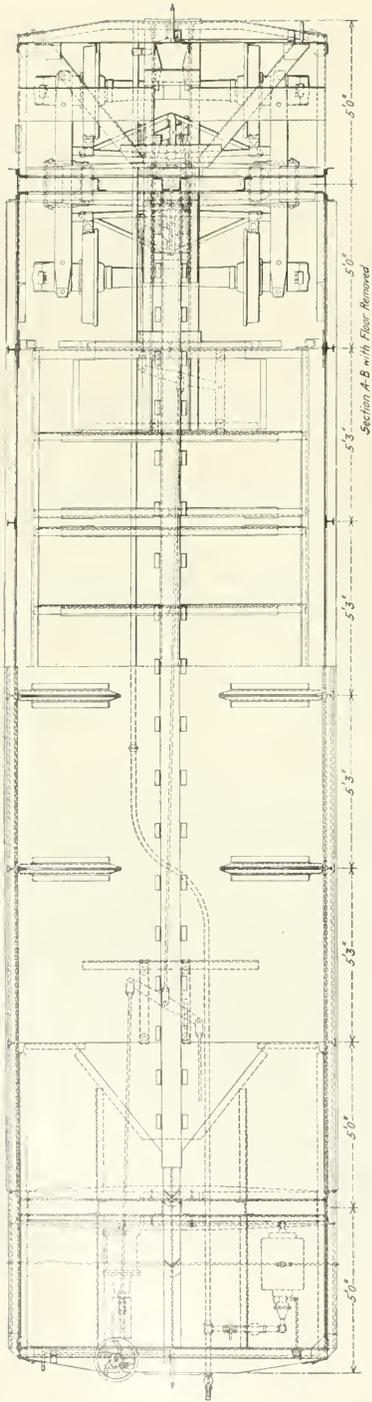


Elgin, Joliet & Eastern Hopper Car

underframe. The center sills are not continuous from end to end, but extend only a short distance beyond the ends of the hopper openings. They are each made up of two 15-in. 40-lb. channels tied together at several points, each of the four channels being 12 ft. 5 9/16 in. long. The

used to support gusset web plates which serve to stiffen the sides.

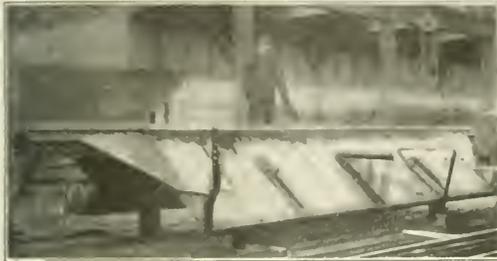
The sides are designed as girders and arranged to assist in transferring the weight of the lading to the bolsters. The top chord member is a built angle 4 in. by 3-in., weighing



Plan and Elevation of E. J. & E. Hopper Cars

11.9 lb. per foot. The lower chord member is a 4-in. by 3-in. angle. The stiffeners opposite the gusset plates are cross-tie sections weighing 9.5 lb. per foot. At the ends of each bolster the sides are supported by two 2½ in. by 3-in. angles.

The side plates are ¼ in. thick while the floor plates have a thickness of 5/16 in. It has been found that the life of the floor and sides is about equal when these thicknesses are used. The sloping end floor sheet extends from the hopper up over the bolster to the end of the car, and is supported by angle irons. The vertical end plate is supported by four pressed steel end posts in addition to the angle iron corner post. The end sheet is stiffened at the



Main Floor Member Being Assembled. Note Extension at End for Attachment to Center Sills

top by a bulb angle of the same section as that used on the sides.

The dump doors are 20 ft. 11½ in. long and 2 ft. 10½ in. in height. They are stiffened by angles along the top and bottom, and at the points where the operating mechanism is attached. There are five links attached to each door, two at the ends which pass outside the hopper opening, and three at intermediate points which pass through openings in the floor. The links are connected to arms on shafts carried under the sides of the floor. The links are bent so that they have a toggle action, and are self-locking when the doors are in the closed position. The shafts which control the operation of the doors are attached to the main



Ends and Floor Section Assembled and Side Gusset Straps in Place

operating shaft by chains. Two turn-buckles are placed in each chain to allow the position of the shaft to be so adjusted that both doors will close together. The main operating shaft extends under the floor to the end of the car, and is controlled by a hand wheel and chain attached to an arm on the end of the shaft. The arrangement of the dumping mechanism is clearly shown in one of the illustrations.

The trucks used under these cars have Andrews cast steel side frames, rolled steel wheels, Simplex truck bolsters and Ajax brake beams conforming with the M. C. B. speci-

fications for No. 3 beam. An unusual feature of these trucks is the combination brake rod safety hanger and brake beam guide. This is also shown in one of the illustrations. It is made of ½ in. sheet steel formed to fit over the spring plank. A hole is punched in the lower portion of the safety hanger for the brake rod to pass through, and the upper end is bent down horizontal so that it extends over the com-



Sides and Ends in Place Ready for Application of Doors and Appliances

pression member of the brake beam and serves to prevent the beam from tipping.

The couplers used on these cars are the M. C. B. type D No. 5 with 6-in. by 8 in. shanks and 9½-in. butt, attached to the yoke with a key. The yoke is of 1¼-in. by 5-in. wrought steel. The draft gear is the Miner type A-15. Westinghouse air brakes are used with the K-2 triple valve and a 10-in. by 12-in. air cylinder.

Express Rates Increased

A 10 PER CENT INCREASE in interstate express rates is allowed by the Interstate Commerce Commission in a decision rendered on June 22 after an order had been issued denying the supplementary petition of the express companies for a 15 per cent increase in rates. The orders were issued after it had been announced that the amended contract between the express companies and the director general providing for unified operation during the period of federal control had been signed. An abstract of the opinion by Commissioner Clark is as follows:

Wells Fargo & Company and the Adams, American, and Southern express companies handle more than 95 per cent of the total express traffic. The evidence in their behalf shows that many of the conditions which have operated to reduce the net earnings of the railroads have affected the express companies in like manner, that emergencies have made necessary the shipment of articles by express that heretofore have moved by freight, and for the handling of which the express companies are not adequately equipped, that the lack of facilities to handle an unexpected and unprecedented volume of traffic requiring expedited movement has resulted in serious competition to the increased traffic, and the attraction of employees to other lines of business have necessitated the employment of more experienced men and the use of unsuitable equipment, and that under these conditions the service has deteriorated and the ratio of operating expenses to revenue has increased to such an extent that their aggregate earnings on interstate traffic under the present rates are insufficient to meet operating expenses.

By far the largest item of operating expenses, after de-

ducting payments for express privileges, is that of labor, and there have been very heavy increases in labor costs. Charges for maintenance, and stable and garage expenses have largely increased. So also have payments on account of loss and damage claims because of the congestion, the shortage of suitable equipment, the careless or inefficient work of inexperienced employees, and the increased value of the shipments. It is unnecessary to discuss in detail these and various other conditions shown of record. Their existence is conceded; the necessity for corrective measures is obvious and imperative; and it is urged that relief from their untoward effect upon the applicants' service and revenues can be obtained only by increasing the rates, inasmuch as all possibilities in the way of operating economies have been exhausted. We will, therefore, proceed to consider the evidence relating to the financial conditions of these carriers and the probable effect upon their revenues of the proposed increased rates.

Wells Fargo & Company

Wells Fargo & Company's operating revenue increased from \$12,945,464 for the first seven months of 1916 to \$15,514,000 for the same period of 1917, but its operating income decreased from \$1,238,761 to \$137,250. Substantial deficits occurred in January, February, June and July, 1917. Had all its rates on state and interstate traffic been 10 per cent higher than they were its operating income for the period would have been \$1,445,847.

American Express Company

The American Express Company's operating revenue increased from \$17,293,759 for the first seven months of 1916 to \$20,968,190 for the same period of 1917, but its operating income decreased from \$1,080,538 to a deficit of \$96,796. Deficits occurred in the same four months as in the case of Wells Fargo & Company. Had the rates of the American Express Company on all traffic been 10 per cent higher than they were its operating income for the period would have been \$1,725,191.

Adams Express Company

The Adams Express Company's operating revenue increased from \$12,838,524 for the first seven months of 1916 to \$14,886,907 for the same period of 1917, but its operating income decreased from \$546,914 to a deficit of \$1,173,188. March was the only one of the seven months of 1917 in which it did not operate at a deficit. Had all its rates been 10 per cent higher the operating income for the period would have been \$209,521. The net operating results of the Adams Express Company for the first seven months of 1917 were much more unfavorable than were those of any other company. This was due in part at least to the fact that the greater proportion of its business is in the east and on lines where the unusual conditions were earlier encountered and more severely felt.

Southern Express Company

The Southern Express Company's operating revenue increased from \$4,774,852 for the first seven months of 1916 to \$5,377,990 for the same period of 1917. If there be included as a deduction from net operating revenue the sum of \$150,000 which this company estimated it must pay as normal income tax and war tax, its operating income for the first seven months of 1917 was \$624,206, or \$185,274 less than for the same period of 1916. The exhibits filed by this company indicate a deficit of \$35,003 for the month of July, but this amount was shown to be \$28,571 more than it should have been, because the tax item of \$150,000 was apportioned only to the months of May, June, and July instead of to the entire seven months' period. Without deducting these taxes, the Southern Express Company had

an operating income for July of \$14,996 and of \$774,206 for the seven months' period. Had all its rates been 10 per cent higher than they were its operating income for the period, with war taxes deducted, would have been \$1,063,670.

The data submitted by all the applicants include deductions representing normal income tax and war tax, but except for the Southern Express Company the amounts are so small as not materially to affect the result.

The Four Companies Collectively

Considering the four companies as a unit, their operating revenue from domestic transportation was \$47,852,600 for the first seven months of 1916 and \$56,747,089 for the same period of 1917, but their operating income decreased from \$3,675,694 to a deficit of \$508,527. The deficit would have been approximately \$321,776 but for the inclusion of income and war taxes. Deficits occurred in the months of January, February, June, and July. Had all the rates of the four companies been 10 per cent higher, their operating income for the period would have been \$4,444,231.

Other Express Companies

The smaller express companies, except the Canadian, showed substantial increases in operating income. The figures for the first seven months of 1916 and 1917, which include the net income derived from their foreign and non-transportation business, are stated below:

	Great Northern.	Northern.	Western.	Canadian.
1917	\$147,370	\$177,377	\$55,864	\$77,900
1916	91,796	137,902	34,752	140,423

The Situation as of December 31, 1917

During the remaining months of 1917, and for that year as a whole, reports filed with the commission show that the net operating results were much more unfavorable than during the seven months' period ended July 31.

Excluding war taxes and the net income derived from the foreign and nontransportation business, it is estimated that the net operating results from the domestic traffic of the four principal companies were as follows:

	Operating income or deficit	August to December, 1917	Calendar year, 1917
Adams		*\$2,237,697	*\$3,416,885
American		*183,764	*280,560
Southern		345,519	1,119,726
Wells Fargo		*117,707	56,294
Total		*\$2,193,649	*\$2,515,425

*Deficit.

Conclusions

It is apparent that the Adams, the American, and the Wells Fargo companies, which together transact about 86 per cent of the total express business, and that the smaller companies, in a somewhat lesser degree, require the additional revenue which the proposed increased rates would yield to enable them to afford adequate service and to meet the constantly increasing costs of operation. Accepting as approximately correct the estimated additional revenue which the increased rates will yield, it is far from certain that, under a continuance of present separate operation, it would be sufficient to offset the increases in wages and other operating costs.

The protests against the proposed increased rates are comparatively few and relate principally to those of the Southern and the smaller express companies. It is unnecessary, however, to particularly consider the revenues or rates of each individual carrier. In the former proceedings, 24 I. C. C., 380; 28 I. C. C., 131; and 35 I. C. C., 3, these express companies were treated substantially as a unit. And, as is well known, they have recently been merged into one company, which will be operated as an agency of the government under

a contract with the United States Railroad Administration. Upon all the facts of record we conclude and find that the application should be granted. An order will be entered accordingly.

Commissioner Atchison in a dissenting opinion said in part: "What is said in the majority report as to the increased cost of performing express service is undeniable. But it is clear from the record that the increases in costs are far heavier in Zone 1, which embraces roughly the territory east of the Mississippi and north of the Ohio and Potomac rivers. The density of traffic and population is greater and the general rate basis is lower in this zone than elsewhere in the country. The added costs are much greater on less than carload than

on carload traffic, and on small than on large packages or articles.

"It is entirely feasible to adjust the express schedules so that the burden of these additional costs shall be borne in the sections where such added costs are incurred, and by the kinds of traffic which have caused the increased expense, but this is not done. Instead the burden is laid upon all kinds of traffic, and is imposed in relatively heavier degree upon localities already carrying the highest rates and which are not responsible for the greatest part of the added financial burden of these carriers."

The new rates are to be established on not less than five days' notice.

The Chinese and Japanese Railways Compared

Japan's Lines Have a Semi-Military Organization.
China Is Hardly Master Over Its Own Railways

By Frank Rhea

CHINA HAS ABOUT 6,500 miles of railroads today, of which 2,300 are what I call concessioned railways—really nothing more or less than other governments operating railways in China. There are almost 3,800 miles of the Chinese government railways which I will refer to later. In Japan there are about 6,000 miles of the Imperial Government Railways of Japan which is one of the best examples of government ownership in existence today. The three railway situations in the world which can be put in

A Semi-Military Management

The Japanese railways are organized on the British departmental basis with a Germanized semi-military management superimposed on top of it. That, to me, answers whether we wish to take up that method of railroad organization. If we want to get the German or the Japanese efficiency, we will have to superimpose the semi-military organization. One goes with the other.

Japan is a very rough country. The lines are 5 ft. 6 in.



A Station on the Canton-Hankow Line

parallel columns and the performance figures studied most interestingly are America, Japan and Germany. The performances of the Japanese railroads are quite remarkable in a number of respects. They have a very light goods wagon with a capacity of 10.6 tons. Those goods wagons each move 110,000 ton miles a year while the American railroads move about 160,000 ton miles a year in cars of 41 tons capacity. Therefore, we have quite a number of things to learn from the Japanese railways.

gauge, the grades are steep, the curvature is sharp and the railroads have cost practically \$80,000 in gold per mile for the Japanese government to acquire. It did not cost quite that to build them, it includes some of the profit to the former owners, who were private individuals.

The Japanese railways were bought through a rather peculiar business transaction which is a long story, but which resolves itself down to a brief statement that the earnings for a period of years were multiplied by 20, which capitalized the earnings at 5 per cent.

For several years the Japanese have made a very careful effort to manufacture their own railway equipment requirements. In 1910 they bought about 40 per cent of the requirements out of the country. In 1914 they reduced this

*This is a paper read at the annual meeting of the National Fire and Trade Convention at Atlantic City, N. J., in 1917. Mr. Rhea is a member of the American Railway Association and the Far East as a member of the American Railway Association and Domestic Commerce Commission. The subject of this paper is railway materials. An abstract of this paper was published in the Railway Age in the issue of May 21. The paper is now in the hands of the press.

to less than 5 per cent. They have since gone up to about $12\frac{1}{2}$ per cent. Manufacturing in Japan is typically along the line of private manufacturing. The two plants which are most important today in the manufacture of railway equipment are the Osaka Locomotive & Car Works and the Kawasaki dock-yards, both of which have modern and moderately well equipped plants. They have been fostered by long-time contracts for both locomotives and carriages for the Imperial Government Railways.

With an adequate supply of labor and materials (both of which are very short in Japan today) these two plants can turn out about 250 locomotives a year, about 1,250 passenger cars and 6,000 to 7,000 goods wagons, in addition to a considerable amount of other materials, fabricated structural materials, shop machinery, etc. The wages at both these works have been substantially increased since the war. At present common labor costs from 25 cents to 50 cents gold a day. The wages of mechanics range from 50 cents to \$2 a day. This was an undreamed of wage for a Japanese mechanic previous to the war.

The Japanese in China

Probably the most serious situation in the long run of Japanese development is in China, particularly in Manchuria and probably later Shantung, as illustrated by the

same and the Japanese in the Shikoku works are all administrative and tactful. Every trained man, every engineer, is a Japanese and the Japanese apparently are very much interested in seeing that the Chinese keep busy.

An interesting problem in that connection was my study of the Tungshang works of the Peking-Mukden Railway which have at the present time about seven Britishers running the works and I was interested as to why the Tungshang works could not get the results that the Shikoku works did. I concluded it was very largely for the reason that they did not have somebody in each one of those positions—a crane man, an engine man, or whatever it might be—that kept things going. Those seven Britishers had about half their time occupied in the administration of the railroad itself and could not put the push into the Chinese.

The South Manchuria Railway

We have looked on the South Manchuria Railroad as a private corporation. It is, so-called. As a matter of fact, the South Manchurian Railway is directly under the administration of the Colonial Department of the Government of Japan. It is actually the instrument of Japan in handling the investigation, development, manufacturing and transportation organization of Manchuria. We always talk in this country of the big part of the United States being Texas.



On the Canton-Hankow Railway

Shakado works of the South Manchuria railways at Darien, which are not only a very complete layout of railway work shops but are as well completely equipped for manufacturing general engineering products. In recent years these works not only furnished fabricated structural materials needed by the Japanese in their developments in South Manchuria, such as the Thiazin color and the Penhiha iron furnace, the Anshan steel plant now in construction, but have as well sent back to Japan structural material, machinery for locomotives to Indo-China, and have built considerable equipment for the Korean and Manchurian railways.

I visited the Shikoku works where there were about 4,150 men employed, of which over 80 per cent were Chinese, principally the upstanding, robust men from Shantung who make excellent mechanics if properly developed and properly supervised and directed. These same remarks apply to the other works in South Manchuria and also in Japan.

It looks to me that one of the serious matters we have to consider in the Far East is not so much what Japan will do in Japan proper as what she will do in China and we have to face the fact that the Japanese are the one yellow race which has administrative and organizing ability and initiative. I don't know whether it's initiative, but they do it just the

Well, Manchuria is equal to Texas with Louisiana and Arkansas added, and is equal practically to the four Northwest states of Washington, Oregon, Idaho and Montana.

The concession railways of China constitute the French-Hunan lines extending from French Indo-China into Hunan, the ex-German Shantung lines now in the hands of Japanese, and the South Manchuria Railway already mentioned. In addition there is the Chinese Eastern Railway crossing Manchuria about which much has been said recently but which really can be left without further mention on account of the present chaotic condition in that part of the Far East, because Manchuria is China and not Russia.

There are about 1,100 miles of this line, of which over 900 miles constitute part of the trans-Siberian route. There is 152 miles in a branch from Harbin to Chang Sha, where connection is made with the Japanese South Manchuria line. This line runs through a very fine agricultural country with a great deal more live stock than is the average in all the rest of China.

Of all the situations in this part of the world, I think we are most interested in the Chinese Government railways, and I speak of this as Chinese Government railroads advisedly. These are administered by the Chinese Ministry of Com-

munications and remarkable progress has been made notwithstanding the great difficulties which have taken place in China in the last few years in nationalizing these railways and I use the word nationalizing advisedly.

I went to China quite of the opinion that we had little chance to get anything but the small amount of business on account of the concessions to the other countries. Without doubt the Chinese railroads are very real examples of business following investment and unless we go after both the investment and the business, it will remain so in many ways.

There are, however, features which I do not understand which, in my opinion, may mean much to us in the future if taken advantage of. First, everyone seems to have taken it for granted that the principal problem was to build railways in China, but I was struck with the similarity of the problem from the one we have at home and which we are suffering from in America, that the real problem is to furnish the ultimate capital to develop the railways of China after they have settled down and know about what they can do. It is not only the problem of first building the railways but it is a large problem to furnish the capital and additional equipment to go ahead and bring those railways to the ultimate development, and the ultimate development of the railways in China is certainly going to be very interesting on

the railroads a consolidated whole. This control by the Ministry of Communications is losing its effect to a certain extent by the amortizing of the loans and the Chinese gradually taking hold of it but that has a long time to run and they are needing all the earnings which they have to put back into property to take care of the constantly growing business.

The Peking-Mukden Railway in five years has had an increase of 50 per cent in traffic with an increase of equipment of about 20 per cent. The other roads have had larger increases with less increase of equipment. Today China is an excellent place in my opinion for the Americans to introduce the selling of equipment or equipment bonds on what seems to me to be a very gilt-edged security to pay for it in the end; one interesting fact is that up to date China has not defaulted on any of her railway obligations.

New Lines Needed

The building of new lines in China is one of the things which deserves a great deal of consideration. The one line which they need immensely is the line from Canton to Hankau, making connections across that part of China and I feel warranted in making the statement that they will never get the Chinese currency straightened out until they get transportation facilities in China for the reason that you cannot have exchange without transportation facilities. You cannot have stability of exchange; therefore they will continue to have their local currencies in China until they get transportation.

I went to China with the idea that I would not undertake to study the loan situation. I found if I was going to make any intelligent report whatever on the railway markets of China, I would have to study loans. I found it a very interesting subject, one of the most interesting subjects I have ever taken up, and in doing that I feel a great deal of sympathy for the Chinese notwithstanding a great many of their shortcomings.

Chinese Have Been Imposed Upon

The Chinese today have been imposed on. The Chinese situation, as a whole, has not been allowed to develop on account of limitations, restrictions of a great many of these loan agreements which are utterly selfish from the standpoint of the people who own them, and I believe that one of the greatest things that could happen to China is to have her railways taken in hand, untangled, straightened; it will be to the good not only of China as a whole but to the good of the actual owners of the loan securities.

The Chinese at the same time no doubt should take steps to remove some of their leaks and obstructions and other difficulties of that kind. The Chinese would probably have to admit and agree to a general supervising situation. I think, however, that they would readily do that. In fact, I was told they would, and by very good authority—in one instance by the vice-president of the Ministry of Communications Committee. He said they would be very glad to exchange twelve different piecemeal controls for one comprehensive control.

The railways of China today have an equity in their balance sheets and this is not fictitious value but is a real asset of about \$450,000,000 Mex. Of this the Chinese Government controls (in round figures) an equity of about \$1,500,000 Mex. In other words, today they do own actually about one third of their own railways. Therefore I think that one of the conditions of peace should be the straightening out of some of the Chinese situation, particularly the results of the battle of concessions, and the battle of concessions in my opinion laid some of the foundation stones for the war. And if they are not corrected, they will be a contributing element to another war.



Japanese Troops in Possession of the German-built Railway at Tsing-Tao

account of the character and density of traffic which will ultimately develop.

Chinese Railways Lightly Equipped

Today the Chinese railways are very lightly equipped as we see it in America. With earnings of approximately \$20,000 Mex. per mile of line they have $\frac{1}{2}$ of a locomotive per mile, $\frac{1}{4}$ of a passenger car per mile and $\frac{3}{4}$ of a goods car per mile of line. The Japanese, with earnings not greatly different, have $\frac{1}{2}$ of a locomotive, 1.2 passenger cars and 7.0 goods wagons while we in America have $\frac{1}{4}$ of a locomotive, $\frac{1}{45}$ of a passenger car and 9.8 freight cars, all very much larger than the Chinese. Germany in 1913, with earnings of \$22,000 gold per mile, had $\frac{3}{4}$ of a locomotive, $2\frac{1}{4}$ passenger cars and $17\frac{1}{2}$ goods wagons, all larger than the Chinese.

The Chinese are making five complete loadings of goods wagons a month, some lines making six complete cycles of loading of a goods wagon a month, and moving a haul of about 146 miles. Americans with a haul of 260 miles make a loading of a little over two a month. The Japanese are loading about four and a half times, I believe, although I was not able to get very definite figures on that feature.

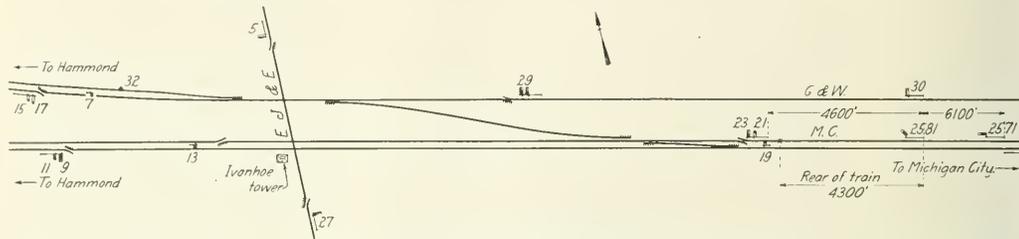
Therefore, the transportation problem of the Chinese railways today is a very interesting one and one of the great difficulties is that they have superimposed on them some 12 loan-restricting ideas tying the Japanese' hands as to making

Rear End Collision at Ivanhoe, Ind., on Michigan Central

AT 3:57 A. M., SATURDAY, June 22, an empty westbound equipment train on the Michigan Central, consisting of 20 tourist sleepers and 1 coach, crashed into the rear of the second section of a circus train, at Ivanhoe interlocking plant, near Hammond, Ind., killing 78 and injuring 120 persons on the circus train, according to the latest available information. Trainmaster F. S. Whipple, who accompanied the second section of the circus train, was evidently killed in the accident as no trace of him has been found. Many of the bodies recovered were charred beyond recogni-

tion in charge of Engineman A. Sargent and Conductor L. Johnson passed the Michigan City depot at 2:55 a. m.; Porter at 3:20 a. m.; East Gary, at 3:34 a. m., and Tolleston at 3:52 a. m.; and crashed into the rear end of the second section of the circus train at 3:57 a. m.

This portion of the Michigan Central is a double track line completely equipped with automatic block signals. The track is on tangent for over a mile east of the point where the wreck occurred. At the point of the accident the Gary & Western tracks are parallel to and 85 ft. north of those of the Michigan Central. The night was clear with nothing to obstruct the view, the accident occurring in the country with no manufacturing plants or factories nearby. The westbound home signal for Ivanhoe interlocking plant is located



The Track Layout of the Ivanhoe Accident

tion and it is doubtful if the total number of killed and missing will ever be determined.

After a performance at Michigan City, Ind., the Hagenbeck-Wallace circus was being moved in two sections to Hammond, Ind. These trains were being run over the Michigan Central to Ivanhoe, at which point they were diverted over the Gary & Western into Hammond. The interlocking plant at which the accident occurred is approximately five miles west of Gary and four and a half miles east of Hammond. The second section of the circus train con-

950 ft. east of a crossing of the Elgin, Joliet & Eastern and 270 ft. east of the crossover switch leading to the Gary & Western tracks.

The second section of the circus train traveled from Porter to East Gary, a distance of 9.2 miles, in 24 minutes, running at an average speed of 23.4 miles an hour. The empty equipment train traveled this distance in 14 minutes, running at an average speed of 39.1 miles an hour. The circus train covered the distance between East Gary and Tolleston, 6.5 miles, in 14 minutes, an average rate of 27.9 miles an



A General View of the Ivanhoe Accident Showing the Debris, the Gary & Western at the Right and the Howe Signal in the Distance

sisting of 27 cars, passed the Michigan City depot at 1:00 a. m., pulling up to Tenth Street, where the loading was completed. This train left there at about 2:30 a. m., arriving at Porter, 11.8 miles distant, at 3:06 a. m.; at East Gary, 9.2 miles from Porter at 3:30 a. m.; at Tolleston, 6½ miles from East Gary at 3:44 a. m. and at Ivanhoe approximately 3.3 miles from Tolleston at 3:55 a. m. The train sheets show that the empty equipment train, pulled by engine 8485 and

hour, while the empty equipment train covered the same distance in 18 minutes at an average rate of 21.7 miles an hour. The distance between Tolleston and Ivanhoe, approximately 3.3 miles, was covered by the circus train in 11 minutes, running at an average speed of 18 miles an hour, while the empty equipment train covered it in 5 minutes, running at an average speed of 39.1 miles an hour. The empty equipment train passed East Gary 4 minutes after the circus

train, while at Tolleston the interval between the two trains was 8 minutes. From this it appears the empty equipment train slowed up materially between East Gary and Tolleston or while passing through the city of Gary, but resumed an average speed of 39 miles an hour at or near Tolleston.

The second section of the circus train consisted of stock cars, flat cars and four sleeping cars, which were just ahead of the caboose. These sleeping cars were converted wooden equipment. The engine plowed through the sleeping cars



A Close View of the Burning Debris

and after the crash these four cars and one flat car were destroyed by fire, which evidently started from the gas lighting system with which the sleeping cars were equipped. That the casualties were so large was due to the sleeping cars being of wooden construction and that they were equipped with three tiers of double deck bunks instead of two as in ordinary sleeping cars.

The second section of the circus train had a blazing

journal box on one of the cars and stopped, after having started to cross over to the Gary & Western tracks with the rear of the train at a point approximately 500 ft. in advance or east of the home signal of the Ivanhoe interlocking plant on the westbound main track of the Michigan Central and 4,300 ft. beyond or west of the distant signal. An automatic block signal was located 6,100 ft. east of the distant signal. When the second section of the circus train stopped to cool the hot box the flagman started back with fuses and lantern. It appears from the preliminary investigation that the automatic signals and the signals of the flagman were disregarded by the engineer of the circus equipment train, as, after the accident the distant signal for the interlocking plant was found to be in the stop position with the red light showing, while the automatic block signal was found to be in the caution position with the yellow light showing properly. This shows that the signals were neglected properly. The signal system consists of one stop, two caution, upper and lower signals.

After receiving the caution indication the engineman should have been prepared to stop at the next signal in advance. Rule 8 of the automatic block signal rules in the Book of Rules for the operating department of the Michigan Central reads, "a train passing an automatic distant signal which indicates caution must be under control so it may be stopped on reaching the home signal." All employees involved in this accident, and in fact all employees in the entire transportation service are examined on all block signal and operating rules once a year as required by the State of Indiana.

Engineman Sargent has been in the service of the Michigan Central from 25 to 28 years, is an extra passenger engineman and is about 55 years old. He reported for duty at 9:50 p. m. on June 21, having been off duty since 1:50 p. m. on June 20. At the time of the accident he had been on duty 6 hr. and 27 min. with a total time off duty of 42 hr. prior to starting work. Mr. Kraus, fireman was called for duty at 12:15 a. m. on June 22, after having been off duty from 12:25 a. m. on June 21, or 25 hr. and 50 min. prior to starting work. He had been on duty 2 hr. and 42 min. when the collision occurred.

Further investigation indicates that Engineman Sargent was dozing or asleep, which was responsible for the accident. The flagman of the circus train was back from 600 to 800 ft. at the time of the accident. At the coroner's inquest at Hammond Tuesday, Engineman Sargent under his constitutional rights refused to testify at this time. Conductor Johnson stated to Sargent after the wreck: "This is quite a bad mess we got into," and asked him what was

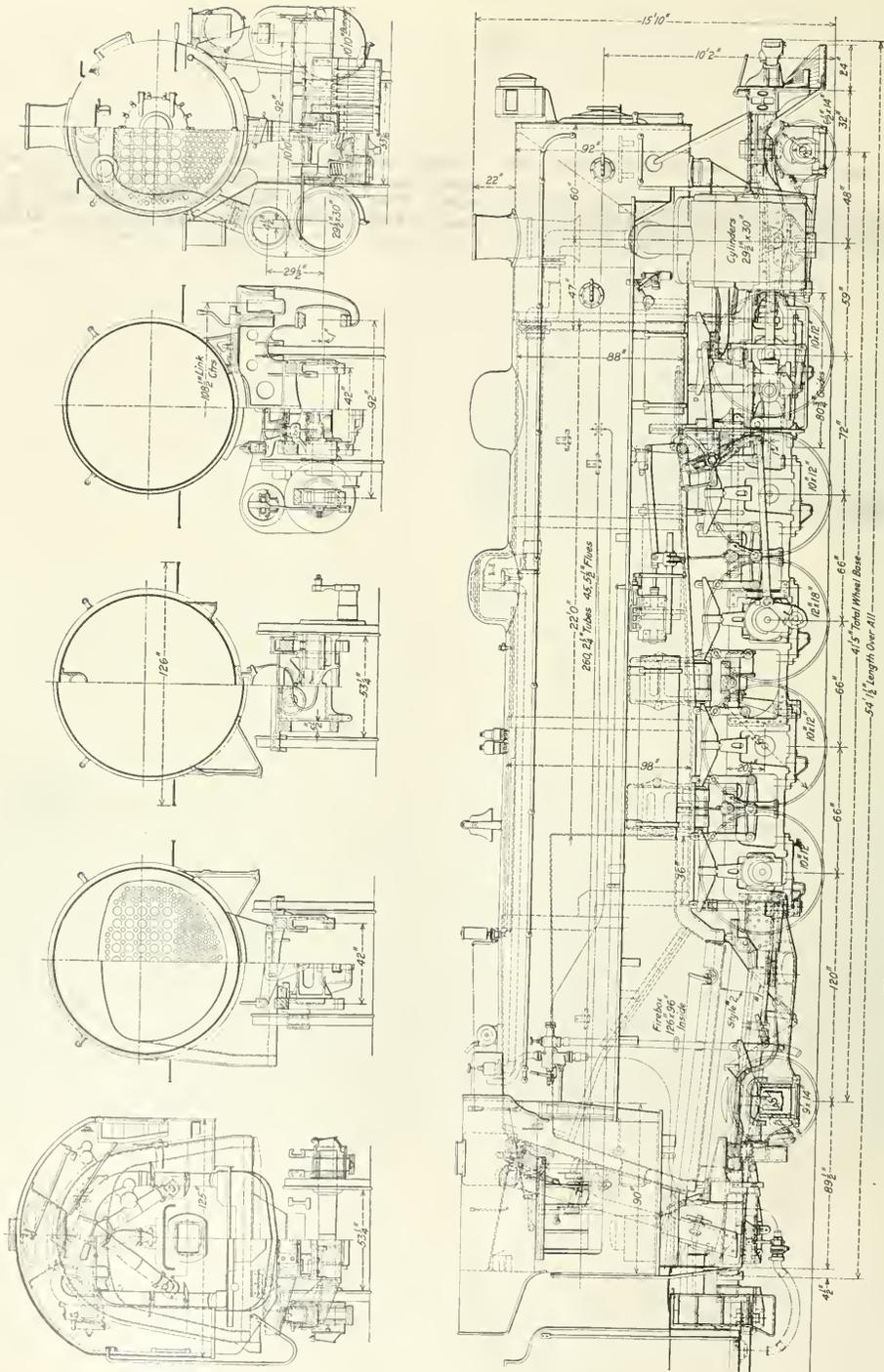


A View of the Wreck

the matter. Sargent's answer was: "I must have been dozing."

The circus officials on Tuesday compiled a list of dead and missing which totals 78.

THE UNITED STATES IN 1917 PRODUCED 342,000,000 BARRELS OF CRUDE OIL, AGAIN INCREASED IN 1916, 210,000,000 IN 1915, AND 134,000,000 IN 1914, AND THIS COUNTRY NOW PRODUCES TWO-THIRDS OF THE OIL OF THE WORLD, ACCORDING TO A COMPILATION BY THE NATIONAL COAL BANK OF NEW YORK.



Elevation and Cross Sections of Union Pacific 2-10-2 Type Locomotive

Tests with 2-10-2 Locomotive on the Union Pacific

Breaking Up Trains and Use of Helper Engines Eliminated;
Results Show High Sustained Capacity

THE UNION PACIFIC SYSTEM has recently reduced the grades on certain parts of the Western Division. With a view to increasing the train load on the reconstructed line, locomotives of the 2-10-2 type were designed for this division under the supervision of C. E. Fuller, superintendent of motive power and machinery and A. H. Feters, mechanical engineer. Twenty-seven of these engines were built last year by the Baldwin Locomotive Works, fifteen for the Union Pacific, six for the Los Angeles and

have given very satisfactory results. A condensed profile of the line on which they are operating is shown below. The reconstruction work has not been completed on this line and there are short sections where the grade is still 63 feet per mile, uncompensated for curvature. In tests the 2-10-2 type locomotives handled 4,800 tons eastbound over this division at an average running speed of 15 m. p. h. The average coal consumption was 358.4 lb. per thousand gross ton miles. The curves reproduced herewith show the tractive



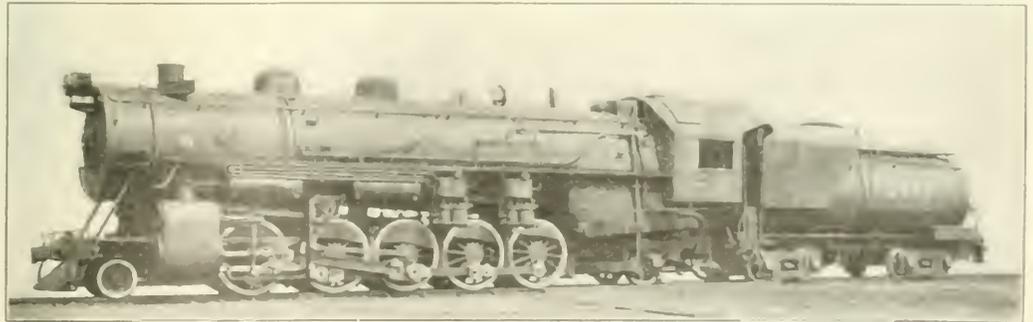
Profile of the Union Pacific Between Ogden, Utah, and Evanston, Wyoming

Salt Lake and six for the Utah Railway. Of these, ten were placed in service on the Union Pacific between Ogden, Utah, and Evanston, Wyo., a division 75.8 miles long. The old line between these points had ruling grades of 9.3 feet per mile eastbound, while the new line has a ruling grade of 60 feet per mile. East of Evanston for 400 miles the ruling grade is 4.3 feet per mile. The 2-10-2 type loco-

motives were designed primarily to move the same tonnage eastbound over the new line with a ruling grade of 1.14 per cent, compensated for curvature, that the Mikado locomotives handle over the line with .83 per cent grades. A secondary object was the elimination of helper service on this district, which has several difficult grades.

These locomotives have been in service for six months and effort and drawbar pull developed and also the horse power. A maximum of 2,940 horsepower was developed at a speed of 30 m. p. h. This is at the rate of one horsepower for every 121.6 lb. weight of the locomotive in working order, which is unusually good performance.

The Union Pacific 2-10-2 type locomotives have a rated tractive effort of 70,450 lb. with 285,500 lb. on the driving-



Heavy Freight Locomotive for the Union Pacific Which Develops 2950 Horsepower

motives were designed primarily to move the same tonnage eastbound over the new line with a ruling grade of 1.14 per cent, compensated for curvature, that the Mikado locomotives handle over the line with .83 per cent grades. A secondary object was the elimination of helper service on this district, which has several difficult grades.

These locomotives have been in service for six months and

wheels the ratio of adhesion being 4.05. The total equivalent heating surface is 7,045 sq. ft. or one sq. ft. for each 19 lb. of tractive effort. The main motive power is supplied by the heavy class of freight service in which these engines are used.

The boiler is of the straight-top type with a wide, deep firebox placed back of the drivers and over the rear truck.

A combustion chamber four feet long extends forward into the boiler barrel, and the tubes have a length of 22 ft. The middle barrel ring has a slope on the bottom to provide a sufficiently deep water space under the combustion chamber. All seams in the firebox and combustion chamber are welded, with the exception of that uniting the back sheet with the crown sheet and side sheets. The seam around the fire-door opening is also welded. Flexible stay-bolts are used in the breaking zone and in the six front rows of stays over the combustion chamber. At the point where the three upper rows of flexible stays on each side pass through the boiler barrel, bosses are welded to the sheet in order to provide a sufficient number of threads for the staybolt sleeves. Both the coal burning and oil burning locomotives are equipped with Security sectional arches and the coal burners are fired by Street type "C" stokers. The superheater consists of 45 elements and has a superheating surface of 1,262 sq. ft.

The piston valves are 15 in. in diameter and are driven by Walschaert valve gear which is controlled by a Ragonet power reverse gear having both air and steam connections. The piston heads are steel castings of dished section 7 in. wide with phosphor bronze bearing rings and gun iron packing rings. The piston rods are of open-hearth steel heat treated and hollow-bored. The same material is used for the crank pins and driving and trailing axles which are also hollow-bored. Long driving boxes are applied to the

with a spherical surface to provide sufficient flexibility. The driving brake system is divided between the third and fourth pairs of wheels. The rear cylinders are placed in a horizontal position back of the main pair of wheels, while the front cylinders are placed vertically and are bolted to the cylinder saddle casting. The arrangement is such that all shoes bear on the backs of their respective wheels. The tender is carried on forged steel wheels, and is of the Vanderbilt type, with equalized trucks and a one-piece cast steel frame.

The principal dimensions and ratios of the locomotives are as follows:

General Data	
Gage	4 ft. 8 1/4 in.
Service	Freight
Fuel	Coal or oil
Tractive effort	70,450 lb.
Weight in working order	357,600 lb.
Weight on drivers	285,500 lb.
Weight on leading truck	23,600 lb.
Weight on trailing truck	48,300 lb.
Weight of engine and tender in working order	554,200 lb.
Wheel base, driving	22 ft. 6 in.
Wheel base, total	41 ft. 5 in.
Wheel base, engine and tender	77 ft. 6 in.
Ratios	
Weight on drivers ÷ tractive effort	4.05
Total weight ÷ tractive effort	5.08
Tractive effort × diam. drivers ÷ equivalent heating surface	6.30
Equivalent heating surface ÷ grate area	83.9
Firebox heating surface ÷ equivalent heating surface, per cent.	5.37
Weight on drivers ÷ equivalent heating surface	40.5
Total weight ÷ equivalent heating surface	50.8
Volume both cylinders	23.73 cu. ft.
Equivalent heating surface ÷ vol. cylinders	296.9
Grate area ÷ vol. cylinders	3.54

Cylinders	
Kind	Simple
Diameter and stroke	29 1/2 in. by 30 in.

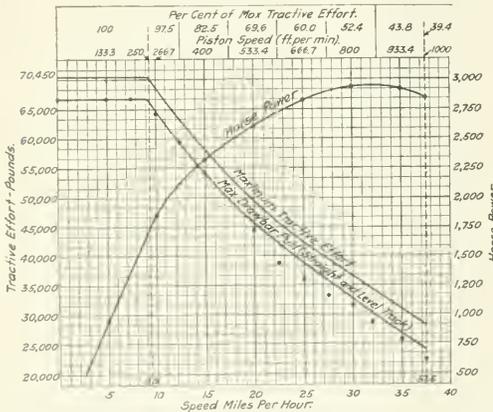
Valves	
Kind	Piston
Diameter	15 in.

Wheels	
Driving, diameter over tires	63 in.
Driving, thickness of tires	3 1/2 in.
Driving journals, main, diameter and length	12 in. by 18 in.
Driving journals, others, diameter and length	10 in. by 12 in.
Engine truck wheels, diameter	30 in.
Engine truck journals	6 1/2 in. by 14 in.
Trailing truck wheels, diameter	25 in.
Trailing truck journals	9 in. by 14 in.

Boiler	
Style	Straight top
Working pressure	200 lb. per sq. in.
Outside diameter of first ring	88 in.
Firebox, length and width	126 in. by 96 in.
Firebox plates, thickness	Sides, back and crown, 3/8 in.; tube, 1/2 in.
Firebox, water space	Front, 6 in.; sides and end, 5 in.
Tubes, number and outside diameter	45-5 1/2 in.
Flues, number and outside diameter	260-2 1/2 in.
Tubes and flues, length	22 ft. 0 in.
Heating surface, tubes and flues	4,774 sq. ft.
Heating surface, firebox, including arch tubes	373 sq. ft.
Heating surface, total	5,152 sq. ft.
Superheater heating surface	1,262 sq. ft.
Equivalent heating surface	7,045 sq. ft.
Grate area	84 sq. ft.

Tender	
Tank	Cylindrical
Frame	Cast steel
Weight	194,600
Wheels, diameter	33 in.
Journals, diameter and length	6 in. by 11 inch.
Water capacity	10,000 gal.
Coal capacity	17 tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.



Test Results Secured with 2-10-2 Type Locomotive on the Union Pacific

main axle and lateral motion boxes to the front axle. The latter are used in connection with the Economy constant resistance leading truck.

The frames are annealed vanadium steel castings 5 1/2 in. wide and spaced 42 in. between centers. They are braced transversely between adjacent driving wheels and also at the third, fourth and fifth pairs of driving pedestals. The driving box wedges are self-adjusting. The Commonwealth rear frame cradle is applied in combination with the Delta trailing truck, which serves the triple purpose of a frame, radius bar and equalizer. The trailing truck is equalized with the two rear pairs of drivers, the equalization being through a central vertical, heart-shaped link which is suspended from a transverse beam hung from the rear driving springs. This link acts not only as the equalizer connection, but also as the rear truck radius bar pin. It is circular in section at its lower end, and is guided in the frame cradle casting. The bearing between the equalizer frame of the truck and the locomotive frame is made

ROAD TRANSPORT PROBLEM IN ENGLAND.—By an order in council, new powers are vested in the British Board of Trade for providing and maintaining an efficient system for the transport of freight by road. The Board may regulate, restrict, or give directions respecting the use for the purpose of road transport or the sale or purchase of horses or vehicles engaged on road transport. The Board may also require any horse or vehicle to be placed at their disposal either absolutely or by way of hire. Power is given to prohibit transportation of freight of any class by road and to prescribe the radius or distance within which freight may be conveyed by road.

New York Central Safety-First Department

A Salaried Specialist on Each Division; Results of Experience in Refinement of Details

THE ESTABLISHMENT of safety committees on all railroads under federal control, as announced in circular No. 5, of the director of the division of transportation, noticed in the *Railway Age* of June 14, page 1422, puts into effect, throughout the country, a system of instruction and supervision, as related to the duty of railroad employees to look out for the bodily safety of themselves and their fellow workers, which has already accomplished remarkable results on a considerable number of important railroads, and which is sure to be of great benefit on any road wherever it is carried out with vigor and persistency. The term "safety first," as introduced into the railroad world by R. C. Richards, in 1910, means two things: (1) the simple operation of reversing the habits of mind of those men who, from excessive engrossment in their work, make care for their own safety secondary and (2) the correction of the mental attitude of those others who neglect their own safety, not because they are too earnest in their work, but because they lack the instinct, or intelligence or training, to put *anything* first; who are unsystematic or lazy or thoughtless in various directions.

This process of correction, though simple, is not easy; the task is a never-ending one; and committees are necessary, on every railroad division, to attend to the rather humdrum business of keeping the men keyed up to the importance of remembering one of the fundamental conditions of their vocation—that of keeping themselves fit to perform their duties. The universal principle that what is everybody's business is nobody's business is in evidence every day of the year; and only a thoroughly efficient organization can avert the well-known weakening effects that are observable in any enterprise in which the principle is forgotten.

Mr. Gray's circular, before referred to, follows closely the lines laid down by the American Railway Association in 1913 (Circular No. 1333), under nine heads. The plan was outlined in the *Railway Age* of April 21, page 1461.

To put the character of this plan before the reader in concrete form we give below a sketch of the operation of the system on the New York Central Lines, under the direction of Marcus A. Dow, general safety agent, who has built up a thorough and efficient organization throughout the twenty or more divisions of the roads under New York Central control. He has an assistant general safety agent in his office at New York city, and one on each important division of the road, sixteen of these in all (some of them attending to one large and one small division). These division agents devote their whole time to this work. For a good part of the year—except in the summer—they have the benefit of one or other of the two motion pictures which have been devised by Mr. Dow for use as aids in impressing their lectures on the employees. Two cars, with attendants, are devoted to these pictures and the safety agents give lectures to the employees, 50 to 75 at a time, in these cars, as they are moved about.

The keynote of the New York Central safety-first system is the maintenance of regular committee meetings on every division, with constant correction of any inattention or negligence of the committee members. Many of the numerous small duties that appeal to the safety-first committee-man are so elusive that many men—strong-minded men as well as those not so strong—fail to do their best *except as they are held to very definite regulations*; and the prevention of the general lapse into carelessness, which would naturally follow this condition, constitutes about the whole function of the safety-first department.

The report of the meeting of the Safety Committee of the Syracuse division of the New York Central, on November 5, last, affords a typical illustration of the amount and kind of work done at such a meeting. This report fills 18 large pages, and the transcript of it which is given below is naturally verbatim down as far as the headings of the columns. From that point, onward, we have inserted simple paragraphs illustrating the kind of subjects coming from different departments, limitation of space forbidding the reproduction of the whole report, which included 166 items having to do with faults in physical features (ending on the 16th page) and 44 paragraphs having to do with the correction of improper practices. In this particular report no item, whatever have found a place in the last column (referred to general committee) and only one item, No. 1088, is found in the column headed "No Action." The extent to which these meetings go into particulars will be understood when it is noted that Mr. Leonard, general yardmaster, who reported item No. 1091, reported also 46 others. (But in this case there had been no meeting for three months.) Mr. Schell, the safety agent of the division (devoting his whole time to this work) made 14 suggestions, all but one of which were referred to some department for attention. That is to say, his observations came before this meeting as new business, whereas most of the items reported by other members had to do with matters which had already received some attention and in many cases had been finally settled. The instructions given by the general safety committee to the division committees call upon members to report, to the proper officer, every unsafe condition or practice as soon as discovered, and if such reports are made, and are properly acted upon, the committee member can, of course, report both the discovery and the correction at the same meeting.

A subject which is continued from one meeting to another appears, by number, in the records of each successive meeting until it is finally disposed of. A report of each division meeting must be sent to the general safety agent at New York city, within ten days after adjournment. Where a committee decides to take no action, it is required to give the reasons for such decision (which requirement however appears to have been disregarded in this particular case). If a matter is referred to the general committee the chairman of the division committee must give full information, including where appropriate, plans for improvements of structures, and estimates of costs; and the division committee is required to make a definite recommendation.



Simple Report of Division Meeting

1913, November 5, 5.00 P. M. - 7.45 P. M.

MEMBERS PRESENT:

(List of names and occupations follows, including F. W. E. [unclear], C. F. Ray, H. [unclear], G. [unclear], M. [unclear], W. L. [unclear], T. F. [unclear], G. I. K. [unclear], T. H. [unclear], A. M. [unclear], E. Alexander, etc.)

Item No.	Member reporting, and his recommendations.	Action taken	Give item numbers in these columns		1174	Mr. J. T. Howley submitted report from Yardmaster Dooley, who on Sept. 15th found brake beam down on NYC 497289, being switched on ladder	Stopped engine and had brake rigging removed	1174
			Corrected	No action				
826	Switchstand in station platform at Alton between main tracks into which passengers might walk after alighting from trains after dark	Held for further investigation	826		1187	Mr. J. T. Howley submitted report from Clerk Riley, who on Oct. 9th found large lump of coal lying between tracks 7 and 8 west end of Syracuse Yard	Removed same to switch cabin for fuel	1187
1064	Mr. J. Parker submitted report from C. A. Kaeli, suggesting that railing along track 4, east end river bridge, be extended farther east and along platform to the old Carpenter Shop, Rochester	Railing has been extended	1064		1202	Mr. C. D. Schaff suggested that a four inch post be erected in the center of the top entrance to subway stairs, middle platform, Syracuse passenger station, to prevent possibility of a baggage truck running down the stairway	Referred to division engineer who advised on Aug. 27th that post had been erected	1202
1072	Mr. C. C. Gleiner suggested fence across the end of the sidewalk, south side of tracks, west side of West street, Syracuse	Matter now up with DL&WRR as fence would be on their property	1072		1235	Mr. A. M. Clough submitted report from Trainmaster C. E. Olp, that limbs of trees obstructed the view of flagman at the Town Line crossing west of Bergen	Trees have been trimmed	1335
1076	Mr. T. Leonard submitted report from Asst. Yd. Master R. F. Smith, that a large number of old rails were lying between tracks 12 and 13 of the Westbound Advance Yard	Account of shortage of track laborers, only part of the rails have been picked up. Will be taken care of soon	1076		1236	Mr. A. M. Clough submitted report from Trainmaster C. E. Olp, that the W. P. (factory) have at times barred a car out so that it fouled track 3 to enable them to unload sand into sand house	Requested them to make some other arrangements and never do this	1236
1082	Mr. C. E. Olp suggested car replacer racks be provided in Batavia yard so that the replacers would be out of the way	Racks have been provided	1082			Mr. Everett reported cautioning Western Union messenger several times about jumping on and off moving trains.		
1083	Mr. C. E. Olp suggested guard be provided around a dwarf signal near station platform at Batavia to prevent passengers from running into same.	Not necessary	1083			Mr. Lambert reported cautioning Brakeman J. E. Ryan about crossing tracks at west end DeWitt yard, too close ahead of moving cars.		
1090	Mr. E. Lambert, October 28th, found board with upturned nails at east end of Belle Isle Yard	Nails were bent over so points were even with board	1090			Mr. T. Leonard submitted report from Yard Master P. J. Loughrey, who on Sept. 29 observed Yard Brakeman Rank step in front of a moving car to adjust knuckle, and cautioned him regarding same.		
1091	Mr. T. Leonard submitted report from Yardmaster C. T. Farrell, who on Aug. 10th observed upper deck door of car 60390 to be swinging	Inspectors put door back in place	1091			Mr. G. J. Klump reported cautioning nine of his men working on the Lewiston branch regarding all unsafe practices in general.		
1095	Mr. T. Leonard submitted report from Yardmaster C. T. Farrell, who on Sept. 15th observed trespasser in a drunken condition attempting to board a westbound freight train, DeWitt Yard	Sent him from yard	1095			Yard Clerk Lincoln reported cautioning Yard Brakeman C. M. Carlisle about running in front of moving cars in order to open knuckle.		
1104	Mr. T. Leonard submitted report from Yard Conductor S. R. Widrick, who on Aug. 27th found broken rail, track 5, Westbound fast freight yard	Repaired by sectionmen	1104			Yard Master Howley reported cautioning two soldiers who were attempting to board a moving train on track 4.		
1111	Mr. T. Leonard submitted report from Yard Brakeman C. Abend who on Aug. 1st discovered drawhead between main track 4 and yard track 1, westbound class yard, DeWitt	Removed to place of safety	1111			Mr. J. F. Robinson reported cautioning several children about crossing tracks at Station Lyons, on a short cut to school.		
1112	Mr. T. Leonard submitted report from Yard Brakeman A. B. Hill who Aug. 3rd discovered had door which would not clear other cars on adjacent tracks in class yard, DeWitt	Car cut out and repaired	1112			Yard Master White at Batavia reports cautioning section foreman who he observed to run across the tracks without looking to see if there was a train approaching.		
1152	Mr. J. Parker submitted report from Maintainer S. V. Doran, who reported guy wire from telegraph pole close to highway leading to freight house at Palmyra	Reported to supt. of telegraph for correction and report	1152			Mr. Clough reported cautioning Maintainer T. Doyle at Churchville about running motor cars too close together.		
1163	Mr. J. Parker submitted report from Foreman C. W. McCulley, who on Sept. 25th observed two of Judd's express men shoving trunks from a truck, one just missing two young ladies, Syracuse Station	Taken up with Judd's Express Co. and their men instructed that trunks should be pulled off and not shoved off	1163			Mr. C. E. Olp reported cautioning passenger on train No. 304 about placing hand under window when attempting to lower same.		
						Mr. E. Alexander reports cautioning Doper Clyde Fressey about riding on side of car going into coal trestle at DeWitt.		
						Mr. C. F. Ray reported cautioning section men who were unloading car coal at DeWitt, carrying it in baskets on their backs across main track 4, where there is a sharp curve with a high bank; instructed them to put a flag out to guard them.		

BOLL OF HONOR.

J. H. Mann, operator, Lyons, on November 2 reported fire flying from BD-6, engine 3868, passing that station, and had train stopped at Lyons Junction, where car with broken truck was found.
 F. A. Palmer, signalman, SS 18, Palmyra, on July 31 discovered brakes sticking on train 1st 45, passing that station, and stopped train at SS 20, where brakes were released.

This record, it will be seen, embodies only subjects and results. The discussion may take anywhere from an hour to a half day or more and may be recorded in such degree of brevity, or fullness, as may be found desirable.

FOR CONSIDERATION OF THE
 CHAIRMAN OF THE DIVISION SAFETY COMMITTEE
 At Chicago,
 Illinois.

Date May 10, 1918.

Your attention is called to following practice or condition: *Hole in freight house platform; flooring worn and broken.*
 Existing at (Give Exact Location) No. 1 Inbound house.
 Action taken or Recommended repairs be made at once.
 Recommendation made by (Signed) C. C. Miller,
 Member Safety Committee

If car or engines reported, always give initial and number.

The current record, from day to day, of the doings of the safety department, between meetings, is embodied mainly in three forms; a card, form ST7, used by committee members to advise the chairman of the division committee of defects or wrong practices which the individual member himself cannot correct; another card, of which a sample (No. 4856) is shown below, to be used by the safety agent in advising of-

ficers of work needing to be done, and, third, a daily report, to be sent to the headquarters at New York, by each of the division safety agents. A sample card of form S17 shown on opposite page.

The form headed "Safety Work Card" is made in duplicate, the duplicate being sent to the general safety agent at New York; and he, if a response is not in due time received from the superintendent or other officer who has the matter in hand, sends an inquiry to that officer to see what is the cause of the delay.

SAFETY WORK CARD No. 4856
Bureau April 30, 1918.

Mr. S. Emerson, Supt.
 Dear Sir: Have to-day made inspection at *Delaware Ave. Plant, Delaware Ave.* and recommended the following work to be done: *Our wires over track are but 15 ft. 5 in. above rail. Should be not less than 21 ft. This does not bear man on top of box car. Longer poles should be put in. This would be solution until wires are raised.*

C. J. Weber, Safety Agent.

[Response]
 The above work was completed on *May 15, 1918*, as recommended.
 S. Emerson

This card must be signed by proper officer and forwarded in sealed envelope to the General Safety Agent as soon as work is completed.

The report, given below, signed J. A. Daley, is that of the safety agent of the Middle division of the Michigan Central for May 15. It contains seven items, three of which are here omitted because of lack of space.

Sample of Safety Work Card Form

Mr. MARCUS A. DOW, General Safety Agent Date May 15, 1918.

Place	Item	Reported to	Remarks
Dowagiac	Ex. truck at station not blocked and left dangerously close to main track.	Blackman	Baggage man left it just for a minute, but said it was not a habit.
Lawton	20 ft. iron pipe that fastened to railing post at freight house by rope twine.	Wardman	Arranged to have it wired securely.
Kalamazoo	Top step broken and half board missing on freight house steps, east end.	Work done by No. 2741	
"	Interviewed Mr. Shakespear, owner of tree menacing old tracks at Botsford Yd., and secured permission to have same cut down by our men.		

Number of employees talked individually regarding safe practices:
 Enginemen ... 1
 Firemen ... 1
 Conductors ... 3
 Brakemen ... 4
 Switchmen ... 1

How many specific injuries noticed did you see and take for correction? ... 5

How many improper practices did you see and take for correction? ... 5

Gave one other interesting item of information performed. Gave a little safety talk to party at ... starting with motor car from ... and explained the different kinds of accidents that ... especially with regard to handling car in ... street work.

J. A. Daley

The personal work done by the division safety agents, as indicated by their daily reports, is summarized at the general office each month in a statement showing, for each agent, the number of men in each class who have been spoken to, and the number of specific remedial measures taken. A sample of this report for the month of May is shown in the double column table.

Another interesting monthly statement is that showing

what has been done by each of the two motion picture cars, and its location on each day of the month.

That for the month of March is as follows:

LOCATION OF MOTION PICTURE CARS
 LINE EAST LAKE WEST

Loc. Place	Number	Loc. Place	Number
R. Sibley	99	2. Tipton	104
4. Liberty	66	3. Cambridge	104
5. Wayne Exchange	86	4. Cambridge	104
6. " " "	110	5. " " "	104
7. " " "	248	6. " " "	104
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- 20 Eye injuries.
- 21 Falling from engines or cars, moving (not due to defects).
- 22 Falling from engines or cars, standing (not due to defects).
- 23 Falling from scaffolding.
 - (a) Due to breakage or giving away.
 - (b) Due to other causes.
- 24 Falling from ladders.
 - (a) Due to ladder slipping.
 - (b) " " breakage or cars, standing (not due to defects).
 - (c) " " other causes.
- 25 Falling over scrap iron, air hose, couplers, and other removable obstructions.
- 26 Falling over rails, ties, signal wires and other permanent appurtenances.
- 27 Falling into engine pits, etc.
- 28 Getting on or off engines or cars moving.
- 29 Getting on or off engines or cars standing.
- 30 Gang planks, slipping or giving way.
- 31 Hand, motor, push cars or velocipedes.
 - (a) Colliding.
 - (b) Derailed.
 - (c) Struck by train or engine.
 - (d) Other causes.
- 32 Handling reverse levers.
 - (a) " signal levers.
 - (b) " rakes.
- 34 " material, traffic, etc.
- (b) Freight (except gang plank slipping).
- (c) Company supplies.
- (d) Rails, ties, or bridge timbers.
- 36 Load shifting.
- 37 Machinery.
 - (a) Defective.
 - (b) Unguarded.
 - (c) Failure to use supplied safety devices.
 - (d) Gloves or clothing catching.
 - (e) Cleaning, repairing or adjusting while in motion.
 - (f) Other causes.

- 38 Parting of trains.
- 39 Rough handling of trains.
- 40 Ropes, cables or chains slipping or giving way.
- 41 Shaker bar slipping off lug.
- 42 Stepping on nails.
- 43 Struck by engines or cars.
- 44 Struck by engines or cars on adjoining track.
- 45 Struck by permanent side ob- or structure.
- 46 Struck by overhead obstruction.
- 47 Struck by piece of exploded torpedo.
- 48 Struck by coal falling from engine tanks or cars.
- 49 Struck by objects thrown from cars, engines, platforms, etc.
- 50 Struck by tools or other objects falling from shelves, scaffolding, platforms, etc.
- 51 Squirt hose pulling off, bursting or cock opening.
- 52 Slipping on apron of engine (except falling off).
- 53 Slipping on snow or ice on or between tracks.
- 54 Slipping on snow or ice on cars (except falling off).
- 55 Slipping on snow or ice at other places.
- 56 Slipping from other causes.
- 57 Throwing switches (not struck by engines or cars).
- 58 Tools, use of:
 - (a) Struck by tools in hands of other persons.
 - (b) Self inflicted injury not due to defects.
 - (c) Defective hand tools.
 - (d) Use of jacks (not defective).
 - (e) Defective jacks.
 - (f) Use of air hammers, drills, etc.
- 59 Working under or around cars or engines without protection.
- 60 Working under or around cars or engines with protection.
- 61 Not otherwise specified.

lectures to gatherings of employees and to individuals. To record and make simple the lessons of accidents or of blunders on one part of the road for the benefit of employees on other parts is a necessary part of the management of any railroad. A sample circular, that issued by Mr. Dow for the month of October last, contains seven paragraphs concerning accidents which have recently happened on the New York Central Lines, a sample paragraph being as follows:

A baggageman was standing in the open doorway of a baggage car of a moving train with his head against the door jamb. The air brake was applied suddenly and the door slammed shut, catching his head and fracturing his skull. This was a very unsafe place for the employee to stand and it should have been apparent to him.

Notes of this kind are already familiar to railroad men and need no further elaboration. A monthly compilation of this kind is valuable in proportion to the measure in which it enables the lecturer to bring his lessons up to the minute, and to give them local color.

These monthly circulars are sent not only to the safety supervisors, but also to the chairmen of committees. These chairmen number 60, the number of committees being larger than the number of railroad divisions because of the existence of separate independent committees for the large shops and also of sub-committees on some of the large divisions.

One of the important elements of interest in the divisional committee meetings is the reading of short essays by individual members of the committee, particularly by those classed as employees as distinguished from officers; employees who have a store of experience, but who have not had much experience in writing or speaking. This arrangement, drawing out the capabilities of these men, often proves peculiarly profitable, not only to the man himself but to the whole committee. To stimulate activity in this direction the general safety agent sends out, each month to the division chairmen,

Besides the classification according to causes, this statement gives the total number of accidents under each of six classes of service, namely: 1, road service; 2, yard service; 3,

PART OF A MONTHLY SUMMARY OF SAFETY AGENTS' DAILY REPORTS (MAY, 1918).
NUMBER OF EMPLOYEES TALKED TO INDIVIDUALLY REGARDING SAFE PRACTICES.

Safety Agents.	Enginemen	Firemen	Conductors	Brakemen	Switchmen	Trackmen	Stationmen	Shopmen	Crossingmen	Others	Total	Specific Im- proper Practices and Conditions Taken Up for Correction.	
												Practices	Conditions
Cooper	34	34	24	57	114	78	25	34	24	114	538	20	57
Daley	22	29	61	62	75	57	25	33	34	15	412	14	128
Dayton	95	37	73	112	7	13	0	39	30	39	454	11	27
Hammond	49	53	57	77	173	75	22	29	18	6	559	10	35
Timley	46	39	48	72	36	60	40	49	36	416	426	24	55
Van Garder	25	51	22	32	98	28	19	40	11	55	290	14	55
Weber	49	51	73	116	14	15	5	26	2	55	416	14	16
Total	545	425	565	861	899	524	330	1,043	236	769	6,197	239	571

MOTION PICTURE CAR ATTENDANCE.

T. R. Campbell	with motion picture car (Lines West)	18 days—	Attendance	2,287
C. D. Shaif	with motion picture car (Lines East)	10 days—	"	1,850
C. J. Weber	with motion picture car (Lines East)	7 days—	"	928
Total Attendance				5,065

shopmen; 4, trackmen; 5, station men, including freight handlers; 6, others.

The reader now has some idea of the machinery by which the safety department is run; but (it is scarcely necessary to say) no machine, not even such a human machine as this one, can take the place of an energizing mind; and Mr. Dow does not rest his reputation for efficiency on any organization, howsoever smoothly it may work. "Safety-first" makes its appeal to the individual's conscience and civic pride and to his devotion to humanity, as well as to the ordinary motive of good discipline and efficiency; and cold formalism must be got rid of as completely as possible. To this end the headquarters office is constantly engaged in gathering and putting into proper shape all available lessons of accidents everywhere, for use by the division safety agents in their

a topic on which the chairman, acquainted with his committeemen, gets one member to write. Thus, after another month the general safety agent has 60 essays, all on the same subject.

REPORT ON AUSTRALIAN RAILWAYS.—P. A. Anthony, general manager and chief engineer of the Federated Malay States Railways, has been appointed to make a report on the railways of South Australia.—*The Engineer, London.*

THE GREAT WESTERN OF ENGLAND has completed the construction of another ambulance train for use on the continent, and when it was recently put on view to the public at Paddington station, a charge of 1s. (\$24) was made, the money being devoted to charitable purposes.



View of the Y. M. C. A. Building.

St. Louis Committee Excels in Entertaining Troops

Car Service Committee With Assistance of Y. M. C. A. and Patriotic Citizens Does Great Work

PROVIDING OVER 182,000 soldiers and sailors with comforts and entertainment in the course of one year constitutes an enviable record which is rendered more remarkable by the fact that these services were performed free of charge by patriotic railroad officers and citizens in co-operation with the Y. M. C. A. The organization which accomplished this is the Soldiers' and Sailors' Welfare Committee of the St. Louis committee of the Car Service Section. This body was created at the first meeting of the St. Louis car service committee in the spring of 1917 and consists of Rubens Humphrey, chairman, who is also executive secretary of the St. Louis Railroad Y. M. C. A., T. K. Knight, S. S. Huffman, P. W. Conley and A. S. Johnson. From the first the committee's great opportunity for service was recognized and very soon an auxiliary committee was formed principally for the purpose of meeting all troop trains passing through the St. Louis gate-way. The members of this sub-committee were drawn from representative bodies of men and women in the city who had been active in patriotic, civic and philanthropic work. By October 1, 1917, fully 100 men and women were giving their time and enthusiastic effort to the work of the auxiliary committee.

What has been, and is being, done by the Soldiers' and Sailors' Welfare Committee includes many activities, all co-ordinated to secure the best results. For example, carefully selected groups of ladies and gentlemen, all of whom are volunteer workers, meet troop trains in the yards and serve the soldiers and sailors with tobacco, candy, fruit, magazines, papers, souvenir post cards and other comforts. Often troops are permitted to leave their trains for several hours or half a day and at such times the Railroad Young Men's Christian Association opens its doors to the men and permits them to use the swimming pool, billiard tables, bowling alleys, reading rooms, library and other available means

of entertainment, without cost. Free writing material is provided and oftentimes the stamps for letters. The Y. M. C. A. restaurant is available to the men and, if any happen to be without funds, as is sometimes the case, no charges are made. In addition, free sleeping accommodations are provided for those who may have to stay in the city over night.

One of the first steps taken by the Soldiers' Welfare Committee was the establishment of an information bureau on the second floor of the St. Louis union station, which is operated by a sub-committee composed of 60 ladies, most of whom are the wives of railroad officers. At this bureau telegrams are sent for the men, relatives found, free writing material provided, magazines distributed, the sick taken care of, and such other assistance rendered as is possible. An important part of the work at Union Station is meeting recruits from all the central district states bound for Jefferson Barracks. These "new" men are given free beds, free beds and frequently free meals until they proceed to the barracks. During the month of December and January when the weather was unusually severe, the committee housed, fed and entertained over 1,000 men in relays of 200 without one serious case of illness.

Committee Builds Huts to Accommodate Men

The work of the Soldiers' and Sailors' Welfare Committee had not been under way long before it was found that the accommodations for the men at the railroad Y. M. C. A. building were taxed to such an extent that railroad members were being denied their privileges. Accordingly, a Y. M. C. A. hut was constructed in front of the Railroad Association building. This structure was erected in the middle of December, 1917, in the short space of 24 hours. The hut, shown in the photograph, is of frame construction, 20 ft. by 120 ft., lighted by electricity and heated by steam.

It did not take long, however, to discover that additional facilities were needed and as a consequence a permanent brick structure, 40 ft. by 140 ft., was built. This hut contains an auditorium seating 800, with a stage and all necessary equipment, including dressing rooms, and is used at night for sleeping purposes. Cots and blankets supplied by the government provide accommodations in this hall for at least 300 men. Canteen service for visiting soldiers and sailors is also provided in this building. Entertainments are staged in the auditorium practically every evening. Dramas, comedies, musicals, patriotic and religious addresses, folk dancing and boxing are among the entertainments provided.

In addition to the entertainment provided there, the city as a whole has extended its hospitality to the men. Through the courtesy of the baseball clubs of St. Louis, several hundred soldiers and sailors have been able to attend big league games without charge. Through the kindness of public spirited citizens of St. Louis several hundred boys have had the privilege of seeing the city by automobile. The welfare committee has also looked after the needs of men who have been rejected for army service. Many of these have been sheltered in the hut and in some cases provided with positions.

The welfare committee's record for the month of May, which is not included in the statistics for its first year's work previously alluded to, is noteworthy. During that time its members met 203 trains, served 59,269 men on trains, 23,198 in the huts and 3,921 at the booth in the station, making a total of 86,388 men served; of this number, 2,507 were provided with sleeping accommodations in the huts, 11,832 with baths and 16 with medical aid. Nearly 17,000 were fed in the canteen at the brick hut and 700 additional were fed in the Railroad Y. M. C. A. building. Approximately 11,000 attended social, educational and religious meetings, while 43,328 letters were mailed through the committee, of which 2,767 were provided with postage by the Y. M. C. A. In addition, positions were secured for 15 rejected men.

Freight Operations for March

THE BUREAU OF RAILWAY ECONOMICS has issued the following report showing the comparative freight operations of the railways for the month of March and the three months of the calendar year, compiled for the American Railway Association.

Item	UNITED STATES				EASTERN DISTRICT			
	1918	1917	Increase or decrease		1918	1917	Increase or decrease	
			Amount	Per cent			Amount	Per cent
Freight train-miles.....	50,404,505	49,743,449	661,056	1.3	21,693,330	22,428,967	d 735,637	d 3.3
Loaded freight car-miles.....	1,207,879,174	1,197,533,361	10,345,813	0.9	560,977,023	578,986,319	d 18,009,296	d 3.1
Empty freight car-miles.....	484,529,156	493,449,342	d 8,920,186	d 1.8	252,955,690	253,973,608	d 21,017,918	d 8.3
Total freight car-miles—loaded and empty	1,692,408,330	1,688,764,244	3,644,086	0.4	793,933,713	832,959,927	d 39,027,214	d 4.7
Freight locomotive-miles.....	59,039,387	57,854,935	1,184,452	2.0	27,064,626	27,483,379	d 418,753	d 1.5
Revenue ton-miles.....	31,341,327,931	29,145,578,151	2,195,749,780	7.5	15,702,320,551	15,370,168,873	332,151,678	d 2.2
Non-revenue ton-miles.....	2,571,071,157	2,529,041,027	42,030,130	1.7	912,447,394	915,048,486	d 2,601,092	d 0.3
Average number of freight locomotives in service.....	28,494	28,013	481	1.7	12,989	12,657	332	d 2.6
Average number of freight locomotives in shop or awaiting shop.....	4,259	4,162	97	2.3	2,029	1,866	163	d 8.7
Average number of freight cars in service	2,192,740	2,121,670	71,070	3.3	1,214,079	1,180,099	33,980	d 2.9
Average number of freight cars in shop or awaiting shop.....	110,086	115,475	d 5,389	d 4.7	66,266	66,185	81	d 0.1
Home.....	68,047	68,984	d 18,937	d 21.8	39,697	48,790	d 9,093	d 18.6
Foreign.....	42,039	28,491	13,548	47.6	26,569	17,395	9,174	d 52.7
Tons per train.....	673	637	36	5.7	766	726	40	d 5.5
Tons per loaded car.....	28.1	26.4	1.7	6.4	29.6	28.1	1.5	d 3.3
Average miles per locomotive per day.....	66.8	66.6	0.2	0.3	67.2	70.0	d 2.8	d 4.0
Average miles per car per day.....	24.9	25.6	d 0.7	d 2.7	21.1	22.8	d 1.7	d 7.5
Per cent of empty car-miles.....	28.6	29.2	d 0.6	d 2.2	29.3	30.5	d 1.2	d 3.8
Per cent of freight locomotives in shop or awaiting shop.....	14.9	14.8	0.1	0.6	15.6	14.7	0.9	d 6.0
Per cent of freight cars in shop or awaiting shop.....	5.0	5.4	d 0.4	d 7.8	5.5	5.6	d 0.1	d 2.7
Revenue ton-miles:								
Per freight locomotive.....	1,099,927	1,040,430	59,497	5.7	1,208,894	1,214,361	d 5,467	d 0.5
Per freight car.....	14,293	13,737	556	4.0	12,934	13,024	d 90	d 0.7
Average miles operated—single track.....	196,896.97	196,810.09	86.88	a	54,729.02	54,996.28	d 267.26	d 0.5

Item	SOUTHERN DISTRICT				WESTERN DISTRICT			
	1918	1917	Increase or decrease		1918	1917	Increase or decrease	
			Amount	Per cent			Amount	Per cent
Freight train-miles.....	9,644,341	8,697,012	947,329	10.9	19,066,834	18,617,470	449,364	d 2.4
Loaded freight car-miles.....	218,456,080	200,742,508	17,713,572	8.8	428,446,071	417,804,534	10,641,537	d 2.5
Empty freight car-miles.....	96,718,411	87,492,458	9,225,953	10.6	154,855,053	151,983,276	2,871,777	d 1.9
Total freight car-miles—loaded and empty	315,174,491	288,234,966	26,939,525	9.3	583,301,126	569,787,810	13,513,316	d 2.4
Freight locomotive-miles.....	10,907,339	9,809,214	1,098,125	11.2	21,067,122	20,562,342	504,780	d 2.5
Revenue ton-miles.....	5,773,780,081	5,224,497,639	549,282,442	10.5	9,865,227,299	8,550,911,639	1,314,315,660	d 15.4
Non-revenue ton-miles.....	505,210,001	482,279,234	22,930,767	4.8	1,153,413,762	1,131,713,307	21,700,455	d 1.9
Average number of freight locomotives in service.....	4,887	4,747	140	2.9	10,618	10,609	9	d 0.1
Average number of freight locomotives in shop or awaiting shop.....	538	591	d 53	d 9.0	1,692	1,705	d 13	d 0.8
Average number of freight cars in service	313,601	267,463	46,138	17.3	665,600	674,108	d 9,048	d 1.3
Average number of freight cars in shop or awaiting shop.....	12,638	12,763	d 125	d 1.0	31,182	36,527	d 5,345	d 14.6
Home.....	7,767	10,021	d 2,254	d 22.5	20,583	28,173	d 7,590	d 26.9
Foreign.....	4,871	2,742	2,129	77.6	10,599	8,54	2,045	d 26.9
Tons per train.....	651	656	d 0.5	d 0.8	578	520	58	11.2
Tons per loaded car.....	28.7	28.4	0.3	1.1	25.7	23.2	2.5	10.8
Average miles per locomotive per day.....	72.0	66.7	5.3	7.9	64.0	62.5	1.5	d 2.4
Average miles per car per day.....	32.4	34.8	d 2.4	d 6.9	28.3	27.3	1.0	d 3.7
Per cent of empty car-miles.....	30.7	30.4	0.3	1.1	26.8	26.7	d 0.2	d 0.5
Per cent of freight locomotives in shop or awaiting shop.....	11.0	12.4	d 1.4	d 11.6	15.9	16.0	d 0.1	d 0.8
Per cent of freight cars in shop or awaiting shop.....	4.0	4.8	d 0.8	d 15.6	4.7	5.4	d 0.7	d 13.5
Revenue ton-miles:								
Per freight locomotive.....	1,181,457	1,100,589	80,868	7.3	929,104	806,005	123,099	d 15.3
Per freight car.....	11,111	11,534	d 423	d 3.7	12,683	12,489	194	d 1.6
Average miles operated—single track.....	33,750.92	33,623.83	127.09	0.4	108,417.03	108,189.98	227.05	d 0.2

COMBINED THREE MONTHS—JANUARY TO MARCH, 1918 (1917)

Item	1918		1917		Per cent	
	Amount	Per cent	Amount	Per cent	Increase	Decrease
Freight train miles	14,018,834	100.0	14,018,834	100.0		
Loaded freight car-miles	2,156,777,000	15.4	2,156,777,000	15.4		
Empty freight car-miles	7,319,777,000	52.2	7,319,777,000	52.2		
Total freight car-miles—loaded and empty	9,476,554,000	67.6	9,476,554,000	67.6		
Freight locomotive-miles	17,110,765	122.1	17,110,765	122.1		
Revenue ton-miles	20,354,411.4	145.2	20,354,411.4	145.2		
Non-revenue ton-miles	2,611,761.1	18.6	2,611,761.1	18.6		
Average number of freight locomotives in service	61,901	100.0	61,901	100.0		
Average number of freight locomotives in shop or awaiting shop	4,663	7.5	4,663	7.5		
Average number of freight cars in service	2,344,171	100.0	2,344,171	100.0		
Average number of freight cars in shop or awaiting shop	189,000	8.0	189,000	8.0		
Home	79,138	4.2	79,138	4.2		
Foreign	109,862	5.8	109,862	5.8		
Tons per train	8.1	100.0	8.1	100.0		
Tons per loaded car	63.1	100.0	63.1	100.0		
Average miles per locomotive per day	1.6	100.0	1.6	100.0		
Average miles per car per day	2.9	100.0	2.9	100.0		
Per cent of empty car-miles	15.4	100.0	15.4	100.0		
Per cent of freight locomotives in shop or awaiting shop	7.5	100.0	7.5	100.0		
Per cent of freight cars in shop or awaiting shop	8.0	100.0	8.0	100.0		
Revenue ton-miles	27,508,899	100.0	27,508,899	100.0		
Per freight locomotive	38,104	100.0	38,104	100.0		
Per freight car	219,061.5	100.0	219,061.5	100.0		
Average miles per yard—single track	18.9	100.0	18.9	100.0		

SOUTHERN DISTRICT

WESTERN DISTRICT

Item	1918		1917		Per cent	
	Amount	Per cent	Amount	Per cent	Increase	Decrease
Freight train miles	28,518,040	100.0	28,518,040	100.0		
Loaded freight car-miles	589,742,235	2.1	589,742,235	2.1		
Empty freight car-miles	2,747,747,395	9.5	2,747,747,395	9.5		
Total freight car-miles—loaded and empty	3,337,489,630	11.6	3,337,489,630	11.6		
Freight locomotive-miles	31,088,261	108.9	31,088,261	108.9		
Revenue ton-miles	15,719,160.707	57.1	15,719,160.707	57.1		
Non-revenue ton-miles	1,502,731,779	5.4	1,502,731,779	5.4		
Average number of freight locomotives in service	52,886	100.0	52,886	100.0		
Average number of freight locomotives in shop or awaiting shop	653	1.2	653	1.2		
Average number of freight cars in service	35,991	100.0	35,991	100.0		
Average number of freight cars in shop or awaiting shop	144,100	4.0	144,100	4.0		
Home	9,821	0.7	9,821	0.7		
Foreign	4,740	0.3	4,740	0.3		
Tons per train	6.5	100.0	6.5	100.0		
Tons per loaded car	29.3	100.0	29.3	100.0		
Average miles per locomotive per day	0.7	100.0	0.7	100.0		
Average miles per car per day	1.1	100.0	1.1	100.0		
Per cent of empty car-miles	21.8	100.0	21.8	100.0		
Per cent of freight locomotives in shop or awaiting shop	1.2	100.0	1.2	100.0		
Per cent of freight cars in shop or awaiting shop	4.0	100.0	4.0	100.0		
Revenue ton-miles	2,077,131	100.0	2,077,131	100.0		
Per freight locomotive	39,298	100.0	39,298	100.0		
Per freight car	57,438	100.0	57,438	100.0		
Average miles per yard—single track	17.9	100.0	17.9	100.0		

Decreases. The returns include in the freight statement, percentage about 26 per cent of the total southern portion of the Southern Class I and also 96 per cent of the total freight ton-miles in that portion of the system.



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Some Big Fellows for the French 380's at a Munitions Station

Handling Bulk Cement With a Clamshell

DURING 1917 transportation difficulties caused the cement manufacturers to use gondola cars for the shipment of their product both in bags and in bulk. The lading was protected against the weather by tarpaulins and no appreciable difficulties were experienced by this innovation; in fact, in the case of bulk cement, some material advantages were obtained. Until necessity had demonstrated otherwise, all plans for the use of bulk cement were based on the assumption that the need of adequate protection against rain precluded the use of anything but a closed car. As a result of this the cement of necessity was unloaded either by hand or with a power shovel of the type used for unloading grain at elevators, and when cement was being supplied to concrete mixers mounted on cars as has frequently been the case with concrete work on railroads in cities, it was necessary to suspend the platforms from the sides of the cars so that the cement could be wheeled from the side doors of the cement car to the mixer on an adjacent car.

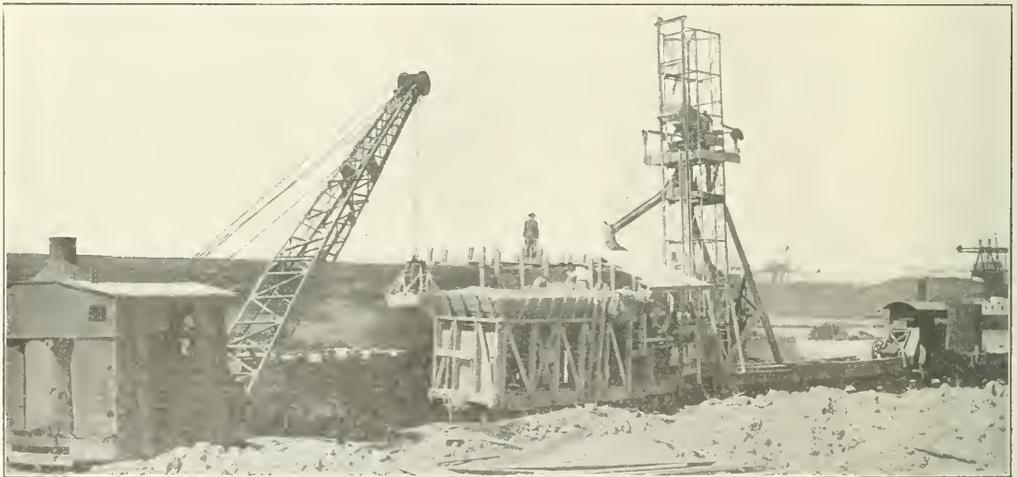
With a demonstration of the practicability of the use of the open top car in this service, the unloading problem was greatly simplified. If done by hand the gondola car can be equipped with runways like those used on the tops of sand and stone cars, but of greater significance is the possibility

of moving the sand and stone through the hopper into the mixer.

Just beyond the end of the mixing plant car were cars containing the concrete materials, the cement car being nearest the mixer with the other cars beyond. Materials in these cars were transferred to the hoppers over the concrete mixer by means of a clamshell bucket operated by a locomotive crane which ran on a track alongside that on which the mixer and material cars were standing.

It has been found that the cement car can be cleaned out thoroughly by the man who passes the signals for the dropping of the clamshell into the material cars and as a result there is very little loss of cement. Careful observations have shown that the loss with cement handled in this manner is less than in the case of sack cement. The tarpaulin which is used to cover the cement is rolled back over the temporary frame work which is built on the cars to support it, so that only a portion of the contents of the car is exposed to the weather at one time.

DUTCH SCRUTINIZE TRAINS.—According to press despatches a semi-official communication has been issued by the Netherlands government in reply to the expression of fear by the British that the control over railroad traffic through the Province of Limberg was inadequate. It says that the trains are submitted to two examinations upon their entry into Holland. The arrangement of the Netherlands gov-



Unloading Bulk Cement With a Clamshell

of using the clamshell bucket which is so widely used in handling the fine and coarse aggregates for concrete work.

A good example of what has been accomplished along this line is illustrated in the photograph which shows one form of car-mounted mixing plant which was used for the construction of an ore trough at the Illinois Steel Company's Bay View plant at Milwaukee, Wis. The concrete was mixed by a one-yard mixer mounted on a flat car which also supported the bins, hopper and belt which held and carried the raw materials. Above the inclined belt there were separate bins for the sand, stone and cement. The sand and stone dropped on the belt and were conveyed into a measuring hopper immediately alongside the mixer. The cement was shoveled by hand into a measuring box directly above the hopper, and when ready the bottom of the box, which was made of a removable steel plate, was pulled out and the cement fol-

lowed to fall into the mixer. The arrangement of the Netherlands government with Germany is that train movements shall not be greater than is customary in peace times.

THE KATANGA RAILWAY, IN BELGIAN CONGO was completed on May 22, thus setting up through communication by rail from Capetown to Bukama on the Congo River, and by rail and navigable waters as far as Boma and the mouth of the Congo. This great work, which may be considered as a section of the line from the Cape to Cairo, has been accomplished under very difficult circumstances owing to the war. The British railway from Buluwayo reached the frontier of the Congo in 1909. Thence it was prolonged under Belgian control, first to Elisabethville (1910), and then to Kambove (1913). Construction, interrupted for a time at the outbreak of the war, was taken up with energy, and has just been brought to a successful ending.

General News Department

D. I. Forsythe, assistant chairman of the Chicago Committee of the Car Service Section, United States Railroad Administration, has been appointed acting chairman to succeed A. M. Schoyer, resigned.

The Palatine, Lake Zurich & Wauconda has filed application with the Illinois State Public Utilities Commission for permission to discontinue operation. The road extends between Palatine, Ill., and Wauconda, 15 miles.

The presidential and diplomatic suite of rooms at the Union Station in Washington, formerly used exclusively for State purposes, has been converted into a canteen station for soldiers, sailors, and marines in transit, and will be in charge of the American Red Cross.

The movement of freight over the main line of the Pennsylvania Railroad now exceeds all former records. At Columbia, Pa., the average daily movement of cars, eastbound and westbound, for the first fifteen days of June, was 8,462. The best previous monthly record was that of May, which was 8,066 cars a day.

The United States Employment Service has established a division of engineering with A. H. Krom, secretary of the American Association of Engineers, Chicago, as director. Opportunity will be given technical men to register for emergency government work or for permanent advancement in positions meeting their qualifications. The office is at 29 South La Salle street, Chicago.

The Federal Employment Bureau at Altoona, Pa., is operated in connection with the employment department of the State of Pennsylvania, and considerable numbers of applications are received. On June 21, seven men were provided with railroad employment. At the same time the Pennsylvania Railroad Company notified the bureau that it would like to hire 2,519 men (or women). Places are waiting on that road in all departments.

The Northwestern Pacific was indicted by a federal grand jury at San Francisco, Cal., on June 18, on a charge of destroying and failing to keep permanent records of its history and operations as required by the Interstate Commerce Commission. The action against the road is the result of the disappearance of papers and documents deemed essential to an accurate valuation of the company's property by the commission.

The Western Regional Purchasing Committee has advised the roads in that area of a considerable amount of new and second hand material available for use by other roads. This material includes 24,400 new and second hand rail braces, a second-hand air compressor and a locomotive type boiler, 61 miles of 60-lb., 70-lb. and 80-lb. A. S. C. T. rail complete with turnouts and fastenings, two 30-ton locomotives, second cars and a large number of through, deck truss and girder bridge spans.

Maximum prices for anthracite coal at Lake Superior and Lake Michigan docks have been announced by the Fuel Administration. The prices are higher than those of last winter, due to the increase in freight rates and the increased cost of handling at the docks. No advantage will result to producers, as the mine prices for coal going to the Great Lakes will be the same as the mine prices for the rest of the tonnage. The order affects only shipments made from the docks on and after June 25.

The train dispatchers are not satisfied with the increases in pay awarded them by Mr. M. A. Ainsworth's general order No. 27, and many communications in their behalf have been received by the Board of Wages and Working Conditions, asking for further consideration and readjustment. A committee of dispatchers called on the Board last week but were put off until later be-

cause the Board was still busy with the case of the long employees in the non-unioning a reorganization this week. The decision may well be given a hearing later.

Prices of iron, as a result of the agreement made by the producers committee of the War Industries Board, and the representatives of the iron ore, pig iron and steel interests have been approved by President Wilson. The maximum prices now prevailing on one pig iron and iron and steel products are to be continued in effect for three months ending September 30, but the base price of Lake Superior iron ore delivered to lower lake ports are increased 4½ cents a gross ton, effective July 1, on account of the increase in freight rates.

At Cumberland, Md., one day last week 21 lawyers performed a great service for local business men by unloading a lot of freight at the freight house of the Baltimore & Ohio, relieving a troublesome congestion which had been caused by the impossibility of securing help. Court-land has entreprising reporters as well as enterprising lawyers, the accident having made for one of them about a million of copy which was well spread with names and personal addresses. The lawyers unloaded a carload of tar, a car of mixed machinery and other things, and received each 24 cents an hour.

Purchase of the Virginian Railway, by the government, is proposed in a bill introduced in Congress on July 21 by Senator James Hamilton Lewis of Illinois. The Virginian runs from the coal fields of West Virginia to the pier at Norfolk, and the Senator's proposal includes 1,500,000 acres of West Virginia coal land. The total proposed expenditure is \$115,000,000. Mr. Lewis bases his proposal upon the necessity of insuring an adequate supply of coal for the navy, and he says also that such a purchase would afford the means to make a test, on a small scale, of government railroad ownership.

H. A. Garfield, United States Fuel Administrator, has issued a statement saying that misapprehension has arisen in certain quarters as to the meaning of the words "government price," as used in the announcement of the recent increase in the price of railroad coal. It is stated that the government price for coal are maximum prices and that it follows as a matter of course that any consumer, including the railroads, may buy for less, provided it is mutually agreeable. But that the preferred rate supply has been discontinued and will not be a consideration in the contract or understanding.

The Chicago sub-committee of the General Learning Division has been established and its plan of operations announced for certain lines has been directed at Chicago, says George H. Inghill, traffic manager at the New York Central lines, as chairman. Mr. Inghill has announced a sub-committee to assist him, consisting of S. K. Rice, general agent of the New York, Chicago & St. Louis; Chairman D. J. Fitzgibbon, secretary, P. C. Schaeffer, president of the Baltimore & Ohio; Chairman Ferdinand W. E. Schaeffer, general superintendent at the New York Central Lines; W. B. Gales, superintendent of the Michigan Central; H. F. Whittenburger, general manager of the Grand Trunk; and W. H. Scribner, general agent and superintendent of the Pennsylvania.

Examiners of Accounts (Male), for service under the Interstate Commerce Commission, are called for by the United States Civil Service Commission. There are vacancies in the Bureau of Valuation and in the Bureau of Contract Accounts. Two general grades of candidates may be obtained from this examination, the salaries in the first grade ranging from \$2,200 to \$3,000, and in the second grade from \$1,900 to \$2,700. Approximately 750 positions will be principally

for duty in the field, but some appointments may be made for duty in Washington. It is desired to secure eligibles of large experience, and a register of eligibles will be established for each of the following branches of accounting:

(1) Steam railroads. (a) General accounts. (b) Disbursement accounts. (c) Construction accounts in engineering department. (d) Accounting and statistical work in valuation departments. (e) Freight accounts. (2) Electric railroads. (3) Steamship service. (4) Other common-carrier service (including pipe-line, sleeping-car, and telephone and telegraph service.) (5) Public accounting practice (as a certified public accountant or in the office of a certified public accountant.) Applicants should indicate the grade for which they desire to be examined; and they must not have reached their forty-eighth birthday.

The **sundry civil appropriation bill** was passed by the Senate on June 24. It carries an appropriation of \$3,500,000 for continuing the valuation work of the Interstate Commerce Commission and one of \$5,250,000 for the Alaska Railroad. The bill had been passed by the House. The Senate added an amendment making the unexpended balance of the appropriation of \$20,000 for the Joint Committee on Interstate Commerce (the Newlands Committee), available until expended. The committee discontinued its work when the government took over the railroads, but has the balance of the year in which to submit a report. Another amendment increased the appropriation for the safety appliance and accident work of the Interstate Commerce Commission from \$250,000 to \$313,000.

Accident Record—Correction

In the derailment of the "Dixie Flyer" on the Nashville, Chattanooga & St. Louis at Vinings, Ga., April 18, the fireman was injured, slightly; he was not fatally scalded, as was stated in our report printed on June 14.

Bureau of Railway Economics to Be Continued

The Bureau of Railway Economics, whose expenses, under an order of the Railroad Administration, may not be charged to the operating accounts of the railroads after June 30, is to be maintained by the railroad corporations, at least until the end of the calendar year. This was recently decided by the executive committee after a great majority of the roads subscribing to the bureau had agreed to continue their regular contributions. The extensive railway library of the bureau has been taken over by the Railroad Administration, but, for the present at least, is to be retained at the offices of the bureau.

Railroads have been authorized by the Railroad Administration to continue to contribute to the maintenance of the American Museum of Safety, New York City.

The Supreme Court's Respect for State Courts

A verdict awarding \$25,000 damages to a boy of seven years, whose foot was cut off by a freight car moving on a side track, was one of the scraps of court news published in the New York papers about a year ago. The sum awarded looked very large, especially as it seemed plain, from the facts as published, that the accident (on the Erie Railroad in New Jersey) was due to the child's own fault. He was playing marbles and put his foot across the rail under the car in an endeavor to recover a lost marble. The United States Circuit Court of Appeals sustained the verdict, holding that the New Jersey law, making any person in such a case guilty of contributory negligence, should not apply to infants, though a New Jersey State court had said that it should. The Supreme Court of the United States on May 20, last, in a decision delivered by Justice Holmes, disapproved this view and reversed the judgment. Apparently it remains true, still, in New Jersey, that but for the specific statutory prohibition, a railroad could be mulcted in \$25,000 for allowing such an accident to happen on its premises! There was some argument on the claim that the plaintiff had been invited on the tracks, but Justice Holmes says that it is not a question of the susceptibility of the boy to the temptation to play on or around the cars;

rather he was impelled simply by the wish to recover his marble. Two justices of the United States Supreme Court dissented from the majority view because the New Jersey State Court, whose opinion had been respected, was not the highest court of the state.

Unused Rails at Vancouver

The Canadian government (Department of Railways and Canals) is negotiating with representatives of the Russian government in the United States for the purchase of rails (150 miles) lying on the Vancouver docks. These rails have been rusting there since the collapse of the Russian Empire. Negotiations, however, are slow and unsatisfactory. The Russian government is in such a chaotic condition that the Canadian authorities are never certain with whom they are dealing. The rails are light weight but in view of the present shortage it is felt that it will be possible to utilize them. In addition to the rails, there are said to be no less than 4,000 cars for Russia stored at the Pacific coast. The cars, unfortunately, cannot be used on Canadian lines.

The Train Despatchers' Association

The annual convention of the Train Despatchers' Association of America, scheduled to be held at Grand Rapids, Mich., on June 18, failed of a quorum (25 members), owing chiefly to the inability of members to be spared from their duties. The only member of the executive committee present was the secretary-treasurer-editor, J. F. Mackie. The annual report to the executive committee by the secretary-treasurer announced that the receipts for the year were \$2,431, and the expenditures \$3,483, leaving a deficit of \$1,052, which, added to that of the previous year makes a total deficit of \$1,658, which the Association owes wholly to Mr. Mackie. The membership list indicated a total membership of 635, a falling off of 314 from the previous year.

In the absence of a quorum, the meeting organized itself into an adjustment committee and made the following recommendations to the executive committee, which has power to fill all vacancies and holds over until its successors have been duly elected and qualified: The election of E. W. Weston, chief despatcher of the Northern Pacific at Livingston, Mont., as president, in place of F. N. McPhee, resigned; the election of J. P. Finan, despatcher of the Atchison, Topeka & Santa Fe, Needles, Cal., as secretary-treasurer and editor, to succeed J. F. Mackie, resigned, and the election of F. I. Felter, chief despatcher of the New York Central lines, electric division, Grand Central terminal, New York City, as member of the executive committee in place of C. C. Barnard, resigned; the continuance of the publication of the Train Despatchers' Bulletin reduced in size; the inauguration of a vigorous campaign for members among train despatchers in sympathy with the present principles of the Association, under which train despatchers are regarded as division staff officers bound to render supreme loyalty to the service and not to any protective organization. The meeting pledged loyalty to these principles and active support of them. There was no meeting of the train rules committee during the year, and consequently no report.

J. P. Finan, F. I. Felter and F. H. Hadley expressed their willingness to wait unofficially upon the Director-General in order to protest against the apparent discrimination against unorganized employees, more particularly train despatchers, in the latest award of the wage adjustment commission, which gives train service employees percentage increases based on present pay instead of that of December, 1915. Accordingly, a conference with C. A. Prouty, director of the division of public service and accounts, was arranged for June 22.

Railway Financial Officers

L. W. Cox, secretary of the Society of Railway Financial Officers, announces that the executive committee has decided that the holding of the annual meeting for this year shall be deferred until further action; and that the monthly bulletin of the society be discontinued for the present. Bulletins may be issued from time to time, with the approval of the executive committee.

Commission and Court News

State Commissions

The Public Service Commission of Massachusetts, in accordance with a recent act of the legislature, has been reorganized, and consists now of three members instead of five as formerly. The new commission, as designated by the governor on June 22, consists of F. J. Macleod, Joseph B. Eastman, and Everett E. Stone. All were members of the old commission.

At a conference with shippers held at their request at Chicago on June 24, the State Public Utilities Commission of Illinois, refused to take any action with reference to Order No. 28 of the Director-General, advancing freight rates 25 per cent, which went into effect on June 25. Shippers said that the increase rates would work great hardship in connection with contracts made before the freight advance was announced and which include no provision for shipments at advanced rates. The utilities commission advised those who had grievances to get in touch with the Director-General and request him to authorize state commissions to hear such cases and make recommendations to him at Washington.

The Public Service Commission of Maryland has refused to allow, without the usual 30 days' notice, increases of fare proposed by the Washington, Baltimore & Annapolis electric railway, and the Baltimore & Annapolis Short Line. These roads wished to increase their local fares to three cents a mile, with corresponding increases in season tickets, and their application is understood to have been approved by the United States Railroad Administration, operating competing steam railroads. The Public Service Commission found, however, that for the first four months of this year, the first-named road had gross revenues of \$744,074 as against \$314,988 in the same period of 1917; while the Short Line had gross revenues of \$142,060, almost double the receipts for the first four months of 1917. The carriers will probably now renew their applications, with the thirty-day proviso, and the commission is expected to make a further study of the tariffs.

Court News

Intervening Cause of Injury

The South Carolina Supreme Court holds that, in an action for personal injuries under the federal act by a station master who was assaulted by a robber at night while engaged in interstate commerce, the proximate cause of the injury was the act of the robber, and not the defendant railroad company's failure to maintain sufficient lights about the station. When the negligence alleged appears merely to have brought about a condition or situation under which another and entirely independent and efficient agency intervenes to cause the injury, the latter is the proximate cause and the former the remote cause.—Carter v. Atlantic Coast Line (S. Car.), 95 S. E., 357. Decided February 19, 1918.

Injuries to Passenger Stepping Off Car

A passenger stepping off a car upon a stepping box placed by trainmen on the platform was injured by the box slipping from under his feet. In an action against the railroad it was not claimed that the stepping box was defective, that the passenger was not given ample time to alight, that the place or the manner in which the box was placed was careless, improper, or negligent, and all the testimony confirmed the railroads' claim that the box was level and firm and did not move prior to the passenger's stepping upon it. The New York Court of Appeals holds that the rule of *res ipsa loquitur* did not apply against the railroad, and that the evidence was insufficient to show any negligence on its part. *Beltz v. B. R. & P. (N. Y.)*, 119 N. E., 81. Decided February 12, 1918.

Equipment and Supplies

Car and Locomotive Specialties

The Central Advisory Purchasing Committee of the Railroad Administration has practically completed the ordering of the specialties for the government's order for cars and locomotives. The following additional orders have been placed for the 100,000 freight cars:

Brakebeams:
 14,250 American Steel Foundries.
 14,250 Chicago Railway Equipment Company.
 14,000 Joliet Railway Supply Company.
 14,000 Davis Brakebeam Company.
 14,000 Damascus Brake Beam Company.
 14,000 Buffalo Brake Beam Company.
 8,000 Haskell & Barker Car Company.
 7,500 Pressed Steel Car Company.

Journal Boxes:
 32,500 Union Spring & Manufacturing Company.
 38,875 National Malleable Castings Company.
 28,500 T. H. Symington Company.
 16,125 Gould Coupler Company.
 4,000 American Malleable Company.
 8,000 Haskell & Barker Car Company.
 2,000 Pacific Car & Foundry Company will secure on Pacific coast.

Steel ends for composite gondolas:
 12,000 Standard Railway Equipment Company.
 8,000 Chicago-Cleveland Car Roofing Company.

Side bearings:
 40,000 A. Stucki Company.
 30,000 E. S. Woods & Co.
 30,000 Wine Railway Appliance Company.

The following additional specialties have been ordered for the locomotives:

Side bearings for tenders:

All—A. Stucki Company.

Brake beams for tenders:

All—Chicago Railway Equipment Company, except 170 to be furnished by the Baldwin Locomotive Works.

Freight Cars

THE LEHIGH & NEW ENGLAND is inquiring for one snow-plow.

THE WISCONSIN STEEL COMPANY is inquiring for one flat car.

THE TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS is inquiring for one dump car.

BALFOUR, WILLIAMS & Co., New York, are inquiring for a number of 8,000-gal. tank cars.

THE GENERAL CHEMICAL COMPANY, New York, is inquiring for one 40-ton steel drop bottom, gondola car.

Machinery and Tools

THE NEW YORK CENTRAL LINES is inquiring through its purchasing department in Cleveland, Ohio, for the following list of machines for its various shops in the Central West: One combination grinder; one 42-in. heavy-duty planer; one 36 x 36-in., 12-ft. bed planer; five 24-in. high-duty shapers; one 1¼-in. drill press; two 104-in. boring and turning mills; one 42-in. boring mill; one punching machine with 12-in. throat, with capacity to drill 1-in. hole through 1-in. steel; one 30-in. power cold saw; one No. 3 rotary bevel shear; one 96-in. 500-ton hydraulic wheel press; one 24-in. slotter; two universal tool grinders; one 3½-ft. radial drill; one 24-in. x 12-ft. engine lathe; one 4-in. turret lathe; one 18-in. x 14-ft. engine lathe; one 30-in., 6-ft. 6-in. centers, engine lathe; one 26-in. x 10-ft. back geared engine lathe; one 18-in. x 8-ft. engine lathe; one 24-in. x 8-ft. engine lathe; one 3-in. x 36-in. turret lathe; one 18-in. x 8-ft. lathe; one 6,000-lb. steam hammer.

Supply Trade News

With a view to obtaining a closer coordination of the commercial and railroad services and sales, the **Air Reduction Sales Company**, after July 1, will handle its railroad sales through its own railroad department, instead of through the Franklin Railway Supply Company. **Ellsworth L. Mills** has been appointed sales manager of the railroad department and apparatus department, with headquarters at 120 Broadway, New York.

M. B. McBride has resigned as auditor of the Seattle, Port Angeles & Western and the Puget Sound & Willapa Harbor, subsidiaries of the Chicago, Milwaukee & St. Paul, to accept the position of general auditor of the Pacific Car & Foundry Company in Seattle. This company is enlarging its plants at Portland and Renton (Seattle) and has recently taken a contract to build 2,000 box cars for the United States Government. The works are now turning out, among other business, 15 new box cars a day for the Union Pacific.

Clarence R. Neher, consulting engineer, Buffalo, N. Y., died recently in that city. Mr. Neher had been engaged in engineering work since 1880, and at various times since was employed in an engineering capacity by a number of railroads, principally the Ohio & Western and the Richmond & Danville. In 1889, Mr. Neher was appointed division engineer on the Rochester division of the Western New York & Pennsylvania. Recently he was identified with the construction of a new trolley line of the International Railway between Buffalo and Niagara Falls, which has recently been put into operation.

W. S. Murrian, superintendent of motive power and equipment of the Southern Railway, resigned, effective May 1, to become president and general manager of the Southern Locomotive Valve Gear Company, Knoxville, Tenn. Mr. Murrian learned the trade of machinist and worked in that capacity for several years. He came from the Union Pacific 15 years ago to the position of master mechanic of the Southern Railway at Alexandria, and was later transferred to Spencer, N. C., in the same capacity. At that time the Southern Railway was building the largest locomotive shops on the system at Spencer. After about two years service at that point, Mr. Murrian was promoted, in 1906, to superintendent of motive power, with headquarters at Knoxville, Tenn. Mr. Murrian is personally interested in the specialties now being manufactured by the Southern Locomotive Valve Gear Company, and he is also thoroughly familiar with the efficiency of the commodities, the Southern Railway having adopted the Southern valve gear as its standard several years ago. Mr. Murrian succeeded General L. D. Tyson, now in active service in the United States Army who had been president since the organization of the company until recently when he resigned.

Trade Publications

INSLEY PRODUCTS.—The Insley, Mich., Company, Indianapolis, Ind., has issued a 100-page catalog descriptive of its concrete handling equipment. This publication opens with a general discussion of the gravity method of handling concrete, including some cost data, followed by illustrations of various installations of this equipment on different kinds of concrete construction projects. The back part of the catalog is devoted to descriptive illustrations and lists of the various types of equipment handled, including buckets, chutes, hopper cars and portable cranes, etc.

WHEN YOU BUY WAR SAVINGS STAMPS you do not give any money, you loan it at 4 per cent, and you are repaid quarterly. You help your Government, but you help yourself even more.

THE UNITED STATES ENFORCES STEEL RAISES in the alert year 1917 valued at \$23,500,000 and cars for railways at \$11,883,000, according to a bulletin of the National City Bank of New York.

Railway Construction

CHICAGO, MILWAUKEE & ST. PAUL.—This company has completion of the construction of connections with the Chicago & North Western center fact line in the Chicago yard and district, in order to make its Galfray yard available to other railroads. One connection is being made to the Salt Lake City Branch, Ill. part west of the Galfray yard and the other to the Tebury yard near line to Milwaukee, Wis. The contract for the grading of the Des Moines connection has been awarded to John M. Andrew, Chicago, and the grading of the Tebury connection is being done by John Marcell, Inc., Chicago. Certain other additional tracks at the Galfray yard, 44 miles of double track will be laid at a cost of about \$300,000. Track laying will be done by the company's own force.

The St. Paul has commenced grading for double track construction at Minnesota. Second track will be laid to connect up all the gaps in the present double track from St. Paul, Minn., to Aberdeen, S. D. The contract for the grading has been awarded to Morris & Dougherty, St. Paul, Minn., and track laying will be done by company forces.

The railroad is preparing to rebuild its bridge over the Missouri river at Clumberlain, S. D. A new trestle, 266 ft. long, and two steel truss spans, each 300 ft. long, will be erected by company forces.

The St. Paul is rebuilding its engine house at Calmar, Iowa, which was recently destroyed by fire.

CHICAGO, ROCK ISLAND & PACIFIC.—This company is preparing to build three short stretches of second track in Missouri between Allerton and Trenton and two in Kansas between Topeka and Herinton.

CHOCTAW, NEWCASTLE & WESTERN.—This railway is being built from a connection with the Chicago, Rock Island & Pacific, at Alderson, Okla., to Coal Fields, six and one-half miles. C. M. Conway, of Texarkana, Ark., has the contract for the work, which was begun in March. About 75 per cent of the hite has been completed. The principal commodity which will be carried will be coal, the annual tonnage of which is estimated at 500,000.

LEON, JOLIET & EASTERN.—This company is asking for bids on a brick building, containing lockers, toilet rooms, dormitories, etc., for enginemen and firemen, at Gary, Ind. It has also asked for bids on water softeners to be located at Frankfort, Ill. and Springfield, and reinforced concrete ceiling slabs at South Chicago, Ill. and Gary, Ind.

KANSAS & MICHIGAN.—The railroad has awarded a contract to the Austin Company, Chicago, Ill., for the construction of an industrial trestle, 40 ft. by 530 ft., with a canopy platform, 12 ft. by 60 ft., a trestle, three building and basement, 144 ft. by 42 ft. and an overhead trestle house, 32 ft. by 300 ft., at Chicago, Ill. Work on the structure will require about one month, by the end of May 17. The industrial trestle house is to be completed within 30 days of the time work on the building is completed, and by May 28.

GOODYEAR, ILLINOIS.—This company is putting in approximately 60 additional yards of track at various points on its main line this season.

ILLINOIS VALLEY.—Work is now being done in connection with contracts for a new passenger building at Alton, Ill. The construction of a 25-car passenger engine house, also a small repair shop, will be completed by the end of August, including shops, with all the other buildings, such as passenger, locomotive, building houses and the necessary track layout.

LOS ANGELES DIVISION.—This company is preparing plans for three new passenger buildings at Grand Island, in San Mateo, Cal.

TEXAS & GREAT SOUTHERN.—The company has contracted with the York Company, Cleveland, Ohio, for a new passenger building, 600 ft. by 200 ft., at the West Commerce, Okla., yard. The main structure is to be covered by a 200-ft. reinforced concrete roof, built on the structural steel structure with outside iron columns, 100 ft. high, and 100 ft. square. The total contract approximately \$2,500,000 and must be completed in 90 working days.

ANNUAL REPORT

Seaboard Air Line Railway Company—Report of the Directors

FISCAL YEAR ENDED DECEMBER 31, 1917.

PORTSMOUTH, VA., April 18th, 1918.

To the Stockholders of the Seaboard Air Line Railway Company:
The Board of Directors submits the following report of the operations of your properties for the year ended December 31, 1917:

INCOME ACCOUNT FOR YEAR ENDED DECEMBER 31, 1917, COMPARED WITH YEAR ENDED DECEMBER 31, 1916.

	1917	1916	Increase
Gross Revenue	\$30,345,146.01	\$26,184,487.25	\$4,160,658.76
Operating Expenses and Taxes	23,097,430.89	18,743,598.01	4,354,832.88
Net Operating Revenue (after Taxes)	7,247,715.12	7,441,889.24	194,174.12†
Uncollectible Railway Revenue	9,833.70	12,890.34	3,056.64†
Operating Income	7,257,548.82	7,454,779.58	197,230.76†
Other Income	391,375.25	460,431.79	69,056.54†
Gross Income	7,629,256.67	7,889,430.69	260,174.02†
Rents and Other Charges	261,430.75	210,135.81	51,294.94
Hire of Equipment	405,354.28	143,991.87	261,362.41
Applicable to Interest	6,962,471.64	5,753,303.01	1,209,168.63
Fixed Interest Charges	4,858,404.50	4,673,292.39	185,112.11
Balance	2,104,067.14	2,862,010.62	757,943.48†
Full 5% Interest on Adjustment (Income) Bonds	1,250,000.00	1,250,000.00	
Net Income	\$854,067.14	\$ 1,612,010.62	\$757,943.48†

† Decrease.
The Gross Revenue increased 15.89 per cent., Operating Expenses increased 23.87 per cent., Taxes increased 14.01 per cent., Operating Expenses and Taxes increased 23.23 per cent.

The Operating Expenses, exclusive of Taxes, were 71.57 per cent. of the Gross Revenue, as compared with 66.96 per cent. the previous year; and including Taxes, 76.12 per cent. of Gross Revenue as compared with 71.58 per cent. for the preceding year.

In common with all other roads, this Company had to meet increased prices in labor and material, due to war conditions. The increase in the prices of these items added to Operating Expenses as follows:

Labor	\$1,349,936
Coal	813,628
Other material	759,935

a total arbitrary increase of \$2,923,499.
If this arbitrary amount be deducted from the Operating Expenses, they would have shown an increase of 7.20 per cent., instead of the 23.87 per cent., shown above, and the operating ratio, including Taxes, would have been 66.48 per cent., instead of the 76.12 per cent., as compared with 71.58 per cent., for the preceding year. These increases were anticipated and this Company, in common with other carriers, filed with the Interstate Commerce Commission early in the Spring a request for an increase of 15 per cent., in freight rates. The requested increase was denied by the Interstate Commerce Commission. The anticipations of the Company, however, ever, as to the situation were realized, and only by the strictest economy was the property maintained at its former standard without further materially reducing the operating income.

On account of the conditions confronting the railroads of the country, the President took over this property with others by proclamation of December 28, 1917, and the details of the contract with the stockholders for the use of the property by the government are now being worked out.

FUNDED DEBT.

The \$688,000 First and Consolidated Mortgage, Series "A," Six Per Cent. Bonds sold during previous year and mentioned in last annual report were delivered on January 31, 1917.

\$364,000 First and Consolidated Mortgage, Series "A," Six Per Cent. Bonds were sold during the year.

An issue of \$4,000,000 Two Year Six Per Cent. Secured Gold Notes, dated September 15, 1917, payable September 15, 1919, redeemable in whole or in part at the option of the Company at 100.5 per cent. of the face amount thereof and accrued interest at any time upon thirty days published notice, secured by the pledge of First and Consolidated Mortgage, Series "A," Six Per Cent. Bonds of the Company, were sold during the year for the purpose of providing for the acquisition of property, completing, extending or improving its facilities or properties, improving or maintaining its service and for the discharging or lawful refunding of its obligations.

The \$55,000 outstanding Roanoke and Tar River Railroad Company First Mortgage Six Per Cent. Bonds maturing April 1, 1917, were refunded at maturity by the issue of First and Consolidated Mortgage, Series "A," Six Per Cent. Bonds, in accordance with the provisions of the First and Consolidated Mortgage. The holders of the Roanoke and Tar River Railroad Company First Mortgage Bonds were paid in cash and the First and Consolidated Mortgage Bonds received in this transaction were placed in the treasury of the Company.

EQUIPMENT.

Equipment shown in last annual report as having been undelivered on December 31, 1916, under Equipment agreement, Series "R," viz:

- 5 Mountain Type Passenger Locomotives.
- 2 Gas Electric Motor Cars.
- 50 Steel Under and Upper Frame Caboose Cars

were received during this fiscal year.
An equipment agreement, Series "S," was entered into on December 1, 1917, for the purchase of:

- 16 Mallet Type Freight Locomotives.
- 10 Santa Fe Type Freight Locomotives.

Under said agreement the cash payment of \$604,340 was represented by a deferred certificate which was received into the treasury of the Company and will be pledged under its First and Consolidated Mortgage in accordance with the provisions thereof, and the remainder of the purchase price was represented by Equipment Trust obligations aggregating \$1,200,000,

bearing interest at the rate of 6% per annum, payable in twenty semi-annual installments of \$60,000, on the first day of June and the first day of December in each year, commencing June 1, 1918, and ending December 1, 1927. Of this equipment there was received during the year:

- 5 Mallet Type Freight Locomotives.
- In addition to the equipment named above, the following were purchased and placed in service during the year:
 - 1 Business Car.
 - 2 Barges.
 - 1 Steam Ditching Car.

MAINTENANCE OF WAY AND STRUCTURES.

ROADWAY, TRACK AND STRUCTURES.

Roadway, track and structures of the company have been properly maintained at a cost of \$3,215,505.46, which represents an expenditure per mile of \$928.98.

SIDE TRACKS.

38.45 miles of new sidings and extensions of existing sidings were constructed, and there were deducted by removal and changes of old sidings, 7.53 miles, making a net increase over previous year of 30.92 miles. There were also constructed 0.39 miles of new sidings on leased lines.

THE RENEWALS.

The renewals were 1,241,697 cross ties and 751 sets of switch ties, and the cost, \$380,746.09 was charged to Operating Expenses.

RAIL.

100.10 miles of new 90-lb. steel rail were laid in the main line, releasing therefrom lighter worn rail. There was charged net to Operating Expenses therefor, \$147,529.95, and to Capital Account \$124,585.64.

In addition 32.08 miles of released 60, 70 and 75-lb. steel rail were laid on branch lines, releasing 68-lb. and lighter rail, and there was charged to Operating Expenses therefor, \$24,048.13, and to Capital Account \$28,373.87.

BALLAST.

91,765 cubic yards of gravel and slag ballast were put under main line track during the year, and of the total cost thereof, \$232,715.62 was charged to Capital Account.

TRESTLES FILLED.

2,722 lineal feet of wooden trestles were filled in during the year and of the total cost thereof, including culverts, \$8,038.60, was charged to Operating Expenses.

TRESTLES REBUILT AND BALLAST DECKED.

There were built during the year out of crosstied timber 1,970 lineal feet of ballast decked trestles, replacing old open decked trestles and in addition thereto 1,582 lineal feet of old wooden trestles were driven with crosstied piles and capped for ballast decking this year, and of the total cost thereof \$16,997.88 was charged to Operating Expenses and \$23,748.68 to Capital Account.

TRESTLES STRENGTHENED.

17 trestles were strengthened for heavy traffic by making them 4-ply chord, at a cost of \$6,587.97 charged to Capital Account.

BRIDGES.

Work has been done on seven bridges, replacing with steel, or strengthening them for heavier traffic.

Three of these bridges were authorized during the year and all of them have been completed. Of the bridges completed, the principal ones are the three bridges mentioned in last year's report as having been destroyed by the high water of July, 1916, and are as follows:

- Catawba River, near Mount Holly, N. C., three through truss spans, each 165 feet long, and one deck girder span 50 feet long.
- Catawba River, near Van Wyck, S. C., four through truss spans, each 147 feet long.
- Wateree River, near Camden, S. C., one through truss span 200 feet long.

MAINTENANCE OF EQUIPMENT.

The equipment of the Company was fully maintained during the year at a cost of \$5,105,472.29.

Included in the cost of maintenance is \$114,901.58, representing value of equipment destroyed or retired from service during the year and credited to Cost of Equipment.

There was also included in the Cost of Maintenance \$516,321.10 for depreciation, which was credited to Reserve for Accrued Depreciation.

The cost of maintenance per article owned was as follows:

Average cost per annum per Locomotive owned	\$3,626.77
Average cost per annum per Passenger car owned	1,095.31
Average cost per annum per Freight car owned	84.15

GENERAL REMARKS.

The extension from Charleston, S. C., to Savannah, Ga., mentioned in last year's report, has been completed, and will be put into operation January 1st, 1918, thus providing two separate and distinct main lines between Hamlet, N. C., and Savannah, Ga. Also, the grade revision work between Hamlet, N. C., and Charleston, S. C., previously mentioned, has been completed, and together with above extension, a through line has been obtained from Hamlet, N. C., to Jacksonville, Fla., via Charleston, with a maximum five-tenths percent. grade in both directions. The new portion of the line from Charleston Savannah has a maximum three-tenths percent. grade line in both directions which, with the improvements realized from the grade revision between Hamlet and Charleston, will effect a large saving in the handling of traffic between Hamlet and Savannah, and will greatly increase the tonnage per train compared with the tonnage which can be handled via the present Co. line.

The grade revision work on certain sections of the line between Sanford, N. C., and Hamlet, N. C., mentioned in report of last year, has been completed, thus eliminating two pusher grades and providing a five-tenths percent. grade against northbound traffic and an eight-tenths percent. grade against southbound traffic on these sections. Train operation has thereby been facilitated, hazard reduced, and a saving effected in operating cost.

During the year, a spur track, used and owned jointly by the Southern Atlantic Coast Line and Seaboard Air Line, has been built to reach the National Army Cantonment located at Columbia, S. C. This spur, together with necessary connecting track, is about 3.64 miles long, and is reached

by the Atlantic Coast Line and South in to high ground, and by the Seaboard Air Line over approximately 4,811 acres of land in the way of the government within the canal reservation. In addition to the main spur and connecting tracks in tunnel above, four yard tracks with a total capacity of approximately 175 cars, were built by the three railroads in order to provide adequate operating track facilities.

Two side tracks, having a total capacity of approximately 50 cars, have been constructed at Montgomery, Ala., to serve the National Great Canal tunnel at that point.

Construction is now in progress on several important industrial spur branching off the main line between Charleston, S. C., and Savannah, Ga. These spurs will reach fertile farm lands equally adapted to early vegetable culture, and will be a big factor in the industrial development along this line. A part of these spurs will be completed and put into operation early in the coming year and others will be completed later in the year. All of this work will readily lend itself to plans for further future extensions and developments.

New shop facilities and additions to the present facilities have been provided during the year at Andrews, S. C. This work includes a boiler engine pits, 200-ton coal elevator, sand house, and an engine room to the boiler house. In addition, work is now in progress on an 8-foot turntable and house, and water facilities for both fire protection and service purposes, all of which will be completed during the coming year.

A coach shop and an upholsterer shop, both equipped with air-tight sprinklers, have been built during the year at Portsmouth, Va., to replace old building destroyed by fire. New and modern machinery has also been installed, thus providing facilities for repairing coaches at the north end of the company's line.

In order to accommodate the large locomotives recently purchased, it was necessary to lengthen the roundhouses and provide engine pits of greater length at Hermitage, Va., Raleigh, N. C., and Dillet, N. C. This work

is now in progress and will be completed during the early part of the coming year. Three additional engine pits of somewhat greater length have been provided at Monroe, N. C., to accommodate these engines.

A new engine pit was constructed at Raleigh, N. C., during the year. Another is now under construction at an elevator. In this capacity, it will be a good house. Two wells will replace structures destroyed by fire and, when completed, will greatly facilitate the handling of locomotives at this terminal.

New turntables, 150 feet long, and of substantial capacity to turn the largest locomotives in the service of the company, were being provided at Hermitage, Va.; Raleigh, N. C.; Hamilton, N. C.; and Winston, N. C. A turntable of 60 feet long has been installed at Greenville, S. C., and another turntable, erected this winter elsewhere, are now being installed at Asheville, S. C.; Hiram, Ga.; and Highlands, Ala., and one is being built, provisionally referred to as being installed at Andrews, S. C.

The work of the Virginia Committee on the part of the passage of Section 19-A of the Federal Anti-Trust Act, which was introduced during the year at a cost of \$14,764.44, which was incurred in operating expenses.

The Development Department of the year was so planned to attract setting and industries to the territory, selected by the board, and to carry on a campaign for the year.

CHANGES IN ORGANIZATION

LEWIS, S. C.—The J. H. Edge, Jr., R. W. White, as his regular, and J. H. Edge, Jr., as his alternate, were appointed General Comptroller.

Mr. J. M. Martin, Charleston, was appointed General Counsel.

The board reports that the year 1917, as a result of the passage of the Federal Anti-Trust Act, was a year of great activity for the railroad industry in this section of the year.

W. H. HARRISON, President.

[Adv.]

Railway Financial News

BALTIMORE & OHIO—The Ohio Public Utilities Commission has authorized this company to issue \$20,000,000 5 per cent bonds, which are to be sold at not less than 80. Of these \$3,000,000 are to pay for improvements made in the past and the balance to pay for improvements approved by the Director General.

BROOKLYN RAPID TRANSIT—To provide for the extension of \$57,735,000 6 per cent notes due July 1, the War Finance Corporation is to loan the Brooklyn Rapid Transit Company \$17,320,000 or such less sum as is necessary to carry out the following plan. Note holders are asked to deposit their notes with the Central Trust Company, New York, and the holder of each \$1,000 note has the option of taking either \$300 in cash and \$700 face amount of new three-year 7 per cent Brooklyn Rapid Transit notes, or of taking \$1,000 of new three-year 7 per cent notes. In other words, he can take 30 per cent in cash and renew the remaining 70 per cent, or renew the entire amount of his notes. The new notes will be secured by the collateral now deposited as security for the old notes, and, in addition, buy \$39,000,000 Brooklyn Rapid Transit consolidated and refunding mortgage bonds. The New York Times says that while these notes are outstanding, the Brooklyn Rapid Transit will pay no dividends in stock and none in script unless the script shall be made to rank junior to the equities of the note holders in the assets of the company.

CHICAGO, ROCK ISLAND & PACIFIC—This company has declared the regular semi-annual dividends of 3 1/2 per cent and 3 per cent on the 7 per cent and 6 per cent preferred stocks, respectively, payable July 20 to stock of record July 5.

ERIE—This company gave notice on Tuesday of offers to extend until July 1, 1928, three issues of underlying bonds maturing on July 1 this year. They are the \$1,500,000 first mortgage 5 per cent bonds of the Buffalo and Southwestern Railroad, \$1,000,000 Buffalo and Southwestern division 5 per cent bonds of the Erie Railroad and \$300,000 terminal 5 per cent bonds of the Chicago & Atlantic Railway. It is intended to extend the first and last named issues subject to prior redemption at 105 and interest. Holders of all three issues are asked to deposit their securities with the July 1 coupon attached at the offices of J. P. Morgan & Co. In the case of the Buffalo and Southwestern division issue temporary receipts will be issued exchangeable for bonds of an equal amount, and there will also be paid in cash \$110 on each \$1,000 bond. The investment yield will be approximately 6 1/2 per cent. Similar conditions will apply in the case of the Chicago & Atlantic terminal bonds

except that the cash payment will be \$75 and the yield on the extended bonds about 6 per cent.

PENNSYLVANIA—The dividend declaration has been deferred until the meeting of the board of directors to be held by July.

PITTSBURGH, CHICAGO & ST. LOUIS—The directors have deferred action on the dividend as a formal statement being made as follows: "The consolidated Pittsburgh, Cincinnati, Chicago & St. Louis (Pittsburgh), having commenced business on February 1, 1917, has no dividend record during the three years' test period. The board therefore deferred action until such approval has been secured and the money therefor obtained from the government as account of compensation for the use of the property."

SAN DIEGO & ARIZONA—This company is asking the California Railroad Commission to extend to December 31 the time within which it may issue \$150,000 bonds which the commission has authorized.

SEABOARD AIR LINE—See editorial comments elsewhere in this issue.

UNION PACIFIC—Kilbo, Loeb & Co., New York, have purchased from the Union Pacific a new issue of \$20,000,000 10-year 6 per cent bonds to be secured by a deposit of railroad bonds owned by the company. The sale of this issue has been approved by Director General McAdoo. It is understood that the bonds will be offered for public subscription in the near future at 98 per cent and accrued interest.

VIENNA—See item in General News Department of this issue.

PETROLEUM PROSPECTING IN NEW SOUTH WALES—A company has been organized for the purpose of determining whether petroleum can be found in New South Wales, Australia. A modern derrick has been erected and machinery installed near Penrith, about 40 miles from Sydney, where surface oil has been found in numerous places in the vicinity of this town well. This will be the first test made in New South Wales for petroleum. The driller who is in charge of operations is a graduate of map from the United States. *Commerce Reports*

PROMOTION OF ENTERING CHINESE IN JAVA—The promoters in connection with the entering contract that is to be held, in the interest of the Netherlands East Indies, at Batavia in 1919 are already in progress. The proceeds will probably be divided into six different sections: (1) harbor and means of communication (railways, trunkways, telegraphs, and telephony); (2) irrigation, drainage, water works, etc.; (3) roads and bridges, low planning, architecture, etc.; (4) production of energy, electricity and water; (5) mining and geology; (6) medical services. The participants in the contract will comprise the experts from the different countries and also firms in the neighboring countries, such as, among others, America, Japan, Australia and South Africa.—*Indian Enterprise*

Railway Officers

Executive, Financial, Legal and Accounting

Thomas Hall Gatlin, whose appointment as assistant to president of the Southern Railway, with headquarters at Washington, D. C., has already been announced in these columns, was born on November 8, 1876, at Tarboro, N. C., and was educated at Trinity College, Durham, N. C. He began railway work in May, 1892, in the engineering department of the Atlantic Coast Line. From 1899 to 1901 he served as chief engineer of the East Carolina Railway, and from March, 1905, to July, 1906, was assistant chief engineer in maintenance of way office, in charge of track work drafting and later was engineer maintenance of way, on the Middle district of the Southern Railway at Knoxville, Tenn. On August 1, 1911, he was appointed assistant chief engineer maintenance of way and structures on the Southern Railway at Washington, D. C., and from January, 1917, to June, 1918, served as assistant vice-president in charge of operation, which position he held until his recent appointment as assistant to president of the same road, as noted above.



T. H. Gatlin

Frederick P. Small, first vice-president and secretary of the American Express Company, has been appointed secretary of the American Railway Express Company, with headquarters at New York. He was born at Augusta, Me., and in 1895 entered the services of the Merchants' Despatch Transportation Company. The following year he went to the American Express Company as a stenographer, and subsequently served consecutively as cashier of the eastern financial department, chief clerk and assistant manager. In 1907 he was appointed line auditor, and later served as second assistant to the first vice-president, until 1914, when he was promoted to first assistant, and was also made assistant secretary of the company. In February, 1915, he was appointed assistant to president, and two months later he was appointed also secretary of the company. Since March, 1918, he served as first vice-president and a member of the executive committee, retaining his duties as secretary of the same company, and now becomes secretary of the American Railway Express Company as above noted.



F. P. Small

Edwin G. Buckland, vice-president and general counsel, of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., has been elected president to succeed Edward J. Pearson.

R. H. Swartwout, vice-president of the Norfolk Southern, with headquarters at New York, has been elected president, to succeed J. H. Young.

John W. Platten, chairman of the board, of the Gulf, Mobile & Northern, with headquarters at New York, has been elected president, succeeding **W. F. Owne**, who becomes assistant to federal manager.

Harry Bronner, chairman of the finance committee of the Missouri Pacific, has been elected president, succeeding **B. F. Bush**, resigned to become regional director of southwestern railroads. Mr. Bronner has been connected with banking and industrial corporations for many years. In 1887 he entered the banking business of Hallgarten & Co., New York, and became a member of the firm in 1904. In October, 1917, he retired from the active banking business, after having become senior partner of that concern. Mr. Bronner has also taken an active part in many railroad reorganizations, notably the Baltimore & Ohio, the Colorado & Southern, and the St. Louis-San Francisco. He has also assisted in the reorganization of a number of industrial companies, and has been actively connected with many corporations, but more particularly with the Missouri Pacific, the Denver & Rio Grande, the American Locomotive Company, the Bethlehem Steel Corporation, the Sloss-Sheffield Steel & Iron Company and the J. G. White Engineering Corporation.

Caleb S. Spencer, vice-president and treasurer of the Adams Express Company, with headquarters at New York, has been appointed vice-president and treasurer of the new American Railway Express Company, with the same headquarters. Mr. Spencer was born at Catskill, N. Y., and entered the service of the American Express Company in 1872, as office boy at Catskill. Two years later he was transferred to Rondout, and later served as general clerk at Westfield, Mass. In 1874 he went to the Adams Express Company as a messenger and in 1876 became waybill and money clerk at New Haven. He subsequently served consecutively as agent at South Norwalk, agent at Fall River, route agent, assistant superintendent at Boston, Mass., and in 1882 became superintendent at Boston. He later served in the same capacity at Bridgeport, and in 1894 was made manager of the New England department. From 1908 to 1913, he retired for rest and travel, and then returned to the service of the Adams Express Company as treasurer and trustee. In 1916 he was appointed vice-president and treasurer of the same company, and now becomes vice-president and treasurer of the American Railway Express Company.



C. S. Spencer

M. B. McBride, auditor of the Seattle, Port Angeles & Western and the Puget Sound & Willapa Harbor, with office at Chicago, has resigned to become general auditor of the Pacific Car & Foundry Company, Seattle, Wash.

Operating

W. L. Park, vice-president of the Chicago Great Western, has been appointed general manager, with headquarters at Chicago.

W. H. Bremner, president of the Minneapolis & St. Louis, has been appointed general manager, with office at Minneapolis, Minn.

John B. Warrington, division superintendent of the Philadelphia & Reading, has been appointed terminal manager at Washington, D. C., with jurisdiction over the Washington Terminal Company, the terminals of the several railroads

and Potomac Yard, reporting to Regional Director Markham of the Allegheny Region.

F. E. House, president and general manager of the Duluth & Iron Range, has been appointed general manager with office at Duluth, Minn.

A. J. Davidson, general superintendent of the Spokane, Portland & Seattle, has been appointed general manager, with office at Portland, Ore.

Otis Bass has been promoted to chief dispatcher on the second district of the Nebraska division of the Union Pacific, at Grand Island, Neb.

LeRoy Kramer, vice-president of the Pullman Company, has resigned, effective June 30, to become federal treasurer of the St. Louis-San Francisco.

M. P. Blauvelt, vice-president of the Lehigh Valley, has been appointed assistant regional director of the Allegheny region, with office at Philadelphia, Pa.

William A. McGonagle, president and general manager of the Duluth, Missabe & Northern, has been appointed general manager, with office at Duluth, Minn.

B. B. Greer, vice-president and general manager of the Colorado & Southern, has been appointed assistant regional director of central western railroads.

J. P. O'Brien, vice-president and general manager of the Oregon-Washington Railroad & Navigation Company, has been appointed general manager, with office at Portland, Ore.

G. L. Benson has been appointed division superintendent of the Erie, with headquarters at Kent, Ohio, succeeding **J. C. Pierson**, who has been granted leave of absence.

O. Hodges has been appointed superintendent of the Anthony & Northern, with headquarters at Pratt, Kan., succeeding **J. D. Feeney**, who had previously been acting superintendent.

W. J. Jenks, general manager of the Norfolk & Western, continues under the United States Railroad Administration as general manager of that road, with headquarters at Roanoke, Va.

H. L. Crandall has been appointed superintendent of the Minnesota, Dakota & Western, with office at International Falls, Minn., vice **C. H. Woodford**, who has been assigned to other service.

S. A. Eddy has been appointed assistant trainmaster on the Superior division of the Chicago, Milwaukee & St. Paul, with headquarters at Green Bay, Wis., succeeding **D. W. Kelly**, promoted.

C. G. Burnham, executive vice-president of the Chicago, Burlington & Quincy, has been appointed federal manager of that road and of the Quincy, Omaha & Kansas City, with office at Chicago.

A. M. Schoyer, resident vice-president of the Pennsylvania Lines at Chicago, has been appointed assistant to the federal manager of the Pennsylvania Western Lines, with headquarters at Pittsburgh, Pa.

W. B. Wood, general manager of the Grand Rapids & Indiana, continues under the United States Railroad Administration as general manager of that road, with headquarters at Grand Rapids, Mich.

B. C. Byers, assistant general superintendent of the Cleveland, Cincinnati, Chicago & St. Louis, has been promoted to general superintendent at Indianapolis, Ind., succeeding **E. M. Costin**, promoted to federal manager. **C. S. Millard**, division superintendent at Mattoon, Ill., succeeds **Mr. Byers**, with office at Indianapolis. **P. T. White**, superintendent of the Peoria & Eastern at Indianapolis, succeeds **Mr. Millard** at Mattoon, and **Robert Alison**, trainmaster at Galion, O., has been appointed superintendent, succeeding **Mr. White**.

Charles H. Reynolds, whose appointment as assistant general superintendent of the Chicago & North Western, with headquarters at Norfolk, Neb., was announced in the *Railway Age* on June 14, was born at Springfield, Ill., on July 13, 1859. He entered railroad service with the Chicago & North West-

ern in June, 1879, as a clerk at Watona, Mo. Subsequently he was chief clerk in the safety office and division superintendent of the Fremont, Elkhorn & Missouri Valley, now a part of the North Western. From March, 1903, to the date of his recent promotion, noted above, he was division superintendent of the North Western at Norfolk, Neb.

Traffic

L. M. White, general agent of the Missouri Pacific at Detroit, Mich., has left the service of that company to go with the Judson Freight Forwarding Company at Detroit as export agent.

Engineering and Rolling Stock

Leigh Goodrich Curtis, whose appointment as assistant chief engineer of the Baltimore & Ohio, with headquarters at Baltimore, Md., was announced in the *Railway Age* on May 31, was born at Hamilton, Ohio, on November 28, 1874. After completing his education in the Ohio State university in 1899, he entered railway service as a civil engineer in the office of the superintendent maintenance of way of the Baltimore & Ohio at Zanesville, Ohio. In December, 1900, he was promoted to assistant engineer in the same office. Two years later he became assistant division engineer at Chicago, and in June, 1903, he was promoted to division engineer at the same point. From April, 1910, to 1914, he was engineer maintenance of way of the north-west district (including which he became district engineer of the Chicago division at Chicago, which position he held until his appointment as assistant chief engineer, as mentioned above.

L. J. Putnam, whose appointment as chief engineer of the Chicago & North Western, with headquarters at Chicago, Ill., already been announced in these columns, was born at Man-



L. J. Putnam

chester, Iowa, on February 17, 1878, and was educated at Cornell College, Mount Vernon, Iowa, where he studied civil engineering. He began railway work in June, 1898, with the Illinois Central, and in June of the following year went with the Chicago & North Western as an instrument man. From February, 1901, to March, 1906, he was assistant engineer in construction, location and maintenance on that line, following which he was acting division engineer of the Ashland division at Kaukauna, Wis. Beginning with March, 1907, he was successively assistant engineer in charge of second track and terminal improvements at Junction, Ill., Wis.; assistant engineer in charge of the construction of a bascule bridge over the north branch of the Chicago river and the Wells street yard at Chicago; resident engineer on the Milwaukee track elevation; and resident engineer on the Levalle road dock construction. From July, 1910, to April 1, 1912, he was with the Milwaukee, Sparta & North Western, a subsidiary of the Chicago & North Western, first as resident engineer in construction and then as acting resident engineer. On April 1, 1912, he was promoted to division engineer at Boone, Ia., and in May, 1913, he was again promoted to principal assistant engineer with headquarters at Chicago, which position he held until his promotion, as noted above.

W. C. Kegler, engineer maintenance of way of the Cleveland-Indianapolis division of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Galion, Ohio, has been appointed district engineer in charge of construction, with the same headquarters. **W. S. Burnett**, engineer maintenance of way of the Cincinnati-Sandusky division, with headquarters at Springfield, Ohio, has been appointed district

engineer in charge of construction, with the same headquarters. **J. E. Kissel**, engineer maintenance of way of the Cairo division, with headquarters at Mt. Carmel, Ill., has been appointed acting engineer maintenance of way at Galion, Ohio, in place of Mr. Kegler. **E. J. Byer**, assistant engineer maintenance of way at Galion, Ohio, has been appointed acting engineer maintenance of way at Mt. Marmel, Ill., succeeding Mr. Kissel, transferred. **R. B. Stokley**, assistant division engineer maintenance of way at Springfield, Ohio, has been appointed acting engineer maintenance of way at Springfield, Ohio, in place of Mr. Burnett. The above changes were effective June 24.

Robert J. Middleton, whose appointment as assistant chief engineer of the Puget Sound Lines of the Chicago, Milwaukee & St. Paul, with headquarters at Seattle, Wash., succeeding E. O. Reeder, retired, was announced in the *Railway Age* of June 24, was born at Greenwood, Ark., in 1881, and graduated from the civil engineering department of the University of Arkansas in 1903. On February 2, 1906, Mr. Middleton entered the service of the Chicago, Milwaukee & St. Paul as a draftsman in the bridge and building department at Chicago. In the fall of that year he was promoted to assistant engineer on the Kansas City division at Ottumwa Junction, Ia., where he remained until October, 1908, at which time he became assistant engineer on the Evanston track elevation, at Evanston, Ill. Three years later he was appointed assistant engineer in charge of the construction of the Savanna, Ill., and Godfrey yards. In January, 1913, he was promoted to engineer of track elevation at Chicago, and in April, 1915, he became valuation engineer, which position he held until his present promotion as noted above.

Thomas H. Strate, whose promotion to valuation engineer of the Chicago, Milwaukee & St. Paul, succeeding R. J. Middleton, was announced in these columns on June 21, was born at Moorhead, Minn., on April 9, 1880, and received his education at the University of Minnesota, graduating from the civil engineering department in 1901. On June 3 of that year, Mr. Strate entered the service of the Chicago, Milwaukee & St. Paul as a rodman and chairman on the Preston branch in Iowa. Later he became instrument man. From 1902 to 1903 he was resident engineer on construction and grade reduction at Faribault, Minn., and during the following three years he was assistant engineer in charge of maintenance and construction in the district office at Minneapolis, Minn. Subsequently, he was consecutively locating engineer, assistant division engineer and division engineer of construction on the line between Glenham, S. D., and Marmarth, N. D., and on the James river branch between Aberdeen, S. D., and Moberidge. From 1912 to 1915 he was construction



R. J. Middleton



T. H. Strate

engineer on double track work between Minneapolis, Minn., and Aberdeen, S. D., following which he became valuation field engineer, which position he held until his recent promotion, as noted above.

C. M. Rogers, inspector of tonnage rating of the Chicago, Rock Island & Pacific, has been appointed supervisor of stationary plants, with headquarters at Chicago, effective June 15, succeeding **J. H. Edwards**, resigned.

E. O. Reeder, assistant chief engineer of the Puget Sound Line of the Chicago, Milwaukee & St. Paul, with headquarters at Seattle, Wash., whose resignation from that position on account of ill health was announced in the *Railway Age* on June 21, has been connected with the Chicago, Milwaukee & St. Paul for many years. His first connection with that company was in the purchasing department previous to 1875, where he was connected with the purchases of ties, timber, etc. His first work in the engineering department was in connection with the construction of a tunnel at Tunnel City, Wis. In 1879, he became resident engineer at Melvina, Wis., and had charge of the engineering work between Melvina, Wis., and Westby. Later he was transferred to Fayette, Iowa, following which he assisted in the survey and location of the bridge over the Mississippi river at Sabula, Iowa. Subsequently, he was engaged in a number of surveys, including the line from Monroe, Wis., to Dubuque, Iowa, and the Ottumwa line from Cedar Rapids, Iowa, to Sigourney. Later, Mr. Reeder took charge of the chief engineers' office, where he had much to do with the location of the Puget Sound line. He then became principal assistant engineer. He was appointed chief engineer of the Puget Sound lines with headquarters at Seattle, Wash., in June, 1911, and was made assistant chief engineer when this line was consolidated with the St. Paul. He remained in that position until his resignation as noted above.

Railway Officers in Government Service

Fred Pettijohn has been appointed chief accountant of the Railroad Administration, reporting to the auditor, **J. W. Roberts**.

C. S. Lake, formerly general manager of the Seaboard Air Line, has been appointed assistant to **C. R. Gray**, director of the Division of Operation.

B. J. Feeney, traveling engineer of the Yazoo & Mississippi Valley, with office at Memphis, Tenn., has been appointed supervisor of the Fuel Conservation section, Southern Regional district, United States Railroad Administration, with office at Atlanta, Ga.

C. B. Dailey, assistant to the director of purchases of the Southern Pacific, has been appointed assistant manager, and **L. G. Plant** has been appointed progress engineer of the Procurement Section of the Central Advisory Purchasing Committee of the Railroad Administration.

Railway Officers in Military Service

J. J. Duggan, chief dispatcher of the Southern Pacific at Bakersfield, Cal., has received a lieutenant's commission in the United States Army, and is now en route to France to serve in an overseas contingent.

C. H. Nichols, formerly chief dispatcher of the Southern Pacific at Bakersfield, Cal., has received a commission as first lieutenant, and has been assigned to Company C, 31st Railway Engineers, stationed at Ft. Leavenworth, Kan.

TELTONS BUILDING TWO RAILWAY IN FINLAND.—According to Associated Press despatches the Germans are building two temporary railways in Northern Finland. One line runs eastward toward Kem on Mourmansk railway in Russia and the other northeastward from a rail-end in Finland toward Petoonga Bay, which is included in the strip of the Mourmansk region which Russia is preparing to cede to Finland. Construction work is easy as there are many small lakes which can be utilized.



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